

US Army Corps of Engineers®
Walla Walla District

F I N A L

Lower Snake River Juvenile Salmon Migration Feasibility Report/ Environmental Impact Statement

Appendix U
Response to Public Comments

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This Final Feasibility Report/Environmental Impact Statement (RE/EIS) and its 21 appendices document the results of a comprehensive analysis of the four dams on the lower Snake River (collectively called the Lower Snake River Project) and their effects on four lower Snake River salmon and steelhead stocks listed for protection under the Endangered Species Act (ESA). The U.S. Army Corps of Engineers (Corps), along with Bonneville Power Agency (BPA), U. S. Environmental Protection Agency (EPA), and U. S. Bureau of Reclamation (BOR) as cooperating agencies, analyzed four alternatives to evaluate the best way to improve juvenile salmon migration through Lower Snake River Project. The Final FR/EIS includes the best available information on the biological effectiveness, engineering components, costs, economic effects, and other environmental effects associated with the four alternatives: Alternative 1-Existing Conditions, Alternative 2-Maximum Transport of Juvenile Salmon, Alternative 3-Major System Improvements (Adaptive Migration), and Alternative 4-Dam Breaching. In the Final FR/EIS, the Corps identifies Alternative 3-Major System Improvements (Adaptive Migration) as the recommended plan (preferred alternative) and explains the process for selecting that alternative.

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FEASIBILITY STUDY DOCUMENTATION

	Document Title
Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement	
Appendix A (bound with B)	Anadromous Fish Modeling
Appendix B (bound with A)	Resident Fish
Appendix C	Water Quality
Appendix D	Natural River Drawdown Engineering
Appendix E	Existing Systems and Major System Improvements Engineering
Appendix F (bound with G, H)	Hydrology/Hydraulics and Sedimentation
Appendix G (bound with F, H)	Hydroregulations
Appendix H (bound with F, G)	Fluvial Geomorphology
Appendix I	Economics
Appendix J	Plan Formulation
Appendix K	Real Estate
Appendix L (bound with M)	Lower Snake River Mitigation History and Status
Appendix M (bound with L)	Fish and Wildlife Coordination Act Report
Appendix N (bound with O, P)	Cultural Resources
Appendix O (bound with N, P)	Public Outreach Program
Appendix P (bound with N, O)	Air Quality
Appendix Q (bound with R, T)	Tribal Consultation and Coordination
Appendix R (bound with Q, T)	Historical Perspectives
Appendix S*	Snake River Maps
Appendix T (bound with R, Q)	Clean Water Act, Section 404(b)(1) Evaluation
Appendix U	Response to Public Comments

*Appendix S, Lower Snake River Maps, is bound separately (out of order) to accommodate a special 11 x 17 format.

The documents listed above, as well as supporting technical reports and other study information, are available on our website at http://www.nww.usace.army.mil/lsr. Copies of these documents are also available for public review at various city, county, and regional libraries.

AQM03-06-1249

STUDY OVERVIEW

Purpose and Need

Between 1991 and 1997, due to declines in abundance, the National Marine Fisheries Service (NMFS) made the following listings of Snake River salmon or steelhead under the Endangered Species Act (ESA) as amended:

- sockeye salmon (listed as endangered in 1991)
- spring/summer chinook salmon (listed as threatened in 1992)
- fall chinook salmon (listed as threatened in 1992)
- steelhead (listed as threatened in 1997)

In 1995, NMFS issued a Biological Opinion on operations of the Federal Columbia River Power System (FCRPS). Additional opinions were issued in 1998 and 2000. The Biological Opinions established measures to halt and reverse the declines of ESA-listed species. This created the need to evaluate the feasibility, design, and engineering work for these measures.

The Corps implemented a study (after NMFS' Biological Opinion in 1995) of alternatives associated with lower Snake River dams and reservoirs. This study was named the Lower Snake River Juvenile Salmon Migration Feasibility Study (Feasibility Study). The specific purpose and need of the Feasibility Study is to evaluate and screen structural alternatives that may increase survival of juvenile anadromous fish through the Lower Snake River Project (which includes the four lowermost dams operated by the Corps on the Snake River—Ice Harbor, Lower Monumental, Little Goose, and Lower Granite Dams) and assist in their recovery.

Development of Alternatives

The Corps' response to the 1995 Biological Opinion and, ultimately, this Feasibility Study, evolved from a System Configuration Study (SCS) initiated in 1991. The SCS was undertaken to evaluate the technical, environmental, and economic effects of potential modifications to the configuration of Federal dams and reservoirs on the Snake and Columbia Rivers to improve survival rates for anadromous salmonids.

The SCS was conducted in two phases. Phase I was completed in June 1995. This phase was a reconnaissance-level assessment of multiple concepts including drawdown, upstream collection, additional reservoir storage, migratory canal, and other alternatives for improving conditions for anadromous salmonid migration.

The Corps completed a Phase II interim report on the Feasibility Study in December 1996. The report evaluated the feasibility of drawdown to natural river levels, spillway crest, and other improvements to existing fish passage facilities.

Based in part on a screening of actions conducted for the Phase I report and the Phase II interim report, the study now focuses on four courses of action:

- Existing Conditions
- Maximum Transport of Juvenile Salmon

- Major System Improvements
- Dam Breaching

The results of these evaluations are presented in the combined Feasibility Report (FR) and Environmental Impact Statement (EIS). The FR/EIS provides the support for recommendations that will be made regarding decisions on future actions on the Lower Snake River Project for passage of juvenile salmonids. This appendix is a part of the FR/EIS.

Geographic Scope

The geographic area covered by the FR/EIS generally encompasses the 140-mile long lower Snake River reach between Lewiston, Idaho and the Tri-Cities in Washington. The study area does slightly vary by resource area in the FR/EIS because the affected resources have widely varying spatial characteristics throughout the lower Snake River system. For example, socioeconomic effects of a permanent drawdown could be felt throughout the whole Columbia River Basin region with the most effects taking place in the counties of southwest Washington. In contrast, effects on vegetation along the reservoirs would be confined to much smaller areas.

Identification of Alternatives

Since 1995, numerous alternatives have been identified and evaluated. Over time, the alternatives have been assigned numbers and letters that serve as unique identifiers. However, different study groups have sometimes used slightly different numbering or lettering schemes and this has led to some confusion when viewing all the work products prepared during this long period. The primary alternatives that are carried forward in the FR/EIS currently involve the following four major courses of action:

Alternative Name	PATH[1/] Number	Corps Number	FR/EIS Number
Existing Conditions	A-1	A-1	1
Maximum Transport of Juvenile Salmon	A-2	A-2a	2
Major System Improvements	A-2'	A-2d	3
Dam Breaching	A-3	A-3a	4

[1/] Plan for Analyzing and Testing Hypotheses

Summary of Alternatives

The **Existing Conditions Alternative** consists of continuing the fish passage facilities and project operations that were in place or under development at the time this Feasibility Study was initiated. The existing programs and plans underway would continue unless modified through future actions. Project operations include fish hatcheries and Habitat Management Units (HMUs) under the Lower Snake River Fish and Wildlife Compensation Plan (Comp Plan), recreation facilities, power generation, navigation, and irrigation. Adult and juvenile fish passage facilities would continue to operate.

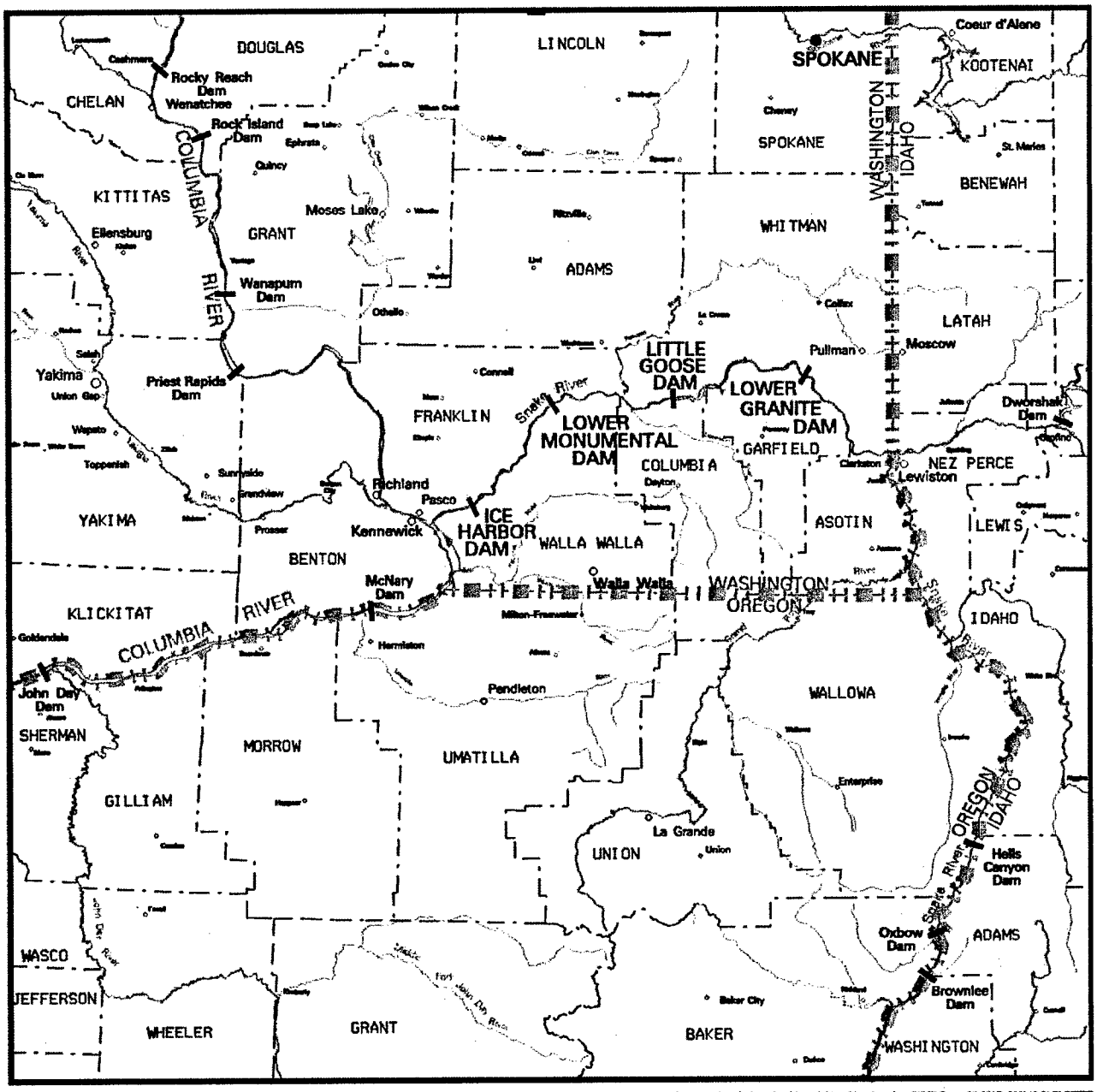
The **Maximum Transport of Juvenile Salmon Alternative** would include all of the existing or planned structural and operational configurations from the Existing Conditions Alternative. However, this alternative assumes that the juvenile fishway systems would be operated to maximize fish transport from Lower Granite, Little Goose, and Lower Monumental and that voluntary spill would not be used to bypass fish through the spillways (except at Ice Harbor). To accommodate this maximization of transport, some measures would be taken to upgrade and improve fish handling facilities.

The **Major System Improvements Alternative** would provide additional improvements to what is considered under the Existing Conditions Alternative. These improvements would be focused on using surface bypass facilities such as surface bypass collectors (SBCs) and removable spillway weirs (RSWs) in conjunction with extended submerged bar screens (ESBSs) and a behavioral guidance structure (BGS). The intent of these facilities would be to provide more effective diversion of juvenile fish away from the turbines. Under this alternative, an adaptive migration strategy would allow flexibility for either in-river migration or collection and transport juvenile fish downstream in barges and trucks.

The **Dam Breaching Alternative** has been referred to as the "Drawdown Alternative" in many of the study groups since late 1996 and the resulting FR/EIS reports. These two terms essentially refer to the same set of actions. Because the term drawdown can refer to many types of drawdown, the term dam breaching was created to describe the action behind the alternative. The Dam Breaching Alternative would involve significant structural modifications at the four lower Snake River dams, allowing the reservoirs to be drained and resulting in a free-flowing yet controlled river. Dam breaching would involve removing the earthen embankment sections of the four dams and then developing a channel around the powerhouses, spillways, and navigation locks. With dam breaching, the navigation locks would no longer be operational and navigation for large commercial vessels would be eliminated. Some recreation facilities would close while others would be modified and new facilities could be built in the future. The operation and maintenance of fish hatcheries and HMUs would also change, although the extent of change would probably be small and is not known at this time.

Authority

The four Corps dams of the lower Snake River were constructed and are operated and maintained under laws that may be grouped into three categories: 1) laws initially authorizing construction of the project, 2) laws specific to the project passed subsequent to construction, and 3) laws that generally apply to all Corps reservoirs.



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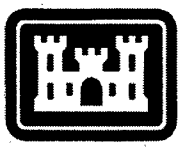
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LOWER SNAKE RIVER
Juvenile Salmon Migration Feasibility Study

REGIONAL BASE MAP



US Army Corps
of Engineers®
Walla Walla District

Final
Lower Snake River Juvenile Salmon Migration Feasibility Report/ Environmental Impact Statement

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Appendix U
Response to Public Comments

Produced by
Foster Wheeler Environmental Corporation

Produced for
U.S. Army Corps of Engineers
Walla Walla District

February 2002

FOREWORD

Appendix U was prepared by Foster Wheeler Environmental Corporation in conjunction with the U.S. Army Corps of Engineers (Corps), Walla Walla District. This appendix is one part of the overall effort of the Corps to prepare the Lower Snake River Juvenile Salmon Migration Feasibility Report/ Environmental Impact Statement (FR/EIS).

The Corps has reached out to regional stakeholders (Federal agencies, tribes, states, local governmental entities, organizations, and individuals) during the development of the FR/EIS and appendices. This effort resulted in many of these regional stakeholders providing input and comments, and even drafting work products or portions of these documents. This regional input provided the Corps with an insight and perspective not found in previous processes. A great deal of this information was subsequently included in the FR/EIS and appendices; therefore, not all of the opinions and/or findings herein may reflect the official policy or position of the Corps.

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ACRONYMS AND ABBREVIATIONS

AFA	Anadromous Fish Appendix
AFEP	Anadromous Fish Evaluation Program
BKD	bacterial kidney disease
BNSF	Burlington Northern-Santa Fe Railroad
BOR	U.S. Bureau of Reclamation
BPA	Bonneville Power Administration
CFR	Code of Federal Regulations
cfs	cubic feet per second
CO	carbon monoxide
CO_2	carbon dioxide
Corps	U.S. Army Corps of Engineers
CRI	Cumulative Risk Initiative
CRiSP	Columbia River Salmon Passage
CRITFC	Columbia River Intertribal Fish Commission
CWA	Clean Water Act
DO	dissolved oxygen
DREW	Drawdown Regional Economic Workgroup
ENSO	El Nino Southern Oscillation
EPA	U.S. Environmental Protection Agency
EQ	Environmental Quality
ESA	Endangered Species Act
ESBS	extended submerged bar screen
ESU	Evolutionarily Significant Unit
FCRPS	Federal Columbia River Power System
Feasibility Study	Lower Snake River Juvenile Salmon Migration Feasibility Study
FERC	Federal Energy Resource Commission
FFDRWG	Fish Facilities Design Review Workgroup
FLUSH	Fish Leaving Under Several Hypotheses
FR/EIS	Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement
FWCA	Fish and Wildlife Coordination Act
FWCAR	Fish and Wildlife Coordination Act Report
GPS	Global Positioning System
GSA	General Services Administration
HAP	hazardous air pollutant
HIT	Hydropower Impact Team
HMU	Habitat Management Unit
IDFG	Idaho Department of Fish and Game
IEAB	Independent Economic Analysis Board
ISAB	Independent Scientific Advisory Board
KAF	thousand acre-feet
MAF	million acre-feet
MW	Megawatt

ACRONYMS AND ABBREVIATIONS

NED	National Economic Development
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPPC	Northwest Power Planning Council
NRDC	National Resource Development Council
ODF&W	Oregon Department of Fish and Wildlife
O&M	operation and maintenance
OSE	Other Social Effects
PATH	Plan for Analyzing and Testing Hypotheses
PDO	Pacific Decadal Oscillation
PIT	passive induced transponder
RED	Regional Economic Development
ROD	Record of Decision
RPA	Reasonable and Prudent Alternative
SAR	smolt-to-adult ratio
SBC	surface bypass collector
SIMPAS	Simulated Passage
SOR	System Operation Review
SRP	Scientific Review Panel
STUFA	State, Tribal, and U.S. Fisheries Agencies
TAG	Technical Advisory Group
TCM	Travel Cost Method
TDG	total dissolved gas
TIR	transport-to-in-river survival
TMDL	total maximum daily load
TMT	Technical Management Team
TSS	total suspended solids
TVA	Tennesee Valley Authority
UGPTI	Upper Great Plains Transportation Institute
UP	Union Pacific
VSP	Viable Salmonid Population
WSDOT	Washington Department of Transportation
WDFW	Washington Department of Fish and Wildlife
WRRC	Water and Related Resources Council
WSCC	Western Systems Coordinating Council
WSLTC	Washington State Legislative Transportation Committee

ENGLISH TO METRIC CONVERSION FACTORS

To Convert From	To	Multiply By
LENGTH CONVERSIONS:		
Inches	Millimeters	25.4
Feet	Meters	0.3048
Miles	Kilometers	1.6093
AREA CONVERSIONS:		
Acres	Hectares	0.4047
Acres	Square meters	4047
Square Miles	Square kilometers	2.590
VOLUME CONVERSIONS:		
Gallons	Cubic meters	0.003785
Cubic yards	Cubic meters	0.7646
Acre-feet	Hectare-meters	0.1234
Acre-feet	Cubic meters	1234
OTHER CONVERSIONS:		
Feet/mile	Meters/kilometer	0.1894
Tons	Kilograms	907.2
Tons/square mile	Kilograms/square kilometer	350.2703
Cubic feet/second	Cubic meters/sec	0.02832
Degrees Fahrenheit	Degrees Celsius	(Deg F –32) x (5/9)

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1. Introduction

The U.S. Army Corps of Engineers (Corps) has conducted an aggressive public outreach effort above and beyond National Environmental Policy Act (NEPA) requirements throughout the Lower Snake River Juvenile Salmon Migration Feasibility Study (Feasibility Study) process. Public interest in the Feasibility Study has been overwhelming, and continual communication has been essential because the impacts could be far reaching. The public outreach program began with scoping meetings in 1995, was further focused with a Public Outreach Plan in 1997, and has been implemented ever since using a variety of appropriate public involvement and public information tools. For a complete description of the Corps' public involvement efforts, please see Appendix O, Public Outreach Program.

This report, Appendix U, Response to Public Comments, focuses on documenting the comments received on the Draft Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement (FR/EIS) dated December 1999. Over 230,000 comment documents in the form of e-mails, faxes, letters, comment forms, etc. were received. Over 1,700 oral and taped comments were also received at a series of 15 formal public meetings conducted throughout the region.

Chapter 2 of this appendix discusses the public comment process, including the public comment period, the formal public meetings, and the processing of the comment documents. Chapter 3 provides an overview of the public comments submitted. It describes the process the Corps used to categorize the comments, compress the comments into issue statements, and respond to those issue statements. Chapter 4 contains general issue statements generated by the public comments received and provides responses, and Chapter 5 contains more issue statements on more specific topics and provides responses. Chapter 6 contains summaries of the 15 public meetings held after release of the Draft FR/EIS. Chapter 7 provides information on literature cited throughout Appendix U. Annex A contains announcements of the public comment period and the public meetings. Annex B contains a list of newspapers containing advertisements for the public meetings, and a sample of the ad that ran. Annex C contains a copy of the comment form provided at each of the public meetings.

All comments received were considered without regard to whether they were provided by a single commentor or repeated by many. Importance was given to the substance or content of the comment, rather than the number of times a comment was submitted. This was not considered to be a referendum or vote. Comments (particularly value statements) are not considered to represent societal values, since our public outreach program was not intended to be a statistically valid approach (i.e., not a random sampling).

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2. Public Comment Process

2.1 Public Comment Period

The public comment period on the Draft FR/EIS began December 17, 1999 with the release of the FR/EIS and associated documents. The Corps announced the availability of the documents, announced the beginning of the comment period, and informed the public how to make comments on the FR/EIS in the following ways: 1) as required by NEPA, a notice of availability was published by the U.S. Environmental Protection Agency (EPA) in the Federal Register dated January 14, 2000; 2) The summary document, which was mailed out to 2,500 interested parties on the Corps mailing list and made available by request, described the public comment period; 3) Newsletter No. 8, mailed in January 2000 to the Corps' mailing list, contained information on the public comment period; 4) an information paper was distributed to media contacts throughout the region in January 2000; 5) the Corps website (http://www.nww.usace.army.mil/lsr) announced and explained the comment period and provided copies of the documents; and 6) the public was encouraged to provide comments at the series of 15 public meetings held in February and March.

Although the comment period was originally set to end on March 31, 2000, the Corps extended the deadline to April 30, 2000 in response to the high volume of interest and comments. Annex A contains a copy of Corps' announcements regarding the public comment period.

Written public comments were received in a variety of forms. Most were mailed, faxed, or e-mailed. Others were hand-delivered at the public meetings. In all, the Corps received over 230,000 written comment documents. Examples of the original comment documents can be accessed at the Corps' Feasibility Study website at http://www.nww.usace.army.mil/lsr. Figure 2-1 is a distribution map of the origin of the written comment documents received on the Draft FR/EIS.

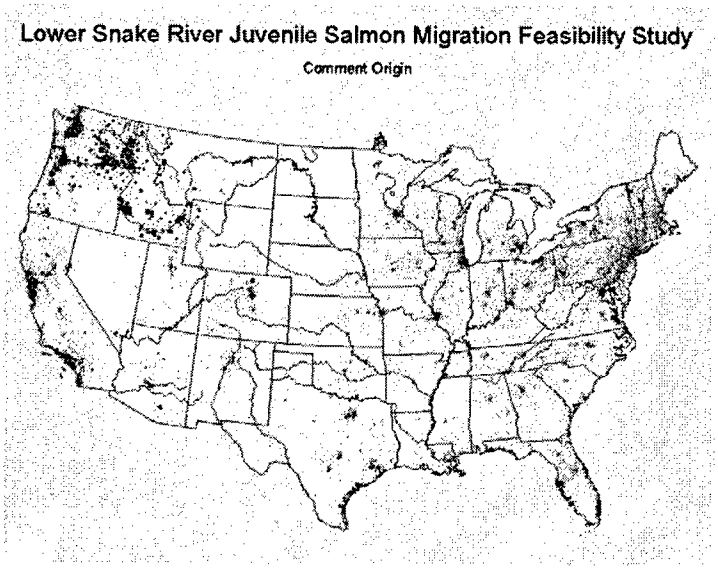


Figure 2-1. Distribution Map of the Origin of the 230,000 Documents Received on the Draft FR/EIS

2.2 Public Meetings

In conjunction with the Federal Caucus, the Corps held a series of public meetings in Oregon, Washington, Idaho, Montana, and Alaska regarding the All-H Paper and other Federal, salmon-related work products. The Federal Caucus brings together nine Federal agencies that all have natural resource responsibilities under the Endangered Species Act (ESA). Although each agency has different authorities and jurisdictions, the Caucus was formed in 1998 to ensure a unified, coordinated approach to protecting listed species throughout the Columbia River Basin. These joint meetings were advertised in regional newspapers, as appropriate (see list in Annex B). The series of regional meetings, held in February and March 2000, provided an opportunity for public questions and formal public comments. A total of nearly 9,000 participants consisting of stakeholders, special interest groups, elected officials, and individuals from the public presented 1,787 oral and taped comments. Figure 2-2 shows the meeting locations and attendance at the meetings.

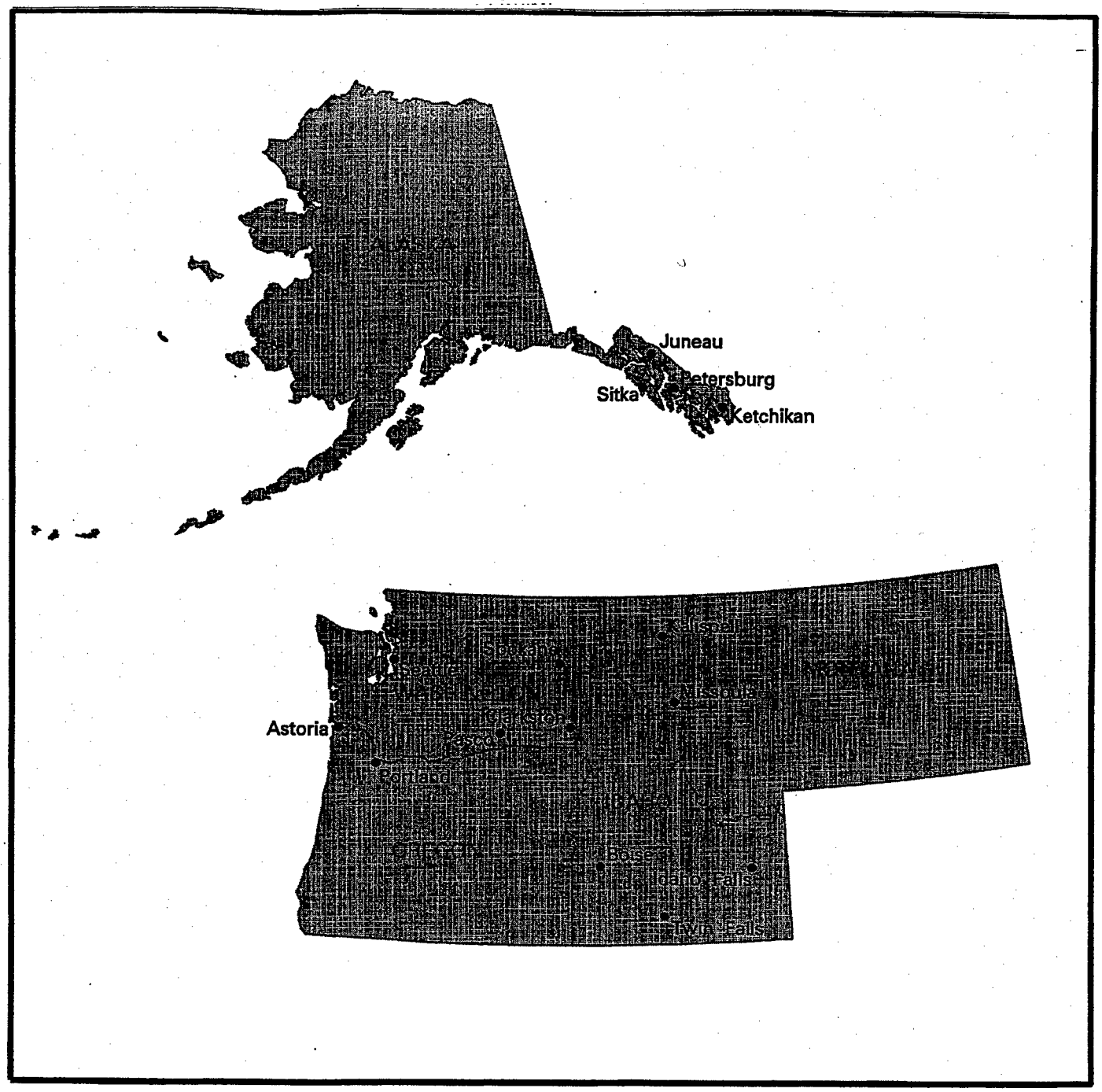
Most meetings consisted of an open house, formal agency presentations, a question-and-answer session, and a public comment session. Oral comments were limited to 3 minutes in length. Two public comment sessions were conducted at some locations during both afternoon and evening meetings. At some of the meetings, the attendance was so large that not all those wishing to speak were able to do so. Comment forms (Annex C) were provided and these and other written comments were accepted at each meeting so that everyone who attended the meeting had the opportunity to enter formal public comment on the FR/EIS in one form or another.

2.3 Processing the Comment Documents

All public comment documents received as a result of the public meetings, the FR/EIS, or the All-H Process were given a unique identification number by the Corps, who then entered the number, name, and address (if provided) associated with each comment document into a Microsoft Access computer database. The Corps set up record retention and management files for all the comment documents.

As the volume of comment documents grew, the Corps was able to identify several different types of form letters, petitions, cards, faxes, and e-mails. Form comment documents within each type were identical to each other, except for the name/signature of the commentor. Of the roughly 230,000 comment documents received, 90+ percent fell into this category. The issues and opinions expressed in each form comment document were read and considered. They are captured in Chapter 4, General Issues and Responses. The remaining "unique" comment documents (about 12,000) were categorized and reviewed by a resource specialist so issues and responses could be developed and appropriate changes to the FR/EIS or associated appendices could be made. This evaluation process is described in Chapter 3 of this document. Chapters 4 and 5 contain the results of the evaluation process—the general and detailed issues and responses developed from the public comment documents.

Figure 2-2. Formal Public Meeting Locations



DATE	LOCATION	ATTENDANCE
February 3, 2000	Portland, OR*	1200
February 8, 2000	Spokane, WA*	800
February 10, 2000	Clarkston, WA*	1800
February 15, 2000	Astoria, WA	200
February 17, 2000	Pasco, WA*	1200
February 23, 2000	Boise, ID*	1100
February 29, 2000	Seattle, WA*	550
March 1, 2000	Kalispell, MT	120
March 2, 2000	Missoula, MT	225
March 6, 2000	Ketchikan, AK	72
March 7, 2000	Sitka, AK	130
March 7, 2000	Idaho Falls, ID	520
March 8, 2000	Juneau, AK	151
March 8, 2000	Twin Falls, ID	600
March 9, 2000	Petersburg, AK	91

**2 Sessions*

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Special Note: States are not displayed at the same scale and projection.

GEOGRAPHIC INFORMATION SYSTEMS
Corps of Engineers
Walla Walla District

LOWER SNAKE RIVER
Juvenile Salmon Migration Feasibility Study

Figure 2-2

FORMAL PUBLIC MEETING LOCATIONS



Photo 2-1. The Corps Received and Stores Over 230,000 Comment Documents on the FR/EIS

3. Evaluating the Comment Documents

It was the Corps' goal to ensure that each unique comment document be read and evaluated so issues of concern could then be identified and addressed by technical experts. Because of the high volume of comments, this process was very involved. It is described in detail in the following sections.

3.1 Identifying and Categorizing Comments

Each unique comment documents was reviewed by a trained member of the comment coding team. Comment coders first reviewed each letter to quickly ensure the commentor information was correct and categorized the comment document according to the commentor who wrote it. The categories used were: Federal Agency, State/Local Agency, Tribal Representative, Organization, "Individual—Detailed", and "Individual". To be placed in one of the first four categories, the document had to be received from an official representative of the agency/tribe/organization. Letters from individual members, etc., were not necessarily included in this category. Letters coded "Individual—Detailed" were from individuals with a specific expertise/training in a technical field who have provided their professional opinion in the form of specific comments on an aspect of the FR/EIS analysis. The Individual category was used to categorize comment documents from the general public. These categories were marked in the database, and were useful to the Corps in sorting and locating particular comment documents.

Once the comment document was categorized, the coder determined whether or not it included Non-Lower Snake River comments. The comment documents that did not include lower Snake River comments were considered to be outside the scope of the FR/EIS and were coded "Non-LSR." The Corps ensured that the appropriate parties (Federal Caucus, John Day team, etc) received copies of the comment documents that pertained to them. The coder then determined if the document identified a specific position regarding the FR/EIS alternatives ("for" or "against" one or more of the alternatives). This position was entered in to the database. While the Corps did not consider the "vote" of each commentor regarding the alternatives, stated positions were useful to have in the database for sorting and query purposes.

The next step in the process was for the comment coder to read each comment document in its entirety and identify individual comments within the document. The comments were marked and numbered on electronic copies of the comment documents, then the corresponding comment number was entered into the database and assigned a comment keyword. To be delineated as a "comment," and marked with a specific keyword, the material had to be detailed and refer (directly or indirectly) to analysis, inconsistencies, inaccuracies, and/or omissions from the FR/EIS, associated documents, or associated studies. When delineating comments, coders were instructed to gage whether the information provided was specific enough to be considered by the appropriate technical specialist (scientist, economist, etc.). If no detailed material was identified in a unique comment document, it received the comment code "Non-specific." The majority of comment documents received this code. Non-specific comment documents typically were statements of position and opinion unsupported by technical details; they were often more along the lines of scoping comments. Although these documents did not provide specific feedback on the FR/EIS text or related analyses, coders did identify common themes, issues, questions, and concerns (along with those expressed in the form documents) to develop the General Issues and Responses provided in Chapter 4. The

comment keywords were developed by the Feasibility Study team based on FR/EIS sections and the common threads of comment themes received early in the comment period. Coders made their best determination of the appropriate keyword for each specific comment. If delineated comments addressed more than one keyword, coders had the ability to code the same comment with more than one keyword. This ensured each technical expert received all the comments related to his/her resource area.

Coded comments were sorted by keyword and forwarded, along with the corresponding marked letters, to the appropriate technical specialists for review and response to comments (Section 3.2).

3.2 Responding to Comments

Appropriate technical specialists in each resource area represented in the FR/EIS (usually the authors of the FR/EIS sections and/or appendices) reviewed the letters containing detailed comments coded for their resource areas, as well as issues raised in oral comments. Because of the high volume of comments coded, issues raised in different comment documents and in oral comments often overlapped. To streamline the process and avoid repetition, Corps management opted to consolidate comments into issue statements. As they reviewed the letters and oral comments, technical specialists identified the issues raised in each comment, making sure each comment was rolled into an issue statement for the appropriate resource area. Once the issue statements were developed, technical specialists, Corps management, and other Corps experts reviewed each issue statement and developed a response for each. The results of this work formed the Detailed Issues and Responses presented in Chapter 5. Responses to the detailed comments in each resource area were also used to develop responses to the more general issues that did not involve significant technical details (presented in Chapter 4).

As responses were developed, any text was highlighted that indicated a change should be made to the FR/EIS or one of the associated appendices. This allowed technical specialists to easily go back through their responses and identify changes they needed to carry over to their sections/appendices. Where indicated in Chapter 5, Detailed Issues and Responses, changes were made to the FR/EIS or associated appendices.

4. General Issues and Responses

The Corps identified 37 general issues as the 230,000 comment documents and 15 transcripts were read and evaluated. These issue statements are summaries of comments received that did not specifically address components of the EIS or analysis in technical detail.

GI-1 The comment process/public hearings were not adequate/fair.

- This is a regional issue. There shouldn't have been so many meetings in the big urban areas and in Alaska. There should have been more in Eastern Washington.

Response: A variety of meetings involving the public have been carried out as part of the Feasibility Study including initial scoping sessions, roundtable workshops, information meetings, focus group meetings, community assessment forums, and public hearings. The meetings, scheduled around the region with many held in the lower Snake River area, have established direct links between the public and team members while providing a forum for public comments and input. In addition, team members have made presentations about the Feasibility Study to special interest groups, stakeholders, service organizations, universities, professional societies, governmental agencies, and others.

- The Clarkston meeting was not well organized.

Response: In communications with industry and interest group representatives prior to the meeting, we were made aware that our planned venue at Lewis & Clark College in Lewiston, Idaho would not be large enough. We therefore changed the meeting location to the largest suitable space that was available, the Lewis & Clark Convention Center across the river in Clarkston, Washington. This new site was not large enough either. However, we made contact with the people of the Lewiston-Clarkston area, interest group and industry representatives, hotel personnel (from the adjacent Quality Inn), and others who helped us make the best of a difficult situation. Local radio station KRLC offered to set up a live radio broadcast, which we welcomed. The City of Clarkston, KLEW Television station, Lewis & Clark College, and AT&T worked to put the public meeting on the cable access channel. With the broadcast of both the afternoon and evening sessions and the Quality Inn staff providing TVs in the hotel's meeting rooms, those who could not fit into the meeting room could watch the proceedings from nearby. In addition, the radio coverage was broadcast in the Convention Center, throughout the hotel, and the parking lot. The Lewiston-Clarkston citizens were very understanding of the situation and helped to keep a calm and cooperative atmosphere.

- The Clarkston meeting gave preferential treatment and seating to Native Americans.

Response: All agency representatives of the Federal Caucus, including the Corps, established and agreed to the process of allowing elected public and tribal officials the opportunity to speak first. This requested procedural course of action provided respect for elected officials and the constituencies they represented. All officials were limited to 3 minutes as were all other public presenters.

- The late location change from the Governor Hotel in Portland was inconvenient for organizations encouraging members to attend.

Response: The Corps and Federal caucus organizers apologize for any inconvenience. The venue change was actually made at the request of several organization representatives; every effort was made to communicate the change and minimize problems.

- Everyone should have had a chance to speak at the public meetings.

Response: All groups and organizations as well as individual citizens expressing interest in the study have been encouraged to participate and to provide input into the study. There were no limits placed on meeting participation since these were open public forums. The Corps' decision on these proposed changes will most certainly not be based on a head count or show of hands. Our goal has been to provide the public with accurate information and to seek input throughout the study.

- Letters should carry as much weight as the words of people who spoke at the meetings.

Response: Over 230,000 comment documents were received on the Draft FR/EIS from around United States. All comments are equally valuable and no weighting system has been developed. The Lower Snake River Project is Federally operated; therefore, the Corps will seek comments on proposed changes in operation as part of the NEPA process.

- The environmental groups were stuffing the comment boxes and busing people in from out of the area, so their comments got a disproportionate amount of attention.

Response: It is unfortunate that our public outreach efforts were characterized by some as a vote-counting exercise for breach or no-breach. The Corps' decision on these proposed changes will most certainly not be based on a head count, show of hands, or ballot stuffing. It will be based on sound science and engineering and will consider comments made on the Draft FR/EIS.

- The opinions of those who would be directly affected by dam breaching should matter more than the opinions of out-of-state environmentalists.

Response: Over 230,000 comment documents were received on the Draft FR/EIS from around United States. All comments are equally valuable and not weighting system has been developed. The Lower Snake River Project is Federally operated; therefore, the Corps will seek comments on proposed changes in operation as part of the NEPA process.

- Public comments don't really even matter, do they?

Response: Over 230,000 comment documents have been received on the Draft FR/EIS from around the United States. All comments are equally valuable and no weighting system has been developed. The Lower Snake River Project is Federally operated; therefore, the Corps will seek comments on proposed changes in operation as part of the NEPA process. Each comment is important and all issues raised are being addressed.

GI-2 The decision on whether or not to breach should not be a vote based on public opinion, politics, or economics alone. The decision should be based on the best available science.

Response: It is unfortunate that our public outreach efforts were characterized by some as a vote-counting exercise for breach or no breach. The Corps' decision on these proposed changes will most certainly not be based on a head count or show of hands. Neither will our decision be driven solely by politics or economics.

The Draft FR/EIS contained the best available information to date. We wanted to hear the public's input on substantive information that may have not been captured—or inadequately captured—in our draft. The 15 regional meetings held February to March 2000 were an opportunity to share with other agencies, interest groups, and the public our findings and to seek new information to make the most informed decision possible.

This Feasibility Study is a straightforward and analytical process in which we carefully consider a range of alternatives in light of biological effects, economic impacts, and legal obligations, such as

treaties, ESA, and NEPA. We also consider the cultural, social, and other impacts of our proposed actions as part of a larger, region-wide recovery effort. There is a growing awareness that long-term solutions must look beyond one single action to all aspects of the salmon lifecycle: habitat, hatcheries, and harvest as well as hydropower impacts.

GI-3 This study is all part of a dam removal master plan.

- Environmentalists are trying to remove all dams; this is just the beginning.
- Why would we remove these four dams, which have fish ladders, and not Hells Canyon, Grand Coulee, Dworshak, or others?
- Easterners and urbanites have something against rural living and removing the dams would make rural life more difficult in Eastern Washington.

Response: This study grew out of the National Marine Fisheries Service (NMFS) 1995 and 1998 Biological Opinions (NMFS, 1995; 1998), which requested that the Corps investigate ways to improve juvenile salmon migration through the four lower Snake River dams. The scope of the study is limited to these dams and issues. It should be noted that dam breaching is only one of four options being evaluated to address salmon passage issues in this Feasibility Study. There is no Federal master plan to remove other dams on the Snake or Columbia Rivers, although dam breaching is a common component of any regional discussion on salmon recovery.

GI-4 Breach dams now. Delays spell disaster for salmon and the environment.

Response: While we understand the urgency of the situation, decision makers need sound science on which to base decisions. It takes time to develop and confirm such complicated analyses. All the issues are very complicated. We need to develop and analyze the best available technical information. This takes time and money. This is such a complicated regional issue that not only does it take time to produce and review sound analyses, but it also takes extensive time for input from all stakeholders. If input was not received and reviewed, then the decision would be made without considering the full impact of Federal actions. The intent of Congress and the laws that direct Federal actions is to involve all those who would be affected and consider all information provided. Within these goals, we are working to conclude this process and produce a Record of Decision leading to implementation of an alternative as soon as possible.

Also, NMFS, through the Cumulative Risk Initiative (CRI), has identified risks of extinction and the timeline during which actions must be taken to prevent extinction. NMFS has published the 2000 FCRPS Biological Opinion (NMFS, 2000a), which sets out a series of actions within the Pacific Northwest that are intended to prevent extinction and lead to recovery. It should also be noted that Alternative 4—Dam Breaching by itself has been determined not to be the solution to recovery.

GI-5 Don't breach dams now.

- Non-breaching alternatives are more prudent, less drastic choices.
- More studies are needed to resolve uncertainties.
- Try everything else before implementing dam breaching.
- Take more time to evaluate the existing system.
- Dam breaching could not reasonably be implemented.
- You can't "turn back time." The ecosystem is no longer natural.

Response: In their 2000 Biological Opinion, NMFS determined that dam breaching alone would not be enough to recover salmon. They also recommended that the region undertake additional monitoring and studies to resolve key uncertainties regarding sources of delayed and extra mortality. The Biological Opinion outlined several major system improvements and changes to implement to try to improve salmon survival and recovery. If these measures do not result in the desired improvement, dam breaching will be reevaluated in 5 years.

GI-6 A regional approach to salmon and steelhead recovery is needed (more than just dam breaching).

Response: The Corps' responsibility under this Feasibility Study is juvenile salmon and steelhead passage at the four lower Snake River dams. However, we also participate in regional species recovery efforts with a broader focus. The discussion of the All-H paper in Chapter 1 has been broadened and reference to this process is included throughout the document.

GI-7 Dam breaching would increase air pollution.

- More trucks on the road due to the lack of barges would increase air pollution and contribute to global warming and health problems.
- Dust storms were a real problem before the dams were in place. If dams are breached, health risks could result from people breathing in air-borne contaminants in reservoir sediments.
- Using power generation other than hydropower would increase air pollution and cause health problems.

Response: All of these concerns (transportation-related emissions, fugitive dust emissions from exposed lake sediments, and replacement power-related emissions are specifically addressed in Appendix P, Air Quality, and carried forward into Sections 4.3 and 5.2 of the FR/EIS. Fugitive dust emissions that would result from dam deconstruction are also addressed.

GI-8 If the dams were removed, there would be flood control problems.

- Dams help control spring flooding.
- Dams prevented serious flooding in Portland a few years ago.
- There would be flooding in the Tri-Cities if the dams were removed.
- If the Snake River dams were removed, would you remove the Columbia River dams too and disable all our flood protection?

Response: As is explained in the FR/EIS and associated documents, flood control is not an authorized purpose of the Lower Snake River Project. These are run-of-the-river dams/reservoirs that do not provide flood control because they do not have storage capacity. Whatever water volume enters this reach above Lower Granite Dam leaves within a very short period at essentially the same flow volume. Other dams on the Snake and Columbia River are authorized for flood control purposes. There are no studies evaluating the removal of any dams authorized for flood control in the Columbia-Snake River System.

GI-9 Sediment from behind the dams would cause problems.

- Breaching would release lots of sediment into the river.
- The heavy sediment load would hurt all fish, aquatic life, and wildlife downstream.
- Low water with heavy sediment would just make for a warm, muddy, shallow river.

- Breaching would allow heavy metals in silt behind dams to escape downriver.

Response: The Corps has evaluated the potential impacts of the sediment on each of the resources evaluated in the FR/EIS. Although the exact outcome is difficult to predict because there are no relevant examples to examine, the Corps believes the FR/EIS provides a sufficient impact analysis.

GI-10 Flow augmentation doesn't work and has negative consequences for those upstream.

- Many commentors from Idaho support breaching of the dams because they believe that keeping the dams in place will negatively impact the supply of irrigation water to Idaho farmers.
- Others wanted the dams to stay in place because they fear breaching would increase flow augmentation.

Response: Flow augmentation is held constant (same as current conditions) across all four alternatives considered in the FR/EIS. Any changes to flow augmentation, whatever the impacts, would not occur as a result of this Feasibility Study.

GI-11 The dams operate in violation of the Clean Water Act.

- Because of the dams, the lower Snake River is not in compliance with the Clean Water Act.
- The current lawsuit over water quality will be expensive.
- The only way to address water quality issues is to remove the dams.

Response: The Corps does not believe it is operating in violation of the Clean Water Act. Water Quality issues are addressed in Appendix C, Water Quality, and the FR/EIS. The Corps is in the process of developing a water quality plan and until this is finished and the States complete their total maximum daily load (TMDL) process, possible future actions or costs are speculative and premature.

GI-12 Dam breaching is not necessary to recover the four lower Snake River stocks.

- Dam removal is not necessary because juvenile fish transportation on barges works great.

Response: There are many factors that affect the effectiveness of transport (NMFS transportation white paper [NMFS, 1999a]) making the benefits far from assured. The most obvious concern is what is known as "differential delayed transport mortality," which is measured relative to non-transported fish as a function known as "D." This factor is simply the ratio of adult survival of transported fish to untransported fish. The net result based on many studies is that there appears to be additional mortality that occurs to transported fish that does not occur to untransported fish once they arrive below Bonneville Dam. The effect is not clear at this time, but it may result in little net overall increase in survival to adult stages between transported and untransported fish. See the transportation white paper (http://www.nwfsc.noaa.gov/pubs/white/trans4-25-00.pdf and http://www.nwfsc.noaa.gov/pubs/white/transresp.pdf for NMFS view on this (NMFS, 1999a).

- If survival is as high now as before the dams were built, there is no sense in returning to pre-dam conditions.

Response: NMFS has determined that the lower Snake River Evolutionary Significant Units (ESUs) identified are at risk for extinction. They have prescribed measures to help encourage survival and recovery of these species.

- How would breaching help if 34 runs of salmon/steelhead listed or proposed for ESA, but only four pass lower Snake River dams?

Response: The focus of this Feasibility Study is improving survival of the four listed Snake River species by making changes to juvenile salmon passage. Dam breaching is one alternative the Corps is evaluating to help these species. Other regional efforts are ongoing to determine a broad range of measures to improve survival and recovery of all listed species in the Columbia-Snake River Basin.

- Fish survival through each dam is higher than in the 60s. New technology will increase smolt survival even more, so why breach?

Response: We are not recommending dam breaching at this time. However, the four lower Snake River stocks are still at risk and measures must be taken to improve their survival and recovery prospects. In their 2000 Biological Opinion, NMFS determined that dam breaching alone would not be enough to recover all salmon stocks on the lower Snake River (NMFS, 2000a). They also recommended that the region undertake additional monitoring and studies to resolve key uncertainties regarding sources of delayed and extra mortality. The Biological Opinion outlined several major system improvements and changes to implement to try to improve salmon survival and recovery. If these measures do not result in the desired improvement, dam breaching and other options will be evaluated in 5 years.

- If 94 percent of juvenile salmon pass the dams, the dams must not be the problem.

Response: Extensive analyses (Plan for Analyzing and Testing Hypotheses [PATH], CRI) show that while dams are not all of the problem facing the four listed lower Snake River species, they are part of the problem. While other regional efforts are looking at a broad range of measures other than hydropower changes (habitat, hatcheries, harvest) that could improve survival and recovery efforts for listed species, the point of this Feasibility Study is to identify and evaluate alternatives for improving passage of juvenile salmon at the four lower Snake River dams. It should be noted that the percentage you quote is misleading. A certain percentage of juvenile salmon are lost in passage at each dam from the Snake River through the Columbia to the ocean. Cumulative losses are greater than your statistic indicates (e.g., 41 to 58 percent passage mortality of in-river migrating Snake River spring/summer chinook during 1995 to 1999 from Lower Granite Pool to Bonneville Dam tailrace). Also, there is the issue of delayed mortality and extra mortality—lower Snake River salmon adults do not return at a rate comparable to other races. Regional scientists involved in PATH and CRI believe that a certain percentage of this "extra mortality" is somehow related to "delayed mortality" from the hydropower system. What percentage is uncertain and is a major issue of debate in evaluation of the effect of the alternatives on anadromous fish. Please note that, in line with NMFS' recommendation in their 2000 FCRPS Biological Opinion (NMFS, 2000a), we are not recommending dam breaching at this time (see above).

GI-13 Removing the dams won't help Snake River salmon.

- The four lower Snake River dams can't be the cause of low fish returns because salmon runs are also declining on rivers and streams where there are no dams.

Response: See response to comment GI-12.

- The fish would still have all the other dams to pass.

Response: See response to comment GI-12.

- Breaching wouldn't open up that much spawning habitat.

Response: The pre-dam channel of the lower Snake River was a coarse-bedded, stable river, possessing over 30 large rifle-rapid sections interconnected with large pools. These characteristics

supported fall chinook salmon spawning and rearing. The 140 miles of the lower Snake River historically contained between 2.5 to 5 percent of the available Snake River spawning habitat prior to complete construction of the Hells Canyon dam complex in the 1960s. Three different modeling exercises using channel reconstruction with flow methodology indicate that the location and amount of fall chinook spawning habitat could be 23.5 up to 54.9 percent of the 140 miles of river if dam breaching occurred.

GI-14 Removing the dams now is the only thing that will help Snake River Salmon.

- Alternatives 1, 2, 3, conflict with ESA.

Response: The effects of each alternative on the ESA-listed stocks have been taken into consideration in the process of selecting a preferred alternative.

- The ESA requires by law that the fed government recover salmon back to healthy, self-sustaining levels.

Response: Salmon populations in the Columbia Basin have been declining for over 100 years. There are numerous factors that have, and are, contributing to this decline, including dam construction and operation. However, it is difficult, if not impossible, to determine what "share" of responsibility to place on hydropower development and, more specifically, dams.

- Breaching would open up spawning habitat upriver on the Salmon River.

Response: The Salmon River is classified as contributing a significant portion of the unregulated seasonal flow into the lower Snake River. Breaching of lower Snake River dams would not influence the physical contribution of spawning habitat or the quality of that habitat.

- We need to make a decision now before the salmon are gone.

Response: See response to comment GI-4.

- The Corps has missed the point by basing their study on justifying dam removal instead of on saving salmon from extinction.

Response: The Corps' responsibility as requested in the 1995/1998 NMFS Biological Opinions is to identify and evaluate alternatives for improving juvenile salmon passage at the four lower Snake River dams. Dam breaching is just one of four alternatives evaluated for achieving this goal. The Corps' task under this Feasibility Study is only one piece of the regional effort to improve salmon survival and recovery prospects under NMFS' guidance. Improving passage through the lower Snake River dams will not, by itself, recover the endangered salmon stocks.

GI-15 The dams aren't the problem, harvest is the problem.

- No one should be allowed to kill an endangered species.
- Stop harvest until the species is recovered.
- Harvest only hatchery fish.
- Put a moratorium on fishing for a certain number of years and monitor progress.
- Curtail illegal fishing.
- Restrict or forbid Native Americans from using modern-day gill nets that catch many more fish than the nets their ancestors used.
- Don't allow Native Americans to sell fish.
- Enforce international fishing regulations to keep fishermen from other countries from depleting our stocks.

- Tribes waste fish and their catch is not counted accurately.
- Harvest of other aquatic species affects food supply for salmon and steelhead.

Response: Appendix A, Anadromous Fish Modeling now includes an explicit analysis and discussion of risk due to harvest for each of the 11 harvested ESUs of salmon and steelhead in the Columbia-Snake River Basin. Some of this discussion was carried forward into the FR/EIS. The reduction of harvest-related risks would require a program in which all hatchery fish are marked, a point made in both a recent NMFS report (McClure et al., 2000) and in the Basin-wide Species Recovery Plan, a product of the Federal Caucus "All-H" process (Federal Caucus, 2000). These and other measures designed to reduce the impacts of harvest are outside the scope of the Corps' Feasibility Study. NMFS has noted all comments regarding harvest, and is working with the region to begin to address these risks in a fair and equitable manner.

GI-16 Don't impose any more restrictions on harvest.

- Many commercial fishermen feel that restricted harvest would be a hardship for them.
- Many people downriver in coastal towns and in Alaska noted that fishing is integral to their survival.
- Many sports and commercial fishermen feel that further restricting harvest would not help salmon that much since not that many are harvested currently.
- The Pacific Salmon Treaty already provides adequate harvest restrictions.

Response: Restricted harvest and other measures designed to reduce potential harvest-related impacts to salmon and steelhead are outside the scope of the Corps' Feasibility Study. We forwarded all comments regarding harvest to NMFS, and they are working with the region to begin to address these issues in a fair and equitable manner.

GI-17 The dams aren't the problem, predators are the problem.

- Do something about the terns on Rice Island at the mouth of the Columbia that eat a significant amount of salmon before you breach the dams.
- Do something about the sea lions and seals that eat a significant amount of salmon before you breach the dams.
- Do something about resident fish who prey on juvenile salmon in the reservoirs.

Response: Predation management is an important variable in salmon recovery, and can not be addressed by the Corps alone. It needs to be managed by States and other Federal agencies. While predation does have effects on survival, much of the predation that occurs in the lower Snake River under current conditions would occur naturally. Stocks should be able to survive with some level of predation. Actions to address some of the major predators are underway, although some sources of smolt loss will remain.

In terms of accounting for predation in the analysis, Appendix A, Anadromous Fish Modeling (and condensed FR/EIS discussions) includes discussion of predation rates and the PATH models included predation as a mortality source for chinook salmon. Unfortunately, although there is a great deal of data on diet, energy budget, and distribution of predators, rigorous translations of these data into rates of mortality for individual salmon races are lacking.

GI-18 The dams aren't the problem, habitat changes are the problem.

- Ocean, climate, and El Nino produce unfavorable conditions for salmon.

Response: Ocean conditions are obviously a major factor affecting anadromous salmonid population growth rates. In addition, it is likely that ocean conditions have differential effects on the several ESUs in the Columbia River Basin. Snake River fall chinook, for instance, apparently have a different ocean residence than Hanford reach chinook. Many ocean conditions do signal a change in the Pacific Decadal Oscillation (PDO) in recent months. However, since Columbia River salmonids have been declining since the 1870s, ocean conditions cannot be held solely responsible for Snake River stock declines. In addition, the mechanism of the oceanic effect on salmon populations is unknown, making predictions of the effect of climatic changes on salmon populations problematic. Moreover, our power of prediction of the duration of these ocean cycles is poor. Finally, there are indications that El Nino/Southern Oscillation (ENSO) events affect salmon populations more strongly than the PDO. Most models of global climate change predict increasing frequency and duration of ENSO events.

- Poor estuarine and riverine habitat conditions are contributing to declining salmon populations.

Response: NMFS addresses the needs for improvement in both early rearing and estuary conditions in their 2000 FCRPS Biological Opinion. Affecting conditions outside of the Snake River region is outside of the scope of the FR/EIS.

GI-19 There is no difference between wild and hatchery salmon.

- They all come from the same genetic stock—what's the difference?
- Scientists should include hatchery fish in counts; returning fish that spawn outside the hatchery should be considered wild.
- If salmon are endangered, why are hatchery officials at the Coleman Fish Hatchery clubbing fish to death?

Response: These comments address the apparent discrepancy in treatment of wild and hatchery fish. Under the direction of the ESA, NMFS is required to consider recovered stocks as self-sustaining (i.e., if hatchery inputs were removed from the ecosystem, a stable population growth rate would result). Therefore, it is important that we assess the status of the wild component of the population (which can be both masked and affected by hatchery fish). Although the addition of hatchery fish may increase the numbers of fish in the rivers, this input does nothing to change the system to allow a wild population to reverse a declining trend. In fact, there are many reasons to believe that the addition of hatchery fish may actually harm wild populations. We have no direct knowledge of the operational activities at the Coleman Fish Hatchery.

GI-20 You can buy salmon at the store, so what's the problem?

Response: Although it is nearly impossible to selectively prevent the harvest of some endangered species because the physical differences between the stocks often aren't easily distinguishable, catch is controlled somewhat by the timing of different fishing seasons. Most often, the salmon you buy in the grocery store is not from an endangered ESU like the Snake River salmon and steelhead; they are either hatchery fish or wild fish that have more sustained populations.

GI-21 Try other methods of dam modification/fish passage.

- Construct a free-flowing side channel that fish can use to bypass the dams.
- Construct a system of pipes filled with water for fish to use to bypass the dams.
- Place nets upstream and downstream of the dams to catch fish and guide them to safe passage.

- Install strobe lights on the dams to help guide the fish.

Response: Past studies of dams on the Columbia-Snake River System and exhaustive analyses written up in the FR/EIS and Appendix D, Major Systems Improvements evaluated many alternative methods of dam modification and fish passage, some of which are still in research, development, and testing stages. The major system improvements carried forward in Alternative 3 of the FR/EIS are considered to be the most effective and practical technologies we can implement as soon as possible. They mirror the measures recommended by NMFS in their 1995, 1998, and 2000 Biological Opinions.

GI-22 Breaching would reduce the amount of wetlands.

Response: It is true that there would be short-term losses of both wetlands and riparian areas under dam breaching. In the long-term, riparian area acreage would be expected to increase significantly under dam breaching, which could be a positive change. With planned enhancements and programs, emergent wetlands could also establish over the long-term. Please see Section 5.5 of the Final FR/EIS for a more complete discussion of changes to wetland and riparian area acreage, and of the effects of these changes.

GI-23 The Corps must breach dams and recover salmon species to meet obligations to the tribes. Tribes are harmed by declining salmon populations, and significant compensation for losses could be due.

Response: The Corps has taken into account the Northwest Treaty Tribes' fishing rights, the United States' Trust responsibility to Native American Tribes and its responsibility to act in a manner consistent with the trust responsibility. The actions which the Corps will implement are designed to lead to increased survival and recovery of the listed salmon species with beneficial results to the Treaty Tribes' fishery and benefits to the Northwest Region as a whole.

GI-24 If the dams were removed, there would be safety, maintenance, and volume issues for Northwest roads and railroads.

- The current roads aren't adequate. There would have to be major road construction.
- The roads wouldn't be safe to drive.
- The rail system wouldn't be adequate.

Response: These concerns are addressed in Section 5.8 of the FR/EIS and Section 3.3 of Appendix I, Economics. Further discussion is provided in the Drawdown Regional Economic Workgroup (DREW) Transportation Workgroup report, which is available on the Corps website. A number of studies have also been conducted by other regional agencies. Summaries of these findings are also included in the FR/EIS, as appropriate.

GI-25 The transportation analysis was incorrect/incomplete.

- If the dams were removed, a lot of small companies would go out of business because it would be more difficult/expensive to move commodities.
- The FR/EIS erroneously assumes 5 million tons of formerly barged commerce would continue to move to domestic and international markets. However, increased shipping costs would eliminate products' ability to stay competitive in these markets.

Response: This assumption was employed in the DREW transportation analysis (see Section 5.8 of the FR/EIS).

- Rail rates would not increase if barging was removed as a competing form of transportation.

Response: The DREW Transportation group disagreed. Some increase in rail rates would be expected if barging on the lower Snake River was eliminated as a means of moving commodities.

Please refer to the sources cited above for a more detailed explanation.

- The current river transportation system does not make sense.

Response: Comment noted.

GI-26 If the dams were removed, there would be power supply problems.

- According to the Regional Power Supply Adequacy and Reliability report by the Northwest Power Planning Council (NPPC), there is a serious threat of power shortages in the area, even brownouts, if the amount of power is not increased. This means that reducing the power supply by 5 percent with dam breaching would result in a more serious shortage.
- Our population growth in the Northwest is endangering the power supply.

Response: The NPPC report cited identifies new additions required by 2003 to support the project population. The hydropower analysis conducted by DREW Hydropower Impact Team (HIT) recognizes that additional capacity will be required to meet load growth over time and assumes that these additions will be made, as necessary. Capacity additions required for 2010 and 2018 are shown in Table 25 of the DREW HIT report. These additions will be required regardless of whether or not dam breaching occurs. The hydropower analysis prepared for the FR/EIS addresses only the impacts associated with breaching the four lower Snake River dams. The effects of this action on the reliability of the transmission system are discussed in Section 3.1.6.3 of Appendix I, Economics.

- We should keep the dams because hydropower is a cheap, clean, renewable energy source.

Response: Comment noted.

GI-27 Removing the four dams would not endanger the power supply.

- We just need to stop selling off so much power and there will be plenty to go around.
- We should encourage the conservation of power.
- We could buy from other sources.
- We should encourage the development of alternative, clean, renewable power sources.

Response: A new section has been added to Appendix I, Economics that addresses conservation as an alternative source of replacement power. The conclusions of this new section have also been incorporated into Section 5.9 of the FR/EIS.

GI-28 If the dams were removed, it would affect water supply.

- If the dams were removed, the loss of irrigated acres would be 36,000 in Washington and 450,000 in Idaho (no source given).
- It would really be expensive/difficult for farmers (particularly small ones) to find other ways to irrigate if the dams are breached.
- Municipal and industrial water supply pumps would be expensive/difficult to replace.
- If the dams were breached, would the government help bear the cost of creating access to other water sources?

Response: These issues are all addressed in the analysis presented in Section 3.4 of Appendix I, Economics; in Annex O to Appendix D; and in Section 5.10 of the FR/EIS.

GI-29 Changes to water supply due to dam breaching would not affect very many people.

- Only 13 farms are irrigated by Ice Harbor Dam.
- Only 13 pumps providing irrigation water from Ice Harbor Dam would be affected.
- Affected farms could get their water pumped from somewhere else.

Response: The scope and significance of the effects of the alternatives on water supply are addressed in the analysis presented in Sections 3.3 and 3.4 of Appendix I, Economics; in Annex O to Appendix D; and in Section 5.10 of the FR/EIS.

GI-30 There appears to be over-use of water and excessive claims for new water.

Response: Comment noted.

GI-31 Recreational activities would change with breaching.

- The recreational opportunities have really improved since the dams have been in.
- The kind of recreation people enjoy would not be available once the dams were breached.
- There would be more recreational opportunities if the dams were breached.

Response: The potential effects of dam breaching on recreation are discussed in Section 5.12 of the FR/EIS. The estimated recreation-related economic effects are discussed in more detail in Sections 3.2 and 6 of Appendix I, Economics.

GI-32 The recreation analysis was incorrect/incomplete.

- Recreational value of rivers would go down (not up) if dams were breached.
- The FR/EIS made wild guesses at future visitation that don't justify the benefits predicted.
- The FR/EIS underestimated the recreation benefits that would occur with dam breaching.

Response: Points 1 and 3 of this comment illustrate the range of public opinion surrounding the findings of the recreation study. A number of concerns have been raised with the DREW recreation analysis. These concerns have been added to Section 3.2 of Appendix I, Economics in the FR/EIS.

GI-33 Dam removal would affect me, my business, and/or my community.

- Quality of life would be negatively affected.
- Way of life would be negatively affected (reversing progress).
- Barge operators would be negatively affected.
- Farmers would be negatively affected.
- Families would be negatively affected.
- Industry would be negatively affected.
- We shouldn't make a rash decision that could negatively affect a lot of people's lives/livelihoods.
- I/my family would have to relocate.
- I/someone in my family would lose my job.

- Some groups in Idaho, Alaska, Montana, and downriver fishing communities felt they woud be positively affected.

Response: The Corps is very aware that the major decisions this study encompasses regarding controversial regional issues could have significant, personal impacts on people in our region. That is one reason we have taken such care to gather the best possible information and analyses for evaluation, and to solicit and consider input from a variety of perspectives on issues related to the study and its outcome. We believe that decisions with the potential to affect people so personally must be made carefully, and be considered and based on the best available scientific, engineering, and economic information available.

GI-34 If salmon go extinct, there would be serious economic consequences.

- Commercial fishing and its economic benefits would be reduced.
- Increased transportation costs would negatively affect farmers.
- Sportsfishing and associated recreation economic benefits would be reduced.
- Tourism dollars would be lost.

Response: The FR/EIS analyzes the economic effects of the four proposed alternatives. The effects of these alternatives on commercial and recreational fishing were addressed by the DREW Anadromous Fish and Recreation workgroups and are discussed in Sections 3.2 and 3.5 of Appendix I, Economics. These analyses are based on numbers of salmon and steelhead projected to return under each alternative. These projections were developed from the 1998 PATH results. The regional economic impacts of changes in tourism are assessed in Chapter 6 of Appendix I, Economics. The results of these analyses are also summarized in Sections 5.12, 5.13, and 5.15 of the FR/EIS. The DREW Transportation Workgroup analyzed potential increased transportation costs, which are also presented in Appendix I, Economics and carried forward into Section 5.9 of the FR/EIS.

- If salmon become extinct, Native American tribes have cause to sue the U.S. government for not fulfilling the terms of treaties. The potential cost of these lawsuits is not adequately addressed in the economic analysis in the EIS.

Response: Potential litigation and associated costs regarding treaty issues are impossible to predict, and are not included in the FR/EIS. The Corps believes the preferred alternative is consistent with its treaty obligations.

GI-35 If the dams are removed, those who are negatively affected should be compensated.

- Extra public funds (Federal and State) from dam removal should be put into transportation infrastructure, both for highways and railroads.

Response: The DREW transportation analysis did not consider the ability of the States and others to finance infrastructure improvements that would be needed. This issue would be addressed in detail, if dam removal were recommended for further study.

- If the Corps decides to breach the dams, they should be required to put up bonds that would pay for putting the dams back if removal does not prove to improve fish runs.
- We should pursue lawsuits against groups that push for dam removal aimed at recovering money from crop loss or other economic impacts of breaching.

Response: Comments noted.

GI-36 The economics analysis was incorrect/incomplete.

- The costs of continued operation of juvenile fish transport were not considered in calculating the relative economic profiles of breaching versus not breaching. The belief is that if dams are breached, a considerable sum will be saved from the end of barging.

Response: These costs are included in the avoided cost analysis presented in Section 3.8 of Appendix I, Economics (see specifically Section 3.8.5.2). These and other avoided costs are subtracted from the estimated costs that would be incurred under Alternative 4 – Dam Breaching. This cost category is identified in the summary of the economic analysis presented in Section 5.15 of the FR/EIS. It is also identified in the Executive Summary and Chapter 10 of Appendix I, Economics.

- The analysis exaggerates the costs of dam removal, and the costs of retaining the dams and of salmon extinction are not adequately considered.

Response: Comment noted. Specific comments about the findings of the economic analysis are addressed in the Economics section of the comment response document. The DREW workgroups assessed the economic effects of the four proposed alternatives.

- The EIS doesn't take into account that the cost of extinction is ecological catastrophe. How much will that cost?

Response: As noted above, the DREW workgroups assessed the economic effects of the four proposed alternatives. Alternative 1 – Existing Conditions was used as the baseline for this analysis, which was projected over a 100-year study period.

- For the breaching alternative, the Corps did not consider the cost savings by not having to continue maintenance of the waterway and power system.

Response: These costs are included in the avoided cost analysis presented in Section 3.6 of Appendix I, Economics (specifically Section 3.8.2.2). See the response to the first bullet of this question.

- The Corps' economic analysis does not fully include the benefits of breaching due to saving and restoring Snake River salmon. A Reading and Associates study showed $170 million economic gain for Idaho, per year, due to revival of salmon runs and increased steelhead populations.

Response: The economic benefits associated with projected increases in salmon and steelhead runs under Alternative 4 – Dam Breaching are assessed in Sections 3.2, 3.5, and 6 of the Appendix I, Economics. These effects are summarized in Sections 5.12, 5.13, and 5.15 of the FR/EIS.

GI-37 Salmon are valuable simply because they exist.

- Many people told stories about historically observing and fishing for salmon, and how valuable it is for them to know the salmon are part of Northwest life.
- Salmon are a symbol of the Northwest.
- Salmon were here before us.
- Salmon are a cultural symbol for Northwest tribes.
- Many people from out of the area said they wanted to come see the salmon some day, and they would like for some to be left when they do come.
- The EIS doesn't properly consider the existence value of these fish.
- We have a duty to preserve the salmon species for future generations to enjoy.

- Our ancestors would be appalled at what we have done to the species.
- We should respect and not destroy other living creatures.

Response: The Corps recognizes and respects the value of salmon to many in our region as a cultural, historical, social, and personal symbol of the Northwest. We agree that, for this and many other reasons, we need to work as part of a regional effort aimed at promoting the survival and recovery of the species that are in danger. It is the goal of this Feasibility Study to contribute to that increased survival. The DREW economic analysis addresses the existence or passive use value of salmon, as well as the passive use values that would be associated with a free flowing river. The findings of this analysis conducted by the DREW Recreation Workgroup are presented in Chapter 4 of Appendix I, Economics and summarized in Section 5.15 of the FR/EIS. Comments ECO-33 through ECO-44 of this appendix specifically address the passive use analysis developed for this study. The importance of salmon for Northwest tribes is emphasized in numerous locations throughout the Final FR/EIS, including Appendix Q, Tribal Consultation and Coordination, Sections 4.8 and 5.7 of the FR/EIS, and Sections 3.6 and 5.0 of Appendix I, Economics.

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5. Detailed Issues and Responses

5.1 Introduction

The issues presented in this section are categorized mostly by resource area. These issues were derived from that portion of the comments which were detailed and referred directly or indirectly to analysis, inconsistencies, inaccuracies, and/or omissions from the FR/EIS, associated documents, or associated studies.

5.2 Non-LSR Comments

These comments did not directly involve the Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement (FR/EIS). By far the majority of these comments dealt specifically with the Federal Caucus All-H Paper alternatives, process, or "Hs." These comments were included in the Federal Caucus comment process. This category also included a handful of non-specific comments supporting or denouncing the John Day Drawdown recommendation, some flow augmentation comments not specifically tied into the FR/EIS, some non-specific Hells Canyon Complex comments, and some letters that had nothing to do with salmon recovery or the Snake River and just mistakenly made there way into the comment database. None of these comments require responses.

5.3 Editorial Changes

These comments were suggested edits to the FR/EIS. All were editorial in nature, rather than technical. These changes were evaluated and incorporated, if still applicable, during FR/EIS revisions.

5.4 Feasibility Study

These comments were categorized under General, Corps Planning, National Environmental Policy Act (NEPA), No preferred alternative, Public Outreach, Regional Coordination, and Slow Process. Comments on Appendix R, Historical Perspectives are also included in this section.

5.4.1 General

FS-1 We don't need studies that add to the research industry because we already know that salmon need a river with "natural" flow.

Response: Generally, we agree that dams and reservoirs are not good for fish and wildlife that evolved in a natural river system. However, none of the alternatives being investigated will provide a natural river. The system has many dams upstream and downstream of the lower Snake River, that will remain in operation. The natural hydrograph has been, and will continue to be, altered. The question remains, do the lower Snake River dams need to be breached to recover Snake River salmon and steelhead? This is an extremely complicated question and research is required to enable us to make decisions based on the best available science.

FS-2 The A-fish analysis is so inaccurate and misleading that it skews the whole Feasibility Study and will result in the Corps' making a misinformed recommendation.

Response: NMFS revised their A-fish analysis with the most current information. This information has been considered in FR/EIS revisions. However, as this analysis points out, biological uncertainty still exists.

FS-3 What will the plan selection criteria be? Will decision analysis tools be used? You need to inform stakeholders so they can participate.

Response: Please refer to Chapter 6, Plan Selection and Implementation, of the Final FR/EIS for details. The revised FR/EIS, including the recommended plan/preferred alternative, will be distributed to the public.

FS-4 Dams should be run by private enterprise.

Response: Congress authorized the building of the dams, so Congress is responsible for ultimately determining their future and who operates and maintains them.

FS-5 The drawdown/breach issue has been the single greatest impediment to implementing regional salmon recovery measures.

Response: The Corps has studied the breaching option because it was a Reasonable and Prudent Alternative (RPA) in the 1995 Biological Opinion (NMFS, 1995). Several stakeholders and the Biological Opinion have called for the study of dam breaching.

FS-6 Congress should cut Federal funding for any more studies involving dam breaching.

Response: The resolution of this issue lies within the jurisdiction of Congress.

FS-7 We question whether the standard of analysis followed by the Corps in the FR/EIS is consistent with the "economically and technologically feasible" language in the definition of "reasonable and prudent alternatives" found in 50 CFR 402.02.

Response: The Corps' analysis of the alternatives is consistent with NEPA, ESA requirements, and Corps planning guidance.

FS-8 The costly, laborious Feasibility Study process should be abandoned in favor of the All-H process or some other comprehensive plan.

Response: The Corps is participating in the larger regional salmon recovery effort, but will finalize the Feasibility Study process.

FS-9 It's hard to believe that such an expensive and time-consuming process couldn't provide a scientifically sound basis for a regional decision.

Response: Salmon recovery issues are highly complex because they must address a multitude of interactive factors that influence survival. Each of these factors also has inherent uncertainties (e.g., ocean conditions and their effects on survival). The Draft FR/EIS used the best available information to fully address and evaluate these complexities as they apply to juvenile fish migration through the lower Snake River. The final conclusions, however, did not provide an alternative that was clearly superior to all other alternatives. Therefore, as described in Chapter 6 of the Final FR/EIS, the Corps proposes that implementation of the measures under Alternative 3 would provide

a reasonably sound opportunity for salmon recovery while maintaining a balance with other elements of the ecosystem.

FS-10 Future analyses under the Feasibility Study should be done in collaboration with the States and tribes to ensure there is a sound scientific basis for decision making.

Response: We will continue to pursue input from all stakeholders.

FS-11 The Feasibility Study analyses rely heavily on researchers who have built-in conflicts of interests on the subjects about which they write, producing conclusions that are contrary to common sense. Fisheries bureaucracies have extracted hundreds of millions of dollars from those who operate dams, and therefore cannot be trusted to provide objective evidence of the effects of dams on fish.

Response: The Corps reviewed all information for objectivity and scientific soundness. We asked for independent reviews and took recommendations on how to present scientific analysis. The Corps strives to present well-rounded information and the best available science. Throughout the Feasibility Study process, we have allowed input by other interested parties (stakeholders, tribes, States, conservation groups, etc.) to ensure that perceived biases are addressed. In addition, we have a multilayered technical review process for all phases of the study.

FS-12 In spite of the inclusion of tribal representation on DREW through the Tribal Circumstances Report, tribal reviewers and authors were not afforded the same level of involvement in FR/EIS writing and review as Federal reviewers, and this resulted in shortcomings in the FR/EIS.

Response: Several agencies, including the Department of Interior, Bureau of Indian Affairs, were afforded a preliminary review. The 120-day public comment period provided an opportunity for all stakeholders to comment on the FR/EIS.

FS-13 The Corps suppressed and distorted some of the information on past, present, and future effects of the dams on tribal circumstances presented in Meyer Resources, 1999 (Tribal Circumstances Analysis Report). This is a fatal flaw in the environmental analysis.

Response: The Corps and other cooperating Federal agencies have the ultimate responsibility to prepare this FR/EIS. In addition to the DREW tribal circumstances report and the Draft FR/EIS review, the Corps consulted with interested tribes during the preparation of the FR/EIS. The report entitled Tribal Circumstances and Impacts of the Lower Snake River Project on the Nez Perce, Yakama, Umatilla, Warm Springs, and Shoshonne Bannock Tribes has been on our website (http://www.nww.usace.army.mil/lsr) since shortly after it was released. The Corps summarized and presented the information from this report, just as we summarized and presented the information from multiple reports that support the Economics Appendix and the Economics section in the FR/EIS.

5.4.2 Corps Planning

FS-14 Third-party consultants were hired to write all the DREW reports except one—Tribal Circumstances. This process was poorly planned and unfair. If the tribes have the right to tell their story from their perspective, so should everyone else.

Response: Authors of all DREW products, including the Tribal Circumstances Analysis Report (Meyer Resources, 1989), were either paid consultants or Federal employees. They were chosen for their expertise or special knowledge of these subject areas.

FS-15 It appears that the Corps' decision on the Feasibility Study alternatives will be based on information released in the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) and Federal Caucus All-H Paper (Federal Caucus, 2000) before the FR/EIS comments are even reviewed. The timing of all these processes reflects poor planning and seems suspicious.

Response: All comments were considered prior to selecting the recommended plan (preferred alternative). The Final NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) was released in December 2000. The Corps reviewed the Biological Opinion to determine how it may affect the decision on the Feasibility Study alternatives.

FS-16 The FR/EIS does not assign a fair share of the responsibility for salmon decline on the Corps and other Federal agencies involved in hydropower activities. Perhaps there should be a moratorium on all Corps activities in the Northwest until mitigation for past harm can be carried out.

Response: The Federal government has many agencies whose missions include conservation of endangered or threatened species. One way the Corps implements its ESA requirement is by complying with the ESA, Section 1536(a)(2), "Each Federal Agency shall, in consultation with and with the assistance of the Secretary, insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or result in the destruction of habitat of such species…". The Lower Snake River Fish and Wildlife Compensation Plan outlines mitigation and comprehensive requirements related to lower Snake River dam development. The Corps continues to work with the region to reverse salmon decline.

FS-17 The study authors display bias against dams and river operations.

Response: The Corps has taken substantial precautions to prevent the infiltration of bias into this study. The Corps has tried to be objective in its presentation of data. However, the development of this study has been an open process with numerous stakeholders and interested individuals presenting their points of view and data in support of their positions for inclusion. The Corps has attempted to analyze and disclose the different points of view. The plan selection is based on the best available scientific information.

5.4.3 National Environmental Policy Act (NEPA)

FS-18 Extinction avoidance is not an acceptable goal under NEPA. NEPA requires Federal agencies to determine how actions will affect recovery, not just survival. The goal for improved salmon passage is not clearly stated as survival *and* recovery, and this causes confusion and difficulty in assessing the potential effects of the alternatives.

Response: The FR/EIS complies with NEPA. The report includes extensive information on the effect of the alternatives on species listed under the ESA. Federal responsibilities usually regarding

recovery and/or survival of a species are related to what is required under ESA. The FR/EIS was provided to NMFS and is discussed in the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a). The Biological Opinion states that implementation of the RPA would allow the FCRPS to avoid jeopardizing the continued existence of the listed species or adversely modifying their critical habitat.

FS-19 Because the A-fish analysis in the FR/EIS relies on inaccurate and incomplete CRI analyses and doesn't acknowledge additional scientific information that could demonstrate positive effects of dam removal on salmon and shortcomings of the CRI process, it does not provide for a "well-balanced and fully informed" decision as required under NEPA.

Response: The CRI has been revised and updated based on additional, up-to-date information. A-fish analysis relies on a variety of processes that we evaluated thoroughly. These documents represent the "best scientific information available."

FS-20 Because the economics analysis consistently exaggerates the costs of dam removal and underestimates the benefits, the FR/EIS does not provide for a "well-balanced and fully informed" decision as required under NEPA.

Response: The Economic Analysis evolved from the DREW process and has been independently reviewed by the Independent Economic Advisory Board. The Economic Appendix represents the "best scientific information available."

FS-21 The FR/EIS transportation analysis fails to consider evidence that those accustomed to using barges for shipment of commodities could actually experience a reduction in costs to the price drop from competition to transport their goods. Because this potential benefit isn't adequately considered, the FR/EIS falls short of the NEPA goal to adequately consider potential benefits from all alternatives.

Response: While the Corps agrees that diversion of commodities to the rail system could result in improved economic viability of the industry within the region, especially the short-line railroads, this aspect of potential impacts was considered to be too speculative to evaluate quantitatively. The Corps believes the FR/EIS fully complies with NEPA.

FS-22 The Corps needs to incorporate the findings of the National Resource Development Council (NRDC) report in the FR/EIS. Because the Corps doesn't analyze how a "clean energy source" approach to replacing hydropower would benefit the region compared to replacement with fossil fuel, the FR/EIS does not fulfill NEPA requirements.

Response: Appendix I, Economics, Section 3.1.6.4 addressed power replacement with non-polluting resources, conservation, and renewable resources. This section also addresses the NRDC report.

FS-23 The FR/EIS does not adequately consider Federal subsidies tied to the four dams.

Response: The Corps invited the region to form the DREW in January 1997. Participants included Federal, State, and local government agencies: tribes; special interest groups; and the public. The DREW formulated the assumptions and the methodologies to be used for the economic analysis. Subsidies were not easily identifiable, therefore DREW decided not to address subsidies. However, whenever costs could be identified and presented as savings, they were identified in the Avoided Cost analysis. DREW assumptions, Study plans, and work products were technically reviewed by

an independent review panel (i.e., the Northwest Power Planning Council's Independent Economic Analysis Board [IEAB]).

FS-24 The FR/EIS uses "overly optimistic" estimates of the costs and benefits of moving commodities on the Snake River, hindering the NEPA goal of providing the public and decision makers with the ability to make a "well-balanced and fully informed" decision.

Response: Appendix I, Economics, page 1.5-3 states methodology. These costs and benefits were identified by DREW groups and reviewed by the IEAB.

FS-25 The Draft FR/EIS completely ignores or inaccurately estimates two major costs associated with dam retention: compliance with the Clean Water Act (CWA), and turbine rehabilitation and the dams' four powerhouses. For the FR/EIS to meet NEPA requirements, these costs need to be fully considered.

Response: The FR/EIS has been revised to display costs estimated for projected and proposed modifications associated with water quality improvements for the Lower Snake River Project. These costs can be found in Appendix E, Existing Systems and Major System Improvement Engineering. As far as turbine rehabilitation, these costs have been addressed in avoided costs for Alternative 4. Water quality improvements and turbine rehabilitation economics can be found in Appendix I, Economics.

The Corps does not believe it is operating in violation of the Clean Water Act. The Corps is in the process of developing a water quality plan and until this is finished and the States complete their total maximum daily load (TMDL) process, possible future actions or costs are speculative and premature.

FS-26 The Draft FR/EIS does not summarize and report important environmental information accurately as required by NEPA, and does not justify its decision on how to proceed with partial dam removal.

Response: The Final FR/EIS includes the best information available and is in compliance with NEPA requirements. The selection of a preferred alternative is detailed in Chapter 6 of the FR/EIS along with the evaluation criteria. Chapter 6 also discusses the implementation plan for the preferred alternative.

FS-27 The Draft FR/EIS fails to adhere to the NEPA requirement to take a "hard look" at all of the environmental issues and consequences related to the four alternatives by ignoring or minimizing relevant studies.

Response: The Corps believes it has considered relevant studies evaluating potential effects of the alternatives.

FS-28 The Draft FR/EIS fails to adequately inform the public and decision makers regarding the requirements and responsibilities of all Federal statutes and treaties (ESA, CWA, Northwest Power Planning Act, Magnuson Act).

Response: In Chapter 9 of the FR/EIS, we have summarized key players and the relevant statutes and treaties. Citations are provided for those who choose to investigate further. Also, copies of the treaties have been attached to Appendix Q for easy reference.

FS-29 The Draft FR/EIS fails to analyze the cumulative impacts of a myriad of other actions that affect Snake River salmon and steelhead. Failure to consider "reasonably foreseeable" cumulative effects in light of the alternatives (even if they are the responsibility of another agency) results in failure to meet a basic NEPA requirement.

Response: The FR/EIS does analyze the variety of factors that have contributed to salmon and steelhead decline. The cumulative impacts are discussed throughout Section 5.3. The cumulative impacts section has been revised to more explicitly explain how cumulative impacts are analyzed in the FR/EIS.

FS-30 The Draft FR/EIS is inadequate for the purposes of NEPA because it fails to adequately consider the water quality impacts of Alternatives 1, 2, and 3, and no strategy for mitigating those impacts is presented.

Response: The Corps believes we have adequately considered the water quality impacts of Alternatives 1, 2, and 3. The alternatives comparisons detail the impacts to this resource area and others (Chapter 5 of the FR/EIS). If mitigation measures are determined to be necessary for implementation of the preferred alternative, they will be discussed as part of implementation in Chapter 6 of the FR/EIS.

FS-31 The FR/EIS does not adhere to NEPA's requirement to consider a full range of alternatives because it treats the alternatives as if they would all involve the same amount of flow augmentation. To decrease confusion and better display all the options, flow augmentation should be adjusted according to what actually might be reasonable and realistic for each alternative.

Response: During the scoping process and alternative formulation, numerous variations of flow augmentation actions were considered. In an effort to configure reasonable and realistic alternatives, flow augmentation was considered to remain constant. This was due in part to past biological opinions that recommended a certain amount of flow augmentation. The current NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) remains consistent with this approach.

5.4.4 No Preferred Alternative

FS-32 If dam removal is the panacea answer, why are you dragging your feet on announcing a preferred alternative?

Response: After reviewing the Preliminary Draft FR/EIS, the Director of Civil Works in Washington, D.C., Joseph W. Wesphal, issued the following conceptual guidance on the preparation, contents, and processing of the Draft FR/EIS as a matter of policy: *"The Army does not at this time have a preferred alternative from among those alternatives considered in the Draft Lower Snake River Feasibility Study. Therefore, we need to ensure the Draft Feasibility Study, the Draft EIS and all related discussions and correspondence are consistent with this policy guidance and do not identify a preferred alternative at this time. In this regard, Chapters 6 and 7 of the Draft Feasibility Study should be reserved for future use."* The District took action according to this guidance.

FS-33 A preferred alternative would have allowed public comment on the FR/EIS to be more focused and meaningful.

Response: We acknowledge that the comments may have been more focused on a preferred alternative, if provided; however, the lack of a preferred alternative facilitated more discussion and

comment on all alternatives. This allowed the Corps to review a broad spectrum of comments and concerns before making a selection.

FS-34 The Corps' failure to include a preferred alternative implies that there is additional information missing from the Draft FR/EIS that the Corps intends to use to select a preferred alternative. The States and other parties are interested in reviewing any additional information. How can so much money, time, and energy be spent on a document that doesn't even include a preferred alternative?

Response: New information has been incorporated into the Final FR/EIS, and all parties will have an opportunity to review the document before a Record of Decision is signed.

FS-35 The Corps should demonstrate leadership in regional salmon recovery efforts by providing a preferred alternative in a Revised Draft FR/EIS.

Response: The Corps takes its role in the regional salmon efforts very seriously. The Corps is the lead agency for this FR/EIS and has taken pride in completing this process in a manner that is objective, honest, and thorough. After careful consideration, a revised FR/EIS was rejected as the best course of action. The Corps' leadership made an informed decision to go directly to a Final FR/EIS with a preferred alternative.

FS-36 It was dismaying to hear that the Corps had a preferred alternative selected for inclusion in the Draft FR/EIS, but pulled it because of pressure from the White House. We expect leadership from the Corps, not political correctness.

Response: Regardless of where the guidance originated, the Corps determined that the best course of action was to present the best available technical information on all alternatives. It is acknowledged that the comments may have been more focused on a preferred alternative, if provided, however, the lack of a preferred alternative facilitated more discussion and comment on all alternatives. This allowed the Corps to review a broad spectrum of comments and concerns before making a preferred alternative selection.

5.4.5 Public Outreach

5.4.5.1 General

FS-37 I could not find a place on the website to submit my comments.

Response: A direct email link was established for comments on the Draft FR/EIS website (http://www.nww.usace.army.mil/lsr) located at the bottom of the page. We received over 15,500 email comments.

FS-38 General Strock's comments in the media that, if the scientific evidence wasn't compelling, public opinion would carry some weight, was very disheartening. The decision should be made based on best available science and common sense.

Response: The Draft FR/EIS contained the best available information to date, we wanted to hear the public's input on substantive information that may have not been captured—or inadequately captured—in our draft. The 15 regional meetings held in February to March 2000 were an opportunity to share with other agencies, interest groups, and the public our findings and to seek new information in order to make the most informed decision possible.

This Feasibility Study is a straightforward and analytical process in which we carefully consider a range of alternatives in light of biological effects, economic impacts, and legal obligations, such as treaties, ESA, and NEPA. We also consider the cultural, social, and other impacts of our proposed actions as part of a larger, region-wide recovery effort. There is a growing awareness that long-term solutions must look beyond one single action to all aspects of the salmon lifecycle: habitat, hatcheries, and harvest as well as hydropower impacts.

FS-39 The Corps should take action and speak up against organizations like Idaho River United who misquote Corps officials and promote false information.

Response: All groups and organizations as well as individual citizens expressing interest in the study have been encouraged to participate and to provide input into the study. We have openly posted preliminary reports, fact sheets (information sheets), links to other organizations, and meeting locations on the Corps' website. Newsletters have been consistently distributed with study updates and meeting information to those interested citizens and groups. Our goal has been to provide the public with accurate information and to seek input throughout the study.

5.4.5.2 Public Review/Comment Process

FS-40 Comments from those who live in the Snake River region should carry more weight.

Response: Over 230,000 comment documents were received on the Draft FR/EIS from around United States. All comments are equally valuable and no weighting system has been developed. The Lower Snake River Project is Federally operated; therefore, the Corps will seek comments on proposed changes in operation as part of the NEPA process.

FS-41 The Corps needs to produce a preferred alternative Report and send it out for public comment.

Response: The Corps' preferred alternative is presented in the Final FR/EIS.

FS-42 The silent majority opposes dam breaching. The Corps needs to find a way to hear from this silent majority.

Response: All groups and organizations as well as individual citizens expressing interest in the study have been encouraged to participate and to provide input into the study. We have openly posted preliminary reports, fact sheets (information sheets), links to other organizations, and meeting locations on the Corps' website. Newsletters have been consistently distributed with study updates and meeting information to those interested citizens and groups. Our goal has been to provide the public with accurate information and to seek input throughout the study.

FS-43 The numbers game in terms of comments is extremely counterproductive to the debate over salmon recovery and should really be discouraged and de-emphasized. This is not a game to the people whose lives will be affected.

Response: Over 230,000 comment documents have been received on the Draft FR/EIS from around the United States. All comments are equally valuable and no weighting system has been developed. The Lower Snake River Project is Federally operated; therefore, the Corps will seek comments on proposed changes in operation as part of the NEPA process.

FS-44 Create a public involvement process that is information-based and provides for constructive, thoughtful, substantive, comments.

Response: The Corps conducted an extensive public involvement process as part of the development of FR/EIS. This process is described in Chapter 7 of the FR/EIS. It included public meetings, public review and comment, newsletters that described the progress of the process, and a wide range of informational materials (e.g., CDs, website, news stories).

FS-45 The public involvement process needs to be more open to local governments, particularly when the decision of State and Federal agencies will have a dramatic effect on the quality of life in our communities.

Response: The goal of the public outreach program has been to inform and involve people in the region in the engineering, science, and planning process that will lead to a recommendation on the future operation for fish passage on the Lower Snake River Projects. Individuals and groups can ensure that their perspective has been heard and factored into the decisions made, and the Corps ensures that it has considered the major factors and recommended a plan that has full public involvement. This outreach program supports the Corps, cooperating agencies, and the public in working openly and collaboratively toward a recommendation that can be effectively implemented. All groups and organizations as well as individual citizens expressing interest in the study have been encouraged to participate and to provide input into the study. We have openly posted preliminary reports, fact sheets (information sheets), links to other organizations, and meeting locations on the Corps' website. Newsletters have been consistently distributed with study updates and meeting information to those interested citizens and groups. Our goal has been to provide the public with accurate information and to seek input throughout the study.

FS-46 This process is very political. Does public comment even matter?

Response: Over 230,000 comment documents have been received on the Draft FR/EIS from around the United States. All comments are equally valuable and no weighting system was developed. Each comment is important and all issues raised were evaluated.

5.4.5.3 Public Meetings

FS-47 You should have had more meetings in the immediate vicinity of the Snake River Basin.

Response: A variety of meetings involving the public have been carried out as part of the Feasibility Study including initial scoping sessions, roundtable workshops, information meetings, focus group meetings, community assessment forums, and public hearings. The meetings, scheduled around the region with many held in the lower Snake River area, established direct links between the public and team members while providing a forum for public comments and input. In addition, team members made presentations about the Feasibility Study to special interest groups, stakeholders, service organizations, universities, professional societies, governmental agencies, and others.

FS-48 The meetings were loaded with environmentalists and no one was screening for those who had already spoken three of four times throughout the series of meetings. The bus loads of environmentalists squeezed out the chance for those with other opinions to speak up.

Response: All groups and organizations as well as individual citizens expressing interest in the study have been encouraged to participate and to provide input into the study. There were no limits

placed on meeting participation since these were open public forums. The Corps' decision on these proposed changes will most certainly not be based on a head count or show of hands. Our goal has been to provide the public with accurate information and to seek input throughout the study.

FS-49 The Clarkston meeting was a fiasco with the late-date venue changes.

Response: The February 10 meeting in the Lewiston-Clarkston area brought in over 1,800 people, about four times the number attending past meetings on salmon issues.

In communications with industry and interest group representatives prior to the meeting, we were made aware that our planned venue at Lewis & Clark College in Lewiston, Idaho would not be large enough. We therefore changed the meeting location to the largest suitable space that was available, the Lewis & Clark Convention Center across the river in Clarkston, Washington. This new site was not large enough either. However, we made contact with the people of the Lewiston-Clarkston area, interest group and industry representatives, hotel personnel (from the adjacent Quality Inn), and others who helped us make the best of a difficult situation. Local radio station KRLC offered to set up a live radio broadcast, which we welcomed. The City of Clarkston, KLEW Television station, Lewis & Clark College, and AT&T worked to put the public meeting on the cable access channel. With the broadcast of both the afternoon and evening sessions and the Quality Inn staff providing TVs in the hotel's meeting rooms, those who could not fit into the meeting room could watch the proceedings from nearby. In addition, the radio coverage was broadcast in the Convention Center, throughout the hotel, and the parking lot. The Lewiston-Clarkston citizens were very understanding of the situation and helped to keep a calm and cooperative atmosphere.

FS-50 The Clarkston meeting was unfair, with preferential treatment/seating/speaking rights for officials and Native Americans.

Response: All agency representatives of the Federal Caucus, including the Corps, established and agreed to the process of allowing elected public and tribal officials the opportunity to speak first. This requested procedural course of action provided respect for elected officials and the constituencies they represented. All officials were limited to 3 minutes as were all other public presenters.

FS-51 This decision should not be a vote. Environmentalists have more time on their hands than hard-working family people to travel around to meetings and stuff ballot boxes.

Response: It is unfortunate that our public outreach efforts were characterized by some as a vote-counting exercise for breach or no-breach. The Corps' decision on these proposed changes was not based on a head count or show of hands. See Chapter 6 of FR/EIS for alternative selection information.

The Draft FR/EIS contained the best available information to date. We wanted to hear the public's input on substantive information that may have not been captured—or inadequately captured—in our draft. The 15 regional meetings held in February to March 2000 were an opportunity to share with other agencies, interest groups, and the public our findings and to seek new information in order to make the most informed decision possible.

FS-52 I did not get to speak at one of the meetings, and I wanted to.

Response: A total of nearly 9,000 individuals attended the 15 regional meetings. About 1,700 people provided oral and taped comments at these meetings. Our goal was to provide an opportunity for everyone to speak orally to the Federal Caucus panel. We were unable to achieve

this goal in some locations due to high attendance and time limitations. We offered taping sessions at each meeting for those who wished to provide oral taped comments. It is unfortunate that some individuals were not able to speak at these meetings and we hope their comments were forwarded to us in writing.

FS-53 No real meaningful comments could be heard at the public meetings over the theater and rhetoric from both sides of the dam breaching issue. Attempts to broaden the focus of the meetings to a more comprehensive approach failed miserably. The circus environment at the meetings compromised their effectiveness and integrity.

Response: Contracted meeting facilitators were obtained to maintain the meetings in a professional, organized manner. These facilitators for the most part preserved the meetings as a forum for public comments. With nearly 9,000 attendees at the 15 meetings, the atmosphere and content of the comments varied at each location. Individuals at each meeting voiced strong convictions and corresponding concerns to the Federal Caucus panel.

FS-54 The costs in General Strock's presentation at the public meetings didn't seem to match up with what was in the Summary or FR/EIS.

Response: General Strock's presentation used cost figures rounded off for ease of presentation. The chart on page 36 of the Summary Draft FR/EIS –Summary of Average Annual NED Cost/Benefits had some typographical errors under the Alternative 4 column. The Total Cost-Benefits quantities from the chart were the same rounded off figures presented by General Strock.

FS-55 The public meetings were very disappointing. Everyone spoke from their own selfish points of view, misrepresenting the facts to fit their perspective. They were not constructive. Most people hadn't even read the FR/EIS or listened to the presentation. Why should uninformed people be allowed to inflict their opinions on me? I was there for the facts and expected the Corps to provide me with more information.

Response: All groups and organizations as well as individual citizens expressing interest in the study have been encouraged to participate and to provide input into the study. There were no limits placed on meeting participation since these were open public forums. The Corps' decision on these proposed changes will most certainly not be based on a head count or show of hands. Our goal has been to provide the public with accurate information and to seek input throughout the study.

5.4.6 Regional Coordination

FS-56 In general, the Corps needs to pay more attention to other regional processes aimed at salmon recovery efforts and explain how they are working inside these other established processes.

Response: The Corps is involved and will continue to be involved in regional processes such as the Basin-Wide Recovery Effort, the TMT, IT, Multi-species Framework, etc. See Chapter 1 in the FR/EIS for updated information on our regional involvement.

FS-57 The number of Federal authorities responsible for Columbia River-Snake River operations, including salmon recovery, is overwhelming. We need to streamline management operations to address this issue and clarify who is responsible for which issues.

Response: Changes in the region-wide management of the salmon issues are outside of the scope of this Feasibility Study. The Corps clarifies its responsibilities and proposals by setting forth actions

in the Records of Consultations, Statement of Decisions, or Records of Decisions. See discussion of agency/entity roles in Chapter 1 for a clarification of responsibilities.

FS-58 An efficient and effective decision making process that involves all stakeholders may be the conservation measure that is most effective in recovering listed species.

Response: The Corps and eight other Federal agencies are working together to help identify appropriate measures. We also work in many other regional efforts that involve representation from a wide variety of stakeholders. In addition, a major region-wide public involvement program (see Chapter 8 of the FR/EIS) was conducted to seek input from the general public, resource agencies, Tribes, and other interested groups.

5.4.7 Slow Process

FS-59 Delaying salmon conservation efforts is not an option.

- Delaying dam breaching is not an option.
- We can't let salmon go extinct while we argue about the best way to save them. The situation is urgent.
- There has been enough time and money spent on this process—let's make a decision.
- Further delay extends the infringement on the tribes' ability to harvest fish.
- Although we shouldn't delay in choosing an option, we shouldn't just rush into something just to get dam breaching off the table.

Response: While we understand the urgency of the situation, decision makers need sound science on which to base decisions. All the issues are very complicated. We need to develop and analyze the best available technical information. This takes time and money. This is such a complicated regional issue that not only does it take time to produce and review sound analyses, but it also takes extensive time for input from all stakeholders. Within these goals, we are working to conclude this process and produce a Record of Decision (ROD) as soon as possible.

5.4.8 Consequences

FS-60 This decision has important long-term consequences for the nation as a whole. The importance and breadth of the decision should not be underestimated.

Response: The Corps is fully aware of the local, regional, and national implications of this Feasibility Study specifically, and salmon recovery in general. Extensive efforts have been made to collect the best available science and foster widespread communication and review within the region throughout this feasibility study process.

5.4.9 Appendix R, Historical Perspectives

FS-61 The appendix only covers 10 years and therefore should be re-titled because it does not go back in history very far. It was suggested that the appendix should cover 150 years, at a minimum.

Response: The Appendix R, Historical Perspectives has been revised to expand discussion of historical salmon management actions, factors historically affecting salmon, and public use and perception of salmon.

FS-62 The history of lawsuits and other court actions on the Snake and Columbia Rivers should be incorporated into this appendix.

Response: The Appendix R, Historical Perspectives has been updated and revised to include more information.

5.4.10 Other Specific Appendix and FR/EIS Comments

FS-63 Some commenters had specific text wording change recommendations, or more general requested changes to the FR/EIS or Appendices, that were not specific issues and were not common enough to be included in Section 4.

Response: Text changes requested were made as appropriate. General comments were considered.

5.5 Purpose and Need

Four comments specifically addressed the Purpose and Need section of the FR/EIS. Of these comments, the following issues were raised with respect to the purpose and need of the Corps undertaking the Feasibility Study and preparing an FR/EIS.

PN-1 The purpose and need statements should clearly focus on salmon survival and examining changes to dams and reservoirs that might lessen impacts to ESA-listed salmon and steelhead.

Response: The purpose and need statement is clearly stated in Chapter 1 of the FR/EIS.

PN-2 The purpose should not be just to delist the species but to select an alternative that leads to sustainable and harvestable fish populations.

Response: The Corps is participating in regional efforts to assist recovery of salmon and steelhead species basin-wide. The Feasibility Study is appropriately scoped to address juvenile salmon migration through the Lower Snake River Project.

PN-3 The need for the FR/EIS is premature and the purpose and need for this study should be described with regard to how it relates to development of the Northwest Power Planning Council Multi-species Framework and the All-H paper.

Response: The 1995 Biological Opinion, RPA 10, requested the Corps to look at dam breaching and other alternatives for juvenile salmon passage improvement (NMFS, 1995). This pre-dates the Multi-Species Framework and the All-H effort. The Corps is working to complete the Feasibility Study while participating in more comprehensive regional efforts that are considering basin-wide salmon recovery.

PN-4 The FR/EIS asks the wrong questions. Instead of looking at breaching cost impacts, you should be looking at the ultimate goal of basin-wide salmon recovery and what measures are most cost-effective for reaching this goal.

Response: The 1995 Biological Opinion, RPA 10, requested the Corps to look at dam breaching and other alternatives for juvenile salmon passage improvement (NMFS, 1995). This pre-dates the Multi-Species Framework and A1 1-H effort. The Corps is working to complete the Feasibility Study while participating in more comprehensive regional efforts that are considering basin-wide salmon recovery.

5.6 LSR Scope

A large number of comments were directed at the scope of the FR/EIS. Most of these fell under General Comments, but others were categorized under 1995/1998 Biological Opinion, Areas/Dams/ESUs Considered, and Flow Augmentation.

5.6.1 General

LSR-1 A broader vision for species recovery is needed.

- The document should include more discussion and incorporation of the All-H paper.
- Favor continued dam improvements, but also multi (All-H) approach.
- Look at all aspects of environment for recovery (follow NMFS approach).
- Favor dam removal, but this alone is probably not enough.
- The FR/EIS must provide detailed analysis of other 3 Hs before a preferred alternative can be selected.

Response: The FR/EIS is focused on juvenile salmon migration at the four lower Snake River dams. However, we also participate in regional species recovery efforts with a broader focus. The discussion of the All-H paper in Chapter 1 has been broadened and reference to this process is included by reference throughout the document.

LSR-2 "Spread the risk" may provide a better hedge than considering transport only.

Response: Spread the risk is considered in Alternative 1. Impacts associated with spreading the risk are discussed in Chapter 5 of the FR/EIS.

LSR-3 Dam removal should not only consider advantages to fish from removing turbine impacts – it should incorporate considerations of habitat improvements in the mainstem.

Response: The analysis does include habitat considerations for all alternatives. See Chapter 5 of the FR/EIS for discussions on habitat.

LSR-4 The FR/EIS is too narrow in focus – it needs to look at natural conditions more than dam-related issues for recovery.

- Look at ocean conditions, not dam removal.
- Ocean and climatic conditions should receive greater consideration.
- Before dams are breached, we need more information on Pacific Decadal Cycle.

Response: The scope of this study is to improve juvenile salmon passage on the lower Snake River as set forth in RPA 10 in the 1995 Biological Opinion (NMFS, 1995). A limited analysis on ocean conditions was conducted for the A-fish analysis (see Appendix A of the FR/EIS). Ocean conditions and their effects on salmon survival are being investigated by a number of other programs including work by National Oceanic and Atmospheric Administration (NOAA), State agencies, and universities.

LSR-5 The Corps should expand scope to include a review and consideration of BPA's BA for FCRPS in the FR/EIS. The Corps should incorporate a discussion of performance issues in the BPA BA. Include benefits and cost of measures for recovery.

Response: The Corps is one of the action agencies; the BA is folded into the FR/EIS.

LSR-6 The FR/EIS needs to expand number of alternatives; the current four are too narrow and isolated.

Response: Numerous alternatives were considered throughout the complete Corps planning process. Alternatives chosen for the Feasibility Study were those that retained merit to support the study purpose by being technically feasible, having some demonstrated biological effectiveness, being cost effective, and being regionally acceptable. For more information refer to Appendix J, Plan Formulation.

LSR-7 Only Alternative 4 meets water quality standards – need additional alternatives to show pathway to compliance.

Response: The FR/EIS discusses water quality in detail in Appendix C, Water Quality and has incorporated the appropriate information in the EIS. The 404(b)(1) analysis (Appendix T) also discusses water quality.

LSR-8 It is a Federal responsibility for water quality issues; this must be elevated in the FR/EIS.

Response: The FR/EIS discusses water quality in detail in Appendix C, Water Quality and has incorporated the appropriate information in the EIS. The 404(b)(1) analysis (Appendix T) also discusses water quality.

LSR-9 The Feasibility Study should produce short-term (and some mid-term) solutions that are more certain to produce results than dam breaching, are more worthy of our tax dollars, and have broad regional support.

Response: The alternatives do include near-term actions. Also, note that the scope of this Feasibility Study is limited to potential changes to improve juvenile passage through the Lower Snake River Project. This Feasibility Study feeds into a larger regional effort, but does not represent the full range of actions possible to address regional salmon issues.

LSR-10 The Feasibility Study shouldn't focus on short-term gains and solutions, but on what is best for long-term health of salmon and the ecosystem.

Response: The Feasibility Study attempts to evaluate both near-term and long-term actions for salmon recovery, and feeds into the larger regional effort aimed at ecosystem recovery.

LSR-11 Short-term projects to help species recovery received inadequate attention in the Feasibility Study. This inadequacy makes it difficult for the region to understand, prioritize, and support Feasibility Study findings.

Response: The Feasibility study examines both near-term and long-term actions to improve salmon passage through the Lower Snake River Project. The Corps also participates in basin-wide recovery efforts.

LSR-12 Battelle studies show potential to restore fall chinook spawning habitats. Emphasis in the FR/EIS should be shifted to habitat considerations.

Response: Habitat considerations are given for each alternative in the FR/EIS. However, the purpose of the study is to find ways to improve juvenile salmon migration through the Lower Snake River Project. Gaining benefits in habitat along the lower Snake River is important but not more so than improved passage through the lower Snake River. The 1995 Biological Opinion, which requested this Feasibility Study, focused on passage; however, NMFS 2000 FCRPS Biological

Opinion (NMFS, 2000a) has increased the focus on tributary and estuary habitat (NMFS, 1995; 2000a).

LSR-13 NMFS data suggest juvenile survival in-river is improving. Do we still need to consider removing dams?

Response: Juvenile salmon in-river continues to be evaluated through multiple programs such as tagging studies, survival estimates, and modeling. The NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a), which is being reviewed by the Corps, BPA, and BOR, establishes performance standards and a timeline for potential dam removal. If the standards are not met, plans for breaching may proceed (NMFS, 2000a).

LSR-14 The Corps should move away from dam breaching and towards other measures for recovery.

Response: The Corps continues to evaluate other measures including testing of a prototype surface bypass collector at Lower Granite, constructing structural improvements to facilities (such as additional screens), and implementing improvements for transporting juvenile fish. These other measures are being evaluated on a continuing basis to determine if they are effective in improving juvenile migration.

LSR-15 Adaptive management with no spill should remain under consideration

Response: NMFS's 2000 FCRPS Biological Opinion (NMFS, 2000a) supports current spill as part of the "spread-the-risk" approach (Action 54) (NMFS, 2000a). Although no-spill will remain under consideration, unless it can be scientifically documented that no-spill is better for juvenile survival, "spread-the-risk" will remain the current approach. An adaptive migration alternative was developed for the Final FR/EIS. This alternative includes the flexibility to reduce spill.

LSR-16 More studies on harvest of adult fall chinook stocks in the lower Columbia are needed to determine losses before they reach lower Snake River.

Response: The Corps relies on the best information available. The NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) addresses all four Hs, including harvest (NMFS, 2000a). The FR/EIS focus is juvenile salmon passage through the Lower Snake River Project; however, the Corps has considered harvest. Harvest is specifically addressed in the NMFS 2000 Biological Opinion (Section 9.6.3 Harvest Measures). The NMFS 2000 Biological Opinion Action 164 sets forth measures to develop or expand use of selective fishing methods and gear. Action 165 discusses measures to address effects of selective fishing on fishery management systems (e.g., Fishery Management and Stock Assessment Models). Action 166 discusses sampling programs and data recovery systems necessary to implement and monitor mass marking programs and/or selective fishery regimes in the Columbia River Basin. See the Biological Opinion for other actions focused on harvest (NMFS, 2000a).

LSR-17 The Feasibility Study needs to include more temperature modeling on Dworshak release. Look at the Hells Canyon Project for potential solutions.

Response: The FR/EIS includes more information on water temperatures and what affects the temperature has within the lower Snake River. How the releases at the Hells Canyon Dams and the quality of the water entering the lower Snake River affect the conditions within the 140-mile stretch have been considered, and a discussion is included in Appendix C, Water Quality. However, the

Corps' authority to implement actions at the Hells Canyon Complex is minimal since the Corps does not own these facilities.

LSR-18 Should we continue to rely on transportation? It hasn't saved salmon. The region needs a wider vision for recovery.

Response: Transportation was developed as an interim measure to help fish while the region works on other salmon recovery issues. The Corps does have a wider vision for recovery both on the lower Snake River and as one of the participants in the broader regional recovery effort.

Transportation is one of many tools for salmon recovery. It has likely contributed to the continued existence of Snake River salmon and steelhead for the past 20 years. As research progresses and our knowledge of how best to use transportation and other tools is increased, we will be better able to determine when and where such tools are implemented. If transportation is providing higher adult returns than other strategies or tools, yes, we will continue to use it.

LSR-19 Consideration of flow augmentation in Columbia should be separated from Snake. If Snake dams are removed, augmentation should be eliminated until it is proven that it is needed.

Response: The NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) sets forth project-by-project requirements with specific details on how spill should be conducted (NMFS, 2000a). The current assumption is that flow augmentation will be needed under a dam-breaching scenario; however, options regarding how the system could be managed would be determined at that time.

LSR-20 BPA/BA performance standards were needed long ago.

Response: Performance standards are addressed in the Biological Assessment. The Corps is a joint action agency with the BOR on the Biological Assessment (BA). NMFS' 2000 FCRPS Biological Opinion (NMFS, 2000a) specifically identifies performance standards that must be considered in future management efforts (see Chapter 9.0 of the NMFS 2000 FCRPS Biological Opinion [NMFS, 2000a]).

LSR-21 Ocean and climatic conditions should receive greater consideration.

Response: The FCRPS focus is juvenile salmon and steelhead passage through the Lower Snake River Project. However, the Corps participates in regional species recovery efforts with a broader focus, including ocean and climate conditions.

LSR-22 Indians are "rightful occupants" of the land – need to consider this in the FR/EIS.

Response: The lands purchased for the Lower Snake River Project were acquired from individual landowners. Lower Snake River Project lands were not purchased from tribal governments. Historically, the Indian treaties reserved the right of the tribes to "fish and hunt at their usual and accustomed sites." The Corps recognizes and supports these tribal rights.

LSR-23 Tone of this section is biased toward river development and clashes with tribal view of living in harmony in nature.

Response: There are many different views on how the Lower Snake River Project should be operated (dams or no dams) and the associated impacts to all people in the region. The Corps tried to present these different views in an objective manner. The tribal views in the Tribal Circumstances and Impacts Report are referenced in the FR/EIS (Meyer Resources, 1999). The FR/EIS presents these views and associated information as part of the NEPA effort to disclose

impacts and effects. This section will be reevaluated for tone and any necessary adjustments will be made to ensure that all information concerning all people is presented in an objective, unbiased manner.

LSR-24 Total Maximum daily loads (TMDLs) do not solve everything, but better water quality can help salmon recovery.

Response: Water quality discussions have been revised both in Appendix C—Water Quality and in the FR/EIS. The State of Washington classifies the lower Snake River as Class A (excellent). However, the alternatives under study include measures to improve the Total Dissolved Gas criteria. Currently there are no TMDLs for the lower Snake River.

LSR-25 Oregon seeks three things: 1) TMDL technical support, 2) acknowledgment by Corps that water quality is degraded, and 3) funding.

Response: The Lower Snake River Project is not located in Oregon and is not subject to Oregon water quality standards; however, Oregon views are considered.

LSR-26 The FR/EIS should contain commitment to TMDLs and CWA compliance.

Response: The TMDL development is an EPA/State/Tribal process and is beyond the scope of this FR/EIS. The water quality information the Corps has or develops will be provided to EPA, the States and appropriate tribes for their use in developing TMDLs. Water quality compliance issues relating to the Corps operations of projects on the Lower Snake River and the Columbia River were addressed by the Corps' Northwestern Division in the May 15, 2001 Record of Consultation and Statement of Decision (ROCASOD).

5.6.2 1995/1998 Biological Opinion

LSR-27 Use of storage releases according to Biological Opinion target flows seems to provide limited benefits at high cost for all alternatives.

Response: The Corps follows direction in the Biological Opinion and considers the possibility that flow factors may not be met in drought years. The Corps, BPA, and BOR are working on a plan to implement actions in the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a).

LSR-28 Flow targets in the 1995 Biological Opinion are often vague, and the Corps and others in the region exploit this vagueness to the detriment of salmon. The Corps needs to comply with these flow targets.

Response: The Corps consistently operates within its authorities to meet flow targets.

5.6.3 Areas/Dams/ESU Considerations

LSR-29 Predators are a major factor in the decline of salmon and need to be considered in the FR/EIS.

- There needs to be more funding for caspian tern control.
- The Federal government should be more aggressive in removing predators from lower Columbia.
- Rice Island is a "killing field" for juvenile fish.

- Why does tern control take so long to implement?
- The FR/EIS does not give predator control sufficient attention.

Response: The management of caspian terns is outside the scope of this study, although the Corps' 2001 ROCASOD for the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) sets forth actions for work on the caspian tern issue. Removing predators from the lower Columbia is outside the scope of this study. Predators are discussed in the FR/EIS in Appendices A and B, as well as in the NMFS 2000 FCRPS Biological Opinion (NMFS 2000a).

LSR-30 Conflict arises from asking Idaho for more water while protecting terns.

Response: The Federal Caucus is looking at all issues related to salmon recovery, including predation. The Corps, U.S. Fish and Wildlife Service (USFWS), and NMFS are working together to resolve tern issues. It should be noted that there is litigation pending concerning the resolution of the caspian terns issue. Although the FR/EIS considered an additional million acre feet (MAF), the current alternatives do not request additional flow augmentation beyond what is currently being required.

LSR-31 The FR/EIS must provide a detailed analysis of the other three Hs before a preferred alternative can be selected.

Response: The FR/EIS focus is juvenile salmon and steelhead passage at the four lower Snake River dams. However, the Corps also participates in regional species recovery efforts with a broader focus. The discussion of the All-H paper in Chapter 1 of the FR/EIS has been broadened, and reference to this process in included by reference throughout the document.

LSR-32 Are lower river dams to be removed?

Response: The FR/EIS does not consider the removal of any dams other than the four that are part of the Lower Snake River Project. Actions that would consider removal of other dams would be part of a separate process.

LSR-33 Removal of one or more dams must be based on failure of transport or "with-dams" alternatives to facilitate recovery.

Response: Chapter 3 of the FR/EIS has been revised to clarify the rationale for examining only the removal of all four dams in detail.

LSR-34 Columbia River salmon/steelhead are not different from others in the Pacific Northwest; they can be interbred. Removal of dams is not scientifically warranted.

Response: The ESA requires Federal agencies to consider their effects on listed and candidate species. Salmon stocks are defined by NMFS in ESUs, which can be certain runs of species. The Corps is required to differentiate between other populations of fish based on whether or not they are in an ESU.

LSR-35 The FR/EIS needs basin-wide perspective; follow the lead of the All-H paper.

Response: The Corps is part of the Basin-wide species recovery (All-H) process. The Corps is focusing on the hydropower portion in this strategy program.

5.6.4 Flow Augmentation

LSR-36 There is no relation between flow and survival rates; reduce augmentation.

Response: The FR/EIS alternatives do not consider changes in flow augmentation because the levels were stipulated in the 1995 Biological Opinion (NMFS, 1995). Now that the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) is final, flow augmentation will be revised accordingly (NMFS, 2000a).

LSR-37 The FR/EIS needs to evaluate effects if 600,000 acres in Idaho become barren because of no water.

Response: Alternatives that have additional flow augmentation levels that might lead to additional effects on agricultural lands in Idaho were not carried forward into the FR/EIS. Earlier in the study effort, an alternative that contemplated additional flows was considered. Additional flow augmentation was eliminated from further analysis in this study due to issues/concerns raised in BOR's "Snake River Flow Augmentation Impact Analysis Appendix, February 1999." Some of those issues/concerns are:

1. Insufficient storage space in the Snake River basin under BOR and Corps exclusive control to provide large amounts of water for flow augmentation without significant impacts to natural resources, recreations, and economic sectors.
2. Inability of BOR to meet its historic obligations and commitments to project beneficiaries if additional flow augmentation was required.
3. Inability of BOR to fully meet all congressionally authorized project purposes if required to provide 1,427,000 acre-feet for flow augmentation.
4. Affected states general opposition to flow augmentation.
5. Congressional action could be needed to clarify BOR's responsibilities or additional authorization and appropriate may be needed.

If additional flow augmentation is contemplated in the Biological Opinion, the BOR and other entities could study this issue more, in a separate environmental review process.

LSR-38 The FR/EIS needs a full review of the NMFS flow augmentation program (benefits and cost).

Response: The NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) evaluates the continuing flow augmentation program. The Corps has incorporated biological opinion information as appropriate.

LSR-39 Water releases for juveniles may harm adults.

Response: The Corps believes its analysis of the effects of operations on adults is adequate. This analysis relies heavily on over 30 years of applied research and monitoring by the USFWS/USGS Biological Resources Division Cooperative Extension at the University of Idaho, led by Dr. Ted Bjornn (Bjornn et al., 1997).

LSR-40 The FR/EIS needs to look at impacts of flow augmentation on wildlife, resident fish, and recreation.

Response: The BOR report identified impacts; however, no changes to flow augmentation are contemplated in the alternatives carried forward into the FR/EIS.

LSR-41 Stop daily peaking operations; they hurt Montana's native trout.

Response: The FR/EIS considers alternatives that affect lower Snake River dams. Issues of daily operation of Columbia dams are beyond the scope of this study. Impacts from operations at Columbia River dams are analyzed in BPA's 1995 System Operation Review (BPA et al., 1995).

LSR-42 Flow augmentation costs are not presented in either the FR/EIS or All-H paper. All costs of flow augmentation need to be included.

Response: Flow Augmentation is assumed to be a part of all four alternatives analyzed in detail. Because of this, the economic and environmental costs and benefits have been considered. Additional flow augmentation was eliminated from further analysis in this study due to issues/concerns raised in BOR's "Snake River Flow Augmentation Impact Analysis Appendix, February 1999." Some of those issues/concerns are:

1. Insufficient storage space in the Snake River basin under BOR and Corps exclusive control to provide large amounts of water for flow augmentation without significant impacts to natural resources, recreations, and economic sectors.
2. Inability of BOR to meet its historic obligations and commitments to project beneficiaries if additional flow augmentation was required.
3. Inability of BOR to fully meet all congressionally authorized project purposes if required to provide 1,427,000 acre-feet for flow augmentation.
4. Affected states general opposition to flow augmentation.
5. Congressional action could be needed to clarify BOR's responsibilities or additional authorization and appropriate may be needed.

5.6.5 Summary

LSR-43 The Summary Document needs to discuss effects of other Columbia River dams, Indian overfishing, and uncertainty of CRI and PATH analysis.

Response: The Summary document has been replaced and updated. It summarizes issues and findings of the study that were determined to be the most relevant. Due to limited space and the nature of a Summary, it does not include all relevant information. Refer to the FR/EIS for more detailed information on topics of interest to you.

5.7 Programs

Comments received in this category fell under General and LSR Comp Plan.

5.7.1 General

PRO-1 Hydroacoustics (Anglea et al. 2000) indicates that SBC efficiency is low.

Response: "Low" is a relative term and very likely depends on what the expectations were for the SBC. For the final year of testing (2000), the hydroacoustic estimate of fish passage through the SBC relative to turbine units 4 and 5 (where the SBC was located) was 62 percent. For the entire powerhouse, 56 percent of the fish passed through the SBC. Another way of looking at SBC performance is "effectiveness," defined as the percentage of fish passed over the percentage of water used. Using this performance indicator, the Lower Granite SBC, with an effectiveness of 11.2, performed nearly as well as the surface bypass system at Wells Dam, which is generally acknowledged to be the best performer of regional surface bypass systems.

PRO-2 Present power distribution prevents compliance on fish passage standards via spill.

Response: Conditions associated with spill and other programs were accounted for in the analysis as base conditions. Impacts were considered only for the effects of Snake River Dam breaching.

PRO-3 The Federal government should manage its own lands for improving habitat. The government should compensate private landowners for any protection measures implemented. It should not be a land grab.

Response: The Corps, like other Federal land management agencies, is responsible for managing fish and wildlife habitat on lands authorized and designated by Congress. There are State and Federal programs that encourage and recognize private land owners for wildife habitat improvement and protection measures.

PRO-4 Species other than salmon/steelhead that pass through the screening/bypass structures need to be evaluated as to impacts.

Response: Only simple observations have been non-routinely recorded for effects on incidental species passing through screening/bypass structures. Empirical data based upon monitoring and research do not exist partly because of the low sample sizes of incidental species, other than lamprey during certain seasons and shad. The FWCAR reports Corps data on bull trout passage back to 1988 for Little Goose only and addresses possible effects. The USFWS Biological Opinion for bull trout and white sturgeon requires additional monitoring and evaluation for bull trout passing mainsteam Snake and Columbia River dams in an attempt to gauge the status and impacts to bull trout. Monitoring and research on Pacific lamprey passage requirements was begun a few years ago and continues to grow in significance. White sturgeon have not been found to pass via screening and bypass structures possibly due to affinity for deeper water because they have been occasionally found in turbine draft tubes. Appendix B, Resident Fish, addresses the available information on these species. Chapter 5 of the FR/EIS has been supplemented with discussion on passage effects to these species.

5.7.2 LSR Comp Plan

PRO-5 The Comp Plan will need to be re-evaluated irregardless of the selected alternative.

Response: The effectiveness of the Comp Plan is monitored. See Appendix L, Lower Snake River Mitigation History and Status, for further details.

PRO-6 Text should include an analysis of whether or not the Comp Plan is effective.

Response: Appendix L discusses the Lower Snake River Mitigation History and Status.

PRO-7 The Final FR/EIS should state that the Comp Plan is not meeting adult fish goals.

Response: Appendix L discusses the Lower Snake River Mitigation History and Status.

PRO-8 Some items listed are not part of the Comp Plan (e.g., Snake River sockeye recovery program and coho recovery program).

Response: Comment noted and text adjusted.

5.8 Project Operations and Alternatives

The comments on the alternatives mostly fell into the General category. A few were received under Alternatives Eliminated and Alternatives Outside the Scope. This section also includes comments on Appendix D, Drawdown Engineering. Comments on Appendix E, Existing Systems/Major System Improvements Engineering parallel those in other appendices or the main text and so are not included here.

5.8.1 The Analysis of the Alternatives is Incomplete/Inadequate

ALT-1 The Draft FR/EIS does not adequately discuss and compare the cumulative and indirect effects of the four alternatives.

Response: Chapter 5, Environmental Effects of Alternatives, goes into detail on the direct and indirect affects of the alternatives on the resources of the Lower Snake River Project. Where uncertainties are high, as in the anadromous fish analysis, the detail of the effects is more general in description. As long as the uncertainties of actions remain large, the description of indirect effects will remain general. Cumulative effects are in Section 5.16. The effects of cumulative actions outside the study area were not thoroughly addressed. These effects have been embellished in the Final FR/EIS.

ALT-2 The Corps needs to identify a preferred alternative.

Response: A preferred alternative has been incorporated into the Final FR/EIS. A 45-day public review period will follow.

ALT-3 The selection of alternatives should receive further consideration. The problem is more complex than four choices (really only two).

Response: Chapter 6 of the FR/EIS and Appendix J, Plan Formulation contain additional information on the development and selection process. Also, there are some similarities between the first three alternatives, but there are also distinct actions with distinct effects that require NEPA analysis.

ALT-4 The Corps needs to incorporate the findings from three studies that have been or are being conducted in the State of Washington concerning effects on transportation (Washington State Department of Transportation [WSDOT]). These studies are as follows:

- A second study by HDR Engineering for the Washington State Legislative Transportation Committee (WSLTC) of impacts of dam breaching on other State highways and county and city roadways.

- A study by HDR Engineering, the State of Washington/Port of Benton Hanford Investment Study (January 2000), shows the practical capacity of the Burlington Northern-Santa Fe (BNSF) Railroad's Columbia River Gorge and Stevens Pass will be reached in 2005 or 2006; given current rail traffic growth rates, the capacity of Stampede Pass will be reached in the 2020s.

- The WSDOT is funding a study of benefits and impacts of 286,000-pound and 315,000-pound rail cars on light-density rail lines in Washington. Although heavier cars may help address capacity constraints on existing mainlines, most light-density lines do not have the necessary rail infrastructure to carry heavier cars.

Response: Issues addressed in the recently completed or on-going studies were assessed as part of the analysis of transportation system impacts of removal of lower Snake River dams. Although the Corps agrees that the additional information should be considered prior to actual implementation of dam removal, the information is not considered critical to a timely decision on a recommendation about the need to study dam removal in greater detail. If dam removal is recommended, additional study of transportation system impacts will be conducted. The study will include consideration of the referenced studies and coordination with transportation agencies and the railroads. Specific comments on issues addressed by the referenced studies are as follows:

- **Highway impacts.** Highway infrastructure improvements and costs included in the FR/EIS for Washington highways were taken from a study prepared for the WSLTC by HDR Engineering. Highway system costs that are included in the FR/EIS are considered adequate.
- **Rail capacity.** The issue of mainline rail system capacity was analyzed for the FR/EIS in a study conducted for the Corps by the Tennessee Valley Authority (TVA) and Marshall University (1998). The study consisted of a systems analysis of capacity constraints and needed system improvements with a significantly higher volume of diversion of grain to the rail system with dam removal than is actually expected. This study found that the additional volume of traffic (higher than is actually expected) would have a relatively insignificant impact on system capacity but identified a number of system improvements that may be needed. The issue was also discussed with representatives of the BNSF and Union Pacific (UP) railroads. The representative of the BNSF asserted that the additional volume of traffic with dam removal could be handled by the rail system without any impact on capacity. (The UP did not respond to our request for comments on potential rail system impacts.) The report prepared by the TVA and Marshall University was not published as part of the FR/EIS but is included in that Transportation Technical Report as a Technical Exhibit and is available for review on Walla Walla District's website (http://www.nww.usace.army.mil/lsr). A summary of the report is included in the Transportation Technical Report that was prepared by the Transportation Workgroup (DREW Transportation Workgroup, 1999a). For the Final FR/EIS, the summary of the transportation analysis that is included in Appendix I of the

FR/EIS will be revised to include information on the types of rail system improvements that could be needed with dam removal.

- **Larger rail cars.** Although analysis of the transition of the railroads to larger cars on mainline railroads may be appropriate for future consideration, the issue is not considered relevant to grain movement by the railroads with dam removal. The reason is that while the mainlines may be suitable for use of the larger cars, the secondary lines that feed the mainline certainly do not have the capability to use them. Accordingly, it would seem apparent that grain originating from secondary railroads would continue to be transported from the Snake River grain shed using cars that are currently in use. The analysis that was done for the FR/EIS was based on the use of cars with a capacity of 95 tons.

ALT-5 The FR/EIS needs to identify implementation items.

Response: Since a preferred alternative was not selected as part of the Draft FR/EIS, an implementation plan was not developed. Based on the selection of a preferred alternative, an implementation plan has been identified. This is discussed in Chapter 6 of the FR/EIS.

ALT-6 The FR/EIS should commit to a TMDL process and list specific items for compliance.

Response: The Corps supports the State and tribal efforts in development of TMDLs. Although the TMDL process is outside the scope of this FR/EIS, the Corps has been involved in several national initiatives to address water quality concerns. See the Clean Water Action Plan and the Unified Federal Policy at website http://www.cleanwater.gov.

ALT-7 The FR/EIS needs to identify all probable impacts, costs, and benefits to the environment.

Response: The Corps believes it has considered all probable impacts, costs, and benefits to the environment. The information has been presented in Chapter 5, Environmental Effects of Alternatives. Numerous Independent Technical Reviews have been conducted, which looked at the existing information with a focus on adequacy and accuracy. The reviews also focused on any missing information that might be critical to decision making.

ALT-8 The FR/EIS needs to indicate that Alternatives 1, 2, and 3 would exceed dissolved oxygen (DO) standards; Alternative 4 would not exceed the standards.

Response: Dissolved oxygen is discussed in more detail in Appendix C, Water Quality. More discussions will be brought forward into the main report.

ALT-9 In the FR/EIS, there is no clear measuring stick, formula, or set criteria for measuring alternatives.

Response: See Chapter 6, Plan Selection and Appendix J, Plan Formulation, for the criteria used to measure, evaluate, and compare alternatives.

ALT-10 Complete additional upstream management study.

Response: The NMFS 2000 FCRPS Biological Opinion, Section 9.6.2 addresses habitat actions (NMFS, 2000a). This section includes actions related to tributary and estuarine habitat.

ALT-11 The Draft FR/EIS fails to adequately consider social and economic factors; present data in more realistic timeframes and localize analysis.

Response: The Corps convened the DREW to develop a combined economic analysis. Members of DREW included representatives of government, State, and local governments, tribes, interest groups, and the public. The DREW agreed upon assumptions and methodologies prior to any analysis. The analysis was based upon the Economic and Environmental Principles and Guidelines for Water and Related Resources Council (WRRC). These guidelines required the evaluation and display of the effects of proposed alternatives in the National Economic Development (NED) account. However, given the magnitude of the study, three additional accounts were also analyzed: Environmental Quality (EQ), Regional Economic Development (RED) and Other Social Effects (OSE). The RED and OSE accounts presented the changes in regional economic activity that would result from each alternative. The RED analysis presented changes in income and employment. The OSE presented such issues as community impacts to life, health, safety, displacement, and productivity. Additionally, Tribal Circumstances were analyzed by CRITFC. In conclusion, the IEAB, a review board of economists drawn from academia and private industry, provided independent peer review of work products.

ALT-12 Mitigation measures to meet CWA requirements must be included for each alternative.

Response: Measures that improve water quality are incorporated into each of the alternatives. The shortcoming is that the measures have not been identified for their water quality benefits. The measures are not considered to be mitigation since they are a integral part of the alternative, not an effort to offset effects of the alternatives. The costs of these measures are incorporated into the implementation costs of each alternative. The Final FR/EIS will highlight the benefits to water quality of each of these measures. However, it is difficult to partition that portion of cost that is associated with the water quality benefit from other aquatic resource benefits.

ALT-13 The FR/EIS needs to incorporate "Normative River" concepts.

Response: The Independent Scientific Group discussed the concept of 'Normative Ecosystems" in the publication "Return to the River: Restoration of Salmonid Fishes in the Columbia River Ecosystem (ISG, 1996)." This concept is a difficult one to capture, because the definition is very general. The ISG identifies a normative ecosystem not as a static target or a single State of the river, but rather as a continuum of conditions. The ISG has identified that progress toward a normative ecosystem requires moving toward normative conditions with regard to the most critical attributes for salmonids. What this requires is a comprehensive, cooperative approach from all entities within the region. The idea of "normative river" has not been clearly defined. The lower Snake River with or without dams will never be an unregulated river unless all water impoundments and diversions above the lower Snake River are eliminated. The real question is whether the lower Snake River can move toward a more normative State with or without dams. That question will not be answered until, first a normative river within a normative ecosystem can be clearly defined such that it is consistent with the needs of native fish and wildlife species.

The ISG concept is based on three fundamental principles: restoration must address the entire natural and cultural ecosystem that encompasses the continuum of freshwater, estuarine, and ocean habitat where salmonids complete their life histories; sustained salmonid productivity requires a network of complex and interconnected habitats that are created, altered, and maintained by natural physical processes in the freshwater, the estuary, and the ocean environments; and life history diversity, genetic diversity, and metapopulation organization are ways salmonids adapt to their

complex and connected habitats. The Corps study on the lower Snake River is focused only on passage through the lower Snake River, not passage through the ecosystem. Therefore for the Corps to focus on the normative river when it is not clearly defined and it is not clearly understood how it fits into the normative ecosystem would be less than productive or informative to the much larger problems identified by the ISG.

ALT-14 Turbine improvements may not be needed; too few fish encounter them.

Response: FR/EIS Section 2.1.4, Turbine Operation, discusses turbine mortality. The efforts the Corps has made since the mid-1980s to operate turbines within 1 percent peak efficiency have reduced mortality due to turbines from 15 percent to 7 percent. However, additional improvements to turbines can lead to increased hydraulic efficiency, which translates into reduced fish mortality.

ALT-15 The FR/EIS needs more detail on the need for backup pumps for fish ladders. Why are they needed?

Response: Most efficient ladder passage for adult salmonids is achieved when water depth and velocity criteria over each weir is maintained. Pumps to maintain water for these criteria require maintenance like all mechanical devices. Auxiliary (or backup) pumps were requested in the 1995 Biological Opinion as emergency replacement pumps and/or replacement pumps when a primary pump is taken out of service for repair or maintenance. This measure ensures minimal periods of time for which ladder flow would not achieve the passage criteria.

ALT-16 The FR/EIS should describe mitigation options for all reasonable alternatives.

Response: The alternatives being evaluated are restoration alternatives with the intent to improve juvenile fish passage through the lower Snake River. As such any and all aspects of the alternative are mitigation measures in themselves. This is a different approach from that of studying ways to use the resources for other than restoration purposes. Costs for what might be considered mitigation are incorporated as implementation costs for the alternative or as economic benefits if in fact there is a cost savings due to no longer needing to expend maintenance funds. Look at the reasonable alternatives as mitigation in themselves.

ALT-17 The Washington Department of Fish and Wildlife (WDFW) lists actions that need immediate implementation. These should be included in an alternative.

Response: A primary responsibility of the Corps in implementing long-term Biological Opinion alternatives is to conduct a study of those measures that are associated with dams and reservoirs and that influence migration through the hydrosystem. The purpose of the Feasibility Study is to evaluate and screen structural alternative measures that may increase the survival of juvenile anadromous fish through the Lower Snake River Project. The 12 actions listed by WDFW identify programs that go beyond the purpose and scope of this Feasibility Study. The majority, if not all of these actions, are ones that should be developed with a regional perspective and that can be implemented throughout the basin. The Federal Caucus was established to focus regional efforts by the Federal agencies in these areas. These measures could be a part of those actions identified by the Federal Caucus for implementation. The Corps, however, will implement to the extent possible those measures identified in current Biological Opinions as well as future Biological Opinions.

ALT-18 The FR/EIS should include more detailed evaluation of entire dam structure removal.

Response: The FR/EIS provides a brief description of this alternative (Section 3.4, Alternative 4—Dam Breaching). References are made throughout this section to Appendix D, Natural River Drawdown Engineering, for details. The Corps' intention is to limit technical details in the FR/EIS, relying on the appendices to serve the purpose of technical discussions. The commentor is encouraged to review Appendix D. If Alternative 4 had been selected, the next step would be Plans and Specifications, where construction level detail is developed.

ALT-19 Detail measures in each alternative comparing measures to meet CWA. Also look at other options if CWA cannot be met.

Response: Measures that improve water quality are incorporated into each of the alternatives. The shortcoming is that the measures have not been identified for their water quality benefits. Efforts to identify measures that support improvements to water quality have been identified in the final version of the FR/EIS. The Corps will continue to explore new options and methods to address water quality issues. The Corps has been involved in national initiatives that focus on water related issues. See Clean Water Action Plan and the Unified Federal Policy at website http://www.cleanwater.gov.

ALT-20 Describe effects and options for mitigation for temperature, turbidity, total dissolved gas (TDG), and low dissolved oxygen in greater detail.

Response: Appendix C, Water Quality has been revised with new information and improved discussions. In regards to temperature, the most effective option would be to manage deep storage hypolimnetic releases in a manner that optimizes conditions for rearing fall chinook and simultaneously cools reservoir waters. Turbidity is not an issue with the reservoir, but it is a short-term issue with Alternative 4—Dam Breaching. Turbidity would continue to cause problems for a period of up to 10 years or until the point each year at which all the deposited sediment is washed out and more natural outflow occurs. The TDG problems are a result of spill. Attempts to manage voluntary spill with various structural improvements has been successful, however, less spill would be better. The involuntary spill that occurs with high river flows will continue to occur with the dams present. Dissolved oxygen will always be a problem at certain times of the year with a reservoir. The Corps has made structural improvements and operational changes to reduce effects on many of the parameters listed above.

ALT-21 The FR/EIS needs a specific schedule for implementation of improvements.

Response: Potential implementation scenarios are identified in the Draft and Final FR/EIS; Appendix D, Natural River Drawdown Engineering, Chapter 2; and Appendix E, Existing Systems/Major System Improvements, Annex E. These schedules are not very detailed. See Chapter 6 of the FR/EIS for more on the implementation schedule.

ALT-22 Unless hatchery fish improve, they do not meet mitigation requirements.

Response: The Lower Snake River Fish and Wildlife Compensation Plan established the goals for compensation of anadromous fish losses due to the Lower Snake River Project. The goals identified the need to modify some existing hatcheries and to build a number of new hatcheries. Hatchery capacity was based on the needed smolt-to-adult ratio (SAR) expected to bring anadromous fish populations back to acceptable levels. The expected SARs have not been realized. This is not a failure of the plan to meet compensation goals, rather it is a failure of not considering the full

lifecycle. It has been documented that the fish populations were on the decline for many fish generations prior to establishment of the Lower Snake River Project (See FR/EIS Chapter 4, Affected Environment).

ALT-23 The costs of turbine rehabilitation are underestimated.

Response: The turbine rehabilitation costs are based on costs reported in the Ice Harbor Lock & Dam Powerhouse, Major Rehabilitation Programs Report dated March 1997 (Corps, 1997). The Ice Harbor rehabilitation costs in this report were developed from a combination of actual project costs and estimates. Preparation work, mobilization, demobilization, turbines, governors, electronic exciters, stators, power transformers, testing, development, design, construction supervision, and miscellaneous work were included in these costs. Costs were reviewed by Operations Division, Portland District Hydroelectric Design Center, and BPA. See the Ice Harbor rehabilitation report for more information.

These costs then were updated to 1998 price level and quantities were increased to cover the rest of the turbines to be rehabilitated. These costs were not escalated to the current period of when they are planned for accomplishment because of the economic evaluation requirements. Also, because of the length of the period of study (105 years), two full turbine rehabilitation costs were also included.

ALT-24 It is important to resolve the delayed mortality issue. To select Alternative 2 would require evidence that transportation is as good as in-river migration with or without dams.

Response: The NMFS 2000 FCRPS Biological Opinion has identified a number of actions that would analyze the issue of delayed mortality (NMFS 2000a). At the present time no empirical evidence exists that indicates delayed mortality is higher with one action over another action.

ALT-25 The surface bypass collector (SBC) at Lower Granite does not address downriver tributaries.

Response: The majority of the juvenile salmon coming down the Snake River originate above Lower Granite. A surface collection system at Lower Granite would leave few migrating fish left in the river below Lower Granite. In addition, few fish enter the lower Snake River from tributaries below Lower Granite. Notable tributaries include Deadman Creek, Meadow Creek, Tucannon River, and Palouse River. For those fish passing Lower Granite or entering the lower Snake River below Lower Granite, new or modified existing extended submerged bar screen (ESBSs) will replace existing turbine intake screening systems at Lower Granite, Little Goose, Lower Monumental, and Ice Harbor. These ESBSs will increase screen diversion efficiency, thereby further reducing the number of fish passing through the turbines. Also, under the recommended plan (preferred alternative), a two-unit powerhouse surface bypass system (with or without dewatering) will be installed at Lower Monumental. In addition, a full-length powerhouse occlusion structure will be installed at Little Goose.

ALT-26 The FR/EIS needs further discussion on costs and burden to landowners for each alternative.

Response: Landowner burden has been translated to cost through the National Economic Development analysis. Where burden cannot be related to costs, there was a qualitative community analysis completed, which captured impacts that cannot easily be related to costs. These analyses have been evaluated for all four alternatives.

ALT-27 Benefits of breaching are underestimated; other actions are overestimated.

Response: A thorough review of costs and benefits has been conducted. The Corps has incorporated input from the region through workgroups, workshops, and public meetings. A series of technical reviews have been conducted by independent entities, and their input has been incorporated to the extent possible. There will always be debate about whether something is a benefit or a cost. However, the Corps follows methodology that is widely reviewed and accepted.

ALT-28 The FR/EIS needs more air quality analysis, particularly concerning particulate deposition to other media.

Response: Additional air quality analyses have been conducted including some modeling of the concentration of PM_{10} in air from sources associated with dam breaching. The "deposition" of particulates to other media is assumed to mean the transfer of particulate matter to the water or land by means of air transport. This is not addressed as an air quality concern, but may be considered a wind erosion factor. Appendix P, Air Quality, does look at migration of dust through wind erosion in general terms.

ALT-29 The FR/EIS needs to address hazardous waste issues, particularly potential spills.

Response: HTRW concerns were evaluated in two areas: materials associated with the dams themselves and materials associated with sediment in the reservoir. Materials associated with the dams would be disposed of following regulatory requirements. Materials associated with sediment have been determined to be of limited concern because their presence is below the standards set by regulating agencies. See Section 4.4.2.4, Other Contaminants, for discussions. In terms of spill, those hazardous waste issues associated with operations of the dams are handled through standard operating procedures for the dams. Potential spills associated with the Alternative 4—Dam Breaching would be addressed as part of developed designs and specifications and the construction plan. Hazardous waste presence is expected to be limited and costs associated with compliance have been included in the cost estimates for all alternatives considered.

ALT-30 The FR/EIS needs to determine impact of soil contaminants (lethal and sublethal) before removal.

Response: A survey of soil contaminants was conducted and is discussed in detail in Appendix C, Water Quality. Results are also presented in Chapters 4 and 5 of the FR/EIS.

ALT-31 Alternative 3 - skimpy discussion. The FR/EIS needs to address all four Hs, all dams, flow augmentation, and CWA costs.

Response: The hydrosystem is part of the All-H Process being evaluated by the Federal Caucus. The All-H Process and its findings are incorporated into the Final FR/EIS.

The purpose of the Lower Snake River Juvenile Salmon Migration Feasibility Study is to evaluate and screen structural alternative measures that may increase the survival of anadromous fish through the Lower Snake River Project.

Additional flow augmentation studies were a measure of the 1995 Biological Opinion and were conducted by the BOR. Based on study findings, no actions have been authorized or implemented, because of insurmountable issues associated with implementation.

Measures and costs that improve water quality are incorporated into each of the alternatives. The shortcoming is that the measures have not been identified for their water quality benefits. Efforts to

identify the measures that support improvements to water quality have been identified in the Final version of the FR/EIS.

ALT-32 There is a need for biological tests to determine "D" value.

Response: In the 2000 FCRPS Biological Opinion (NMFS, 2000a), NMFS has identified a number of biological tests that will attempt to explain delayed mortality (NMFS, 2000a).

ALT-33 The FR/EIS needs to debate potential for spawning habitat recovery in currently inundated areas.

Response: The potential for spawning habitat recovery in the lower Snake River under Alternative 4—Dam Breaching is discussed in Chapter 5 of the FR/EIS. There is no way to predict how successful this habitat will be under the sediment budget equilibrium, which could occur 10 to 20 years after dam breaching.

ALT-34 There are really only two alternatives—Alternatives 1, 2, and 3 vs. Alternative 4. There are identical benefits (economic, social, cultural) for first three.

Response: There are some similarities between the first three alternatives, but they are distinctly different actions. Benefits are not necessarily the same. Each of the three alternatives has a different impact on fish, water quality, power production, etc. The first three alternatives also have significantly different costs associated with implementation.

ALT-35 The FR/EIS needs to have additional consultation on all subjects to address concerns, both direct and indirect, on affected tribes outside of fish issues.

Response: The Corps set up three consultation meetings and responded to two requests from tribes to participate in meetings. See Appendix Q, Tribal Consultation and Coordination for discussions. The Corps is also seeking input from the tribes on how they want the Corps to fulfill consultation requirements under the Feasibility Study. The Corps plans on either additional consultation meetings with affected tribes or consultation meetings with individual tribes.

ALT-36 Any new roads would need testing for cultural/historic sites. What are the mitigation measures?

Response: Refer to Appendix D, Natural River Drawdown Engineering, Annex N, Cultural Resources Protection Plan.

ALT-37 There is concern about the need for contact with the State Historic Preservation Office, testing of sites, and discussion of interested parties' views.

Response: The Section 106 process of the National Historic Preservation Act requires coordination and consultation. Implementation of Section 106 process is part of the NEPA process in complying with Federal laws (see Chapter 9—Compliance with Applicable Federal Environmental Statutes and Regulations). Appendix D, Natural River Drawdown Engineering, Annex N, Cultural Resources Protection Plan goes into greater detail on coordination/consultation, as does Appendix N, Cultural Resources.

ALT-38 It is unclear how the Draft FR/EIS will comply with Section 106. There is a need for consultation for historic properties.

Response: The Section 106 process of the National Historic Preservation Act requires coordination and consultation. Implementation of Section 106 process is part of the NEPA process in complying with Federal laws (see Chapter 9—Compliance with Applicable Federal Environmental Statutes and Regulations). Section 106 compliance will occur on an as-needed basis. Newly exposed lands and resources under Alternative 4—Dam Breaching would be treated as a special circumstance with many unknowns. Therefore, a comprehensive resources inventory to identify and assess resource conditions would be necessary.

ALT-39 The FR/EIS needs to more clearly state differences between alternatives (as to recovery). Also discuss the Corps' confidence in CRI analysis.

Response: The purpose of the Feasibility Study is to evaluate and screen structural alternative measures that may increase the survival of juvenile anadromous fish through the Lower Snake River Project and assists in the recovery of listed salmon and steelhead stocks. If any one of the alternatives is determined to increase survival of juvenile anadromous fish through the Lower Snake River Project, then that alternative also assists in the recovery of listed species. It is not the purpose of this study to identify the recovery measure.

As far as the Corps' confidence in the CRI analysis, the Corps recognizes the high degree of uncertainty with the biology. This uncertainty is based on the fact that there are a lot of data gaps that translate into what we don't know and that there is a lot of natural survival variability related to the lifecycle components of the listed species that we do not understand. NMFS has attempted to qualify the uncertainty by developing a model that predicts extinction, thereby helping the region to focus on actions to close data gaps and make a more informed decision.

5.8.2 The Analysis for Alternatives 1, 2, or 3 is Incomplete/Inadequate

ALT-40 The FR/EIS needs to mention for Alternatives 1, 2, and 3 that recreation will continue.

Response: This discussion occurs in the opening paragraph in Section 5.12, Recreation and Tourism. It states, "Implementing Alternatives 2 and 3 would not lead to any changes to existing recreation facilities and usage patterns. From a recreation use perspective they would essentially be the same as Alternative 1 – Existing Conditions." Subsequent paragraphs talk more about recreation for all the alternatives.

ALT-41 The FR/EIS needs to analyze effects of changes already made under Alternative 1 per the 1995 Biological Opinion.

Response: The PATH process did not analyze a hydrosystem with the improvements that were incorporated for fish passage. The CRI analysis did look at a hydrosystem that is representative of today, incorporating the latest adult spawner data available through 1999. Therefore those changes made over the years to the existing system have been taken into consideration, including many of the measures implemented as part of the 1995 Biological Opinion.

ALT-42 The region needs to allow more time to see effects of Alternative 1 due to length of fish cycle.

Response: The PATH process did not analyze a hydrosystem with the improvements that were incorporated for fish passage. The CRI analysis did look at a hydrosystem that is representative of

today, incorporating the latest adult spawner data available through 1999. Therefore those changes made over the years to the existing system have been taken into consideration, including many of the measures implemented as part of the 1995 Biological Opinion.

ALT-43 The FR/EIS needs to address sedimentation effects for Alternatives 2 and 3. Also include costs.

Response: Sedimentation effects for Alternatives 2 and 3 are no different than those for Alternative 1. The costs for dredging have been incorporated into the costs of each alternative, largely as an avoided annual cost.

ALT-44 Flip lips are not the most effective method to reduce TDG. Use submerged discharge. Add this to Alternative 3.

Response: Spillway flow deflectors (flip lips) have been proven to be extremely effective at minimizing TDG supersaturation of spillway flows. The flow deflectors have reduced gas concentrations by as much as 25 to 35 percent TDG on the Lower Snake River Project, and are capable of maintaining gas concentrations below 120 percent (levels accepted by the regional fisheries agencies as safe for juvenile salmonids) for voluntary spill events. However, spillways with flow deflectors will continue to produce high levels of TDG during a 10-year, 7-day flow event.

Submerged conduits have been evaluated as a dissolved gas abatement alternative in the Phase I and Phase II Gas Abatement studies conducted by the Corps. This alternative includes the construction of large conduits through the existing spillway monoliths. Various alternative designs were evaluated and tested within a 1:40 and 1:25 scale physical hydraulic models. The conduits were designed to pass approximately 10,200 cubic feet per second (cfs) per bay in an effort to meet the State and Federal water quality standards. The conduits would draw flow from the forebay and discharge beneath the water surface of the tailrace in an effort to prevent the aeration of flow while maintaining positive pressures throughout to prevent cavitation.

This alternative was evaluated by regional biologists and was not accepted because of juvenile fish survival concerns. A study by the Oregon Department of Fish and Wildlife in 1992 at Fall Creek Dam in the Willamette River indicated a 70-percent mortality of spring chinook juveniles passing through submerged conduits at high head discharge, and a 30-percent mortality at low head discharge. Mortality is likely to occur from injuries associated with high shear zones created by flow separation at the intake gates and outlets, and abrupt changes in pressure gradient.

5.8.3 The Analysis for Alternative 4 is Incomplete/Inadequate

ALT-45 The FR/EIS needs to identify specifics (detailed costs) on traffic increases/ capacity and pavements/intersection/ and track deficiencies with Alternative 4.

Response: Analysis of specific highway and railroad infrastructure improvements that would be needed with Alternative 4 and development of detailed costs are beyond the scope of the Feasibility Study. If Congress authorizes dam removal, detailed studies of infrastructure needs and costs will be completed before this alternative would be implemented. However, detailed information developed on this issue is included in Appendix I, Economics, Section 3.3, Transportation. The summary of the transportation impacts analysis for the Final FR/EIS has been revised to include identification of the types of improvements that would likely be needed for the rail and highway systems with Alternative 4.

Railroad capacity analysis is addressed in the report, "The Incremental Cost of Transportation Capacity in Freight Railroading: An Application to The Snake River Basin" (TVA and Marshall University, 1998). This analysis is included in the Transportation Technical Report as Technical Exhibit F. The Transportation Technical Report was not published as part of the FR/EIS but is available on the Walla Walla District's website (http://www.nww.usace.army.mil/lsr).

ALT-46 For Alternative 4, look at downstream flood effects, particularly in the lower Columbia.

Response: The Lower Snake River Project was not designed and is not operated to provide flood control benefits because flood control is not a congressionally authorized project use. According to the 1995 Columbia River System Operation Review (SOR) EIS (BPA et al., 1995), the Lower Snake River Project is physically capable of providing a minor benefit under a partial drawdown operation strategy, but only when coupled with major reconstruction of the projects. The reconstruction would be necessary to continue current congressionally authorized uses and operation of fish passage facilities. The Dworshak Dam located upstream on the Clearwater River currently provides congressionally authorized flood control benefits for the lower Snake River and further downstream on the Columbia River.

ALT-47 The FR/EIS needs to identify specific projects that will prevent or correct embankment failure under Alternative 4.

Response: The embankment protection scheme is summarized in Appendix D, Natural River Drawdown Engineering, Annex F, Railroad and Highway Embankment Protection Plan. The repair plan is identified in Annex H, Railroad and Roadway Damage Repair Plan of the same Appendix D. Using pre-dam information, the Corps was able to identify potential failure problem areas, however, the exact extent of embankment failures is hard to predict due to the rapid drawdown rate of 2 feet per day. The extent of repairs and locations identified in the annexes are estimates only. One of the problems with accurate prediction is that information on the character of all embankment material is not adequate to predict specific failures under the rapid drawdown. A slower drawdown is not reasonable if dam breaching is to occur within a work window that has the least impact on migrating salmonids.

ALT-48 The FR/EIS needs to describe the status of ownership of natural riverbeds under Alternative 4; the lands should go to the Washington Department of Natural Resources.

Response: Lands ownership and status is discussed in Subsection 5.11.2.2. More detail is presented in Appendix K, Real Estate. The land below the ordinary high water line of the original river bed was never acquired by the Federal government, therefore remains in State ownership. Lands that would become exposed as a result of Alternative 4—Dam Breaching, would be retained by the Federal government for restoration purposes. If any lands were no longer required, they would be reported to General Services Administration (GSA) for disposal.

ALT-49 Hazardous waste issues with replacement power need to be discussed for Alternative 4. The FR/EIS needs to address human health and environmental risks, including those to areas outside immediate area of project.

Response: See Chapter 5, Environmental Effects of Alternatives in the Final FR/EIS for added qualitative discussions.

ALT-50 The FR/EIS needs to address water quality impacts due to new transportation infrastructure, particularly under Alternative 4.

Response: Impacts of construction of infrastructure improvements needed with dam removal are expected to be comparable to those associated with similar types of construction. Except for in-water work that may be needed during construction of a new grain terminal in the Tri-Cities area, impacts to water quality would be minimized through use of temporary erosion/runoff control measures during construction. Operation of the new infrastructure would not have an impact on water quality. The need for measures to minimize or eliminate impacts of construction of transportation infrastructure will be addressed during preparation of detailed design of infrastructure improvement, if dam removal is authorized by Congress and implemented. Because of the insignificance of potential impacts and because standard construction practices include measures to prevent or minimize impacts of construction on water quality, the Corps does not believe that it is necessary or appropriate to address this issue in the FR/EIS.

ALT-51 The FR/EIS needs to look at existing water quality in tributaries and anticipated effects under Alternative 4 (e.g., sediment).

Response: Alternative 4—Dam Breaching is not expected to affect the water quality of tributaries. However, with a smaller volume of water in the river, the tributaries with the same volume of water will have a greater effect on the river than they did on the reservoir. This might have an annual short-term effect on the river water quality.

ALT-52 The analysis of indirect and cumulative effects of Alternative 4 on transportation systems and the environment is inconsistent with NEPA.

Response: Section 5.8 of the Draft FR/EIS does describe infrastructure impacts and estimates a cost for needed improvements associated with Alternative 4—Dam Breaching. The level of detail is not site specific, however, it is detailed enough to understand the effect of impacts to the infrastructure. Look for further discussions on the indirect effects and cumulative effects of Alternative 4 as regards transportation infrastructure improvements in the Final FR/EIS.

ALT-53 The FR/EIS needs to incorporate studies on heavier railroad capacity constraints for Alternative 4.

Response: Analysis of specific highway and railroad infrastructure improvements that would be needed with Alternative 4 and development of detailed costs are beyond the scope of the Feasibility Study. If Congress authorizes dam removal, detailed studies of infrastructure needs and costs will be completed before this alternative would be implemented. However, detailed information developed on this issue is included in Appendix I, Economics, Section 3.3, Transportation. The summary of the transportation impacts analysis for the Final FR/EIS has been revised to include identification of the types of improvements that would likely be needed for the rail and highway systems with Alternative 4.

Railroad capacity analysis is addressed in the report, "The Incremental Cost of Transportation Capacity in Freight Railroading: An Application to The Snake River Basin," (TVA and Marshall University, 1998). This analysis is included in the Transportation Technical Report as Technical Exhibit F. The Transportation Technical Report was not published as part of the FR/EIS but is available on Walla Walla District's website (http://www.nww.usace.army.mil/lsr).

ALT-54 The FR/EIS needs to provide additional evaluation of sediments deposited in Lake Wallula. Will this result in the need for additional dredging?

Response: A detailed analysis of sediment deposition is presented in Appendix F, Hydrology/Hydraulics and Sedimentation. Key elements of this analysis are presented in the Draft FR/EIS, Section 5.3, Water Quality. It is fair to assume dredging in Lake Wallula might be necessary due to added sediments resulting from implementation of Alternative 4—Dam Breaching. However, it is very difficult to predict how much dredging, how often, or where the dredging would occur. The information presented identifies the likely areas for deposition, however, nature controls the quantity and timing of deposition, which dictates the need for dredging.

ALT-55 The FR/EIS needs to consider and evaluate at-grade crossing improvements that are needed under Alternative 4.

Response: Appendix I, Economics, Section 3.3.5.6, Infrastructure Requirements and Costs discusses working with railroad representatives to identify needed improvements, including interchanges, track upgrades, and "other" for Alternative 4 – Dam Breaching. Costs were also estimated. Additional detail has been added to the Final FR/EIS Main Report.

ALT-56 Need more details on new infrastructure requirements such as miles of road, railroads, and impervious surfaces.

Response: A detailed analysis of infrastructure requirements is presented in Appendix I, Economics. Key elements of this analysis are presented in the FR/EIS, Section 5.8, Transportation. Requirements and costs are presented in these reference locations.

ALT-57 PATH model does not match real data as basis for breaching.

Response: There were many concerns with the fact that PATH used little empirical data, especially not incorporating data gathered in more recent years. Because of these concerns, NMFS used what PATH had done, augmenting it with additional data and knowledge of how the hydrosystem works into the CRI model. The CRI model has been used to help shape the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a).

ALT-58 The FR/EIS needs to better address increased operating and maintenance costs for highways, railroads, and roadways for all alternatives.

Response: The only Feasibility Study alternative that is expected to have a significant impact on highways and railroads is Alternative 4—Dam Breaching. Increased highway and railroad traffic required to transport commodities diverted from the Snake River with dam removal was evaluated. However, the analysis was limited to the cost of infrastructure improvements that would be needed. Analysis of potential impacts on the operating and maintenance costs of affected highways and railroads was beyond the scope of this study. If dam removal is recommended for more detailed study, increased operating and maintenance costs for highways and railroads will be addressed.

ALT-59 Evaluate timing alternatives under Alternative 4.

Response: Phasing of implementation for Alternative 4 is part of the plan. Appendix D, Natural River Drawdown Engineering describes how that would work.

ALT-60 Piers will be subject to increased scour. What are the effects/costs/mitigation for this effect?

Response: Refer to Appendix D, Natural River Drawdown Engineering, Annex E, Bridge Pier Protection Plan for a description of the protection measures and the effects. Annex X, Comprehensive Baseline Cost Estimate identifies costs.

ALT-61 Alternative 4 description needs more detail - but implement immediately.

Response: Alternative 4—Dam Breaching is discussed in detail in Appendix D, Natural River Drawdown Engineering. If Alternative 4 is selected, the next phase of the process is to prepare plans and specifications that are at a construction level of detail.

ALT-62 Reservoir lands should stay in Federal ownership; the Federal government should fund.

Response: FR/EIS Section 5.11.2, Lower Snake River Corridor, discusses the proposed ownership of lands that would become exposed under Alternative 4—Dam Breaching. The primary reason for Federal ownership to continue would be to monitor and maintain the biological effectiveness of dam breaching, which includes not only riparian habitats for salmon, but also terrestrial habitats for wildlife species. Congressional legislation could address the future status of these lands. If any lands were no longer required, they would be reported to the General Services Administration for disposal.

ALT-63 For Alternative 4, the FR/EIS needs to consider fish trapped in pools in the reservoirs. What are the mitigation measures for this?

Response: This short-term effect is identified for resident fish in FR/EIS Section 5.5.2, Resident Fish. No mitigative measures were identified because no preferred alternative had been identified. The Corps will ensure this mitigative measure is part of the implementation plan if Alternative 4—Dam Breaching is selected.

ALT-64 Dam breaching is not the "silver bullet." We need a regional energy plan.

Response: The Federal Caucus consists of nine Federal agencies that have agreed to cooperate and establish a recovery plan. Their efforts have been to identify actions associated with improvements in habitat, hatchery, harvest, and hydropower. As far as a regional energy plan, the Northwest Power Planning Council has the mandate for developing such a plan and providing guidance to the region.

ALT-65 The FR/EIS needs to know more about a removal timeline before a decision can be made.

Response: The Implementation Schedule for Alternative 4—Dam Breaching is discussed in Annex W of Appendix D, Natural River Drawdown Engineering. The overall schedule for implementation is affected by things such as how quickly Congress reacts to developing authorization and appropriation legislation and length of time in which a decision to implement Alternative 4 is tied up in court as part of litigation.

ALT-66 Extra mortality is a result of the hydrosystem.

Response: There is some evidence associated with transported fish that extra mortality exists and it is known as "D" or delayed mortality. However, the evidence is based on a small number of returning adults with large confidence interval for each estimate. NMFS has been unable draw conclusions regarding the existence of delayed mortality on non-transported fish. NMFS has

determined that research is needed on the issue of extra mortality, as defined by the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a).

ALT-67 Alternative 4 analysis should include the cost of replacement generation.

Response: FR/EIS Section 5.15, Economic Overview identifies that the costs associated with the shift from hydropower to more expensive forms of replacement power, which would be required under Alternative 4—Dam Breaching, are included in the National Economic Development account. For more detailed discussions, refer to Appendix I, Economics, Chapter 3, National Economic Analysis Development, in particular Section 3.1.9, Summary of Hydropower Economic Effects.

ALT-68 It is unlikely that projects would be reconstructed with Alternative 4. Safety, hydraulic conditions, and stability of structures are all of concern.

Response: If Alternative 4—Dam Breaching were selected and implemented, and it did not result in improved salmon returns, Congress would have the option to rebuild the dams. Whether or not this is realistic is for Congress to decide.

ALT-69 The need for dam removal not conclusive. See or compare to poor runs on streams where there are no dams but where they have gill netting and streamside development.

Response: CRI modeling identifies that there are large biological uncertainties with Alternative 4—Dam Breaching. The NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) has incorporated a broader scope approach by looking at all the Hs involved in the lifecycle of the salmon and steelhead.

ALT-70 Spawning grounds immediately below dams would be eliminated under Alternative 4.

Response: Current estimate of spawning by fall chinook salmon in the lower Snake River is considered incidental. The locations at which it has been observed are below Lower Granite, Little Goose, and Ice Harbor. Continued operations under Alternative 1 – Existing Conditions, would allow for maintenance of the limited use of these areas for spawning. Under Alternative 4—Dam Breaching, it is expected that establishment of a functional habitat for spawning could take 10 to 20 years pending a sediment budget equilibration/pseudo-stabilization. The spawning habitat that would be gained back would be slight in comparison to the historic levels where most of the habitat was upstream of Hells Canyon Dam.

ALT-71 The FR/EIS needs to further identify transportation infrastructure impacts, particularly slope and embankment failures under Alternative 4. The FR/EIS needs to describe mitigation.

Response: The embankment protection scheme is summarized in Appendix D, Natural River Drawdown Engineering, Annex F, Railroad and Highway Embankment Protection Plan. The repair plan is identified in Annex H, Railroad and Roadway Damage Repair Plan of the same Appendix D. Using pre-dam information, the Corps was able to identify potential failure problem areas, however, the exact extent of embankment failures is hard to predict due to the rapid drawdown rate of 2 feet per day. The extent of repairs and locations identified in the annexes are estimates only. One of the problems with accurate prediction is that information on the character of all embankment material is not adequate to predict specific failures under the rapid drawdown. A slower drawdown is not reasonable if dam breaching is to occur within a work window that has the least impact on migrating salmonids. The repair plan describes measures for handling failures.

ALT-72 Lack of tribal input on Alternative 4 is a concern because there is no quantifiable assessment.

Response: Drawing down the Lower Snake River Project was identified as a reasonable and prudent measure in the 1995 Biological Opinion issued by NMFS (NMFS, 1995). The Corps presented natural river drawdown as a concept in July 1995 during the public scoping meetings. The Corps returned to the region in September 1997 and November 1998 with updates on the concept of natural river drawdown. The Corps worked with the CRITFC through the DREW to develop a report entitled, "Tribal Circumstances and Impacts of the Lower Snake River Projects on the Nez Perce, Yakama, Umatilla, Warm Springs, and Shoshone-Bannock Tribes" (Meyer Resources, 1999). The CRITFC also worked with the anadromous fish economics team of the DREW to incorporate tribal ceremonial and subsistence values into the overall fish harvest presentations. All 14 tribes with which the Corps consults were provided opportunities to participate in the regional meetings and to review the above document. The Corps held several consultation meetings with the tribes and accepted invitations by tribes to participate with their tribal counsels (reference Appendix Q, Tribal Consultation and Coordination). The most quantifiable information that was obtained was for fish harvests. Other circumstantial information obtained was largely qualitative in presentation.

ALT-73 What are the effects on wetlands from new transportation facilities under Alternative 4? What mitigation is proposed?

Response: The Corps will analyze the indirect and cumulative environmental effects of transferring commodity shipments from the waterway to surface transportation. However, because the Corps will not decide on the improvements needed or the locations for surface transportation (the States of Washington and Idaho will make these determinations) to accommodate the shift in transportation, the Corps cannot make site-specific determinations of effect. The effects discussion will be general in nature. If Alternative 4—Dam Breaching were selected, the Corps would enter into discussions with the States of Washington and Idaho and the Federal Highway Administration during the plans and specifications phase of implementation. The Final FR/EIS reflects the analyses completed.

ALT-74 Spread decommissioning over many years to test results—up to 60 years.

Response: By spreading decommissioning over many years, the negative impacts of deconstruction and sediment movement will last longer, thereby greatly affecting the survival of not only returning adult salmon but also migrating juvenile salmon. The greatest amount of sediment movement will occur with high flows eroding those materials deposited over the years. Water users would be out of business for a longer time because of long-term sediment problems. Recreation opportunities would become diminished due to long-term changes in the water. Impacts to the aquatic environment are just too great to prolong this process over many years. Delays of implementation beyond the 15-year period could lead to extinction for spring/summer chinook according to NMFS. The phased decommissioning as outlined in Alternative 4—Dam Breaching would allow the river/aquatic system to rebound in the shortest period possible. Even though there are some great short-term impacts, they would be out-weighed by the long-term benefits, once the river system acclimates.

ALT-75 Phase decommissioning under Alternative 4.

Response: Alternative 4—Dam Breaching incorporates a two-phased approach to help keeps costs down and to create the least impact to the aquatic system.

ALT-76 Remove all dam parts under Alternative 4.

Response: The Corps considered two dam-breaching options: channel bypass and complete dam removal. Both options can be implemented; however, the Corps chose to promote the channel bypass option. Both options would open the river to a near-natural yet regulated condition; however, the complete dam removal option is approximately twice as expensive to implement. See Appendix D, Natural River Drawdown Engineering, Annex X, Comprehensive Baseline Cost Estimate for presentation of costs.

ALT-77 Remove all but the powerhouse under Alternative 4. This would save money in the long run.

Response: See response to comment ALT-76.

ALT-78 Alternative 4 should include a reserve for rebuilding.

Response: This is an option that Congress could consider if they felt it of importance to return to a hydropower situation on the lower Snake River under Alternative 4—Dam Breaching.

ALT-79 Alternative 4 should include a good highway from Lewiston to Pasco.

Response: The shift of commodity movement from water to land will place greater demands on the highways in Idaho and eastern Washington. This shift is identified in Appendix I, Economics: Section 3.3, Transportation. The existing highways would need to be upgraded to handle the added traffic and for safety purposes. The States of Idaho and Washington would determine the extent and location of these improvements.

ALT-80 The FR/EIS does not cover the full range of recovery options.

Response: The purpose of the Feasibility Study was never to address the full range of recovery options. The Corps' primary responsibility in implementing long-term Biological Opinion alternatives is to study those measures associated with dams and reservoirs and that influence migration through the hydrosystem. More specifically the Corps' purpose for the Feasibility Study is to evaluate and screen structural alternative measures that may increase the survival of juvenile anadromous fish through the Lower Snake River Project. The full range of recovery options was undertaken by the Federal Caucus in their All-H Process. One of the purposes of the Federal Caucus is to develop an overall, conceptual recovery strategy encompassing all the threatened and endangered fish and wildlife species in the Columbia Basin. Because the Federal Caucus consists of nine Federal agencies, it serves to assist the agencies align their programs and activities to ensure maximum coordination and uniformity of policy from the Federal perspective.

ALT-81 The FR/EIS needs a preferred alternative including a range of actions. Look at other alternatives such as grow more salmon, reform harvest management to protect wild stocks, remove predators, remove tribal subsidiaries, study ocean conditions, and end junk science ("modeling").

Response: See response to comment ALT-80.

ALT-82 Only Alternative 4 provides CWA compliance. Other alternatives for compliance should be explored.

Response: Appendix T, CWA Analysis has been developed for the purposes of addressing issues associated with CWA compliance. This information analyzes CWA requirements against all four alternatives considered as part of the Feasibility Study.

ALT-83 Move beyond dam debate and look at improved bypass/transport, NMFS flow augmentation program, and water management. These alternatives should be developed by water rights holders.

Response: Improved bypass and transport is being considered by the Corps as part of Alternatives 1, 2, and 3. Each one has different variations for implementation. The flow augmentation program and water management programs are being considered by the Federal Caucus as part of its All-H Process.

ALT-84 Build a small (passable) dam near Lewiston to maintain water level/withdraw water at mothballed Lower Granite for irrigation.

Response: The irrigation demands in the vicinity of Lewiston are minimal. Provisions are included in Appendix D, Natural River Drawdown Engineering to deal with several water users in the area. There is no irrigation water presently diverted at Lower Granite Dam for use in the area. The primary irrigation use in the system is the reservoir behind Ice Harbor Dam. Transporting the estimated 700 cfs required for the current irrigation demand from the Lewiston area to the Ice Harbor area is a monumental task. The current water users in the Lewiston area would find it difficult to bear the high cost of such a system.

ALT-85 Draw water for hydropower at Lower Granite and pipe to other dams, leave the natural river.

Response: The comment implies that power production uses a small fraction of water available in the river. The quantity of water required for current levels of hydropower production is approximately 20,000 cfs per unit. With six units at each project, 120,000 cfs is required for peak production. It is not feasible to provide an off-stream pipe, canal, or channel for this quantity of water. During certain times of the year, the full river flow passes through the turbines for power production.

ALT-86 The Corps ignores reasonable alternatives. The FR/EIS should further discuss bypass collectors, turbine improvements, or other approaches.

Response: Surface bypass collection is a significant part of Alternative 3 – Major Systems Improvement. Turbine improvements as incorporated into Alternative 1 – Existing Systems, Alternative 2 – Maximize Transport, and into Alternative 3. Additional bypass measures, which were not identified in the Draft FR/EIS, have been incorporated into Alternative 3 for the Final FR/EIS. Many other approaches have been considered over the years in various studies that have lead up to the present study. These approaches can be reviewed in the System Configuration Study – Phase I report and in the Interim Status Report, which is part of Phase II of the System Configuration Study (Corps, 1996).

ALT-87 Look at other options first including:

- Curtail ocean and river system harvest and rigorously enforce the restrictions.
- Reduce pressure from predators on both smolts and adults.
- Continue to improve the dam bypass systems as the Corps has been doing for both smolts and returning adults.
- Consider a natural river bypass. This has worked well in British Columbia.
- Count hatchery fish in the recovery statistics.

Response: These are all worthwhile options for consideration; however, only bullets three and four are within the scope of this study. The other three are options that can and should be considered as part of an ecosystem approach to salmon recovery in the region. As part of this study the Corps is considering improvements to dam bypass systems and is considering a natural river bypass. The Federal Caucus is a nine-agency team, which is considering ecosystem approaches to salmon recovery. The Caucus prepared the "All-H" paper, which is under consideration by the Corps at the present time.

ALT-88 Keep Ice Harbor but remove the other three dams. Save Ice Harbor for irrigation and save money.

Response: Breaching of one, two, or three dams was not considered in this FR/EIS because the removal of any one dam would eliminate major navigation in the lower Snake River to Lewiston, ID and would have significant effects on power production, thereby not supporting the regional demand. In addition, options for fish collection and transportation would be curtailed, making it difficult to support many of the RPAs identified in the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a). There is no biological support for removal of less than all four dams.

5.8.4 Consider a More Comprehensive Approach than is Represented by Current Alternatives

ALT-89 Use Framework Alternative 4. Do not remove dams; use flow from ineffective augmentation to produce money for recovery program.

Response: The Feasibility Study Alternative 3 – Major System Improvements also emphasizes additional research and adaptive management as does the Framework Alternative 4. The Phase II Interim Status Report addresses other alternatives not carried forward in the study.

ALT-90 A new alternative for the All-H program should be developed. This would address areas of: Management, Hydropower, Habitat, Harvest, Hatcheries, Predation, and Ocean and Climate.

Response: This comment has been passed on to the Federal Caucus, which is developing and overseeing the implementation of these types of ecosystem types of approaches.

ALT-91 The FR/EIS needs to incorporate aspects of the BPA.

Response: The Corps of Engineers, the BOR, and the BPA prepared a Biological Assessment for the FCRPS. This assessment was sent to NMFS and the USFWS for their biological opinions. These opinions addressed not only the FCRPS, but also the complete lifecycle of the listed species. The Lower Snake River Juvenile Salmon Migration Feasibility Study influences just a part of the listed species lifecycle. The purpose of the Feasibility Study was not to address the entire lifecycle, but only that portion associated with the lower Snake River. The Federal Caucus, however, has developed a series of alternatives that are broader and more holistic in nature and consider the Columbia River Basin rather than just the lower Snake River. Both the Lower Snake River Juvenile Salmon Migration Feasibility Study and the Federal Caucus All-H paper fulfill the purposes and needs for which they were designed.

ALT-92 There needs to be a regional approach to recovery.

Response: The purpose for the Feasibility Study was never to address the full range of recovery options. The Corp's primary responsibility in implementing long-term Biological Opinion

alternatives is to study those measures associated with dams and reservoirs and that influence migration through the hydrosystem. More specifically, the Corp's purpose for the Feasibility Study is to evaluate and screen structural alternative measures that may increase the survival of juvenile anadromous fish through the Lower Snake River Project. The full range of recovery options was undertaken by the Federal Caucus in its All-H Process. One of the purposes of the Federal Caucus is to develop an overall, conceptual recovery strategy encompassing all the threatened and endangered fish and wildlife species in the Columbia Basin. Because the Federal Caucus consists of nine Federal agencies, it serves to assist the agencies align their programs and activities to ensure maximum coordination and uniformity of policy from the Federal perspective.

ALT-93 Defer study and discussion of Alternative 4 indefinitely; focus on other Hs.

Response: See response to comment ALT-92.

5.8.5 Consider Alternative Methods or Additional Structure/Operation Changes to Help Recover Juvenile Salmon

ALT-94 Build and test a pipe or bypass channel for outmigrating juveniles.

Response: Upstream collectors and conveyance of collected fish downstream were considered during the System Configuration Study Phase I, March 1994. It was decided that collectors should continue to be evaluated, however, the migratory canal/pipeline proposals should be eliminated from further consideration due to biological concerns and uncertainties.

ALT-95 Redesign fish ladders for adults; have different ladders for juveniles.

Response: Juveniles migrating downstream past dams use several pathways: turbines, bypass systems with tailrace outfalls, and spillways. Ladders, however, are not one of their routes.

ALT-96 Replace obsolete turbines with fish-friendly turbines to reduce mortality.

Response: The exact nature of changes to turbines to allow for improved fish passage is still under study. However, it is assumed that improvements to turbines will be incorporated in the scheduled turbine rehabilitation for each dam. For the purpose of this study, a minimum gap runner design will be installed in each turbine.

ALT-97 Consider keeping fish ladders open longer/ remove trash from upstream entrances more often.

Response: The adult fish passage facilities are operated in accordance with the Corps' Fish Passage Plan as prescribed in the 1995 and 1998 Biological Opinions (NMFS, 1995; 1998). Fish ladders typically operate all year with two weeks shutdown for maintenance in the January through March timeframe when adult passage through the lower Snake River is at its lowest, thereby minimizing the impact. The upstream entrance being referred to is actually an exit for the adults. These exits typically do not have a debris problem.

ALT-98 Use rotary screens for bypassing dams or put a viaduct around ends of dams.

Response: Use of high volume rotary screens for bypassing fish around dams would be impractical. The screens would be huge and would create some major changes to the hydrograph for the lower Snake River. Conveyance of collected fish downstream was considered during the System Configuration Study Phase I, March 1994. It was decided that the migratory canal/pipeline

proposals should be eliminated from further consideration due to biological concerns and uncertainties.

ALT-99 Turbine and dam facility improvements have increased survival rates; more work should be done on these areas.

Response: Testing of turbine modifications continues as do dam facility improvements. Improvements made to date on the lower Snake River facilities have made great strides in fish passage. The Corps, along with other Federal agencies, continues to look for opportunities to make improvements to hydropower facilities and their operation.

ALT-100 A Proposal for 9-mile bypass channel should be considered.

Response: Upstream collectors and conveyance of collected fish downstream were considered during the System Configuration Study Phase I, March 1994. It was decided that collectors should continue to be evaluated, however, the migratory canal/pipeline proposals should be eliminated from further consideration due to biological concerns and uncertainties.

ALT-101 Develop a gravity fish canal that could go all the way to Bonneville.

Response: Upstream collectors and conveyance of collected fish downstream were considered during the System Configuration Study Phase I, March 1994. It was decided that collectors should continue to be evaluated, however, the migratory canal/pipeline proposals should be eliminated from further consideration due to biological concerns and uncertainties.

ALT-102 Modify spillways for surface spill of juveniles.

Response: Improvements to spillways are begin considered. Existing spillway flow deflectors and pier extensions are part of Alternatives 1 through 3 as are additional spillway flow deflectors and end by deflectors. Also removable spillway weirs are being tested at Lower Granite for potential use at all four dams under Alternatives 1 through 3.

ALT-103 Guide fish using upstream/downstream nets for adults and juveniles.

Response: The best way to guide fish around/through the dams is with flow. When river flows are low, it becomes a greater challenge. The Corps has developed a behavioral guidance curtain that works very well for moving fish to a point of collection or bypass. The use of nets has not been tested in the lower Snake River however, should be considered if guidance using flows proves less than successful.

ALT-104 Build a spawning channel.

Response: Artificial spawning channels are not effective long-term solutions for spawning. The lower Snake River canyon does not lend itself to creating a backwater area that could maintain itself, therefore the cost to maintain such a concept would be high. An alternative to an artificial spawning channel is hatcheries, which are widely used for reproduction of salmon. Improvements to tributary habitats can lead to natural spawning, which would be better than any artificial substitute.

5.8.6 Incorporate/Eliminate/Change Flow Augmentation Considerations

ALT-105 Eliminate 1 million acre-feet from consideration.

Response: An additional 1 million acre-feet flow augmentation was considered as PATH Alternative A-6; however, this alternative was eliminated from further consideration. The rationale for elimination was based on two factors: 1) the BOR study that analyzed the feasibility and potential impacts of providing 1.0 MAF did not provide an impact analysis in comparative detail to this FR/EIS; 2) PATH did a screening analysis of this alternative and found that with most realistic assumptions it performed at only 80 to 100 percent of the survival and recovery criteria compared with Alternative 2 – Maximum Transport.

ALT-106 Flow augmentation should only be considered as an experiment. Impacts in the BOR study are underestimated.

Response: Additional 1 million acre-feet flow augmentation was considered as PATH Alternative A-6, however, this alternative was eliminated from further consideration. The rationale for elimination is based on two factors: 1) the BOR study that analyzed the feasibility and potential impacts of providing 1.0 MAF did not provide an impact analysis in comparative detail to this FR/EIS; 2) PATH did a screening analysis of this alternative and found that with most realistic assumptions it performed at only 80 to 100 percent of the survival and recovery criteria that the Alternative 2 – Maximum Transport.

ALT-107 Select Alternatives 2 or 3, but with no flow augmentation.

Response: Flow augmentation was originally addressed by the Fish and Wildlife Program of the Northwest Power Planning Council in 1982 to simulate natural spring freshets for juvenile salmon outmigration. The 1995 Biological Opinion and all subsequent Biological Opinions have emphasized the need to continue flow augmentation and have called for evaluating the setting aside of additional flow. The NMFS 2000 FCRPS Biological Opinion continues to identify the importance of flow augmentation. Flow augmentation is a part of each alternative studied.

ALT-108 The FR/EIS needs to add flow augmentation alternatives, both with and without breaching.

Response: Flow augmentation is an element of all four alternatives evaluated in detail.

ALT-109 Remove the 427,000 and 1 million acre-feet from all alternatives.

Response: Flow augmentation was originally addressed by the Fish and Wildlife Program of the Northwest Power Planning Council in 1982 to simulate natural spring freshets for juvenile salmon outmigration. The 1995 Biological Opinion and all subsequent Biological Opinions have emphasized the need to continue flow augmentation and have called for evaluating the setting aside of additional flow. The NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) continues to identify the importance of flow augmentation. Flow augmentation is a part of each alternative studied. Each alternative evaluated includes 427,000 acre-feet.

An additional 1 million acre-feet flow augmentation was considered as PATH Alternative A-6, however, this alternative was eliminated from further consideration. The rationale for elimination was based on two factors: 1) the BOR study that analyzed the feasibility and potential impacts of providing 1.0 MAF did not provide an impact analysis in comparative detail to this FR/EIS; 2) PATH did a screening analysis of this alternative and found that with most realistic assumptions it

performed at only 80 to 100 percent of the survival and recovery criteria compared with Alternative 2 – Maximum Transport.

ALT-110 Use augmentation for water temperature only.

Response: Releases of cool water from Dworshak Dam in the summer have resulted in reduced periods of high temperature in the Snake River reservoirs below Clearwater River. However, the main purpose for Dworshak releases has not been resolved among management groups with varied opinions about whether to release Dworshak water just to increase flow for juvenile passage or also to release flows to reduce temperatures.

ALT-111 Many economic and environmental costs are associated with flow augmentation; these should be evaluated.

Response: Flow augmentation is assumed to be a part of all four alternatives analyzed in detail. Because of this, the economic and environmental costs and benefits have been considered. Additional flow augmentation as studied by the BOR has not been considered at this time because of insurmountable issues associated with implementation.

5.8.7 We Support Alternative 4/Are Against 1, 2, and 3

ALT-112 Oregon feels that Alternative 4 is the most risk averse; use PATH results not CRI for analysis.

Response: The PATH results do not consider research results from the last several years. Some of the current research results do not support some of the assumptions made by the PATH, which suggests that the PATH results are not complete. To complement PATH, NMFS undertook an additional approach to address factors not specifically examined in the PATH analysis. It is important to incorporate all the information available in identifying a preferred alternative.

ALT-113 The STUFA report supports dam breaching.

Response: The STUFA report considers only PATH results. It does not take into account research results from the last several years or the results of the NMFS' CRI process. The resulting information indicates dam breaching is not the silver bullet to recovery.

ALT-114 The Draft FR/EIS is biased toward Alternatives 1, 2, and 3. The region cannot afford to defer action for another 10 years.

Response: Extinction risk analyses conducted by NMFS for the seven indicator stocks have identified a 12- to 15-year period for extinction. Based on this information, the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) has identified measures recommending improvements not only to fish passage, but also to headwater and estuarine habitats in an effort to stimulate recovery (NMFS, 2000a).

ALT-115 Alternatives violate conservation principles; Alternative 4 is the only alternative to meet ESA and Indian requirements (treaties).

Response: The fundamental principles or "conservation standards" as referenced here are associated with concerns related to treaty fishing rights and the tribes' right to take fish. None of the alternatives considered in the Feasibility Study will deny the tribes of their right to fish at usual and accustomed fishing sites. The Corps' purpose of this study is to improve juvenile salmon migration

through the lower Snake River corridor. In fact, the most recent CRI conclusions of the NMFS have indicated that the dam passage improvements have dramatically mitigated direct mortality associated with the dams; that even if main stem survival for Snake River spring/summer chinook salmon were elevated to 100 percent, the population would continue to decline towards extinction; and that modest reductions in first year mortality or estuarine mortality would reverse current population declines. More importantly, NMFS in their analysis of the FCRPS operation in the 2000 FRCPS Biological Opinion has identified that if the dams are operated as described in the RPA, Corps' actions do not put the stocks in jeopardy of extinction (NMFS, 2000a). Therefore, NMFS does not interpret ESA as requiring dams to be breached. Regarding tribal harvest restrictions, harvest restrictions (tribal and non-tribal) are implemented for numerous reasons and these determinations are made by the NMFS.

ALT-116 Alternatives 1, 2, and 3 discriminate against tribes because they force tribes to sacrifice their treaty-reserved rights while non-Indians have subsidized transport.

Response: The current hydrosystem in the lower Snake River is operated in a manner accomplishing several congressionally authorized uses. The intent of Congress in authorizing a series of locks on the lower Snake River was to make navigation available to the region. Whether this particular benefit is a subsidy or not is a question for Congress. Navigation up and down the inland waterway provides benefits to people of the Northwest, including tribal people. Navigation (i.e., transportation) has not restricted the tribes' right to fish in their usual and accustomed places.

ALT-117 Alternative 1 is not a recovery measure; do not consider it because it will not work.

Response: Alternative 1 – Existing Condition is the base case against which all the other alternatives are evaluated. It is possible that the base case or Existing Condition could in fact be considered the preferred alternative. To assume that Alternative 1 does not work is also incorrect. NMFS determined that had the Existing Condition not been implemented over the years, the listed species of salmonids on the lower Snake River would have gone extinct by now.

ALT-118 The regulatory process takes too long; delay in implementing Alternative 4 is not an option.

Response: NMFS, through the CRI, has identified risks of extinction and the timeline during which actions must be taken to prevent extinction. NMFS has published the 2000 Biological Opinion, which sets out a series of actions within the Pacific Northwest that are intended to prevent extinction and lead to recovery. Implementation of Alternative 4 – Dam Breaching by itself has been determined not to be the solution to recovery.

The process to action does take time. It was set up this way to allow input from the public and stakeholders. If these interactions were not to occur, then decisions would be made without considering the full impact of Federal actions. The intent of Congress and the laws that direct Federal actions is to involve all those who would be affected and consider all information provided.

ALT-119 Weight of evidence process needs to be reimplemented.

Response: The PATH Process placed different weights of importance on different parameters. The Scientific Review Panel, an independent peer review group, initially agreed with this approach. After a second review, the SRP changed their position and recommended that the weights be equal for all parameters. In developing the CRI, the NMFS agreed with equal weighting because of the large uncertainties associated with so many of the parameters.

ALT-120 None of the Hs appear to recover all listed stocks. The USFWS needs to provide technical basis for recovery.

Response: NMFS has identified that none of the Hs by themselves will recover the listed stocks. No one human or natural action has lead to the decline of the stocks. Decline has been due to a combination of actions; therefore, it will take a combination of actions to recover the stocks. NMFS is the Federal agency mandated to oversee recovery actions for anadromous fish. NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) outlines a series of actions that must be implemented for recovery to occur (NMFS, 2000a).

ALT-121 The FR/EIS needs to state a commitment to full recovery.

Response: The FR/EIS is not the recovery plan. It is intended that the FR/EIS recommended plan assist with recovery; but, as NMFS has made clear, recovery will not be accomplished by the implementation of the plan alone.

5.8.8 Alternatives Eliminated

ALT-122 Idaho water users support elimination of the 1 million acre-feet added augmentation flow.

Response: An additional 1 million acre-feet flow augmentation was consider as PATH Alternative A-6; however, this alternative was eliminated from further consideration. The rationale for elimination was based on two factors: 1) the BOR study that analyzed the feasibility and potential impacts of providing 1.0 MAF did not provide an impact analysis in comparative detail to this FR/EIS; 2) PATH did a screening analysis of this alternative and found that with most realistic assumptions it performed at only 80 to 100 percent of the survival and recovery criteria compared with Alternative 2 – Maximum Transport.

ALT-123 Other options may provide a better "spread-the-risk" opportunity than Alternative 4.

Response: The "spread-the-risk" concept refers to the method in which fish are transported down the river. With in-river migration, the fish pass through dams largely over the spillway. With barge and truck transportation, the fish are collected and released below Bonneville Dam, thereby bypassing all subsequent dams. Alternatives 1 and 3 allow for a balance of fish passage between the two methods, whereas Alternative 4 places all fish in-river and does not consider spreading the risk.

ALT-124 Look at possible SBC at Little Goose but not at Ice Harbor or Lower Monumental.

Response: An SBC at Little Goose was considered; however, the majority of the juvenile salmon coming down the Snake River originate above Lower Granite. Therefore, below Lower Granite there would be few migrating fish left in the river. For those fish bypassing the collection system at Lower Granite or those entering the lower Snake River through a limited number of tributaries (Deadman Creek, Meadow Creek, Tucannon River, and Palouse River), the ESBSs at Little Goose, Lower Monumental, and Ice Harbor would reduce the number of fish passing through the turbines. If the combination of SBC and the ESBS systems function as anticipated at Lower Granite, construction of SBCs at the three lower dams may not appear to be justified.

ALT-125 Look at possible articulating fish ladders that adjust to different reservoir levels.

Response: Articulating or adjustable fish ladders would be a requirement for a fluctuating reservoir operation. However, System Configuration Study—Phase II, Interim Status Report, identified that seasonal spillway crest and seasonal natural river drawdowns would have low biological benefits

(Corps, 1996). In addition, in the case of the seasonal natural river drawdown, there would be recurring detrimental environmental and cultural resource damage throughout the project life. For these reasons, permanent drawdown was selected for further study, therefore, there is no need to consider articulating fish ladders.

5.8.9 Alternatives Outside the Scope

ALT-126 Build a bypass channel or causeway around the dams.

Response: Conveyance of collected fish downstream was considered during the System Configuration Study Phase I, March 1994. It was decided that the migratory canal/pipeline proposals should be eliminated from further consideration due to biological concerns and uncertainties.

5.8.10 Appendix D, Natural River Drawdown Engineering

Appendix D contains details of the drawdown engineering aspects of Alternative 4—Dam Breaching. The comments either asked for further detail on engineering assumptions, questioned cost estimates, or suggested alternative approaches. The specific issues were divided into the following categories.

5.8.10.1 General

ALT-127 Appendix D is lacking in detail and the description of critical assumptions is not adequately described or rationalized.

Response: Appendix D provides a summary of the criteria, considerations, and concept for the various phases of implementing drawdown. The information provided does adequately summarize those issues to convey the extent of operations and ultimately provides support for the proposed cost and schedule. Further presentation does not add value for the decision process.

ALT-128 We need to breach for fall chinook recovery.

Response: NMFS, through their CRI modeling, does not consider that breaching is necessary for fall chinook recovery. It is projected that other measures could have the same level of success as dam breaching.

ALT-129 The FR/EIS needs additional detail on the screening analysis that led to rejected alternatives.

Response: The System Configuration Study Phase I and Phase II reports, which preceded the Feasibility Study, contain sufficient detail on the array of alternatives considered and the process for eliminating some of these alternatives (Corps, 1996). Appendix J, Plan Formulation summarizes those alternatives considered and details the process used for the Feasibility Study to pare down the alternatives for consideration.

ALT-130 The FR/EIS needs to discuss the rationale for mitigation measures that were originally put in place for dam construction/operation (e.g., The FR/EIS needs to detail what will be done with Habitat Management Units (HMUs) if Alternative 4 is selected).

Response: Section 5.6, Terrestrial Resources discusses the maintenance of the existing HMUs as interim measures until the natural system becomes functional. Appendix D, Natural River Drawdown Engineering, Annex J identifies modifications that would be needed to allow for

continued operations of the HMUs. Appendix L, LSR Mitigation History and Status focuses on the rationale for maintaining existing facilities and the process for transitioning between the current mitigation program and a loosely defined future mitigation program. If it is necessary to mitigate, as is anticipated under Alternative 4—Dam Breaching, a mitigation plan will be developed to pull together all the actions required and define the intent more clearly.

ALT-131 The Corps' alternative for breaching is not the least cost and does not provide the best passage for fish.

Response: Alternative 4 – Dam Breaching, as defined, provides the best balance given all the considerations such as construction season, availability of construction equipment, construction management of contracts, drawdown rate, in-water work windows, and reliability of the drawdown method.

ALT-132 Move the construction window (Alternative 4) to December through February to avoid adult migration periods.

Response: It is impossible to construct during this period when there is a high probability of high flows. For example, during the corresponding period for 1996-97, we saw flows of 200,000 cfs. The drawdown process requires that the maximum cfs be 60,000. That is why the current plan would be to take the dam and embankment down by December to avoid the catastrophic impacts that could result under large flows. For more detail, refer to Appendix D, Natural River Drawdown Engineering, Annex B, Dam Embankment Excavation Plan.

ALT-133 Complete a risk assessment for drawing down reservoirs when the fewest fish are present.

Response: The time period for drawdown is based on the risk of river flows overwhelming a somewhat limited system for discharging reservoir water. It is not necessary to perform a risk assessment for this scenario since the exceedance probabilities for flows in excess of 60,000 cfs after December are historically high. Furthermore, the consequences of not being able to complete the drawdown/breach operation in one season would be disastrous for fish migration. The selected time period is the one in which to do the work and not compromise the safety of the construction operation or create greatly adverse impacts to the migrating fish.

ALT-134 The FR/EIS needs to address more breaching alternatives.

Response: The System Configuration Study Phase I and Phase II reports, which preceded the Feasibility Study, contain sufficient detail on the array of alternatives considered and the process for eliminating some of these alternatives (Corps, 1996). Appendix J, Plan Formulation of the Feasibility Study summarizes those alternatives considered and details the process used for the Feasibility Study to pare down the alternatives for consideration.

ALT-135 Criteria used to determine velocities in the breached section for adult passage are highly questionable.

Response: The criteria to determine how to control velocity and to what level for optimum upstream fish passage were developed in consultation with the Fish Facilities Design Review Workgroup (FFDRWG). The FFDRWG is a group of Federal, State, and tribal representatives who review issues regarding fish design. NMFS has a strong presence on the FFDRWG. Refer to Appendix D, Natural River Drawdown Engineering, Chapter 6, River Channelization Plan, Table 6-1 for more information.

ALT-136 What are the risks to fish that are forced to hold until flows subside during breached conditions? Upstream passage problems through the breach only occur at Ice Harbor and Lower Monumental. Why worry about the other two dams?

Response: During the 90-day construction period, the fish transport facilities would be non-operational. Fish would not be able to migrate upriver. The choice is to leave the adult migrants at the entrance to the Snake River or provide some means of passage. NMFS recommended trapping and hauling the fish in trucks because the fish may not be able to handle holding for 60 to 90 days, then swimming in sediment-laden waters (See Appendix D, Natural River Drawdown Engineering, Annex C, Temporary Fish Passage Plan).

Upstream passage problems are likely to be greater at Ice Harbor and Lower Monumental because velocities are higher there. The exact conditions created at each dam are unknown at this point and will require more detailed modeling to adequately anticipate and design for upstream passage. The modeling will dictate the extent of specific fish passage systems. Refer to Appendix D, Chapter 6 for more detail on fish passage features.

ALT-137 Remove dams going upstream to move sediment quicker through lower Snake River.

Response: There is little advantage to breaching downstream dams prior because the majority of built up sediment is behind Lower Granite. There is 100 million tons of sediment behind Lower Granite, of which 1 million is expected to move down right away. Sediment transport is an issue that will be studied further if Alternative 4—Dam Breaching is selected.

ALT-138 Why, in this section, is the Corps concerned with cavitation if the dams would be removed anyway?

Response: It is possible that cavitation could cause damage that would prevent the completion of drawdown. The operating units and the passageways serve as outlets to drawdown the reservoirs. The concern is not with deterioration of the turbine runners or the passage surfaces. It is possible to pass 60,000 cfs while dismantling the embankment, however, we would need to avoid cavitation to pass water. Cavitation could lead to the erosion of concrete and steel, rendering the system inoperable.

5.8.10.2 Costs

ALT-139 CRITFC cost estimates for removal are lower than Corps; they could save $150 million.

Response: CRITFC cost estimates may not have fully considered constructability and reliability objectives. The timeframe necessary to implement these objectives must be considered when developing implementation costs.

ALT-140 All costs for individual items must be included to make comparisons amongst alternatives.

Response: The Corps believes it has incorporated all appropriate costs and benefits associated with the alternatives being considered. Appendix D contains a sufficient level of detail for informed comparison, so no additional detail will be added.

ALT-141 The FR/EIS needs more detail on costs of roadway or railroad damage repair costs.

Response: A detailed analysis of infrastructure requirements is presented in Appendix I, Economics. Key elements of this analysis are presented in the FR/EIS Section 5.9, Transportation.

ALT-142 The Corps' 75 percent contingency seems excessive for roadway/railroad repair.

Response: The contingency values represent the degree of uncertainty. The estimates for embankment repair are very uncertain, so the contingency percentage is correspondingly high. Appendix D, Natural River Drawdown Engineering, Annex X, Comprehensive Baseline Cost Estimate, Section X.10, Contingency Analysis, explains selection of contingencies.

ALT-143 Costs for drilling 50 wells for cattle watering under Alternative 4 seems excessive.

Response: Appendix D, Natural River Drawdown Engineering, Annex L, Cattle Watering Facilities Modification Plan contains detailed accounting of the wells. The wells were costed out using actual estimates. The estimate is approximately $60,000 per well. If a cheaper and acceptable method for watering cattle could be determined, it would be adopted.

ALT-144 The FR/EIS needs more detail on other support action costs for Alternative 4.

Response: See responses to comments ALT-131 and ALT-141.

ALT-145 What is the cost of turbine blade removal. Is it necessary?

Response: The general configuration of the hydrosystem facilities is presently based on average mean daily flows. In order to implement dam breaching, higher flows must be passed, maybe something approaching 75 percent or even 90 percent exceedance limit. The point is that there are at least 60,000 cfs that have to pass the dam facilities. The concept of using the turbine passage has always required modifications to the system. Significant modification is needed to pass flows through the system at low heads. Removing the turbine blades has been the selected method to accomplish this low-head passage. The cost estimate includes costs for this operation. It is not a high cost since it involves labor to gain access to the draft tube, dismantle part of the turbine, cut the blades, and reassemble the unit. It is a critical step because it provides the capability to lower the reservoirs the last increment before breaching the cofferdams. The direct construction cost, including contingency for this specific item, is estimated at approximately $3.2 million. Note this does not include engineering costs or escalation costs.

ALT-146 The FR/EIS needs to show costs separately for embankment removal and concrete structure removal.

Response: These costs are broken down in Appendix D, Natural River Drawdown Engineering, Annex X, Comprehensive Baseline Cost Estimate. Table X1 shows two dam removal options. The channel bypass option is embankment removal only and complete dam removal is embankment removal plus concrete structure removal.

ALT-147 This section needs to examine infiltration compared to surface water withdrawal for irrigation or other water supply.

Response: The analysis presented is considered the least-cost approach. This however does not mean it is the best option to resolve irrigation issues. The least-cost approach identified a reasonable solution for the purposes of identifying economic costs for the economic analysis. A sensitivity analysis was considered for the approach presented, which asked, "if the costs were half of that identified for the least cost approach, would it affect the economic analysis?" The answer was that the net costs and benefits number would not change substantially if the costs to modify the irrigation pump systems were cut in half. So in response to this comment, it is possible that there are cheaper approaches, but the costs for these cheaper approaches will not change the economic analysis,

therefore use of the presented least-cost approach is adequate and appropriate in accounting for the water supply needs of irrigators.

ALT-148 Removing spillway structures and excavating the channel using natural erosion would be cheaper and provide a much wider channel.

Response: The engineering analysis demonstrates that this is an unsafe and unreliable proposal that could equal catastrophic failure of the embankment and would pose significant risks to railways and roads.

ALT-149 If spillway sections are removed and new channel began at powerhouse rather than locks, the need for channelization and protection would be mostly eliminated.

Response: This would not be possible during the construction season (because of high flow events). It is a high-risk approach.

ALT-150 Was the abandoned or mothballed project used for the cost estimate?

Response: The facilities would be completely abandoned. No provisions are included to maintain the facilities for future use.

ALT-151 The FR/EIS needs to expand the analysis on modifications to irrigation pump system proposals for Alternative 4. There are cheaper approaches.

Response: See response to comment ALT-147.

5.8.10.3 Railroads/Roadways/Embankments

ALT-152 Why not put railroads back into their pre-dam locations? This avoids embankment protection.

Response: The possibility of using railroad embankments for construction access to put structures in (gambling that they would be serviceable) was considered. However, it was determined to be very uncertain as to whether the embankments would be stable enough for rail service. There was too high of a probability of rail service interruption.

ALT-153 The FR/EIS needs additional detail on riprap placement. Look at other options (e.g., vegetation).

Response: The toe location of the riprap slope is identified as the elevation midway between the waterline (water surface elevation at flow of 20,000 cfs) and the centerline of the river channel, not the midpoint of the river.

The actual toe elevations will be determined by surveys, however, they were not done for this level of study. During a feasibility level study only gross quantities are needed. If Alternative 4—Dam Breaching is selected, then during the next phase of study, plans and specifications would be prepared and surveys would be completed.

The Corps uses 5 feet as freeboard. Some of that freeboard is for wave protection and it is consistent with Corps design standards.

As regards the use of fabric mats, alternative slope protection materials may prove to be a better choice; however, riprap is the standard. If Alternative 4 were selected, then evaluation of alternative methods of slope protection would be considered.

ALT-154 Use controlled sluicing for embankment removal.

Response: See response to comment ALT-148.

ALT-155 Ten feet of freeboard is excessive for embankment protection.

Response: Quantities are based on 5 feet freeboard (see response to comment ALT-153). Some of that freeboard is for wave protection and is consistent with Corps design standards.

ALT-156 Why do you need drainage structures for embankment area?

Response: The main objective of drainage structures is to protect the embankment from erosion due to outfall areas. The culvert unplugging task is associated with culverts presently below the water level of the reservoir. This would allow for use of those culverts without constructing new drainage structures.

ALT-157 The FR/EIS needs to identify indirect impacts from preventing or correcting slope/embankment failures (e.g., need for erosion control when work is occurring).

Response: Appendix D, Natural River Drawdown Engineering, Annex F, Railroad and Highway Embankment Plan presents a plan for slope failures. This plan is in response to anticipated slope failures associated with transportation infrastructure. Results of slope failures downstream would largely be masked by the high turbidity conditions during the time of drawdown. The areas to be exposed after drawdown would already be highly disturbed; therefore, it is not anticipated that slope failure would add significantly to the disturbance. Annex K, Reservoir Revegetation Plan addresses development of native vegetation and control of soil erosion due to wind and rain. In addition, during the plans and specifications phase of implementation, erosion control details related to construction activities would be developed.

5.8.10.4 Revegetation

ALT-158 Remove or modify revegetation approach in the Draft FR/EIS. There are ways to do it cheaper or look at other alternatives.

Response: If Alternative 4—Dam Breaching were selected, the Corps would conduct a more detailed analysis during the next study phase (plans and specifications) of the revegetation process to ensure the most effective methodology was to be used .

ALT-159 Let vegetation come back naturally; however, there may be a need for a plan to control non-native and noxious weeds.

Response: The approach proposed by the Corps would let vegetation come back naturally and is a major part of the plan. However, action is necessary to encourage the initial development of native vegetation and to control soil erosion due to wind and rain. The proposed plan will accelerate the development, thereby minimizing short-term negative affects and hastening the long-term benefits, rather than allow years of slow development and detrimental erosion. See Appendix D, Natural River Drawdown Engineering, Annex K, Reservoir Revegetation Plan.

ALT-160 Seeding approach can be successful or unsuccessful; arguments for both were presented.

Response: If Alternative 4—Dam Breaching were selected, the Corps would conduct a more detailed analysis during the next study phase (plans and specifications) of the revegetation process to ensure the most effective methodology was to be used.

5.8.10.5 Wells

ALT-161 The FR/EIS needs to further evaluate and provide more detail on converting surface water supplies to groundwater.

Response: It is not the intention of the Feasibility Study to fully develop concepts and costs for items not considered Federal costs. If Alternative 4—Dam Breaching were selected, Congress could chose to provide Federal assistance for owners of private water wells. The study of groundwater effects of reservoir drawdown is extremely expensive and time consuming, and requires the collection of much subsurface information. Such evaluation is beyond the scope of this Feasibility Study.

ALT-162 There is an inconsistency on numbers of wells between the appendices and the Draft FR/EIS text.

Response: The Corps will look for inconsistencies and correct them when found.

5.9 Air Quality

AQ-1 Section 5.2 did not complete the air quality analysis. Therefore, the FR/EIS is not complete.

Response: The Air Quality analysis presented in Appendix P was very thorough. However, the Corps recognizes that additional information could help the reader understand the issues and the associated effects. Look for more detail in the Final FR/EIS.

AQ-2 The Air Quality Appendix needs to translate emissions into ambient air concentrations to compare against ambient air quality standards.

Response: Appendix P, Air Quality has been modified to include predicted ambient concentrations that result from the following sources:

- Towboats navigating the Snake River near the Ice Harbor Dam
- Towboats moored upstream from the Ice Harbor Dam
- Traffic in the US 395 and SR 260 intersection, with and without drawdown
- Fugitive emissions from demolition of the Lower Monumental Dam
- Rock quarry haul roads
- Dry lake-bed sediments during high wind speed events
- A representative new power plant constructed to replace hydropower.

Ambient concentrations were predicted by estimating emissions from theses sources and modeling impacts of theses emissions using recognized models and representative input data. In all cases, the modeled worst-case ambient concentrations are less than allowable limits. A discussion of the modeling methods, input data, and assumptions has been added to Chapter 3, Plan Implementation. Predicted concentrations have been presented and compared to the ambient air quality standards in Chapter 4. The concentrations are summarized and compared in Chapter 5.

AQ-3 The Air Quality Appendix needs to use more recent studies on windblown dust in Eastern Washington.

Response: Appendix P, Air Quality has used and referenced the work performed by the Northwest Columbia Plateau Wind Erosion and Air Quality Project, an extensive research program funded by Federal and State agencies. The Project has characterized land use and soils in the Columbia Plateau, estimated PM_{10} emission rates from the various land use types, developed and applied a regional windblown dust model, developed programs to control PM_{10} emissions from agricultural lands, and developed public awareness programs. Results of the Columbia Plateau PM_{10} Program (CP^3) windblown dust model were included in Appendix P, Air Quality. In addition, CP^3 remodeled several of their cases with the dry Snake River reservoirs included as emission sources. Results of these efforts were added to Appendix P. The only Eastern Washington windblown dust study that includes the elements required by Appendix P, Air Quality is the CP^3 program.

The CP^3 modeling methods are described in Section 3.3 of Appendix P, Air Quality. The modeling results are presented in Sections 4.1.3 and 4.3.3, for the Existing Conditions and Dam Breaching alternatives, respectively.

AQ-4 The Air Quality Appendix needs to discuss the effects of sediment toxicity and sediment hazardous constituents in the wind blown dust assessment.

Response: Appendix P, Air Quality has been expanded to assess potential impacts of toxic and hazardous air pollutants (HAP) originating from sediment contaminants. The assessment used sediment contaminant concentrations from Appendix F, Hydrology/Hydraulics and Sedimentation and the CP^3 modeling results. A discussion of the methods and input data has been added to Section 3.3 or to Appendix P, Air Quality. The results of the analysis, in terms of risk to human health, are presented in Section 4.3.3.

AQ-5 The Air Quality Appendix needs more discussion of the effects of alternatives on global warming.

Response: Appendix P, Air Quality has been updated to describe carbon monoxide (CO_2) emissions for each of the FR/EIS alternatives. Recently published data from EPA regarding nationwide and northwest regional CO_2 emissions have been incorporated. Section 5.4 of Appendix P, Air Quality, has been updated to compare the air quality impacts for Alternative 1 (A1)—Existing Conditions, and Alternative 4—Dam Breaching (A3) with the option for a 820 aMW of new power plants added in Pacific Northwest and Alternative 4 with the option for a Zero-Carbon Conservation Program.

Alternative 4—Dam Breaching with replacement power plants would increase CO_2 emissions in the western United States by about 1 percent.

AQ-6 The Air Quality Appendix needs more discussion of effects of replacement power with respect to greenhouse gas emissions.

Response: Appendix P, Air Quality has been updated to evaluate potential greenhouse gas emissions from natural gas-fired power plants, considered as construction to replace 820 aMW of generating capacity that would be lost under Alternative 4. Newly-published CO_2 emission data for gas-fired, combined-cycle power plants, similar to those that would be expected to be built under Alternative 4, have been incorporated into revised Section 4.3.4 of Appendix P. This alternative would increase CO_2 emissions in the western United States by about 1 percent. Section 4.3.4 of

Appendix P has been updated to describe the Zero-Carbon option, whereby a combination of new conservation programs and installation of new non-polluting renewable energy resources would be used instead of constructing new gas-fired power plants. By using the Zero-Carbon option, the CO_2 emissions under Alternative 4 would be no higher than for Alternative 1.

AQ-7 The Air Quality Appendix needs to evaluate emissions and impacts resulting from replacing hydropower with alternative energy sources (such as wind power or conservation).

Response: Appendix P, Air Quality has been updated to estimate the air pollutant emissions that would be expected from new gas-fired power plants. The actual emissions of combustion products and toxic air pollutants from the newest gas-fired plants constructed in the northwest are described. Sections 4.3.4 and 5.4 of Appendix P, Air Quality have been updated to reinforce that under the Zero-Carbon option the hydropower lost from dam removal could be replaced by a combination of energy conservation and non-polluting renewable resources with no net increases of greenhouse gases or combustion emissions.

AQ-8 The Draft FR/EIS states that emissions from new natural gas-fired power plants would result in adverse and unavoidable impacts. The Corps should demonstrate that these impacts are adverse by identifying the criteria (e.g., violations of air standards) that this determination is based upon. Sufficient analyses that demonstrate that emissions from power plants are unavoidable should also be included.

Response: Appendix P, Air Quality has been updated with new analysis and presentation of emissions from new natural gas-fired power plants. If natural gas power plants are built to replace lost power generation, emissions that result would be adverse and unavoidable since these type plants emit products that are not beneficial or neutral to the environment.

AQ-9 The Air Quality Appendix has failed to review some very significant impacts that would result from dam breaching (Alternative 4). In short, the analysis in Appendix P tremendously underestimates the amount of air pollution that would be generated by Alternative 4—Dam Breaching.

Response: One of the goals of Appendix P, Air Quality is to provide a basis that will allow the alternatives to be compared from an air quality perspective. To accomplish this goal, Appendix P, Air Quality includes estimated changes in emissions and resulting concentrations associated with Alternative 4—Dam Breaching. Appendix P, Air Quality focuses on four areas where drawdown is likely to have the greatest impact:

- Fugitive dust emissions resulting from deconstruction of the dams. Worst-case modeling shows that the ambient dust concentrations on public lands adjacent to the dams would be less than Washington allowable limits.
- The change in the quantity and distribution of vehicle emissions as commodities are shifted from barges to trains and trucks. Worst-case modeling shows that the ambient concentrations of tailpipe emissions along public roads would be lower than Washington's allowable limits.
- Fugitive dust emitted from dry exposed lake sediments during high wind speed events.
- Atmospheric emissions associated with replacement power generation by thermal power plants. Worst-case modeling shows that ground-level concentrations of stack emissions from any new power plants would be less than Washington's allowable limits.

A comprehensive emissions estimate for a three-State area projected to the year 2010, with and without the Snake River waterway, is beyond the scope of Appendix P, Air Quality. Such an assessment could not significantly expand the understanding of the impacts associated with drawdown, as presented in Appendix P, Air Quality, and would not change the conclusions of the analysis.

Dam breaching would impact other aspects of air quality that are not considered in the Appendix. To simplify the analysis, Appendix P, Air Quality does not consider the following:

- Following drawdown, there would be a switch from irrigated to dryland farming. CP^3 has indicated that fugitive dust emissions from irrigated farmland are higher than from dryland, depending on the timing and severity of the high wind speed event generating the emissions. The change in agricultural practices may decrease overall PM_{10} emissions in Eastern Washington.
- Numerous Washington industries depend heavily on inexpensive electricity, particularly aluminum production. Drawdown could result in the loss of inexpensive electricity and possibly the loss of this industry. Emissions from aluminum producers may decrease with drawdown.
- The EIS specifies a vigorous grass seeding and tree planting program for the nearly 34,000 acres of exposed lake sediments. Carbon will play a role in this vegetation, and in agricultural practices impacted by drawdown such as a shift from irrigated to dryland farming.
- Advances in control technologies and management practices will continue. EPA initiatives will mandate reductions in vehicle, marine, and locomotive emissions. Programs such as CP^3 will result in agricultural practices that will eventually reduce fugitive emissions in Eastern Washington. The timing of these initiatives and the impact that they will have on Eastern Washington emissions is unknown.

5.10 Hydrology

Comments in this category fell under General, Flooding, Flows, and Sedimentation. Comments regarding Appendix F, Hydrology/Hydraulics and Sediments; Appendix G, Hydroregulations; and Appendix H, Fluvial Geomorphology are included at the end of this section.

5.10.1 General

HY-1 Installing fish-friendly culverts and bridges should be the primary goal of a short-term salmon recovery strategy. Adequate funding should be sought.

Response: This type of activity is out of the scope of the FR/EIS. However the Corps will be contributing to this type of activity through the habitat forum as specified in the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a).

HY-2 Evaporative gains under Alternative 4 should be considered; less surface area equals more water.

Response: There is no reason to believe that there will be reduced evaporation. At most, any changes would be insignificant relative to total flow.

HY-3 After breaching, will ground water be recharged enough to build new wells for irrigation instead of diverting water from streams?

Response: It is not anticipated that groundwater levels would change significantly from what they are currently. These levels are not likely to be sufficiently high to allow for new groundwater wells.

HY-4 If BOR's million acre feet study were delivered, impacts to fisheries would dramatically increase.

Response: The fisheries effects of this potential delivery have been assessed in the BOR's Snake River Flow Augmentation Impact Analysis for resident fish in the middle and upper Snake River (1999). The fisheries effects of this potential delivery for anadromous fish were assessed in a sensitivity analysis in PATH (1998), resulting in slight benefits of about 0.5 percent survival per project (dam and reservoir). The fisheries effects of this potential delivery have been assessed in the BOR's Biological Assessment (1998), and the corresponding NMFS and USFWS Biological Opinions in 1999.

5.10.2 Flooding

HY-5 Many commentors felt that the lower Snake River dams' ability and importance to store water as part of flood control efforts has been ignored.

Response: The storage capability of the Lower Snake River Project was explained in the text. These are run-of-the-river projects and have no capability of affecting flood control because they have extremely little or virtually no storage capacity. What this means is that whatever water volume enters this reach above Lower Granite Dam leaves within a very short period at essentially the same flow volume. The confusion occurs when the area between minimum operating pool and maximum operation pool (3 to 5 feet, depending on the reservoir) is characterized as being available for flood control.

5.10.3 Flows

Commentors in this category generally felt that increased velocity from flow augmentation has questionable benefits for migrating juvenile salmon.

HY-6 Hydrologic data do not support the premise that natural river conditions can be restored with flow augmentation.

Response: It is agreed that flow augmentation with reservoirs does not equal the same hydrology as river conditions. But flow augmentation can change substantially the water travel time in a reservoir during lower flow periods. The relationship between water travel times for reservoir and river conditions is shown in Appendix F, Hydrology/Hydraulics and Sedimentation.

HY-7 We need to cut down more Douglas Fir to allow more water into the system instead of flow augmentation that doesn't work.

Response: Comment noted. Out of the scope of this FR/EIS.

5.10.4 Sedimentation

Commentors concerns regarding sedimentation fell into two major categories, as identified below.

5.10.4.1 Effects and Associated Costs of Sedimentation on Lake Wallula Needed to be Addressed in Greater Detail

HY-8 What are the impacts and costs of annual dredging and siltation on Lake Wallula and McNary National Wildlife Refuge and its associated wetlands? What are the added operation and maintenance costs with increased sediment load?

Response: Given available information, only limited estimates of where sediments would go and how much sediment would be deposited are possible. These general locations are indicated in Appendix F, Hydrology/Hydraulics and Sedimentation. But if dam breaching were selected, an extensive monitoring plan would be implemented. The results of this monitoring would be used to determine the details that are of interest in this question.

HY-9 How long would it take to fill the reservoir?

Response: We do not know that the McNary reservoir would ever fill, at least in over a 100-year period.

HY-10 A Dredge Material Deposit Plan is needed to show where and how deep the sediment deposits will be.

Response: This cannot be done in more detail than presented in Appendix F, Hydrology/Hydraulics and Sedimentation with available information. If dam breaching were selected, a monitoring plan would be implemented to answer this question.

HY-11 Federal agencies should review and incorporate findings from sediment appendix into required analyses and assessments.

Response: The appendices were reviewed and relevant information was incorporated into the text.

HY-12 Insufficient review and attention has been given to damage caused by sediment deposits after breaching.

Response: Considering the level of uncertainty inherent in trying to estimate the effects of such a massive undertaking, and that there are no relevant examples to work from, the Corps believes it has done a sufficient job assessing the impacts of the sediment relative to each of the resources. A plan for monitoring the sediment in Lake Wallula is included in Appendix F, Hydrology/Hydraulics and Sedimentation, Chapter 26.

HY-13 Annual sediment deposits without the dams are nearly equal to the amount dredged annually for the entire Lower Columbia River Basin.

Response: Comment noted.

HY-14 Different-size dislodged sediments could damage different areas as smaller sediments in suspension damage estuary habitat.

Response: The impacts of sediment have been adequately addressed in the text. Impacts below McNary pool, and especially in the estuary, are likely to be small and insignificant. Very little of the total sediment, even the small fraction of fine material, would reach the estuary because of settling in the four reservoirs downstream of the Snake River.

HY-15 A summary of findings on sedimentation under Alternative 4 should be included in the appendix.

Response: See appendix change. A summary of findings is discussed in the Executive Summary of Appendix F, Hydrology/Hydraulics and Sedimentation.

HY-16 If the dams are filling up with sediment at a rate that implies obsolescence for hydropower in the next few years, the retention of dams is a moot point.

Response: They are not filling up at any significant rate that would make them obsolete in the near or distant future.

HY-17 Sediment may cause a huge delta to form at the mouth of the Snake River resulting in a wide, braided channel that allows for increased predation of salmon.

Response: A wide, braided channel is not anticipated.

HY-18 Recycling of the soil dredged after breaching should be considered under Alternative 4.

Response: Should this alternative be selected, a monitoring plan would be developed which would consider issues of this kind.

HY-19 A great deal of saturated soil will slide into the riverbed, after breaching, increasing the amount of sediment added to the river. This has not been considered.

Response: The types, sources, and amount of soil that would enter the river has been considered, including saturated soil. The amount of soil that would enter from the river banks is very small relative to the amount that would be contributed from both existing accumulations in reservoir bed channels and the amount that would enter annually from upstream.

5.10.4.2 Deposited Sediments May Have Negative Effects on Port and Irrigation Operations

HY-20 Ongoing maintenance dredging in Lake Wallula at various port facilities may be needed to maintain open channels that allow continued export shipping.

Response: Lake Wallula (behind McNary Dam) will capture all but the finest suspended sediment. It is difficult to predict the depths and patterns of sediment deposition, but siltation of port facility navigation in Lake Wallula could potentially occur, and would require dredging operations to reopen navigation lanes. For more detail, refer to Appendix F, Hydrology/Hydraulics and Sedimentation.

HY-21 Sediment deposits may impact water intake pipe and pier/dock at Boise Cascade Paper Mill.

Response: While sediment could deposit in this area, this type of problem could be easily managed.

HY-22 Large sediments will be deposited in Lake Wallula without any frame of reference to judge impacts.

Response: Estimates of quantity of sedimentation has been addressed in the FR/EIS and Appendix F. The Lower Granite pool sediment amount supplies a point of reference.

HY-23 Concerns by Boise Cascade and potential impacts from sediment need to be addressed.

Response: This issue would be addressed in more detail only if Alternative 4 were selected.

HY-24 The Port of Walla Walla sees potential impacts to its tenants from siltation at Lake Wallula.

Response: See response to comment HY-23.

HY-25 Water pumped for irrigation from McNary pool may be too loaded with sediments and may require costly filter systems.

Response: Other than during the initial periods of dam breaching high suspended sediment loads would be relatively low. It is unlikely that even during the high sediment periods, filters would be required because the fine sediment would not significantly affect pumps.

5.10.5 Appendix F, Hydrology/Hydraulics and Sedimentation

A number of comments were directed at Appendix F. Most of these were focused on sediment effects that would occur if the dams were breached. Other comments addressed concerns about flows.

5.10.5.1 General

HY-26 Most of Chapter 11 of this appendix is biased toward river development; the chapter is irrelevant.

Response: This chapter serves its designated purpose to describe accurately what conditions existed prior to most of the recent development, at the time when development was a major objective of this region.

5.10.5.2 Sedimentation

HY-27 In Chapter 5, the Corps needs to indicate that grazing and overtillage by farming has left land more susceptible to wind and rain erosion (thus increasing sediment runoff).

Response: This is outside the scope of the FR/EIS.

HY-28 Look at erosion rates for Mt. St. Helens. These rates declined considerably with time, and this needs to factor into this analysis.

Response: Conditions at Mt. St. Helens are considerably different from Snake River conditions. The relevancy of making comparisons between the two areas would, therefore, be highly questionable.

HY-29 In Chapter 18, the items derived from the Kaiser Report are non-sensical regarding soil erosion.

Response: The Corps disagrees, and believes they are relevant to discussions relating to surface erosion.

HY-30 In Chapter 16, the Russell report of 1897 is outdated; use more recent approaches.

Response: The point of the section is to look at historical evaluations, not current conditions. Therefore, the article is very relevant.

HY-31 The Corps needs to make this appendix more consistent with Chapter 5. It would appear that wetlands and riparian development from released sediment could be significant in lower Snake/McNary pool.

Response: Riparian and wetland development are not meant to be part of the physical discussion in Appendix F. The effects of any physical changes on biological conditions are discussed in the sections of the FR/EIS that deal with vegetation and wildlife.

HY-32 Impacts of sedimentation on Lake Wallula need more evaluation.

Response: Because many of the changes that may occur cannot be reasonably predicted, a monitoring plan would be developed should dam breaching be selected. The monitoring plan would contain the details of how effects would be measured and what mitigation would be implemented, depending on the results of the monitoring.

HY-33 Increased sediment load would limit use of river for recreation.

Response: The recreational use of the region following dam removal is estimated to increase not decrease. While there may be limited water visibility during brief periods, this is not anticipated to significantly reduce the river's recreational use.

HY-34 How long will it take to fill Lake Wallula either with breaching or under current conditions?

Response: It is not anticipated that the lake would fill during the life of the project, which is in excess of 100 years.

HY-35 Other Federal agencies should review the sediment appendix and incorporate their analysis and findings into the report.

Response: Other Federal agency comments were considered and appropriate changes were incorporated where appropriate into the appendix analysis and the Final FR/EIS.

HY-36 In Chapter 17, the comparisons to the Boise/Salmon River erosion problems are not comparable; need pre-farming data compared to present for sediment yields.

Response: Historical sediment input is relevant to the analysis of current sediment input calculations.

5.10.5.3 Flows

HY-37 The FR/EIS needs to include 1982 to 84 flows in Chapter 9 and overall average flows would increase.

Response: These years were included, but they were not clearly indicated. Figure 9-1 was changed to clarify this issue in the Final FR/EIS.

HY-38 In Chapter 14, there is a need for a reference on adult/juvenile passage; it extends through December.

Response: The text was modified.

HY-39 The flow augmentation discussion needs to look at overall system effects (e.g., kokanee that are impacted in upstream areas by augmentation releases).

Response: Flow augmentation will remain as it has been in the recent past. Augmentation impacts have been addressed in past documents (the SOR, BPA et al. 1995), and were considered in the development of the flow objectives in the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a).

5.10.6 Appendix G, Hydroregulations

Comments were received primarily from one group, and were mostly technical in nature.

HY-40 Hydroregulation models are static and don't have predictive capabilities; used dynamic model.

Response: Hydrosystem regulation assumes conditions as they are. Future conditions are not adequately known to modify the model with reasonable certainty.

HY-41 How will global warming be factored into the hydro regulations model?

Response: It is not factored into the model.

HY-42 There is no evidence of tribal input into Appendix G, even though the Corps claims so.

Response: Appendix Q, Tribal Consultation, has been revised.

HY-43 The Corps failed to incorporate any CRITFC hydro model alternatives in their analyses.

Response: A Hydroregulation Work Group consisting of Federal agencies, NPPC, tribes, and States was formed to specify requirements and oversee model runs and outputs. The 1995 and 1998 Biological Opinions served as the basis for requirements used for the model runs. Feedback was obtained from the Implementation Team and PATH. PATH and other interested parties conceptually identified the alternatives and measures to be investigated by the hydroregulations. If there was limited support based on the feedback from the various groups for certain runs or if proposed runs did not support alternatives under consideration, then the runs were not made or the results not reported if a run had already been conducted.

HY-44 Overall, Appendix G is outdated and needs updating.

Response: Hydroregulations were completed in 1997 based on input from the 1995 Biological Opinion for the Federal Columbia River Power System. Even though some new operations were proposed in the 1998 Biological Opinion, it was determined the changes would not affect the alternatives for the Lower Snake River Juvenile Salmon Migration Feasibility Study; therefore, the hydroregulations for the lower Snake River were not updated. When the review period is as long as it was for the Draft FR/EIS and the Columbia River System is under constant change, it is difficult to keep the input updated and yet complete an analysis such as is found in this FR/EIS. Therefore, the study is using the 1997 analysis as the basis for hydroregulations.

HY-45 In Annex A of this appendix, it would be useful to present the number of Julys when Grand Coulee did not refill.

Response: The considered actions do not affect Grand Coulee any differently than current conditions and would be the same for all alternatives. Effects on Grand Coulee from this type of operation have been addressed in other past documents (SOR, BPA et al. 1995) and will not be repeated here.

HY-46 In Chapter 5, Tables 5-10/11, the Corps fails to incorporate any CRITFC model results.

Response: A Hydroregulation Work Group consisting of Federal agencies, NPPC, tribes, and States was formed to specify requirements and oversee model runs and outputs. The 1995 and 1998 Biological Opinions served as the basis for requirements used for the model runs. Feedback was obtained from the Implementation Team and PATH. PATH and other interested parties conceptually identified the alternatives and measures to be investigated by the hydroregulations. If there was limited support based on the feedback from the various groups for certain runs or if proposed runs did not support alternatives under consideration, then the runs were not made or the results not reported if a run had already been conducted.

HY-47 In Section 4.2.2 on rule curves, using observed runoff to calculate a rule curve is incorrect.

Response: The Corps believes these to be correct.

5.10.7 Appendix H, Fluvial Geomorphology

Only two major comments were received (however, many of the ones in Appendix F overlap with these, mainly because of the sedimentation issues).

HY-48 Appendix H needs to emphasize that 10 years may be required to clear the reservoirs of sediments.

Response: Determination of when most sediment will be cleared from reservoir areas are estimates and cannot be more precisely estimated. For that reason the Corps believes its presentation of periods of clearing is adequate and need not be changed.

HY-49 No mention is made in this appendix that augmentation flows could be used to increase the rate of sediment removal.

Response: Flow augmentation occurs during periods of flows less than peak yearly levels, more often to enhance spring and early summer flows. It is during highest annual flows and during less frequently occurring high flows that the vast majority of sediment is moved. Therefore, augmentations would have insignificant effects on sediment movement.

5.11 Water Quality

Most of the comments received in this category were General, but others fell under Contaminants, DO and TDG, Laws/Regulations/Programs, and Temperature. Comments on Appendix C, Water Quality are also included in this section.

5.11.1 General

WQ-1 There are many cues for juvenile migration; flushing of fall chinook could be the wrong thing to focus on.

Response: The cues for fish were discussed in the fisheries section. The commentor is correct that flows for flushing provide only one cue for fall chinook juvenile migration. Statistically, for Snake River fall chinook it has been shown that flow:travel time is significant and flow:survival has low significance. Even more significant of a cue is water temperature dynamics; fall chinook need a warming period <18 degrees C to grow rapidly enough to be large and fit enough to leave rearing environments and actively migrate when the shoreline temperatures reach 18 degrees C. Just like

too warm of water results in negative effects to fall chinook juveniles, too cool of water during rearing affects growth rates and leads to residency in fall chinook smolts. We did not focus on flushing, it is just one of many factors; however, it is one that can be influenced directly by management actions.

WQ-2 Evidence indicates that augmentation flows would not be very helpful for salmon recovery with dam breaching.

Response: In fact, we have no empirical evidence one way or the other about flows in the lower Snake River without dams relative to chance of salmon recovery. However, there is evidence that higher flows have benefited the Snake River fish under current conditions and that some level of higher flows in the Columbia River benefit migrating fish. Since flows in the Columbia River are influenced by flows in the Snake, it is premature to conclude that flow augmentations would not benefit salmon recovery.

WQ-3 The Federal government has not sufficiently reviewed or addressed impacts from sudden release of sediments under Alternative 4. The release may affect wildlife refuges downstream, ports, and navigation. Gather more details on effects to Lake Wallula.

Response: The Corps feels that these issues have been adequately addressed in the appropriate text sections to the level of knowledge available. The plan for dam removal also has provisions for monitoring to determine more specifically what actions would be taken if dams were removed.

WQ-4 Washington State's regulations acknowledge navigation's unique status.

Response: The State laws were considered in the analysis of effects.

WQ-5 The FR/EIS needs to further discuss effects of increased human health and environmental risks with spills or explosives from piping or transport of fossil fuels for alternative energy sources under Alternative 4. Also, the FR/EIS needs to look at potential spills during deconstruction.

Response: If this alternative is selected, more detail of the specifics of the actions will be developed. When these are developed they will be analyzed specifically.

WQ-6 The FR/EIS needs to evaluate breaching with and without flow augmentation. This needs to be clarified in the text.

Response: The analysis in the FR/EIS is intended to determine whether to breach or select some other alternative. The inclusion or exclusion of flow augmentation to breaching would not affect this determination and therefore does not need to be included.

WQ-7 Oregon wants (from Federal government) technical support on TMDLs, acknowledgment of water quality degradation in the lower Snake River, financial support, and willingness of the Federal government to resolve issues.

Response: The Corps has been, and continues to be, interested in working with the State of Oregon on water quality issues. The type of support or commitment will need to be further evaluated and the appropriate assistance determined based on our authorities, appropriations, applicable laws, and regulations.

WQ-8 The results from flow augmentation are inconclusive (e.g., spring chinook may be helped/fall chinook may hindered). Water temperature and TDG are the two most important factors affected by operations.

Response: The effects of flow augmentation are discussed in general in Section 4.5 and 5.5 of the FR/EIS. However, this FR/EIS is not intended to evaluate the benefits of flow augmentation on its own but as a part of the alternatives being evaluated. PATH considered flow augmentation by incorporating flow simulation modeling based upon the 60+ years in the period of record. Then sensitivity analyses were performed that would zero out flow augmentation or increase flow augmentation up to 1 MAF. The results of increasing and decreasing flow augmentation were fairly insignificant, resulting in only a couple percent change in system survival. This conclusion could indicate that the current use of flow targets for each stock is scientifically justified for optimizing survival of each stock and more or less flow augmentation is either not required or limited in providing additional benefits to survival. Ecological benefits of flow are typically expressed as secondary effects that are not easily measured directly to show a cause-and-effect result. Flow magnitude and timing indirectly affect water temperature by volume difference relationships compared to air temperature and tributary inputs.

Water temperature and TDG effects are discussed in Section 5.5. Dams can have both slightly negative or slightly positive effects on moderating water temperature dynamics depending upon time of year and upriver inputs. TDG supersaturation is an indirect effect of higher flows or voluntary operations for fish passage by forcing high spill operations through the dams.

WQ-9 The FR/EIS needs to look at effects of water quality changes and flow augmentations (under Alternative 4) on resident fish/benthic organisms/and other aquatic life.

Response: The project operational effects, including for water quality, are discussed relative to resident fish and their food resources. Flow augmentation effects, if significant, would be presented in this section.

WQ-10 The Final FR/EIS needs a commitment by the Federal government to TMDL process as a way to comply with CWA.

Response: The TMDL development is an EPA/State/Tribal process and is beyond the scope of this FR/EIS. The water quality information the Corps has or develops will be provided to EPA, the States and appropriate tribes for their use in developing TMDLs. Water quality compliance issues relating to the Corps operations of projects on the Lower Snake River and the Columbia River were addressed by the Corps' Northwestern Division in the May 15, 2001 Record of Consultation and Statement of Decision (ROCASOD).

WQ-11 Federal responsibility for water quality issues needs to be expanded in the Final FR/EIS.

Response: The potential impacts of each alternative to water quality are detailed in Appendix C, Water Quality. Further discussion on Federal responsibility has been added to the FR/EIS.

WQ-12 Sediment will disperse (under Alternative 4) in 2 years with benefits in 2 to 4 years. Why haven't comparisons been made to existing dredging in lower Snake River?

Response: The magnitude of the sediment being released from dam breaching is so much greater than that of dredging that any comparisons would likely not be relevant.

WQ-13 EPA says Alternatives 1, 2, and 3 are unacceptable because they degrade water quality and threaten salmon. Alternative 4 would improve water quality.

Response: The District has spent considerable time since the Draft FR/EIS was published working with EPA in an attempt to resolve their concerns with the information reported. We have worked through several significant issues relating to modeling, etc., but some things are still unresolved. However, all the alternatives were evaluated with regard to water quality, and the Final FR/EIS reflects the updated information and the results of the meetings with EPA.

WQ-14 The Corps must address water quality concerns in this FR/EIS, not rely on conditions or events elsewhere (e.g., Hells Canyon relicensing). The Corps should include all costs and benefits of alternatives.

Response: NEPA regulation (40 Code of Federal Regulation [CFR] 1508.7) defines a cumulative impact as an impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable actions. The Hells Canyon relicensing was included in the discussion because it is a reasonably foreseeable action. Costs and benefits of alternatives are included in Section 5.16. These economic data are the best information available at the time of publication.

WQ-15 To control turbidity, spring floods should be better controlled by buffer zones and no-till cultivation. Also, control turbidity through new upstream storage dams and settling ponds.

Response: The Corps has no control over riparian and farming actions outside of the reservoir shoreline and, therefore, these concerns are out of the scope of this document.

WQ-16 Water quality should be a key in selection of the preferred alternative.

Response: Water quality, as it affects the listed species, is of concern for selection of a preferred alternative and was considered in the evaluations of effects and ultimately in the selection of a preferred alternative. However, it is just one of many factors and resources that were evaluated and considered.

WQ-17 The discussion of the effects of turbidity and total suspended solids (under Alternative 4) on aquatic biota and productivity are confusing. The FR/EIS needs to compare to pre-dam conditions.

Response: Some text revisions were made; however, because of the uncertainty of the quantity, timing, duration, and the effects of this sediment to aquatic organisms, the section will remain somewhat vague regarding conclusions of effects. Information about pre-dam conditions is too limited in most cases to be of use in evaluating the effects of alternatives.

WQ-18 The FR/EIS needs to quantify effects of suspended solids and total suspended solids (TSS) under Alternative 4.

Response: The discussion of TSS impacts in Chapter 4 was revised and expanded.

WQ-20 Mud and silt can cause decreased runs after breaching. This effect can last for several years.

Response: Effects of suspended sediment on adult runs are adequately addressed in Section 5.5 of the FR/EIS.

WQ-21 Sediment problems with Alternative 4 cannot be minimized (need to readjust model input by adding up to 70 percent more sediment). Also, the FR/EIS needs to discuss effects on resident fish and benefits to salmon.

Response: The effects of additional sediment not included in the models were addressed in a qualitative fashion. Additional modification of the models would not significantly change the evaluation of the effects.

WQ-22 Costs of the new irrigation system under Alternative 4 would be high and permitting would be difficult.

Response: The economic effects of the irrigation system were evaluated in the economics section. The details of permitting for this withdrawal are outside of the scope of this document.

WQ-23 Irrigation would be less reliable due to channel changes under breaching.

Response: The reliability of water supply is discussed in Section 5.10 of the FR/EIS and in Appendix D, Natural River Drawdown Engineering, Annex D—Irrigation System Modification Plan.

WQ-24 Flow augmentation and cold water releases need to be reevaluated; they should approximate original, pre-dam conditions.

Response: These effects are discussed in the NMFS 2000 FCRPS Biological Opinion and pertinent information was added to the FR/EIS text.

WQ-25 The FR/EIS needs to address fuel loadings on Federal lands. Forest fires can alter runoff patterns. Increasing buffers alters hydrology.

Response: Effects of upper basin land use patterns, outside of those directly controlled by the Corps, including grazing, farming practices, forestry practices, road and culvert construction, irrigation withdrawal, water use, pesticide and herbicide use, riparian management, and both ocean and river harvest are all out of the scope of the FR/EIS. While these all ultimately affect listed fish stocks, most cannot be directly influenced or controlled by the Corps and therefore are not considered as an area of manipulation for alternative evaluation. General effects of basin activities, harvest practices, and ocean conditions are discussed to put them into perspective. But since these areas cannot be controlled by the Corps and are not specifically part of the actions we were directed to evaluate, they are not discussed in further detail in this document. These issues are more fully evaluated in the "Basin-wide Salmon Recovery Strategy" by the Federal Caucus (1999) and considered in the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) addressing possible basin-wide actions that may be taken (NMFS, 2000a).

WQ-26 Cottonwood farms need water.

Response: See response to comment WQ-25.

WQ-27 The FR/EIS needs to address other areas including gillnet dropout, silt deposits on fish habitats, and the potential for transporting adults during breaching.

Response: See response to comment WQ-25. Also, the decision on whether to transport adults will be made if Alternative 4 is selected. It is being considered by the management agencies, but the specific plans have not been developed.

5.11.2 Contaminants

WQ-28 The FR/EIS needs to discuss sediment contaminant levels and the health of some aquatic species. Although levels are below standards, a discussion is still needed.

Response: Because sediment parameters measured did not exceed standards, in most cases no further discussion is warranted.

WQ-29 Increasing augmentation flows under existing conditions could disturb silt in reservoirs and disturb wetlands.

Response: Sediment moves primarily under peak flow conditions, which are not affected by flow augmentation. The changes in flow made by augmentation are primarily at the medium- to low-flow regions, so effects on sediment movement would be insignificant.

WQ-30 The FR/EIS needs to consider sediment contaminants such as heavy metals and arsenic.

Response: Sediment contamination, including heavy metals and arsenic, was considered in the analysis of alternatives and no further analysis is needed. The sediment contamination section was expanded to include additional recent sediment data.

WQ-31 What is the composition of sediments?

Response: The physical composition of the sediment is discussed in Appendix C, Water Quality.

WQ-32 The FR/EIS needs to add conclusions on suspended sediments in the summary section.

Response: The TSS section in Section 5.4 was expanded and a sentence was added to the summary.

WQ-33 The FR/EIS needs to describe mitigation proposals for silt moving downstream over 10 to 15 years.

Response: A monitoring plan would be put in place should Alternative 4 be selected. The details of what mitigation would be needed would follow, depending on the results of the monitoring. However, many unavoidable impacts would remain. These general levels of impacts are already presented in the document.

WQ-34 The FR/EIS needs to address sediment contamination bioavailability to aquatic species. Deeper cores are needed for evaluation. Also need bulk sediment analysis and elutriate testing.

Response: The Corps believes that results of the sediment analysis done were adequate to address the level of impacts. There are no compelling reasons to believe: 1) that deeper cores will reveal markedly different results, or 2) that conclusions about impacts or actions chosen would change from this analysis.

WQ-35 Releasing sediments could cause health problems, particularly to water supplies/the Federal government needs to bear this cost of any additional water treatment.

Response: The projected magnitude and nature of sediment impacts are displayed in the FR/EIS in Section 5.5. If a breaching alternative is selected, prior to breach a more detailed sediment impact analysis is planned. Once this analysis was completed and details of the potential (individual and community) impacts were defined, Congress could take action to compensate non-Federal entities that would be impacted. An example of past actions by Congress is the $2 million appropriation to compensate for certain impacts of the 1992 Drawdown test at Lower Granite.

WQ-36 The FR/EIS needs to address increased risk of spills for each alternative. Shift in goods transport increases the risk with land-based and higher level transportation.

Response: It is anticipated that there would be no increased risk of spills under Alternatives 1 through 3. The potential for increased spills under Alternative 4 is greater due to a higher level of land transportation. The details of the risk would be determined if breaching were selected and control plans would be put in place.

WQ-37 The FR/EIS could be improved by explaining threshold levels for contaminated sediments/what the levels are now and what they would be if breaching occurred.

Response: The levels that occur currently have been explained adequately. How these conditions might change has been discussed in Appendix C, Water Quality and summarized in Chapters 4 and 5. We have insufficient detailed information to develop a more complete assessment of what levels would be in the future.

WQ-38 Chemicals used by farmers, orchardists, counties, State, and Federal governments end up in the river.

Response: See response to comment WQ-25.

WQ-39 Pulp mill effluent and cattle feedlots near the river are a problem.

Response: See response to comment WQ-25.

WQ-40 Past direct dumping of city sewage effluent for decades is a problem.

Response: See response to comment WQ-25.

WQ-41 Untreated stormwater runoff including salt from roads for de-icing is a problem.

Response: See response to comment WQ-25.

WQ-42 The FR/EIS needs more discussion of contaminants or hazardous constituents.

Response: The discussion of impacts presented is adequate to evaluate and select an alternative.

WQ-43 Garbage dumps on or near streams are a problem.

Response: See response to comment WQ-25.

WQ-44 Slaughter houses on streams used to dump waste into streams.

Response: See response to comment WQ-25.

WQ-45 Mining wastes are a problem.

Response: See response to comment WQ-25.

WQ-46 Mercury was used on crop seeds and ended up in the river.

Response: See response to comment WQ-25.

5.11.3 Dissolved Oxygen and Total Dissolved Gases

WQ-47 The FR/EIS needs to discuss the more severe problems with TDG that occur with involuntary spill.

Response: The TDG produced have the same effect on fish whether the spill is voluntary or involuntary. TDG effects are discussed for both anadromous fish and resident fish in Section 5.5, Aquatic Resources.

WQ-48 Uncontrolled spills that violate water quality standards are not acceptable.

Response: TDGs produced by spill (voluntary and involuntary) can create a water quality concern and the Corps is addressing this issue in various ways, specifically in the Water Quality Plan addressed in Chapter 6 of the FR/EIS.

WQ-49 A spillway bypass of juvenile outmigrants may be more cost-effective that SBCs.

Response: All reasonable alternatives were considered in the evaluation and those considered most promising were selected. Future analysis may refine the details of specific alternatives selected.

WQ-50 A discussion of dissolved oxygen below standards (described in Appendix C) needs to be included in this section.

Response: The discussions of DO in Chapter 4 and the impacts of alternatives on DO in Chapter 5 were expanded.

WQ-51 Under Alternative 3, a large SBC at Lower Granite would remove fish from potential TDG.

Response: Effects are discussed in Section 5.5, Aquatic Resources.

WQ-52 Continued non-compliance with dissolved gas standards under Alternatives 1, 2, and 3 are not cited in the Draft FR/EIS. Alternative 4 would eliminate them.

Response: TDG levels under all alternatives are discussed in Section 5.5 under Dissolved Gases.

WQ-53 Removal of dams would increase greenhouse gases and reduce irrigated acreage.

Response: Some discussion of emissions changes was made in the Air Quality section.

5.11.4 Laws/Regulations/Programs

WQ-54 The All-H paper must be given proper regard.

Response: The All-H Paper has been discussed in the FR/EIS. See Chapters 1, 5, and 6.

WQ-55 The FR/EIS needs to include costs for compliance with CWA and more money is needed for additional water to dilute pollution.

Response: The costs of concept designs related to water quality have been carried through the sensitivity discussion in the risk and uncertainty analyses. For example, the average annual costs associated with actions or structural modifications relating to total dissolved gas can range from $1 to $55 million. These added costs would only be attributable to the non-breach alternatives (Alternatives 1 through 3). The costs included in the FR/EIS are for structural modifications related to improving water quality during voluntary spill conditions and when river flows exceed the

hydraulic capacity of the powerhouse (approximately 125,000 cubic feet per second). Costs associated with possible future actions regarding water quality are extremely speculative and controversial, and have not been included in either implementation costs or avoided costs.

However, the Corps recognizes that these costs are an issue and believes it is important to disclose to the public. Until the Corps works through the process of developing a water quality plan and the States complete their total maximum daily load (TMDL) process, it is premature to include costs in the National Economic Development analysis relating to this issue.

WQ-56 The U.S. must respect State and water law and western water law.

Response: The Corps respects all laws and regulations.

WQ-57 The Federal government is bound by law to recover fish. The FR/EIS needs to comply with CWA.

Response: The ROCASOD discusses the Corps responsibilities and planned actions regarding these issues.

WQ-58 The FR/EIS must discuss TMDLs in the analysis of alternatives and include costs of compliance for each.

Response: The TMDL development is an EPA/State/Tribal process and is beyond the scope of this FR/EIS. The water quality information the Corps has or develops will be provided to EPA, the States and appropriate tribes for their use in developing TMDLs. Water quality compliance issues relating to the Corps operations of projects on the Lower Snake River and the Columbia River were addressed by the Corps' Northwestern Division in the May 15, 2001 Record of Consultation and Statement of Decision (ROCASOD).

The costs of concept designs related to water quality have been carried through the sensitivity discussion in the risk and uncertainty analyses. For example, the average annual costs associated with actions or structural modifications relating to total dissolved gas can range from $1 to $55 million. These added costs would only be attributable to the non-breach alternatives (Alternatives 1 through 3). The costs included in the FR/EIS are for structural modifications related to improving water quality during voluntary spill conditions and when river flows exceed the hydraulic capacity of the powerhouse (approximately 125,000 cubic feet per second). Costs associated with possible future actions regarding water quality are extremely speculative and controversial, and have not been included in either implementation costs or avoided costs.

However, the Corps recognizes that these costs are an issue and believes it is important to disclose to the public. Until the Corps works through the process of developing a water quality plan and the States complete their total maximum daily load (TMDL) process, it is premature to include costs in the National Economic Development analysis relating to this issue.

WQ-59 The Corps should undertake an analysis of cumulative impacts on mainstem compliance including costs and benefits for CWA compliance.

Response: The Corps is working with Federal agencies to develop a water quality plan for the mainstem Columbia and lower Snake Rivers. The scope of the plan is broader than the FCRPS and would include actions to improve mainstem water quality by reducing TDG and temperature. For further information see the ROCASOD.

WQ-60 The two major weaknesses of FR/EIS are no preferred alternative and no analysis of the entire hydrosystem.

Response: The selection of a preferred alternative is not required for a Draft EIS. The entire hydrosystem is not part of the evaluation as it is out of the scope of this document, which was only intended to evaluate specific actions taken at the Corps' dams on the lower Snake River. Operation of the whole Columbia system is dealt with in other forums, such as the "Basin-wide Salmon Recovery Strategy" prepared by the Federal Caucus (1999).

WQ-61 Alternative 4 is the only one that will recover natural river processes and meet CWA.

Response: Alternative 4 has not been shown in the analysis to recover the listed stocks with adequate assurance of success. Because of the many changes in the river system, Alternative 4 would also not restore "natural" river processes. Additionally, dam removal also has no assurance of meeting CWA criteria. Historically, the summer water temperatures as measured above the Lower Snake River at Anatone, Washington exceeded the current standard of 20°C (68°F) for a period of approximately 60 days each summer from 1974 through 1999.

WQ-62 The Draft FR/EIS ignores costs associated with CWA and turbine rehabilitation.

Response: See response to comment WQ-55. Turbine rehabilitation costs are considered part of maintenance costs.

WQ-63 The FR/EIS should acknowledge that Alternative 4 would eliminate TDG risk.

Response: This is noted in Section 5.5. Appendix C, Water Quality states that "geographically localized TDG above 110 percent is possible infrequently and for short durations" under the dam removal option. It also points out that management of water could increase spill from Hells Canyon and Dworshak Dams, which could likely remain at spill caps regulated by 120 percent TDG waivers. Fish traveling through the hydrosystem would still be exposed to potentially high levels of TDG in the lower Columbia, particularly if voluntary spill were still in place.

WQ-64 The standards for suspended sediments are not supported in the literature; remove dams going upstream and not down.

Response: The methods for achieving dam removal are presented in Appendix D, Natural River Drawdown Engineering. The methods selected were those considered to have the least impact and greatest benefits overall.

WQ-65 Dworshak releases help decrease downstream water temperatures.

Response: Dworshak releases do appear to reduce downstream water temperatures during certain seasons and release regimes. The cooling effect is most noticeable in Lower Granite Reservoir at the lower water depths. Ecologically, Dworshak releases of cool water have also shown to retard fall chinook pre-smolt size and growth, thus, affecting smolts suitable fitness to actively migrate as evidenced by residualized fall chinook.

WQ-66 Water entering Lower Granite pool can already be warm

Response: Details of temperature are discussed in Appendix C, Water Quality.

WQ-67 Run of river reservoirs have no significant impact on water temperature

Response: Details of temperature are discussed in Appendix C, Water Quality.

WQ-68 Congress did not intend CWA to be used to affect or impair operations for navigation

Response: Comment noted.

WQ-69 If Corps would include costs of meeting CWA for Alternatives 1,2, and 3, removal would be best.

Response: See response to comment WQ-55.

WQ-70 States are under the triennial review of water quality standards – the FR/EIS should be updated to include results of the review

Response: The current water quality standards have been included in the FR/EIS.

WQ-71 Without evaluation of CWA for each alternative, the FR/EIS may be challenged legally

Response: Each alternative was evaluated regarding effects to water quality. See Appendix C, Water Quality, and Chapters 4 and 5 of the FR/EIS.

WQ-72 The DRAFT FR/EIS underestimates the role, importance, and provisions of CWA

Response: The Final FR/EIS adequately discusses the issues regarding the CWA. For example, Temperature, TDG, Sediment, Turbidity, Chemicals of Concern, 404(b)(1) etc. were all discussed in the FR/EIS, Appendix T, Section 404(b)(1) and Appendix C, Water Quality.

WQ-73 The FR/EIS needs to look at zero carbon alternatives if Alternative 4 is adopted.

Response: The Corps has addressed zero carbon alternatives to hydropower in Appendix I, Economics (Power Replacement with Nonpolluting Resources).

WQ-74 Environmental permits and water rights would be difficult to obtain if breaching moves forwards.

Response: Comment noted.

5.11.5 Water Temperature

WQ-75 The study should provide more information on reservoir surface water warming and effects on salmon and predators.

Response: See revised text in Appendix C, Water Quality; Appendix M, Fish and Wildlife Coordination Act Report; and Chapter 5 of the FR/EIS.

WQ-76 The dams cause numerous water quality exceedances, particularly for water temperature

Response: Additional information was added to Appendix C, Water Quality, to help clarify these issues. Please note the inclusion of historical temperature data and the new temperature comparison charts with and without dams.

WQ-77 The FR/EIS should explain the overall role that water temperature plays in ecology and physiology of salmon

Response: See revised text in Appendix C, Water Quality; Appendix M, Fish and Wildlife Coordination Act Report; and Chapter 5 of the FR/EIS.

WQ-78 Ecological and physiological consequences to salmon under Alternative 4 need to be more fully described

Response: See revised text in Appendix C, Water Quality; Appendix M, Fish and Wildlife Coordination Act Report; and Chapter 5 of the FR/EIS.

WQ-79 Reviewer doubts that pre-dam temperatures were higher (disagrees with Corps).

Response: See new information in Appendix C, Water Quality. New analyses indicate that the temperature of water coming into reservoirs is about the same as temperatures found in reservoirs, but timing and diurnal fluctuations are shifted.

WQ-80 Diurnal and seasonal water temperatures need to be more fully described. Include other influences such as springs, seeps, and tributaries. Develop an example for Alternative 4

Response: Information that may be available is not sufficient to develop useful information on likely springs and seeps that may affect the river with dam breaching. More lengthy presentation of seasonal temperature is not needed to address effects to major aquatic resources.

WQ-81 Dam breaching may cause major detrimental water quality impacts

Response: Water quality effects of dam breaching were discussed in adequate detail to assess effects. See Appendix C, Water Quality.

WQ-82 The FR/EIS needs to discuss effects of high water temperatures on adult salmon and subsequent life stages

Response: Section 5.5 of the FR/EIS discusses the effects of water temperature on adult salmon and the subsequent lifestages. Additional information has been provided in the Final FR/EIS. Detailed information can be found in Appendix C, Water Quality, and in Appendix M, Fish and Wildlife Coordination Act Report.

WQ-83 Dams have resulted in a number of water temperature changes. Even though temperatures may have been higher for the short term before the dams were built, dams extend the period of high temperatures.

Response: For discussion on the shift in the temperature regime of the lower Snake River due to the existence of dams, see Appendix C, Water Quality.

WQ-84 Provide more detail in the FR/EIS on water temperature data collection methodology. Show more on pre/with dam temperature relationships

Response: Details can be found in Appendix C, Water Quality. The FR/EIS highlights the necessary information to allow for decision making, leaving specific details in the appendices. Additional temperature relationship information has been provided in the Final FR/EIS.

WQ-85 Lower water temperatures at Bonneville Dam suggest that dam breaching should not occur.

Response: The Corps is not aware of data indicating temperatures are cooler at Bonneville Dam.

WQ-86 Is it possible for the Corps to store more water at upper elevations to help temperature problems; divert warmer water to fields for crops

Response: The comment meaning is unclear. But, in general, it is outside the scope of this study to consider a change where water is stored or where it is diverted.

WQ-87 There is no merit to conclusions in the FR/EIS resulting from historical scroll case data on water temperature.

Response: The scroll data are valid as demonstrated in Appendix C, Water Quality.

WQ-88 It is misleading to describe and compare water temperatures of free-flowing vs. reservoir situations based only on instantaneous maximum water temperature measurements.

Response: This is evaluated in Appendix C, Water Quality.

WQ-89 It is inappropriate to suggest release of Hells Canyon Complex water to help downstream temperatures. There would be no benefit because of distance.

Response: Water is not released from Hells Canyon for temperature control, although flows from this area may affect downstream temperatures. There are, however, flow releases from this complex to augment flow volume (augmentation).

WQ-90 There are problems with interpretation of data from SOR model/Normandeau; they don't relate to Alternative 4.

Response: See revision to Appendix C, Water Quality.

WQ-91 Data do not support the conclusion that the number of days in a year that water temperatures exceed 68 degrees has decreased since the dams were constructed.

Response: See revision to Appendix C, Water Quality and summary in FR/EIS Section 4.4.

WQ-92 Discussions on conclusions concerning water temperatures are flawed and misleading. Water temperatures for fish have not improved for fish with dams. The Draft FR/EIS presents many models on water temperature, but does not evaluate or compare them.

Response: All models were considered to contribute to the analysis. Since all had different approaches and criteria for evaluation, they cannot be compared directly. It is not part of the FR/EIS to evaluate models. Model results are used for analysis. All have some merits and failings and, where relevant, some of these are noted. In addition to models, more extensive empirical data were included in the final analysis. See the latest information presented in Appendix C, Water Quality and the FR/EIS, Section 5.4. At any rate, the benefits or deficits to fish are less clear than the changes to the temperature.

WQ-93 EPA has no information on the Bennett et al. (1997) water temperature model. Compare it to others used.

Response: See revision to Appendix C, Water Quality. Dr. Bennett attempted to calibrate an established and readily used Corps model with transect data his team collected in the lower Snake River across several years. The graphic displayed in the Draft FR/EIS was mislabled. The data is not Dr. Bennett's data or model results, nor was it a model of scroll case data collected routinely by the Corps it was simply a misidentified graphic representation of scroll case data. Text and graphical representations have been rectified in Appendix C and coordinated with EPA.

WQ-94 The FR/EIS needs additional modeling on releases from Dworshak. Look at Hells Canyon and Clearwater also as possible sources.

Response: More temperature analysis and data are included, but no additional modeling was done. More extensive interpretation of the temperature and potential temperature conditions are included in both the FR/EIS and Appendix C, Water Quality. The Corps believes the additional empirical data added to the document are adequate to determine likely effects of the alternatives without additional modeling Adequate data series across Dworshak and Hells Canyon operations exist for the Corps to propose coordinated development of Biological Rules for augmentation of flows from all upriver sources to optimize passage benefits across all salmonid stocks. Additional modeling is not necessary. What are necessary are ecologically based rules targeting the management of a seasonal water temperature range that prioritizes beneficial responses to each stock's physiological requirements for completion of passage through the estuary by lifestage affected, and without shocking certain lifestages during their critical period of growth with either too warm or too cold of water.

5.11.6 Appendix C, Water Quality

The issues involving water quality broke down into three general areas, including: 1) compliance with existing standards; 2) sediment releases; and 3) potential spills or hazardous wastes.

5.11.6.1 Compliance with Existing Standards

Several letters indicated that existing Federal or State standards are not being met with the current operation of the four lower Snake River dams. The primary areas of concern are water temperature and TDG. Specific issues are included below:

General

WQ-95 Appendix C underemphasizes the CWA and the need for compliance.

Response: See responses to comments WQ-72 and WQ-76.

WQ-96 The antidegradation policy of Oregon is to ensure that high quality waters are not degraded to established standards (i.e., if water quality is better than standards, then they cannot be degraded down to that standard).

Response: Note: The lower Snake River dams are in Washington State, not Oregon. The Washington State degradation policy has been revised and the FR/EIS addresses this issue adequately.

WQ-97 Water quality discussion in the Draft FR/EIS does not directly relate to effects on salmon/steelhead.

Response: Water quality effects are discussed in Section 5.5 of the FR/EIS.

Water Temperature

WQ-98 Compliance with the CWA regarding temperature would not be met under Alternatives 1, 2, and 3.

Response: See response to comment WQ-76.

WQ-99 Water temperatures with the dams will be actually more favorable than under pre-dam conditions.

Response: This is evaluated in the Final FR/EIS.

WQ-100 It is not readily apparent that breaching would lower water temperatures in the lower Snake River.

Response: This was reevaluated in the Final FR/EIS.

WQ-101 The lower Snake River dams extend the warmer water temperature period over a longer period of the year compared to a potential dam breaching scenario.

Response: This conclusion is based on one model. However, other models and empirical data do not necessarily agree with this conclusion.

WQ-102 Alternative 4 may have higher summer temperatures, but these would be for shorter periods compared to those with the dams in place.

Response: This hypothesis cannot be confirmed at this time, and some information suggests this may not be the case.

WQ-103 Use of scroll case data versus data from TDG stations gives different results.

Response: The utility of scroll case versus other temperature data was evaluated in the latest Appendix C, Water Quality.

WQ-104 EPA water temperature modeling does not agree with Corps' modeling.

Response: See additional analysis in Appendix C, Water Quality.

WQ-105 The author needs to read and incorporate into the FR/EIS aspects of a publication by Gerald Bock entitled *Perspectives on the Temperature Issues in the Columbia River.*

Response: Comment noted. We have reviewed this document.

WQ-106 Based on data in Appendix C, it appears that water temperature has not decreased as a result of the dams.

Response: See new analysis in Appendix C, Water Quality.

WQ-107 Corps needs to state hypotheses for water temperature analysis.

Response: See new analysis in Appendix C, Water Quality.

Total Dissolved Gases

WQ-108 The FR/EIS needs to discuss involuntary spill as a result of hydraulic capacity and lack of power demand as it affects TDG.

Response: A discussion of TDG and involuntary spill is included in Appendix C, Water Quality.

WQ-109 The FR/EIS needs to evaluate TDG for each alternative and compare amongst them.

Response: This was done in the FR/EIS text.

WQ-110 The FR/EIS needs to provide more detail on low dissolved oxygen (below standards) levels in the lower Snake River as discussed in Appendix C.

Response: The discussion was expanded in Appendix C, Water Quality and in the FR/EIS text.

WQ-111 A free-flowing river would have higher dissolved oxygen, which would be a benefit to fish.

Response: The discussion on DO was expanded in Appendix C, Water Quality and in the FR/EIS text.

5.11.6.2 Sediment

WQ-112 The potential for pre-dredging prior to breaching needs to be evaluated.

Response: The amount of sediment distributed through out the LSRP is so large that it is unlikely pre-dredging would effectively remove enough material in order to prevent problems later. The lack of benefit and the fact that pre-dredging would be prohibitively expensive make it unsound to incorporate into a viable alternative. In addition, the loss of salmonid habitat that currently exists by a pre-dredging operation, would be contrary to the idea of salmon restoration.

WQ-113 The FR/EIS needs to discuss potential effects of residuals in reservoir sediment that may be released following breaching (e.g., DDT, aldrin, dieldrin, and chlordane).

Response: Toxic substances in sediment were addressed in Appendix C, Water Quality and in Chapter 4 of the FR/EIS. Levels of aldrin, dieldrin, heptachlor, and lindane in Snake River sediment were found to be below screening levels of 10 ppb. See also the 404(b)(1) analysis in Appendix T.

WQ-114 The FR/EIS needs to further address air-borne contaminants from reservoir sediments and their potential effects.

Response: Airborne contaminants from reservoir sediments and their potential effects have been discussed in detail in Appendix P, Air Quality. Discussions have been updated in the Final FR/EIS.

WQ-115 The FR/EIS needs to describe effects of sediments on salmonids and their habitat.

Response: The effects of sediment on salmonids and their habitat are discussed in Section 5.5 of the FR/EIS (Aquatic Resources).

WQ-116 The FR/EIS needs to further describe effects of sediment deposition on Lake Wallula including effects on ports, existing wetlands, and recreation.

Response: See response to comment WQ-3.

5.11.6.3 Potential Spills and Hazardous Materials

WQ-117 The potential for spills of petroleum and hazardous materials needs to be compared among the alternatives. There is a higher potential for spills with increased road traffic under Alternative 4—Dam Breaching.

Response: A section that addresses the potential for spills of petroleum products and hazardous materials under each alternative has been added to the main FR/EIS (Section 5.9.3.5). Spill Control Plans will be required during implementation of construction activities. See Appendix T for the 404(b)(1) analysis.

5.12 Anadromous Fish

5.12.1 Effects of Dams

AF-1 Construction of Snake River Dams by 1975 is most likely responsible for the greater decline of these stocks compared to lower river stocks.

- This analysis is based primarily on the PATH process,
- Lower river stocks survive better in the ocean, suggesting delayed mortality.

Response: Many commentors felt that NMFS was "too easy" on dams and cited the tremendous declines in salmon populations that coincided with the construction of the four Snake River dams. There is no question that the dams initially killed large numbers of fish. But there is also no question that engineering improvements in hydrosystem operations have improved fish passage and survival. Hence the key question is, under current conditions and operations, how much opportunity for salmon recovery is provided by dam breaching, by other modifications of hydrosystem operations, or by alterations in other sectors (e.g., habitat and hatcheries)? To answer this question, one has to start with current conditions as the baseline, and quantitatively explore possible improvements. The Kareiva, Marvier, and McClure (Kareiva et al., 2000) manuscript, which is incorporated into Appendix A, Anadromous Fish Modeling, conducts this exercise and shows that the benefits of dam breaching depend entirely on how much mortality below Bonneville Dam ("extra mortality") is ascribed to the passage of fish through the four lower Snake River dams. Noting that there are four large lower Columbia dams in place, even if the Snake River dams were removed, the concept of "natural river" seems off-base. The uncertainty that bedevils any decision to breach the dams is the lack of evidence substantiating extra mortality of the magnitude required to make dam breaching a clear-cut "winning" decision (Figure 5 of Kareiva et al., 2000). Other commentors felt that NMFS did not attribute enough benefit to barging and hence was leaning unduly towards dam breaching. In fact, the high downriver survival of barged fish is built into NMFS' matrix models (Kareiva et al., 2000), which is exactly why the merits of dam breaching come down to our estimation of how much extra mortality is due to the hydrosystem alone.

In addition to the above common "general concerns," several comments were directed at specific aspects of hydropower operations. Usually these comments were on-target, and raised issues for which data are lacking.

For example, genetic effects are not explicitly treated by either PATH or CRI, although some demographic sensitivities were performed by PATH for small population consequences at Allele effects. Such sensitivities showed relative insignificance due to little evidence for density-dependence at the current population densities. This neglect arises because of a lack of data. Because we do not know the relative fitness of hatchery-derived fish, we cannot even begin such an analysis. Such an analysis would require knowledge of gene flow between hatchery fish and wild spawners. Increases in the amount of available habitat are an issue primarily for fall chinook. PATH included these increases in its simulations of future fall chinook population growth under the breaching option. CRI did not explicitly consider the consequences of increased habitat, because it argues that first declining population trends have to be reversed, and only then does the amount of available habitat become important.

Details about the effects of migration timing are mentioned in Appendix A, Anadromous Fish Modeling but do not play a major role in the discussion of management options. The reason for this is the small sample sizes at this point in time. As the passive induced transponder (PIT)-tag research

continues and provides more recoveries of tagged fish, it may be possible to explore timing as a critical factor that influences smolt-to-adult returns, and is amenable to improvement in the hydropower corridor. At this stage, such analyses would be premature.

AF-2 Adverse fish health, including increased disease and increased stress are likely increased through the hydrosystem.

- Increased stress likely contribute to increased bacterial kidney disease (BKD) in fish, contributing to delayed mortality.
- Transport increases chance of disease transmission.
- Transport and bypass systems increase stress.

Response: The effects of hydrosystem and transport on stress, disease, and delayed mortality are at best equivocal. NMFS in its white papers (NMFS, 1999a) on the effects of transport concluded: "Research clearly demonstrates the high prevalence of BKD in anadromous salmonid smolts originating in the Columbia and Snake Rivers. However, whether or not transport exacerbates mortality due to the disease in unknown." Disease studies found that BKD could be transmitted from infected fish to unaffected fish when confined in the same water. Also the highest potential disease levels occurred after 75 percent of the migration had occurred.

However, it appears that infection increases during migration and that the increases were caused in the river environment. The length of migration, and possibly temperature, appear to be factors because Snake River stocks had higher rates of infection than Columbia River stocks. Finally, even if BKD is transmitted from fish to fish, nearly all smolts arriving at dams would have been previously infected.

Results of stress tests were also highly varied. The NMFS white paper on passage (NMFS, 1999b) also stated: "The relationship between physiological indicators of bypass-induced stress and in-river survival are not well documented." Fish do have increased stress from collection at dams and passing through the collection system. However, in many of the tests, stress decreases during transport to background levels (NMFS, 1999a), while some tests showed that stress remained elevated. Other tests have found that stress decreases to background levels within 3 hours of being elevated. Even inducing descaling (of 20 percent) did not increase time of recovery from stress relative to control fish. Mixing of species of steelhead and chinook does increase stress in chinook during transport. Some studies suggest greater susceptibility to predation from highly stressed fish, but another study found no significant difference in predation from moderately descaled and control fish by northern pikeminnow. Stress may also reduce food reserves. But the bottom line is that demonstration of stress being a causative factor on fish survival in the wild has not been shown.

AF-3 The currently high mortality of both juvenile and adult fish passing the Columbia and Snake River dams make the chance of recovery low.

- Juvenile yearling passage mortality is 24 to 86 percent, juvenile subyearling 62 to 100 percent.
- Adult spring chinook 21 percent and adult fall chinook 39 percent mortality.

Response: Several points affect the interpretation of these numbers relative to consideration of effects on recovery of these stocks:

1) Even without any hydrosystem passage, survival through the river reach that is currently impounded would have been far greater than zero percent. For example, NMFS in their 2000 FCRPS Biological Opinion (NMFS, 2000a) estimated that passage mortality of juvenile yearling

chinook in just the Snake River reach, without dams would be about 8 percent with current in-river mortality of about 30 percent in this reach. For fall chinook, even without dams, one of NMFS' estimates of mortality is as high as 27 percent in the Snake River reach, which currently has an estimate of about 72 percent mortality. NMFS (1999b) indicated that mortality for the whole system in recent years (1995 to 1999) has been about 49 percent average (41 to 58 percent) for spring/summer chinook, and 90 percent average (84 to 99.5 percent) for fall chinook. While mortality appears higher with dams, the natural system also had substantial mortality, which, while smaller, was not zero percent.

2) The recent estimates of passage mortality for yearlings is similar to estimates for the 1960s when adult returns were high, indicating production can be high with current mortality rates.

3) Because fall chinook rear as they migrate, mortality levels are naturally much higher for these stocks compared to those of yearling chinook.

4) NMFS (2000a) also estimates that natural mortality of adult spring/summer chinook, at least in the Snake River, is little different from what it may be without dams. They used two different methods, and one estimated a similar mortality rate as currently occurs in the Snake River for spring/summer chinook, about 4.4 percent per dam. Another estimate suggested lower rates without dams (about 1 percent). Differences are likely higher for fall chinook, which is currently about 4.2 percent mortality per dam or currently about 40 percent for passage of all eight dams. But natural mortality is likely to have also been higher for these fish than spring/summer chinook as well. The bottom line is, while substantial mortality currently occurs, a natural system would also have had substantial mortality without human influences.

5) There are many factors, including injury from marine mammals and damage from gill nets, that affect upstream passage survival independent of the hydrosystem.

6) Migration rate of adults through reservoir systems does not appear to have been slowed, so delay does not appear to be a source of mortality.

AF-4 Appendix A, Anadromous Fish Modeling fails to supply sufficient evidence to support statement that the FCRPS operations have fixed most adverse effects. The Appendix A, Anadromous Fish Modeling allocated direct mortality to other life stages, not considering the weight of evidence indicating delayed mortality results from the hydrosystem.

Response: See response to comment AF-1.

AF-5 Installation of dams on the Snake caused the decrease in fish runs. The decrease in fish runs on the Snake corresponded nearly exactly with installation of dam, with returns 4 to 5 years after the dams went in correspondingly decreased in returns.

Response: While correlation between dam construction and decrease in some runs is high, other factors also correlated to this decrease. To name a few: 1) decadal ocean cycle shift, which has been shown to affect salmon production, occurred at the same time, and 2) many hatcheries came on line with high numbers of smolts being released. But the real question is not what caused the decline but what can be done to change it. The hydrosystem has undergone many changes to increase survival. The analysis concerning whether removal of dams will result in "recovery" or prevention of extinction is not clear. Removal of dams, under some analysis, will not prevent extinction of some stocks and in some cases is little different in its results than other actions that can be taken. The results of this analysis indicated that other actions are needed.

AF-6 The current system of dam passage and collection at dams may adversely affect the genetics of fish.

- Extended length screen select against subyearling survival.
- Collection and transport select against the tail end of the migration period.
- Timing of arriving at the estuary is adversely affected as timing is critical to survival.

Response: Please see response to comment AF-1.

AF-7 Flip lips cause high mortality by descaling fish and increasing predation by birds.

Response: The most recent studies do not indicate that descaling is significant when passing flip lips, and we do not have any data indicating that flip lips lead to increased bird predation. In most cases passage survival has been higher with flip lips than without flip lips because flip lips allow a more efficient and suitable in-river passage route by allowing some voluntary spill. The optimum volume of voluntary spill continues to be tested and debated.

AF-8 If direct survival is high, why are dams the focus? Fish passing through the hydrosystem are assumed to be less vigorous but no mechanisms has been shown to cause this to the level affecting survival. Also, recent pit tag data indicates significantly high "D" values, so a decision should wait until more data is developed.

Response: Please see response to comment AF-1.

AF-9 Explain how fish passing through the system are "less fit" for survival.

Response: This question relates to the calculations of delayed mortality that result from the modeling of the result of fish survival and return. Fish that have passed through the hydrosystem or are transported often times, based on tagging studies, have lower survival than those that do not appear to have passed through the hydroelectric passage facilities. Also some lower river stocks appear to have higher overall survival from smolt to adult, below Bonneville Dam than those Snake River stocks that have arrived below Bonneville Dam. The assumption is that some process encountered during this passage affects their survival. Several mechanisms have been proposed including, increased stress, descaling, and disease, but none has been proven to be the cause because no good test has been done or is possible to address this issue.

AF-10 The fact that the decline of Snake River salmon correlates highly with the construction of Snake River dams is compelling evidence that the dams are the cause of the decline.

Response: A correlation does not necessarily translate into cause and effect. Many other things were happening prior to and at the same time as the lower Snake River dams were being constructed. The period of overfishing was ending, habitat destruction through mining and agriculture in association with smaller private dams in tributaries had eliminated Clearwater River spring chinook and Salmon River basin lake produced sockeye runs, fish hatcheries concentrating on steelhead and rainbow trout were coming on line as compensation for dams and habitat destruction, climatic and ocean conditions were changing, and spring flow levels were fluctuating causing uncontrolled spill over construction surfaces such as tetrahedrons during high flow years and high water temperatures during low flow years. All of these factors likely contributed to declining salmon populations and it is impossible to say which ones contributed most or least.

Also see response to Comment AF-1.

AF-11 The fact that stocks were maintaining harvestable levels before the Snake River dams were complete is concrete argument that dams were the problem and need to be removed. The argument that ocean conditions changed coincidentally does not wash because the Alaska fishery has maintained during this period.

Response: See response to comment AF-1.

AF-12 As you stated in press releases, Snake River runs had declined by 90 percent before the lower Snake River dams were installed. The result is that dams account for only a small portion of total historical fish loss. This should be made clear in the document.

Response: The large historical losses were described in the document, and were primarily the result of impassible upriver dams blocking fall chinook. However, stocks have continued to decline even for fish that are not blocked by dams. This is the issue the Corps addresses in the FR/EIS relative to their facilities.

5.12.2 Juvenile Fish Transportation

AF-13 There is a lack of scientific evidence indicating other factors, outside of hydrosystem, are adversely affecting fish to the level suitable to mask benefits of fish transport.

Response: Several comments expressed dissatisfaction with NMFS' discussion of management actions outside the hydrosystem as possible approaches to salmon recovery. NMFS agrees that evidence substantiating the likely effectiveness of habitat or hatchery improvements is not strong – but the "weakness" of such evidence is comparable to the weakness of the evidence in favor of the hydrosystem as the main cause of extra mortality. It is unfortunate that over the past 5 years so little data and analysis has been directed at habitat and hatchery effects on smolt-to-adult returns and fish productivity. However, a well-designed monitoring and evaluation program combined with experimental management promises to remove this uncertainty (see All-H discussion of monitoring and evaluation). In addition, recent analyses (Appendix A, Anadromous Fish Modeling) indicate that improvements in population growth rates are plausible given improvements in harvest regimes, hatchery practices, and habitat factors. These preliminary analyses will provide the foundation for management experiments.

AF-14 Transport benefit ratio (T:C) as measure of relative transport survival indicates that survival is not improved by transport when compared to "true" in-river fish. Idaho's stated reason is that the return rate of fish "not detected" is nearly the same as for transported fish, indicating adverse effects of most of the hydrosystem that fish pass through.

Response: The methods and results of this analysis are also summarized in the qualitative (non-modeled) assessment portion of the anadromous fish impact section. For more details on this analysis see NMFS, transportation white paper (NMFS, 1999a; http://www.nwfsc.noaa.gov/pubs/white/trans4-25-00.pdf and http://www.nwfsc.noaa.gov/pubs/white/transresp.pdf).

AF-15 Alternatives 1, 2, and 3 fail to recognize that that while increasing transport and passage improvements reduced direct passage mortality, smolt-to-adult ratio (SAR) remained too low to recover stocks over the last 20 years. In fact, stocks have continued to decline and transport-related mortality is still uncertain. Action proposed in Alternatives 1, 2, and 3, which include extensive transportation, may in fact be part of current problem, not part of the solution.

Response: The effects of transport are summarized in the FR/EIS. For more detail, see NMFS transportation white paper (NMFS, 1999a; http://www.nwfsc.noaa.gov/pubs/white/trans4-25-00.pdf and http://www.nwfsc.noaa.gov/pubs/white/transresp.pdf) for NMFS, view on this.

AF-16 Transporting fish by barge helps survival and recovery efforts.

- Survival of juvenile transported fish is much higher (about 98 percent) than for non transported fish that have to pass through the eight dams or even the four lower river dams if Snake River dams are removed. Any alternative that increases fish transportation (e.g., Alternative 3) should increase overall fish survival including over dam removal alternatives.
- Dam passage with dam removal will increase "direct dam passage mortality" due to loss of transport and therefore is a bad alternative.
- Current survival of barged fish is 2:1 that of in-river fish. Removing dams will cause all fish to have to go through the lower four river dams. These dams are worse on survival than the Snake River dams so it is concern for the benefit purported for survival with dam removal.
- It appears as though most of the fish decline (from 16 million to 2.5 million) occurred prior to 1938 when Bonneville was built and that the dams have in fact slowed the rate of decline considering the historical rate.

Response: Appendix A, Anadromous Fish Modeling makes it clear that there is considerable uncertainty regarding D values, and that the benefits of dam breaching vary depending on what D values are assumed to hold. The decision of what to do in the face of this uncertainty is not purely a scientific question. PATH models showed, that regardless of what assumptions are made, all simulated futures (including futures that are the status quo) yield survival of the index salmon stocks. In contrast, CRI analyses indicate that the index stocks face a substantial risk of extinction if conditions stay the same. Thus, there is clearly uncertainty about the urgency of the situation as well as about D values. NMFS is continuing its PIT-tag studies to reduce uncertainty about D values. However, even if we knew D with certainty, the benefits of dam breaching would not be pinpointed, because there would remain the uncertainty regarding extra mortality for untransported fish. The current D values do not lead to an unequivocal conclusion regarding the value of dam breaching, and even if we narrow our uncertainty about D values, the question will not be resolved.

AF-17 Transport does not meet the goal of "Conserve the ecosystems upon which salmon and steelhead depend."

Response: Using transportation systems does not in itself conflict with this goal. It is just another tool that has been shown to benefit the survival of migrating salmon and steelhead in a variety of conditions (see also response to comment AF-16). Other actions, both within and outside of the Snake River corridor, are being taken by the Corps and other involved parties to aid this goal, including cool water releases and habitat improvements.

AF-18 Many major documents by scientific groups indicate that fish transportation does not and will not lead to recovery, so it should not be continued in the future.

Response: See response to comment AF-16.

AF-19 Studies (e.g., 1994) indicate higher survival and SARs with transportation than without. Higher spill for fish passage has had adverse effects to fish resulting in gas bubble disease. Transportation makes more sense for maintaining fish passage survival than increased spill.

Response: See response to comments AF-14, AF-15, and AF-16.

5.12.3 Survival and Recovery Standards

AF-20 The 1995 Biological Opinion survival and recovery standards should be used to evaluate alternatives; the standard includes "recovery," not just prevention of extinction (NMFS, 1995). The goal of "recovery" should be self-sustaining, harvestable populations of Snake River salmon and steelhead, not the standard of "avoiding extinction" based on one fish minimum which was used in Appenidx A, Anadromous Fish Modeling.

The problems noted with the FR/EIS evaluation relative to the evaluation criteria for survival and recovery are:

- The CRI analysis appears to "lower the bar" relative to these standards with their definition of "quasi extinction."

Response: The CRI was a comparative analysis using the most biologically useful point of comparison—extinction. When recovery goals are established, CRI analyses will consider these goals.

- The PATH analysis and CRI analysis are not comparable in the evaluation of meeting these standards because of the difference in definition of escapement.

Response: CRI used the escapement estimated produced in the PATH process. There is no difference in the definition of escapement to the spawning grounds.

- The Appendix A, Anadromous Fish Modeling loosely defines production of fish without specifically referring to recovery as properly defined.
- The statistical standards for survival and recovery used are even lower than what was in the 1995 Biological Opinion. This is the time for precautionary principle, not to do the minimum.
- Actions to achieve recovery are not evaluated but should be.
- NMFS has confused the issue between avoiding extinction and "recovery" in the text, which is misleading. Recovery needs to be the standard used in Appendix A, Anadromous Fish Modeling.
- The NMFS evaluated actions are against "avoiding extinction" not "recovery," making their statements about what actions would be successful insufficient for recovery.
- Considering recovery as a goal, only dam removal will be successful for most Snake River stocks even though other actions may still be needed to achieve recovery of spring/summer chinook.

Response: Recovery goals have not been established for any Columbia River ESUs except the Upper Columbia chinook and steelhead (as part of the QAR process). When recovery goals are established, analyses can address them. In the interim, the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) has considered the 1995 recovery standards. New analyses added to Appendix A, Anadromous Fish Modeling make the distinction between recovery and avoiding extinction clear.

- NEPA requires agencies to evaluate actions relative to applicable laws, which require "recovery."
- The ESA requires agencies to "conserve" which means recover listed stocks as well as prevent jeopardy.
- To prevent jeopardy an agency must insure its actions do not reduce both "survival and recovery."
- Other laws and treaties imply recovery is the standard by which actions should be evaluated.

Response: Recovery goals have not been established for any Columbia River ESUs except the Upper Columbia chinook and steelhead (as part of the QAR process). When recovery goals are established, analyses can address them. In the interim, the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) has considered the 1995 recovery standards. New analyses added to Appendix A, Anadromous Fish Modeling make the distinction between recovery and avoiding extinction clear.

AF-21 The goal of the FR/EIS should be to achieve recovery of the listed stocks.

Response: The purpose of this FR/EIS is to evaluate ways to improve juvenile salmon migration through the hydropower system on the lower Snake River. The study focuses on how the lower Snake River dams can be changed to improve migration prospects for Snake River stocks listed under the ESA. The recommended action would contribute to recovery.

5.12.4 Deficiencies in Text/Additions Needed

5.12.4.1 Appendix A, Anadromous Fish Modeling

AF-22 Provide information on changes in Snake River salmon numbers since dams were built and provide information on lower Columbia River salmon runs compared to Snake River salmon runs.

Response: See response to comment AF-1.

AF-23 Appendix A, Anadromous Fish Modeling should be updated with new information based on NMFS latest modeling analysis and addressing agency concerns.

- NMFS has already developed new model result and these at least need to be included.

Response: New and revised analyses have been added to Appendix A, Anadromous Fish Modeling.

- Agency concerns and how the document was changed should also be noted.

Response: Most responses to agency concerns are addressed below.

AF-24 Appendix A, Anadromous Fish Modeling should include the "Weight of Evidence" analysis and SRP weighted analysis done in PATH.

- The weight of evidence reports considered all available data in its analysis and risk assessment, which is not done by the modeling work shown in Appendix A, Anadromous Fish Modeling.
- The SRP panel considered all of the alternatives to the hydrosystem effects and objectively evaluated their likely effects including delayed mortality. It is full disclosure to present this information in Appendix A.

Response: Appendix A, Anadromous Fish Modeling clearly reflects a shift on the part of NMFS towards relying more on CRI analyses rather than PATH analyses. This shift, however, has nothing to do with a rejection of collaborative science. Instead, NMFS was reacting to criticism of PATH expressed by an ISAB review (see NWPPC website), and by a failure of PATH to include the four most recent years of run-reconstruction data or the most recent PIT-tag data regarding differential

delayed transportation mortality. Comments in Appendix A suggesting that PATH was "too optimistic" reflect aptly a major concern expressed by the ISAB in critiquing PATH results. CRI is not the original source of the worry that PATH is off-target because it is too optimistic.

It is important to recognize that CRI is committed to peer review – and that there is no distinction between PATH and CRI when it comes to peer review. For example, the CRI analysis has been reviewed by the ISAB; in addition CRI analyses have been or are currently being peer reviewed by leading scientific journals. Kareiva et al. (2000) has already passed such peer review and is in press in the *Journal Science*. Several of the other analyses are in the midst of broad peer review for other internationally renowned journals. Both PATH and CRI also sought collaboration and input from a broad community of scientists. For example, through frequent workshops, and as a result of placing drafts of papers on the CRI website for public comment, the CRI has shown a commitment to public comment, openness, and collaboration. Unfortunately, collaboration does not imply that everyone (or even that anyone) will agree with the science. PATH itself never reached any internal consensus, as is evident from the conflicting conclusions attributed to FLUSH versus CriSP passage models.

Of course, there are substantive differences between PATH and CRI. CRI places greater emphasis on recent data, whereas PATH places greater emphasis on historical data. CRI favors simple transparent models that consequently do not include as many hypotheses and details; PATH favors more detailed and intricate models that consequently are not as transparent or easy-to-understand.

Several comments express dissatisfaction with NMFS for turning away from PATH. Without getting involved in technical debates, there are a few simple practical reasons why CRI was elevated in prominence:

1. PATH analyses did not use the most recent four years of run-reconstruction data; CRI analyses did. NMFS believes a decision such as dam breaching demands that we use the most recent data.
2. PATH analyses (and the "weight of evidence" reports) did not have access to the most recent PIT tag data.
3. PATH analysis indicated that even if no action were taken, and the status quo were preserved, then Snake River spring/summer chinook salmon met PATH's survival standards. That conclusion of a certain probability of survival runs counter to the obvious declining trends in the salmon stocks.
4. PATH provided quantitative analyses for only two of the twelve listed ESUs within the Columbia Basin. In contrast, CRI provides a standardized and consistent protocol for examining all ESUs within the basin.

The CRI formulation lends itself to clear examination of management possibilities outside of the hydrosystem (Kareiva et al., 2000).

AF-25 The Corps needs to note where uncertainty occurs and be prepared to reassess its position where science indicates.

Response: The Corps has asked NMFS to assist with analysis of uncertainty. Uncertainty in hypotheses is noted throughout Appendix A, Anadromous Fish Modeling and new incorporated analyses.

AF-26 Appendix A, Anadromous Fish Modeling should acknowledge that sockeye are virtually extinct and coho were already extinct in the 1980s.

Response: Additions to Appendix A, Anadromous Fish Modeling indicate that this is the case.

AF-27 Clarify percent survival needed for each of the alternatives for fish arriving below Bonneville dam to reduce extinction (in Table 5.4-1).

Response: Most of these analyses are included in the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a). More perspectives on NMFS' extinction model used for their revised survival standard for determining jeopardy and the rate of population growth (lambda) are included in the above responses and the revisions to Appendix A, Anadromous Fish Modeling. The number of fish is not evaluated, however, because there is great variability in abundance. Rather, the anticipated changes in population growth rate (lambda of the lifecycle) are assessed.

The number of fish successfully migrating to below Bonneville (whether by barge or in-river) is less important than other life stages, according to NMFS' CRI analysis. The percent survival required to Bonneville to reduce extinction to an acceptable probability (NMFS defined as 5 percent) varies with environmental conditions like first year survival and habitat production, annual flow, hydrosystem operation, ocean productivity, and harvest rates, plus other predator population dynamics. One average estimated metric projected through time is unrepresentative of likely responses possible for adult spawner escapements because salmonid survival ecology is not static, but dynamic seeking self-balancing across 1 to 5 years of cohort juvenile to adult production. In-river and transported survivals for spring/summer chinook smolts since the late 1990s have been as high as those recorded during the surrogate recovery period of the 1960s. These 50 to 60+ percent smolt survivals have returned adults that have exceeded the 10-year averages and maximum escapement counts recorded since before the 1960s, but mathematically in-river system survivals in the 80 to 90 percent range should theoretically be better given that all indirect and unaccounted for mortality vectors are held constant, which isn't usual in evaluating large ecological scales, especially across several salmonid species and stocks adapted to slightly varied lifestage or lifecycle survival strategies.

AF-28 NMFS is not serious about recovery. They have not evaluated illegal water use, permit dredging in habitat (lower river) without analysis, do not know whether recommended habitat improvements are possible, and are not addressing the temperature problems on the Columbia.

Response: Comment noted. These comments concern NMFS policy rather than the FR/EIS.

AF-29 Appendix A should include more analysis of the effects of sediment on fish in the Columbia River stocks from breaching, and provide more information on harvest effects on fall chinook and others.

Response: New, revised analyses attached to Appendix A, Anadromous Fish Modeling include a general evaluation of harvest effects on all Columbia River ESUs (except Snake River sockeye and Columbia River chum, which were impossible to evaluate). Effects of sediment from breaching on fish are largely unknown, but what we do know can be found in Appendix A.

5.12.4.2 FR/EIS

AF-30 The discussion of passage (juveniles and adult) needs to be presented in a more encompassing way including the ecological and physiological consequences to salmon of passing dams or free flowing river.

Response: See revised discussions in Chapter 5; Appendix A, Anadromous Fish Modeling; and Appendix M, Fish and Wildlife Coordination Act Report.

AF-31 The Corps needs to include the PATH retrospective analysis in the FR/EIS. The retrospective analysis should be included because it helps explain likely effects of future actions. The analysis indicated:

- Salmon decline and reduction in survival correlated with periods of hydro development.
- Effects of the hydrosystem were both direct and indirect.
- Decreased stock abundance correlated with the completion of Snake River and John Day Dams.
- Snake River stock survival is 25 to 30 percent of that of lower river stocks.
- Survival of current stocks with all improvements is only about 0.05 to 0.44 percent, not the 2 to 6 percent needed for recovery.
- Most habitat degradation occurred prior to hydro development so does not account for current trends.
- Hatchery operation have not significantly affected survival of wild stocks.
- Recent harvest (since 1974) have not significantly affected survival of Snake River spring/summer chinook.
- No consistent different effects of oceans or climate on upriver and lower river stocks.

Response: A historical section in Appendix A, Anadromous Fish Modeling, and added to Chapter 5 includes information from the PATH retrospective analysis in context of chronological development of the hydrosystem and other contributing H effects.

AF-32 The condition of usable fall chinook habitat above Hells Canyon complex at the time of their construction is not as clear as indicated in the FR/EIS. The statements about quantity of fall chinook habitat lost by construction of these dams needs to wait until a study being done by Idaho Power is complete before this determination can be made.

Response: While the historical information is not completely clear, it is the best available and the Corps believes the information is adequate for the discussion and purpose used. The Idaho Power report will be reviewed and information incorporated, as applicable.

AF-33 The FR/EIS is deficient because it does not describe the status of each listed Snake River stock including the decline in spawners and reducing smolt-to-adult return in spite of consistent production of smolt per spawner, and how each "H" contributes historically and presently to this species decline. The Corps needs to describe how each of the Hs has contributed to this decline and where the biggest improvements can be made.

Response: The FR/EIS is not deficient in its approach. The Corps does not believe it needs to address each of the issues as stated. It needs to evaluate the effect of its actions on the listed species, which it did. Nor does the Corps need to present a historical perspective of where effects have occurred or relative potential benefits of each of the Hs. These issues are addressed in another regional forum, the "All-H" report. However some historical issues related to the current status of salmon are discussed in revisions to Appendix R, Historical Perspectives.

AF-34 Include an analysis of additional habitat and flow needed.

Response: Additional discussion on habitat and flow is included in Chapter 5; Appendix H, Fluvial Geomorphology; Appendix C, Water Quality; and Appendix M, Fish and Wildlife Coordination Act Report.

AF-35 The FR/EIS needs to focus on restoring habitat to more natural conditions. This has been the focus of many noted publications by science groups addressing the needs of the salmon regionally. This can only be achieved by dam removal.

Response: The ultimate goal is to aid in recovery of the stocks, not just restore habitat. Restoring habitat is one factor to consider, but not the only one. The Corps' preferred alternative has methods intended to help achieve the overall goal of increasing the chance for survival and recovery.

AF-36 Provide more detailed information on habitat use by anadromous fish in the Snake River reservoirs, especially juveniles, similar to that presented in Resident Fish, Section 4.5.2.

Response: The Corps presented relative information on anadromous fish use of the reservoirs for rearing and migration as it relates to important types of impacts (see Section 5.5.1), such as feeding and predation, but not in this section. The Corps believes inclusion of the information requested for this section would not substantially improve the impact analysis, which is the purpose of the FR/EIS. One of the reasons for the appendices is to provide more detail on the type of information requested so that those readers wishing more detail can access these documents. This type of information was included for resident fish because, as their name implies, they reside in the reservoirs year round, while the anadromous stocks use this region primarily as a migration corridor and rely less on rearing habitat.

AF-37 Table 5.4-1 needs to be condensed and organized so it is more user friendly.

Response: The table (now 5.5-1) is condensed considerably and at this time we do not believe that there are changes available to improve its readability.

AF-38 Increase the discussion of the interaction of hatchery and wild fish in the FR/EIS. Different sizes and state of physiology affect how fish respond to passage at dams and transport. Without this information it is hard to evaluate the passage options adequately.

Response: The Corps relies primarily on the results of the modeling to evaluate passage alternatives. This modeling was done by both PATH and NMFS. The quantitative information available on differences between hatchery and wild fish, if appropriate, was included in these models. The additional type of information you requested is generally more qualitative in nature. While we have included some qualitative information in the FR/EIS text, we have attempted to limit this because it was generally relied on less in the evaluation of alternatives. We do not believe the addition of this type of information would be a substantial improvement in the document.

AF-39 Address benefits of a free-flowing river to sockeye salmon, Pacific lamprey, and sturgeon.

Response: The benefits of changing to a free-flowing system have been discussed in mostly a qualitative manner in the text for these fish. Appendix B, Resident Fish does suggest that white sturgeon biomass per mile could be about three times the current levels if the new river reaches are similar to the river upstream of the current reservoirs. Habitat conditions would likely be much more beneficial to feeding and spawning for this stock. The benefits to sockeye would likely be similar to those of other anadromous salmon, but lack of species specific data precluded modeling the effects for this species as was done for the other major stocks. The benefits to lamprey were discussed for each alternative in the FR/EIS. More detail is presented in Appendix M for lamprey, but again a lack of data prevents quantitative assessment for this stock. With other limiting factors for this species, predictions of benefits of a free-flowing river remain questionable.

AF-40 Address fallback, delays, and delayed mortality (post-Granite) of adult salmon and steelhead.

Response: Fallback and delays were discussed in the impact sections. Post-Granite morality is included as a component in the models used in the anadromous fish analysis. However, because it is poorly quantified, it is not discussed in detail in the text.

AF-41 Discuss gas bubble disease in juvenile and adult salmon and steelhead, lamprey, and sturgeon and associated delays.

Response: The known effects and level of impacts to salmon and steelhead have been presented in the text. Little is presented specifically for lamprey and sturgeon because quantitative effects are not as well known. But gas bubble effects are very similar among species. So severe effects are not likely to be apparent until levels exceed 120 percent saturation which is the level often indicated for salmonids and other resident fish (see Appendix B and Appendix M). These levels can occur when flows are very high, as discussed for salmon and steelhead in the FR/EIS.

AF-42 The John Day study stated normal operation had better survival than drawdown. This suggests analysis methods used for the dams must be in error.

Response: The study of the John Day is a separate issue than that addressed in the FR/EIS. The validity of this analysis has no bearing on the analysis used in the FR/EIS.

AF-43 The scope of the FR/EIS only addresses passage so it cannot and does not attempt to address factors such as lost spawning habitat, historical overharvest of Snake River stocks, and historical effects of mining and dams on habitat. These factors will not be changed even with changes in the dam, so any benefits to self sustaining runs may not be the result of breaching.

Response: It is true that the FR/EIS does not attempt to change or evaluate the effect of historical conditions outside of the lower Snake River. However, historical and current conditions in the basin have been considered by the modeling groups PATH and CRI. The goals for recovery set by NMFS have considered that the basin has changed from historical conditions. Harvest has been greatly changed from historically high levels. There remains a lot of very suitable spawning habitat for all species that is not being fully used. New mining practices are quite different from historical practices. And no new blocking dams have been built in many years. While historical conditions in many cases will remain unchanged, the analysis that has been done by the knowledgeable managers indicates that even with these adverse conditions, relative to historical conditions, salmon should be able to achieve higher numbers than those occurring today. The method to achieve this goal, in light of other impact considerations, is what is being selected as the preferred alternative in this FR/EIS.

AF-44 The Corps needs to consider the differences between natural- and man-induced mortality (four Hs). Natural mortality is normally high for the first one and half years of life at about 90 percent.

Response: The amount of change in mortality rates that can be affected at any life stage is, as noted, highly dependent on natural mortality rates. The population status monitoring program to be developed in the NMFS' 2000 FCRPS Biological Opinion (NMFS, 2000a) seeks to gather data that will allow life-stage specific survival rates to be determined. Management actions conducted in an experimental framework will contribute to determining the degree of anthropogenic mortality at those life stages.

AF-45 Need to acknowledge that the smolt to adult survival stage is main source of the problem and where hydro system is the main source of this problem.

Response: This remains an unproven hypothesis. This issue is covered in detail in the PATH and CRI analyses. The results of these two analyses are presented in the FR/EIS. The two analyses in combination indicate that there is a high degree of uncertainty on this issue.

AF-46 The implication that slow water slows migration is in conflict with other information that says migration timing is independent of flow.

Response: Flow and migration are directly correlated. Higher flows decrease migration time. See NMFS flow white paper (NMFS, 1999c; http://www.nwfsc.noaa.gov/pubs/white/whiteflow.pdf and http://www.nwfsc.noaa.gov/pubs/white/flowresponse.pdf).

AF-47 The assumption that water and fish travel times decrease with breaching of dams may be incorrect: fish would travel in a straight line reservoir faster than in a meandering river.

Response: Travel time has been correlated strongly with water velocity in the reach depending on the time of year and temperature. The river would have relatively little change in overall distance in the lower Snake River reach if dams were breached relative to the current reservoirs. The increase in average velocity would be much greater than the average distance increase resulting in marked reduction in travel time for yearly fish. Subyearling fish movement, however, is less correlated with velocity as they spend much of their time rearing. So migration rate may be less affected for these fish.

AF-48 There is no evidence that velocity per se conveys a strong measurable survival benefit for salmon.

Response: Your comment is correct. However, information in the NMFS flow white paper (NMFS, 1999a) addressing effects of flow on survival stated that while recent research has not demonstrated a flow/survival relationship for some races, it may provide survival benefits downstream from the hydropower system. Also, there is a relationship of flow and juvenile fall chinook survival. Also, smolt to adult return has been positively related to flow. While flow is not just velocity, increased velocity is one function of flow, and has in the past been related to survival.

AF-49 The FR/EIS needs to discuss all listed species in one location.

Response: While it is often common practice to present all listed species in one location in NEPA documents, it is not a requirement. While some benefit may occur for reviewers wishing to view only the information on effects to listed species, the result of combining these sections would make the document less easily reviewed by most others who are not looking for just listed species information. Also, the whole anadromous fish section addresses primarily effects of actions on listed salmonids. The Corps does not believe combining these sections with the other sections addressing listed species would make the assessment any clearer. The other fish and non-fish listed species designations are clearly marked in the text so that reviewers looking for information on these other species can find them.

AF-50 The Corps needs to discuss whether alternatives will meet the Compensation Plan mitigation goals in the aquatic section, because some actions are likely to not achieve these goals.

Response: The FR/EIS was intended to evaluate how well actions successfully achieved survival and recovery of listed stocks, not whether the Compensation Plan was being met. However, the

compensation plan mitigation goals are discussed in Appendix L, Lower Snake River Mitigation History and Status.

AF-51 The reason for extensive (25 percent of the shoreline) riprap needs to be explained. Much of the riprap should be replaced with more environmentally friendly materials, like rootwads. Water quality is a significant contributor to salmon decline and likely recovery and needs to be identified as a specific issue.

Response: The reason for the riprap is explained in Appendix D, Natural River Drawdown Engineering. Basically, there are roads or railroads along the banks of the reservoir that, along much of their length, will be susceptible to slumping once the river reservoir level is dropped. The riprap will protect against this slumping and undercutting of the steeper bank areas by the river. More environmentally friendly material will not hold up to the flow conditions well enough to protect the areas being protected by the riprap. So it will remain the material of choice for most of the region.

The effects of water quality are important. Because it affects many different areas of the aquatic environment it was believed by the Corps that it could best be handled under each of the life stages separately as was done for many of the other issues. Therefore calling it out as a separate issues would be less informative and not consistent with the current format of the impact assessment sections.

AF-52 There should be criteria for selecting transportation, inriver migration, or other actions for enhancing recovery. This should be presented in the summary.

- It was proposed that criteria for selecting inriver or transportation be selected based on which consistently returns 30 percent more adults than the other. Neither currently does.
- Another suggested criteria is selection of the one the provides SAR of 1.5 percent.

Because these criteria do not exist, the result is that none of the modifications of the hydrosystem will achieve recovery and improvements in other areas of the fish lifecycle will be needed to achieve recovery.

Response: NMFS, in its 2000 FCRPS Biological Opinion (2000a), has proposed certain types of criteria for measuring whether actions being taken on the Snake River are achieving these criteria. NMFS also selected a variety of actions including those outside of the operations of the lower Snake River system to aid recovery of fish because it does not appear that any actions taken by the Corps at these dams can of themselves be assured of recovering Snake River stocks. The Corps considers the NMFS criteria in the evaluation of alternatives in the final document.

AF-53 Explain the success rate (survival) of fish getting past Bonneville dam for all alternatives.

Response: See response to comment AF-3.

AF-54 A qualitative analysis of the effect court cases have had on salmon recovery relative to alternative analysis should be included in the Anadromous fish section 5.4.1.

Response: The Corps disagrees that litigation analysis belongs in this section (now 5.5.1).

AF-55 Provide an estimate of the number of fish increased by each alternative. If this cannot be determined because the study only evaluates passage, then you need to address changes to the whole lifecycle.

Response: Most of these analyses are included in the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a). More perspective on the extinction model is included in the above responses and the additions to the Appendix A, Anadromous Fish Modeling. The number of fish is not evaluated, however, because there is great variability in abundance. Rather, the anticipated changes in population growth rate (lifecycle) are assessed.

AF-56 As was stated by Bevan in 1994, one management source is needed for the Columbia River stocks. Discuss an alternative management strategy to improve efficiency of recovery actions.

Response: Determination of who is to manage the Columbia River stocks is not part of the scope of the FR/EIS.

AF-57 The FR/EIS needs further investigation to alternate bypass methods for existing hydropower plants.

Response: The Corps continues to investigate bypass methods. However, the main methods considered are those that have in the past shown the best results, including the turbine intake screens and, recently, surface bypass collectors. The consideration of new methods requires long lead times and extensive testing before they can be installed.

5.12.5 Delayed and Extra Mortality

AF-58 The data used by PATH to calculate D values have largely been discarded and methods to calculate D by PATH are flawed for the 1970s and 1980s.

The latest data based on PIT tags is what is being used and has much higher D values, with best estimates in range of 0.59 to .8 (last estimate near 0.59). This makes dam breaching supply less benefit than predicted by PATH.

Response: See NMFS, transportation white paper (NMFS, 1999a; http://www.nwfsc.noaa.gov/pubs/white/trans4-25-00.pdf and http://www.nwfsc.noaa.gov/pubs/white/transresp.pdf) and flow white paper (NMFS, 1999c; http://www.nwfsc.noaa.gov/pubs/white/whiteflow.pdf and http://www.nwfsc.noaa.gov/pubs/white/flowresponse.pdf).

AF-59 PATH analysis assumes delayed mortality is resulting from the hydrosystem with a large part of this assumption based on comparisons to Hanford reach stocks. But recent information from the Canadian Department of Fisheries and Oceans indicates that Snake River stocks feed off Vancouver Island where ocean conditions have been poor, which differs from where Hanford reach stocks feed. This would account for the high values assumed for delayed mortality and would reduce the apparent benefits of breaching.

Response: For fall chinook salmon, PATH relied on comparisons of Deschutes River stocks with Snake River stocks.

AF-60 The PATH statement that the passage through the system or transport causes delayed mortality at great distance from the dams is observed and should be stated so. The fact that 98

percent survive transport and inriver migrants survive at nearly 60 percent seems to be lost in presentations.

Response: Delayed mortality is a calculation, not an observation. Some delayed mortality does likely occur. What has yet to be determined is whether this is an adverse effect of transportation or just a result of the transportation system "protecting" some fish that would have died independent of effects of passage. But the occurance of delayed mortality does not necessarily mean that recovery of stocks can not occur. That determination can only be made by examining overall survival, which was done in the FR/EIS. "Delayed mortality" caused by "passage through the hydrosystem" is more correctly called "extra mortality" and could be caused by a number of factors other than dam and reservoir passage. Although most PATH scientists apparently felt that hydrosystem passage was the most likely cause, there is little evidence to substantiate this. David Welch and others have shown that climate regime shifts in the ocean environment can cause differential survival between stocks from different geographical freshwater origins (Welch et al., In Press).

AF-61 The PATH explanation of delayed mortality and values used, including differential delayed mortality of transported fish ("D" value) and "extra mortality" appear correct. The higher values of "D" used by NMFS and the manner of explaining "extra mortality" are not justified.

- PATH used a large data set to develop the range of "D" values used.
- NMFS selected the "D" value from a small data set.
- The "D" value used by NMFS will not work in the models unless "extra mortality" is adjusted upward, which NMFS did not do.
- NMFS did not consider the opinion of the Scientific Review Panel (SRP) in its rationale for explaining "D" values and extra mortality, which differ from that discussed by NMFS.
- The SRP did not consider ocean conditions or other factors adequate to explain "extra mortality" differences in survival of Snake River fish.
- The source of low "D" values and high "extra mortality" for Snake River stocks is primarily the result of the development of the hydrosystem.
- The use of a high "D" in models would require balancing with increased extra mortality, which NMFS did not do in their analysis.
- Considering a pessimistic view of dam breaching, and the most optimistic view of transport (high "D") and the future hydrosystem effects on delayed mortality (low extra mortality) is not risk averse.
- Adjusting "D" values upward will only increase recovery chance if the hydrosystem is not the source of "extra mortality." The most complete work available (Marmorek and Peters, 1998) indicates that the hydrosystem is the source of extra mortality, so even a higher "D" value will have little benefit to recovery.
- The characteristics of "D" and extra mortality were discussed in the FR/EIS and Appendix A. Several White papers by NMFS were used as sources for this discussion. The reader can obtain more details in the following sources. Appendix A, Anadromous Fish Modeling optimistically states that delayed mortality may be low in the future, but does not note that delayed mortality needs to be low for both transported and untransported fish for breaching to not be compelling.

Response: See NMFS, transportation white paper (NMFS, 1999a; http://www.nwfsc.noaa.gov/pubs/white/trans4-25-00.pdf and http://www.nwfsc.noaa.gov/pubs/white/transresp.pdf) and flow white paper (NMFS, 1999c;

http://www.nwfsc.noaa.gov/pubs/white/whiteflow.pdf and http://www.nwfsc.noaa.gov/pubs/white/flowresponse.pdf) for NMFS most up-to-date estimates of "D." These values superceded those used in PATH. D is a calculated representation or index of delayed mortality for transported smolts for the whole system, while in-river extra mortality has typically been an estimation for passage through the estuary from below Bonneville (last dam) to the near ocean. These values are not directly comparable given the geographical difference in distance traveled and route effects imposed. For a more directly comparable evaluation, extra mortality estimates need to add all indirect mortality estimates from passage through each dam and reservoir up to Lower Granite Dam.

AF-62 NMFS needs to present all of the information indicating the hydrosystem has caused "delayed mortality."

Response: See information in transportation white paper (NMFS, 1999a; http://www.nwfsc.noaa.gov/pubs/white/trans4-25-00.pdf and http://www.nwfsc.noaa.gov/pubs/white/transresp.pdf) and fish passage white paper (NMFS, 1999b; http://www.nwfsc.noaa.gov/pubs/white/passage.pdf and http://www.nwfsc.noaa.gov/pubs/white/passagecomments.pdf).

AF-63 Appendix A, Anadromous Fish Modeling needs to supply specific information indicating that "extra mortality" occurs from sources other than the hydrosystem.

The areas that need to be included are:

- Data indicating how hydrosystems (dam passage, transport, spill, flow augmentation) have compensated for adverse FCRPS effects.
- Sources of extra mortality that occur outside of the hydrosystem at the same time as the hydrosystem came on line in the Snake and upper river.
- How extra mortality occurred in estuary for upriver and Snake River stocks but not downriver stocks.
- How upriver and Snake River stocks got "worse" ocean conditions than similar downriver stocks.
- If not oceans, how other factors (hatcheries, genetics, disease, less freshwater production) differentially affected Snake River and upriver stocks.
- How delayed or extra mortality is not substantially higher for transported fish.
- How delayed mortality is not related to hydrosystem.

Response: These comments are difficult to address as they apparently are based on an assumption that "extra mortality" exists solely as a result of the Snake River hydropower system construction, unless "proven" otherwise. The fact that stocks from different areas have different responses in R/S ratios over time is not proof that extra mortality is or is not hydropower system related. See Appendix A and more detailed discussion of specific types of passage effects in the NMFS white papers. See NMFS, transportation white paper (NMFS, 1999a; http://www.nwfsc.noaa.gov/pubs/white/trans4-25-00.pdf and http://www.nwfsc.noaa.gov/pubs/white/transresp.pdf) and fish passage white paper (NMFS, 1999b; http://www.nwfsc.noaa.gov/pubs/white/passage.pdf and http://www.nwfsc.noaa.gov/pubs/white/passagecomments.pdf) for discussions of "D" and potential extra mortality.

AF-64 Total system survival is needed to accurately determine the values of spill, transport and bypass operations. A big part of this is more accurate determination of "D" values.

- D has not been accurately determined and without this determination total transport survival cannot be determined.
- Without accurate D range, individual groups will interpret the data suiting their viewpoint.

Response: The Corps agrees with the comment and further discussion has been included in Section 5.5 of the FR/EIS. Accurate determinations of efficacy of spill in particular have been disrupted by special interests, focusing the debates on transport and related bypass. NMFS is consistent in its requests for critical studies to more accurately determine the range of D across a range of flow years. Such a proposed research plan is costly in time and money given the ecological need to recover wild stocks in the short term. Alternative specific survival values were never determined for many reasons. First, the survival from year to year and within season varies by location and species. Therefore, average values would have little meaning because of these variables, and determining an average is highly sensitive to the set of assumptions used. Second, PATH analysis used ranges of variables for many of the parameters that produce frequencies of different survival values. These values are not shown with the analysis but are entered into the life-cycle model to produce output of adults. In practice, high passage survival may not be related to high adult survival because of the parameter variables used in the lifecycle model (e.g., "delayed" and "extra" mortality component may vary independent from actual passage survival), so it is not possible to make comparisons among alternatives with just one number for passage survival for each. NMFS uses the most recent empirically derived D values and passage route specific evaluations up through the 2000 brood year outmigration in the simplistic determinations of SIMPAS modeling for comparison in the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a). The FR/EIS' text discusses NMFS' results and how their determinations affect the FR/EIS alternatives.

AF-65 The range of D values recently developed for spring/summer chinook should be presented.

- Recent values have ranged from 0.49 to 0.83.
- The inclusion of a range not just average is needed for determination of recovery strategies.

Response: The most recent values of "D" have been included in the FR/EIS. See NMFS, transportation white paper (NMFS, 1999a; http://www.nwfsc.noaa.gov/pubs/white/trans4-25-00.pdf and http://www.nwfsc.noaa.gov/pubs/white/transresp.pdf) for NMFS' most recent estimates of "D."

AF-66 NMFS needs to present a formal "weight of evidence" analysis for extra and delayed transport mortality. Interior felt that NMFS did not consider all of the information when determining these values and that all of the information for and against these factors needs to be presented to an independent group to determine what they are.

Response: See NMFS, white papers for the latest estimates of "D" and "extra mortality" (NMFS, 1999a; b; c). Weight of evidence will not resolve an issue because it is an opinion and not a scientific exercise.

AF-67 The consideration by NMFS to delay determination of alternatives for up to 10 years so that "D" values can be resolved and uncertainty can be reduced is not warranted. The reasons given for not delaying include:

- Delay will greatly increase chance of extinction of several stocks, including some spring chinook that already have had years with zero return.
- Determination of "D" is not really the question, the question is whether extra mortality is caused by the hydrosystem which many claim has already been determined to be the case.

Response: Comment noted.

AF-68 Uncertainties regarding key technical issues such as delayed mortality, extra mortality, and "Return to the River" strategy strongly affect the interpretation of analyses and studies.

Response: Comment noted.

AF-69 The amount of delayed mortality is not clear, but the best information suggests it to be 10 to 20 percent, not as high as 50 to 66 percent as suggested by PATH for fish arriving below Bonneville Dam. This needs to be confirmed by experiment.

Response: True, it is not clear. There is a potentially large range. Experimental evidence will best determine the true potential value.

AF-70 A simple experiment can be developed to assess the effects of Snake river dam removal on survival based on protocols already in place. Additional experiments with transported fish from Lower Granite can be done. These data will help determine the D value.

- This would include release of marked fish above Lower Granite and Ice Harbor Dams and determine their adult return rate.
- It will take 5 years to conduct the test with one replicate.
- The experiments should document encounters with passage systems, because these appear to adversely affect survival.
- Currently, PATH assumes the D hypothesis to be fact in models, this would supply real data.
- This would help determine if delayed mortality occurs to fish that pass through the hydrosystem but not for those transported.

Response: Specific actions to determine values in the future are not part of the scope of this document; however, potential experiments focused on "D" value are addressed in the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a). Refer to responses to comment LSR-7.

The Corps AFEP program has a project in place to determine survival of fish after they have passed through the hydrosystem or been transported by barge. These studies will help to define what differential mortality transported fish experience. Fish will be collected at Bonneville that have migrated in river. These fish will have been PIT tagged, so their passage history (whether they passed through bypass systems or over spillways or a combination) will be known. Fish will be taken off of a transportation barge at the same time. These fish will all be reared for an extended period of time in saltwater tanks. Survival differences will be compared between the various "migration" groups. (Refer to NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a), RPA actions 47, 185 and 186.)

AF-71 See Dr. David Welch's work on the likely effect of ocean feeding conditions on Snake River Stocks as to how these may change beliefs about delayed mortality.

Response: Ocean conditions are obviously a major factor affecting anadromous salmonid population growth rates. In addition, it is likely that ocean conditions have differential effects on the several ESUs in the Columbia River Basin. Snake River fall chinook, for instance, apparently have a different ocean residence than Hanford reach chinook. Many ocean conditions do signal a change in the Pacific Decadal Oscillation (PDO) in recent months. However, since Columbia River Basin salmonids have been declining since the 1870s, ocean conditions cannot be held solely responsible for Snake River stock declines. In addition, the mechanism of the oceanic effect on salmon populations is unknown, making predictions of the effect of climatic changes on salmon populations problematic. Moreover, our power of prediction of the duration of these ocean cycles is poor. Finally, there are indications that El Nino/Southern Oscillation (ENSO) events affect salmon populations more strongly than the PDO. Most models of global climate change predict increasing frequency and duration of ENSO events.

AF-72 If delayed transport mortality is not low, and we do not have data sufficient to say it is low, then selecting transport alternatives will greatly increase the chance of extinction. Dam breaching will reduce the chance of extinction whether delayed transport mortality is low or not. Also, if delayed transport mortality is low, dams can be re-activated.

Response: See response to comment AF-1.

AF-73 The fact that transported fish survive at a higher rate than inriver fish suggests that the hypothesis of "delayed mortality" is likely not real. More research is needed into the issue before the theory of delayed mortality can be accepted.

Response: The rationale for delayed mortality is thoroughly discussed in the FR/EIS and NMFS thoroughly discusses D in Appendix A, Anadromous Fish Modeling. While some delayed mortality does occur, the level and mechanism remains unclear and will require more study to determine its effect.

AF-74 Upriver stocks show greater decline than downriver stocks. These declines correlate with dam construction and they do not relate to differences in habitat, harvest, or hatcheries.

Response: Several reviewers felt there was compelling evidence in favor of the hydrosystem as the dominant source of extra mortality. It is worth noting that the PATH process itself never came to this conclusion, and was never able to resolve the uncertainty about sources of extra mortality. Moreover, the review of Carl Walters (SRP) regarding the PATH models expressed distrust in the passage models which rely on assigning extra mortality to the hydrosystem, or other sources, underlying PATH's evaluation of the recovery probability. NMFS has concluded that the evidence regarding sources of extra mortality is equivocal when examined through a proper BACI design. The review of Appendix A, Anadromous Fish Modeling by the ISAB makes it clear that no analysis or "weight of evidence" procedure is likely to provide an unambiguous conclusion regarding extra mortality or delayed mortality. The necessary data are simply lacking.

AF-75 The FR/EIS and Appendix A, Anadromous Fish Modeling need to acknowledge that there is substantial disagreement over "D" value including whether it is real, how to measure it, what the average value is, and the implication of varied D values.

Response: Appendix A, Anadromous Fish Modeling makes it clear there is considerable uncertainty regarding D values, and that the benefits of dam breaching vary depending on what D values are assumed to hold. The decision of what to do in the face of this uncertainty is not purely a scientific question. PATH models showed, that regardless of what assumptions are made, ALL simulated futures (including futures that are the status quo) yield survival of the index salmon stocks. In contrast, CRI analyses indicate that the index stocks face a substantial risk of extinction if conditions stay the same. Thus, there is clearly uncertainty about the urgency of the situation as well as about D values. NMFS is continuing its PIT-tag studies to reduce uncertainty about D values. However, even if we knew D with certainty, the benefits of dam breaching would not be pinpointed, because there would remain the uncertainty regarding extra mortality for untransported fish. In sum, the current D values do not lead to an unequivocal conclusion regarding the value of dam breaching, and even if we narrow our uncertainty about D values, the question will not be resolved.

AF-76 If the thermal regime fish pass through is thought to be minimal, why is it thought to be a source of delayed mortality?

Response: The temperature that adult fish pass through varies by race and year. During late summer some years, temperatures can be stressful to these fish and may result in greater use of food reserves for example, possibly resulting in increased chance of fish expending their food reserves before they successfully spawn. (They do not feed once they enter the river.) This does not appear to be a common occurrence, but complete data to evaluate this are sketchy. For juvenile fish, temperatures that occur are less likely to be a source of delayed mortality because most migrate during cooler periods and these fish also feed while migrating. However, temperatures during some periods may be elevated, especially for fall chinook. This has the potential to reduce their energy resources also, because they may not be able to consume food at a rate that will maintain their energy needs. Again, this is mostly hypothetical; no specific tests have been made to confirm the effects of this on there overall survival.

5.12.6 Plan for Analyzing and Testing Hypotheses (PATH) Analysis

5.12.6.1 Analysis Incomplete/Incorrect

AF-77 PATH analysis, while detailed, did not include many other factors that affect future existence of salmon. This needs to be noted in the FR/EIS.

While PATH determined the recovery chance was greatest with dam removal, there is less than 2:1 chance that removal is needed to achieve recovery.

Response: See the changes to the text. In general the PATH analysis did not include an adequate range of sensitivity analysis values. It was limited in such areas as harvest to staying within the current guidelines so results do not show what changes would occur if more radical changes were made in other areas, such as a large reduction in harvest or radical changes in hatcheries (e.g., no hatchery release for one to several years). CRI contributed to analyses of the other Hs which NMFS used in its 2000 FCRPS Biological Opinion (NMFS, 2000a) to formulate RPAs for habitat contributions to achieving recovery (NMFS, 2000a).

AF-78 PATH analysis is flawed for Alternative 4 because it does not consider additional mortality of migrating smolts during the transition period. Idaho expressed concern that fish would be impacted during the period of dam removal by sediment, temperature, handling, transport, and other factors.

Response: PATH did consider these potential effects for a specified number of years; it reduced passage survival relative to values used for later years. The commentor is correct, however, in that the values used for passage during the first few years following dam removal were the same as those with dams in place. PATH considered a range of transition periods in sensitivity analyses format. For the most likely range of transition length PATH inserted several years of negative effects representing sediment and adult passage blockage or additional mortality. Instead of inserting a gradual process of increasing survival from the short-term negative period, PATH opted to model the period of negative effects as a step process whose effects were more rapid and short-lived, then easily overcome by the high equilibrated reach survival estimates of 85 to 96 percent. Review of breaching implementations and studies performed across the U.S.indicated that transition periods may be short (<2 years) or long (>20 years) depending upon geographical parameters such as hydrology, land management practices, soils, etc.

AF-79 While PATH assumed all factors, other than the hydropower alternative actions, remained the same for long-term modeling (48 and 100 years), NMFS considered other factors (habitat, harvest, hatcheries, ocean) which are likely to change. This approach considered the All–H strategy and needs to be included in the FR/EIS.

Response: See response to comment AF-24.

AF-80 PATH scientists concentrate on the most optimistic conditions when supporting dam breaching while, when discussing transport, concentrate on the worst-case scenario.

Response: Some PATH scientist did consider this scenario; however, others did not. There was not consensus on the values to use, so a range that included optimistic and less-than-optimistic results was included. The effect on the final outcome may have been generally more optimistic than some scientists believed appropriate. PATH did not finish their critical sensitivity analyses due to nonconsensus, ISAB review, recent data analyses by NMFS on D values, and the formulation of CRI. PATH did evaluate an extremely large set of possible scenario/hypotheses (over 4000 simulations). CRI incorporated more recent D estimates that address your concern on transportation in Appendix A, Anadromous Fish Modeling. A broader discussion on dam breach modeling by PATH is included in Chapter 5 of the FR/EIS.

AF-81 PATH has too little historical data from too few sources to be a reliable means for "analyzing and testing hypothesis" to make a significant determination about dam removal.

Response: See response to comment AF-24.

AF-82 PATH analysis that discusses economic benefits did not consider the effect of mixed stock fishery on declines of other listed salmon in the Columbia River System if Snake River stocks were to increase as a result of dam removal.

Response: NMFS did consider the potential effects of changes in harvest among species on the Columbia River System in its 2000 FCRPS Biological Opinion (NMFS, 2000a). Relevant information from this document has been be added to the FR/EIS as appropriate.

5.12.6.2 Other PATH Issues

AF-83 NMFS did an excellent job of summarizing PATH results.

Response: Comment noted.

5.12.7 Cumulative Risk Initiative (CRI) Analysis

5.12.7.1 Extinction Risk Analysis

AF-84 The definition of extinction risk used in the document is less conservative than previous risk analysis and underestimates the risk of extinction.

The following specific concerns were identified by a variety of commentors:

- In fact, extinction risk estimates use returning spawner counts, and do not arbitrarily stop at any particular brood year. Analyses have used the most current spawner data available, including returns from outmigration years 1997 and 1998.
- Revised extinction risk analyses do consider multiple return years, rather than a single year of return.
- Extinction risk estimates are always affected by the years chosen for analysis. This is unavoidable, for any species in any system. Nonetheless, they do provide an important measure of relative risk between stocks and ESUs. In addition, the most robust estimates of annual population growth rate are achieved by using the longest data sets. The 1980-present time period, of the available data, best represents the current conditions.
- Data for the most recent return years in the Snake River were not made available to CRI scientists prior to the completion of the Appendix A, Anadromous Fish Modeling. CRI analyses now include data for return years through 1999.
- One commentor notes that all population growth rates are positive and there should be no danger of extinction. The value of lambda (the annual population growth rate) must be greater than one for stocks to be experiencing a stable or increasing population trend. Any values less than one and greater than zero indicate that the population is declining.
- An extinction threshold of one fish (absolute extinction) was chosen because it is the most biologically meaningful number for comparison across stocks. While the commentor suggests a depensation threshold of 10, 20 or more fish, in fact, there is little biological support for any one depensation level that would be applicable to all the stocks in the Columbia River Basin. The extinction threshold chosen is not a policy statement, but a useful and scientifically meaningful point for comparison.
- Analysis has never used an "average" of one fish as a threshold – rather the analysis uses a threshold value of one fish. Any value below one would count as extinct. Stocks that had less than one returning spawner in recent years have also had more than one returning spawner in the most recent year.
- Because salmon are not annual species, lifecycle increases do need to be larger than annual increases in population growth rate to mitigate risk of extinction. The conversion between the two is a simple calculation, and is presented in other documents (e.g., the Biological Opinion) to avoid this confusion.
- Data are not available that would allow steelhead counted at Lower Granite Dam to be appropriately divided into spawning populations of steelhead in the Snake River Basin. In the Draft FCRPS, an attempt to approximate the size of the largest and smallest populations in the Snake River was made in order to estimate a more appropriate extinction risk. However, this is an unfortunate situation that will only be resolved conclusively with additional information. For situations such as this, CRI scientists

urge reliance on other measures, such as annual population growth rate or risk of substantial decline, rather than on extinction risk.

- The AFA and ISAB have not conducted a risk assessment for Columbia River salmonids. The limitations of the risk assessment conducted by the CRI are discussed above.

Response: See also responses in Section 5.12.17.3 of this appendix for specific responses to ocean condition issues.

The CRI extinction risk analysis has changed substantially, both in methods and in the number of stocks assessed since many of these comments were submitted. The response below describes the current CRI analysis.

The simple extinction risk model used in CRI does not consider a variety of factors, many of which are noted in the public comments. Specifically, risks are potentially underestimated because the analysis does not consider increasing rates of decline, Allee effects, the probability of catastrophe, depensation thresholds, or the possibility that conditions could worsen from the present. Conversely, it overestimates risk in its failure to consider metapopulation dynamics, the potential for ocean conditions to improve in the near future, and density-dependence. The value of this simple model is three-fold. First, it allows ready organization and comparison of population status across a large number of stocks and ESUs. This is vital to the prioritization necessary for any conservation planning. Second, it is explicit, repeatable, and responsive to the addition of new data. Finally, and perhaps most importantly, the data currently available for nearly all stocks do not support the development of more complex models that do consider these factors. For instance, demographic units (populations) of anadromous salmonids have not been defined using appropriate biological criteria anywhere in the Columbia Basin, precluding any ability to incorporate metapopulation dynamics into a model. In the absence of these data, the analysis developed and employed in CRI estimates annual population growth rate robustly, even in the face of large sampling error or perturbations to the age structure. This growth rate in itself is perhaps the most important risk measure, since a declining population will always eventually go extinct. The extinction risks estimated in the CRI provide an important measure of the relative risk faced by the stocks in the Columbia River Basin.

AF-85 Define CRI Extinction risk threshold relative to recovery levels of escapement and provide more detailed comparisons of the alternatives relative level of reduction of extinction risk, such as bar chart. Also provide more detail on the perspective of the extinction model.

Response: Most of these analyses are included in NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a). More perspective on the extinction model is included in the above responses and the additions to the Appendix A, Anadromous Fish Modeling. The number of fish is not evaluated, however, because there is great variability in abundance. Rather, the anticipated changes in population growth rate (lifecycle) are assessed.

AF-86 Be more clear on the level of reduction of extinction risk for Alternatives 2, 3 and 4 and the relative differences between these and Alternative 1—Existing Conditions, and not level of confidence in the model. Also, note if CRI does not provide adequate information to make this evaluation.

Response: Most of these analyses are included in NMFS 2000 Biological Opinion. More perspective on the extinction model is included in the above responses and the additions to the Appendix A, Anadromous Fish Modeling. The number of fish is not evaluated, however, because

there is great variability in abundance. Rather, the anticipated changes in population growth rate (lifecycle) are assessed.

AF-87 The criteria used to determine extinction risk in CRI need to be changed.

- Using of one fish instead of possibly 10, 20, or more is not biologically justified.
- Using an average of one fish means that non-average could be below 1 and in fact two of the stocks have already been below 1 in recent years.
- Since the analysis ended with the brood year 1990, much of the 10-year periods selected for analysis have passed.
- Lifecycle increases need to be much higher to ensure reduced risk of extinction; for example, steelhead will need a 60 percent increase in growth rate, not 10 percent as implied.
- Using steelhead as one aggregate (so that 1 fish is extinction risk) is not valid, because there are likely 40 spawning populations.

Response: See response to comment AF-84.

AF-88 If salmon are in immediate risk of extinction can we preserve the gene pool?

Response: One reason that CRI scientists conducted a risk analysis was to provide decision makers with a measure of the cost of doing nothing. CRI scientists agree that determination of "D," while a useful value to know, is not the entire picture. However, the magnitude of any other indirect mortality attributable to the hydropower system will be virtually impossible to determine.

AF-89 Whose risk analysis is correct AFA, CRI, or ISAB?

Response: See response to comment AF-84.

5.12.7.2 CRI Analysis Incomplete/Incorrect

AF-90 There are analytical problems with the CRI analysis.

- The regression method used does not consider that salmon have multiple return years so that single year return of one fish does not mean that returns are necessarily going to extinction.
- It does not consider the potential straying of metapopulation members to reestablish individual stream populations.
- The years selected affect regression if 1984 to 1994 regression would have been different.
- Hydrosystems have changed since 1980, so the exclusion of more recent years also affects results of regression.
- The data after 1994 should be included and data no further back than 1990 should be included to incorporate the effects of project modifications since the 1995 Biological Opinion (NMFS, 1995).
- Because all of the average growth rates shown are positive, it appears that none of the stocks should be in jeopardy of extinction.

Response: See response to comment AF-84.

AF-91 Extinction estimates generated by CRI are likely too conservative because they do not consider the documented effects of changing ocean conditions increasing survival in recent years.

- The model used by NMFS stops with brood year 1994, which was a poor return year; the model is highly dependent on last year survival in predicting chance of extinction.
- The time period used was during a down ocean cycle for production.
- Recent survival, from outmigration years since 1997, has been much higher.
- Had higher survival been used in CRI analysis, the chance of extinction would have been 0 for the 24-year period and a one-stock-of-seven chance of extinction in 100 years.

Response: See response to comment AF-84.

AF-92 The CRI analysis developed by NMFS has many errors or improper assumptions, making its use for selecting alternatives of little use in its current form. Much analysis, review, and questions were developed by these commentors encompassing the majority of discussion and analysis of any single issue. Several points noted by these groups addressing these concerns are:

- The CRI does not use the most recent information on trends of Snake River spring stocks from return years of 1995 to 1999, which indicate steeper rate of decline.

Response: Although adequate analytical methods are not yet available to incorporate variability in the rate of population production into simple extinction risk models, NMFS has used an alternative method of time series production into the final CRI analysis the years 1980 to 2000. CRI scientists have indicated that if a decline occurs, risk metrics are underestimated for these stocks.

- The CRI needs to include individual steelhead stocks, not lump them together.

Response: See response to AF-84.

- The separation of stocks of spring chinook, while lumping all steelhead and fall chinook, does not allow similar comparisons; the loss of one stock of spring chinook does not have the same meaning as the others.

Response: CRI attempted to use populations as the unit of comparison. In the Snake River, there is only one population of fall chinook, and data were not available to separate populations of steelhead. Policy makers will certainly need to consider the differences in numbers of populations in an ESU when assessing the level of risk they are willing to support. In addition, when Technical Recovery Teams have completed population definition in the Snake River Basin, these analyses can be re-conducted.

- The CRI analysis does not include the 1995 Biological Opinion standards; it should in the future.

Response: Snake River stocks do not currently meet 1995 Biological Opinion projections, and CRI risk analyses assessed the risk of extinction, or serious decline to Columbia Basin stocks, should no action be taken. Analyses presented in the Biological Opinion show the needed improvements in annual population growth rate to meet 1995 Biological Opinion standards (NMFS, 1995). However, the 1995 Biological Opinion was superceded by the 2000 FCRPS Biological Opinion recovery standards established by Technical Recovery Teams, according to the principles laid out in the VSP paper (NMFS, 2000a). Therefore, CRI scientists will not spend additional time addressing the 1995 Biological Opinion analyses.

- Delayed mortality (e.g. "D" and "extra mortality") of transported and non-transported fish is not specifically included. There are substantial empirical data indicating these exist.

- There are substantial data indicating that hydrosystem is the source of delayed mortality. This was not included in CRI.
- Sources of delayed mortality are not discussed and reasons why are not presented.
- Delayed mortality is included in the PATH analysis, making it more correct than CRI.
- Delayed mortality needs to be included in future CRI analysis for it to be relevant.

Response: There are many hypotheses about the cause of the decline of Snake River stocks, including the occurrence of indirect mortality attributable to the hydropower system ("delayed" and "extra" mortality). Because the magnitude of this indirect mortality attributable to the hydropower system (including transportation) has not yet been determined, CRI has chosen to explore this hypothesis in two ways. First, CRI scientists assessed the impacts on population growth rate from a range of values of this currently undefined mortality. Second, the matrix framework has allowed CRI scientists to determine what proportion of the mortality occurring after passage through the hydropower system must be attributable to the dams for dam breaching alone to be effective. When and if the magnitude of "delayed" and "extra" mortality is determined, the framework is flexible enough to allow their inclusion. See also responses to AF-59, 61 and 63. PATH and CRI have taken different approaches to the inclusion of "delayed" mortality, but both have considered this factor.

- The survival values used for life stages are often wrong or not justified.
- The method used to allocate survival by life stage resulted in misallocation of survival levels.
- The method used by PATH to allocate survival is more robust and should be used to corroborate NMFS selected survival values.
- The allocation of survival of life stages and exclusion of extra mortality resulted in smolt-to-adult return (SAR) three times higher and egg-to-smolt survival one-half of that of empirical data.
- The lack of inclusion of delayed mortality results (which essentially results in allocating this mortality to other life stages) in CRI analysis results in a determination that actions other than dam breaching would be needed to recover stocks.
- The STUFA analyzed the survival values used by CRI (egg-to-smolt, estuarine, ocean life stages) and found that they were either wrong or not always adequately justified.

Response: In the first iteration of the CRI matrix analysis, survival values for specific life stages were obtained from the peer-reviewed literature, and always cited. CRI scientists often used the only published information about survival rates. We have changed survival rates for two early life stages for spring/summer chinook stocks in response to this criticism, as described below. Originally, CRI matrix analysis relied on the only published estimates of estuarine and ocean survival rates. CRI scientists have since altered these analyses to include previously unpublished smolt-to-adult return rates. This alteration has resulted in egg-to-smolt survival rates consistent with estimates made by State and tribal agencies. The method used to allocate survival to the first-year is a commonly used (and published) method in population biology. The exclusion of "extra" mortality (i.e., one specific cause of mortality that occurs after passage through the hydrosystem) did not affect survival rates in any way, and does not result in allocating this mortality to other life stages. There is a high mortality rate in the estuary and early ocean stage, and some of that mortality is likely attributable to the hydropower system. As above, in the face of considerable uncertainty about the magnitude of that mortality, CRI scientists have explored its impact in a variety of ways. The approach taken in this analysis does not result in a determination that actions other than dam

breaching would be needed to recover stocks. Rather, it has provided a simple and easily manipulated model to evaluate the impact of dam removal given different, hypothetical rates of "delayed" mortality.

- The "everything but dam removal" alternative which assumes benefits in all other areas (habitat, harvest, hatchery) is faulty because it did not include delayed mortality.

Response: Since mortality is allocated to the life stage at which it occurs, the failure to include delayed mortality does not make analyses invalid. The "everything but dam removal" numerical experiment increased survival at several important life stages (including the estuarine/early ocean phase at which delayed mortality is likely to be expressed). However, in these numerical experiments, much mortality at each of these life stages was still included in the model, and the mortality attributable to factors not altered (including delayed mortality) still numerically occurred.

- The benefits of survival improvements indicated in CRI were not confirmed by STUFA analysis and only result in increased overall survival of about 10 percent of those developed in the CRI.
- The STUFA analysis, which includes a matrix similar to CRI, indicates that the "everything including dam removal" action is what is needed to recover stocks. This is in contrast to the CRI analysis.

Response: The STUFA analysis incorporated an extremely low D-value and a high extra mortality attributable to the hydropower system, giving these results. When the CRI matrix model uses similar assumptions, it has similar results. However, CRI scientists do not believe that data exist to support any particular assumption about total indirect mortality attributable to the hydropower system.

- The management scenarios presented in the CRI are not biologically or logistically feasible. The CRI needs to determine which management scenarios are feasible to include them.
- Predation rate caused by hatchery fish does not appear correct and is unlikely to be reduced by the rate considered in the CRI. The CRI analysis assumption about benefits of reducing predation from hatchery steelhead was examined and found to be highly unlikely. Additionally the only observed benefits occur from reducing their abundance during transportation and reducing hatchery steelhead may reduce chance for recovery of wild steelhead. CRI analysis of potential areas where mortality could be reduced stated that steelhead predation could be very high on spring chinook and that this was an area where pre-dam passage survival could be greatly increased. CRITFIC analysis indicated that this was highly unlikely.
- Predation caused by birds is overstated and has less room for improvement than suggested.
- Increased estuarine survival also seems unlikely based on past trends.
- The egg-to-smolt survival value has been constant for many years and is unlikely to increase.
- The STUFA analysis of what they considered "feasible" changes in factors (habitat, harvest, hatcheries) showed little gain in overall survival.
- The CRI analysis should not be including unlikely actions or those that we have no control over in modeling benefits. Examples of unreasonable actions are100 percent reduction in steelhead predation on chinook, or improvements in estuary conditions. We have no way of knowing if these can be achieved and it is doubtful actions would be taken to achieve these.
- The hypothetical improvements proposed in the CRI analysis, other than dam removal, that the analysis indicates could prevent extinction are: 1) not likely a current source of problem (e.g., habitat is basically good so you cannot improve it, harvest is already low), or 2) would require such massive changes that they cannot be achieved, or 3) will take decades to implement, leading to extinction.

Response: The CRI evaluated a number of hypothetical management scenarios in order to determine the magnitude of changes that would be required to mitigate extinction risk if management actions affected a number of life stages, and to assess the effect of a number of small changes on overall population growth rate. CRI scientists stress that these experiments were not intended to be a prescription for recovery, but rather an exploration of possibilities. In addition, the need for well-monitored management experiments to determine the magnitude of change that is possible through any management action is clear. Several specific points:

1. CRI scientists used a steelhead predation rate from a technical paper produced by Idaho Department of Fish and Game (IDFG). This rate was specific to steelhead released as "catchables" and is therefore likely to be inappropriate for the current situation, since Idaho now releases few steelhead this size. It is therefore true that the magnitude of hypothetical change assessed in the original appendix is not likely to be achieved. Again, the example was not presented as a prescription for recovery, but as a means to explore the resulting change in overall population growth rate from changes at a variety of life stages. The overall conclusion–that IF a number of small changes can be effected across the lifecycle there can be substantial changes to the population growth rate—remains valid.
2. CRITFC states that reducing hatchery steelhead may reduce the chances for recovery of wild steelhead. While it is true that conservation hatcheries can reduce the risk of extinction, in no case have hatchery fish been shown to contribute to the recovery of a wild population.
3. The "survival contours" presented in the attachment to Appendix A, Anadromous Fish Modeling allow the assessment of a wide range of bird predation rates.
4. In fact, estuarine survival (as measured by smolt-to-adult return rates) has fluctuated dramatically over the last 40 years (and even within the last 20). Given that 65 percent of original marshes and wetlands in the Columbia River estuary have been diked or drained, that Caspian tern predation has increased dramatically since the creation of Rice Island, and that there are several Superfund sites in the Willamette and Lower Columbia, CRI scientists believe that there is potential to improve estuarine and early ocean survival rates. In addition, if there is indirect mortality attributable to the mechanical stress of dam passage, improved passage facilities or dam removal may also increase survival at this life stage.
5. While egg-to-smolt survival has not apparently declined or increased over the recent past, it has been highly variable during that time, indicating that some factors (some potentially human-induced) are affecting survival at that time. Water diversions, for example, continue to dewater streams in the Snake River Basin, killing fish living in those streams and rivers. In addition, many impacts, such as grazing, have been felt for many years, but still leave room for improvement.
6. The STUFA analysis considered a variety of management actions. However, they did not consider all possible actions, nor are there data available to assess the impacts of many of those actions. Ultimately, well-conducted management experiments will be necessary to determine the feasibility of mitigating extinction risk and achieving recovery through any set of actions.

- The CRI has not allocated benefits where they may occur but across entire species, which is not representative of what would occur.

Response: As described above, CRI matrix analyses were intended to explore the range of improvements that might be expected to occur over a range of hypothetical changes. As data become available to tie changes explicitly to specific populations, these analyses will be conducted.

- The CRI analysis does not integrate benefits across all ESUs and stocks; without this, we cannot see how each improved action benefits each stock or ESU.

Response: Data at this time do not support the development of matrix models for all ESUs and stocks. CRI scientists were unwilling to guess in order to develop these models, but will certainly develop them as data become available.

- The CRI analysis has several other areas that need to change to make comparisons with PATH, including: density dependent growth, variability in demographics or stock recruitment, and inclusion of multiple hypothesis.

Response: CRI scientists sought to conduct the best scientific risk assessments for Pacific anadromous salmonids. Finding no evidence of density-dependent growth, CRI adopted a density-independent model for use at the current low population levels. In addition, stocks are analyzed on an individual basis, and the demographic variability in that stock is incorporated into CRI analyses. The framework CRI adopted is flexible enough to assess the effects of many actions, even when there are multiple hypotheses about the effect of those actions. However, CRI also emphasized the need for well-documented data, and chose not to incorporate hypotheses explicitly into its models until such data are available.

AF-93 The CRI analysis needs to take a set of actions and present it across all species to see where the greatest benefit to all species occurs with a set of actions.

Response: This is clearly the ultimate goal of risk analyses. However, data are not currently available to support this comparison. It will be a priority for CRI scientists as data become available.

AF-94 The CRI analysis and all of Appendix A, Anadromous Fish Modeling need to be developed through a collaborative process. States and tribes indicated that they were not included in the development of the CRI analysis or Appendix A. They noted:

- NMFS committed to a collaborative process with the States and tribes to assesses jeopardy of FCRPS and actions necessary to meet these standards in the 1995 Biological Opinion.
- Without their involvement, the results of the analysis are flawed .
- Also, the "weight of evidence" analysis should be included in the next FR/EIS as part of the CRI analysis.

Response: See response to comment AF-24.

5.12.8 Reliance on CRI versus PATH

AF-95 Statements in the FR/EIS and in the A-Fish appendix indicate bias against PATH analysis. Many felt that the FR/EIS leans toward the results of CRI analysis and does not consider that it has many of the same problems and more than that of the PATH analysis. The problems with the FR/EIS presentation include:

- The document claims that the PATH analysis is "too optimistic" relative to dam removal while statements about analysis of other alternatives are "too pessimistic." In contrast, statements about CRI analysis results only state problems as "lack of data." The same criticisms of lack of data should be used for both analyses, not the biased qualifying statements in the FR/EIS.

Response: The FR/EIS text has been changed to better represent Appendix A and PATH findings.

- Instead of objectively characterizing PATH results, Appendix A, Anadromous Fish Modeling appendix promoted a narrow set of assumptions that faired poorly under scientific review, and downplayed the full set of assumptions considered by PATH.

Response: The A-Fish Appendix clearly reflects a shift on the part of NMFS towards relying more on CRI analyses rather than PATH analyses. This shift has nothing to do, however, with a rejection of collaborative science. Instead, NMFS was reacting to criticism of PATH expressed by an ISAB review (see NWPPC website), and by a failure of PATH to include the four most recent years of run-reconstruction data or the most recent PIT-tag data regarding differential delayed transportation mortality. Comments in the A-Fish suggesting that PATH was "too optimistic" reflect aptly a major concern expressed by the ISAB in critiquing PATH results. It is also worth noting that Carl Walters, in one of his SRP reviews writes, "*I don't trust any of the recovery predictions at all, under either option. This arises from seeing that none of the mean trajectory predictions would be for continuation of historical decline, meaning there is a basic (and quite possibly wrong) optimism somewhere in the survival calculation chain independent of passage models.*" Hence, CRI is not the original source of the worry that PATH is off-target because it is too optimistic.

It is important to recognize that CRI is committed to peer review, and that there is no distinction between PATH and CRI when it comes to peer review. For example, the CRI analysis has been reviewed by the ISAB; in addition CRI analyses have been or are currently being peer reviewed by leading scientific journals. One of the articles incorporated into Appendix A, Anadromous Fish Modeling (Kareiva et al., 2000) has already passed such peer review and is in press in the *Journal Science*. Several of the other analyses are in the midst of broad peer review for other internationally renowned journals. Both PATH and CRI also both sought collaboration and input from a broad community of scientists. For example, through frequent workshops, and as a result of placing drafts of papers on the CRI website for public comment, the CRI has shown a commitment to public comment, openness, and collaboration. Unfortunately, collaboration does not imply that everyone (or even that anyone) will agree with the science. PATH itself never reached any internal consensus, as is evident from the conflicting conclusions attributed to FLUSH versus CriSP passage models.

Of course, there are substantive differences between PATH and CRI. CRI places greater emphasis on recent data, whereas PATH places greater emphasis on historical data. CRI favors simple transparent models that consequently do not include as many hypotheses and details; PATH favors more detailed and intricate models that consequently are not as transparent or easy-to-understand.

Several comments express dissatisfaction with NMFS for turning away from PATH. Without getting involved in technical debates, there are a few simple practical reasons why CRI was elevated in prominence:

1. PATH analyses did not use the most recent four years of run-reconstruction data; CRI analyses did. NMFS believes a decision such as dam breaching demands that we use the most recent data.
2. PATH analyses (and the "weight of evidence" reports) did not have access to the most recent PIT tag data.
3. PATH analysis indicated that even if no action were taken, and the status quo were preserved, then Snake River spring/summer chinook salmon met PATH's survival standards. That conclusion of a certain probability of survival runs counter to the obvious declining trends in the salmon stocks.

4. PATH provided quantitative analyses for only two of the twelve listed ESUs within the Columbia Basin. In contrast, CRI provides a standardized and consistent protocol for examining all ESUs within the basin.
5. The CRI formulation lends itself to clear examination of management possibilities outside of the hydrosystem (Kareiva et al., 2000).

AF-96 PATH analysis should be relied on more for determining effects of the alternatives; CRI analysis should be relied on less. The PATH analysis was considered superior to the CRI analysis in evaluation of effects of the alternatives by several agencies and tribes. The reasons given for reliance on PATH include:

- It was developed by 25 regional scientist and subjected to independent review.
- It is more "robust" because it uses a wide range of uncertainty and assumptions.
- It includes more historical empirical data in the lifecycle model.
- PATH presents a range of results based on the range of data and assumptions indicating a level of risk.
- PATH uses a comparison of upstream and downstream stocks to clarify effects of hydrosystem.
- The analysis indicates differences in upstream and downstream stocks best explained by development of hydrosystem (all other hypotheses such as different ocean conditions or area, different life history, disease, and others do not appear valid).

Response: Please see response to comment AF-95.

AF-97 Dam breaching supplies other benefits to stocks besides fish passage survival; these should be discussed in Appendix A, Anadromous Fish Modeling.

Benefits noted include:

- Increased spawning habitat.
- Increased "normative river" habitat is considered critical to the recovery of Columbia Basin salmon.

Response: See response to comment AF-1.

AF-98 Major changes have already been made to passage. Older juvenile passage survival was only 10 to 30 percent for the whole system. Current estimates with spill and passage improvements have increased survival to 86 to 94 percent per project and total passage survival to 50 to 60 percent. These data are from NMFS and these values should be used instead of the questionable PATH modeling process data.

Response: See response to comment AF-1.

5.12.9 Flow Augmentation

AF-99 There are no data clearly demonstrating any biological benefits (e.g., to listed salmon and steelhead) of flow augmentation in the Snake River System.

The points made concerning this issue include:

- Flow has changed little in Idaho upstream of Lower Granite Dam since 1916.
- While increased flow during the summer appears to benefit survival and travel time for subyearlings, the benefits may correlate with temperature or turbidity.
- Travel time of subyearlings appears mostly related to period not flow.

- Releases from Hells Canyon would be expected to be low in turbidity and high temperature, both negative factors in subyearling survival.

Response: The effects of increased flow were evaluated in a qualitative manner, but flow augmentation will not change with any alternative, so a quantitative assessment of flow was not evaluated in the FR/EIS, either in the whole Columbia River system, or in the Snake and Columbia Rivers separately. NMFS considered the benefits of flow augmentation in its 1999 White Paper on flow effects and in its 2000 FCRPS Biological Opinion (NMFS, 2000a) (see the FR/EIS for more details). Readers are referred to these documents concerning the need for flow augmentation. While greater flow does not always show greater direct survival benefits, it does have a benefit to habitat conditions relating to rearing of salmon. Concerning changes in flow in Idaho, this is also analyzed in the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a).

AF-100 Discharge benefits (including augmentation from storage projects) to the Columbia River need to be developed separately from the Snake River. These benefits need be considered in light of fish transport options.

Response: See response to AF-99. Also, because flow will remain the same no matter the transport option considered, it was not necessary to distinguish flow between these options.

AF-101 While there are some general benefits of flow on survival, the level and mechanism are not clear, indicating that the need for additional flow through augmentation is not warranted. Reasons for this statement include:

- Effects of flow are compounded by temperature, turbidity, timing, and fish size.
- Effects of flow in a single year have not been shown to be significant for survival.
- More study is needed to confirm the relationship.
- Additional flow may have negative effects if it reduces turbidity and increases temperature.
- There is no evidence that increase velocity per se, or specific arrival time provide strong survival benefits.
- There is not enough water in storage to change a drought year to a flood year, which is the range over which most benefits have been observed.

Response: See responses to AF-99 and HY-4. The Corps does not disagree with these statements, as discussed in both the PATH (1998) sensitivity analyses on 1 million KAF versus zero KAF augmentation and the BOR Snake River Flow Augmentation Impact Analysis (1999). Specific flow benefits are not part of the evaluation in this FR/EIS because flow options are only considered as operational requirements within the alternatives as specified through the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a). Further discussion on ecological and lifestage effects of flow is located in Chapter 5; Appendix C, Water Quality; and Appendix M, Fish and Wildlife Coordination Act Report. Without incorporating any parameter value adjustments for flow effects on temperature, turbidity, timing, or shaping of flow, PATH (1998) performed a rather simplified sensitivity analysis on 1 MAF versus 427 thousand acre-feet (KAF) versus zero augmentation. Results were rather insignificant, with a plus or minus 0.5 percent improvement in system survival per project (dam plus reservoir).

AF-102 Other environmental cues, often correlated with flow, may be the major factors affecting flow/survival relationships. Based on several conditions that have been observed:

- Environmental cues including discharge, turbidity, temperature change, increased day-length, and Julian day affect movement.
- Spring freshets may stimulate physiological change associated with migration.
- For fall chinook temperature may be key because of their long migration time and later migration.
- Late fall chinook migrants actually return more adults, so flushing flows would not be of benefit.

Response: See responses to comments AF-99 and 100.

AF-103 Overall, the region needs to balance the benefits and deficits of flow from the Clearwater and Snake Rivers (Hell's Canyon), and determine the season. Concerns relate to the following issues:

- Low water temperature in the Clearwater system reduces growth of some stocks (e.g., fall chinook).
- What species benefits from flow alternatives (e.g., spring flow or summer flows)?
- What is the effect on life stages, (e.g., adult fall chinook and steelhead benefit from cool water in the summer)?
- Need to consider all effects of flow in light of other factors (e.g., reducing cattle in tributary streams, reducing harvest, reducing rafting over redds).
- Also need to consider what benefits would be to flow additions from other areas such as Banks Lake and Willamette River.

Response: Again, the Corps has followed NMFS' scientific lead on flow determination. Recommendations to action agencies about where flows originate and how they are allocated is done by the Technical Management Team (TMT) on an annual basis and during in-season meetings that try to consider the various benefits of flows and needs at that time in light of a lot of factors that can not be determined ahead of time, like period of outmigrants and inmigrants, and amount of flow available from each area. The Corps assists in this determination and has some influence over where the flows come from for the facilities they control and in consideration of their other mandated requirements and goals. Too low of temperature releases from Dworshak and its effects on fall chinook growth and fitness and the need to balance effects between juvenile and adult lifestages is a concern of the Corps and is addressed in Appendix C, Water Quality; Appendix M, Fish and Wildlife Coordination Act Report; and Section 5.5 of the FR/EIS. Also, effects of upstream activities that affect both quantity and quality of water are not part of the control of the Corps and, therefore, are not detailed in this study. However, the NMFS analysis does evaluate these effects. The concerns with the effects of Willamette River or Banks Lake Flows are again not part of the operation of the Lower Snake River project, which is what this FR/EIS is evaluating.

AF-104 Idaho agrees that flow of 1 MAF should not be considered further from Idaho. Reasons for their agreement include:

- Unsure where water would be obtained.
- Benefits are unclear.
- High level of social impact.
- Correlation between flow and survival does not prove benefit because other factors also influence survival during periods of changing flow.

- Benefits are especially complicated for subyearling chinook salmon.

Response: Comment noted.

AF-105 Flow augmentation from the Hells Canyon complex in the summer may increase water temperature and predation and actually cause negative effects to migrating smolts, especially fall chinook.

Response: See Flow White Paper (NMFS, 1999c; http://www.nwfsc.noaa.gov/pubs/white/whiteflow.pdf and http://www.nwfsc.noaa.gov/pubs/white/flowresponse.pdf). Comment noted. The relationships between flow, temperature, fish travel time, and fish survival are very complicated and difficult to separate out. Warmer water, to a point comparably matched to the seasonal ambient upriver temperature, may increase growth rates of subyearling chinook in the Lower Granite reservoir, thus increasing their migration speed and possibly survival. On the other hand, warmer water also speeds up the metabolism of predator fish and could decrease survival of summer migrants. Summer flow augmentation has typically come from the Dworshak reservoir, as the outflow from this project can be regulated, to a certain extent, to influence temperature.

5.12.10 Water Quality Issues

AF-106 While effects of many water quality parameters are discussed, the FR/EIS needs to do a more complete job of providing a clear defensible analysis of the relative importance of the various water quality parameters on anadromous fish species viability.

Response: The Corps believes the presentation of effects of water quality on anadromous salmonids is adequate with its revision of sections in Appendix C, Water Quality and in Chapter 5 of the FR/EIS. NMFS, who had to develop the measure of the impacts on listed species, only noted dissolved gas and temperature as being of concern for listed species. (see Appendix A, Anadromous Fish Modeling). Other than temperature, total dissolved gas, and dissolved oxygen under summer water temperatures with high coolwater releases from Dworshak, water quality effects on listed stocks for any of the alternatives are generally minor and do not warrant more detailed discussion. The effects of dissolved gas on salmonids has been extensively researched. Adequate information is presented in the document summarizing what is known about possible effects relative to the alternatives. Much detail is also supplied about temperature in the documents, and in Appendix C, Water Quality. Again, based on what is known about temperature in this region and likely changes that may occur with the alternatives, is presented in the FR/EIS. The range of effects that may occur based on relevant documents is discussed. More detail can be found in Appendix C, Water Quality and does not need to be brought forward to the actual text of the FR/EIS. The reader should look in Appendix C, Water Quality and Appendix A, Anadromous Fish Modeling for more details. The Corps believes adequate coverage has been provided in the text to discuss the effects of the most relevant water quality parameters.

AF-107 Differences in water quality between the Snake and Columbia Rivers could also account for differences in production between the Hanford reach and the Snake River. Many of the adverse water quality conditions in the Snake River (e.g., warm water, pesticides, reduced flow) are independent of the presence of the dams so that dam removal would not cause these conditions to improve.

Response: Some of this is discussed in the FR/EIS. The relative importance of these differences, however, is unsubstantiated.

AF-108 The Clean Water Act and the NMFS implementation of ESA are in conflict over spill; this needs to be resolved.

- Some forms of spill can be beneficial to fish passage, while levels of gas over 120 percent can be harmful.
- Surface spill modification needs to be pursued at the dams to enhance migration, but may cause increased gas saturation.

Response: The region is addressing these issues.

AF-109 Excess spill confuses adult fish migrating, and kills them with high gas concentrations.

Response: There have been data showing very high spill can cause delay of migration, by preventing fish from entering ladders. Since flip lips have been installed at most dams, no adult mortality has been reported as a result of gas supersaturation.

AF-110 A new temperature monitoring system and modeling conditions are needed to determine what benefits will occur for salmonids from changes in releases from the Dworshak and Hells Canyon complexes.

Response: Several models have been developed already assessing the effects of operations and releases on temperature. The Corps does not believe another model will enlighten the assessments that have already been done. However additional empirical temperature data have been added to Appendix C, Water Quality and Chapter 5 of the FR/EIS which help define how releases from Dworshak and Hells Canyon affect temperature. Monitoring of temperature is constantly being done and will continue with more sensors and updated equipment, regardless of the selected alternative. In addition, several studies on water temperature dynamics in relation to Dworshak augmented flow release regime effects on downriver Snake River fall chinook and Clearwater River bull trout by the USFWS and others are scheduled for 2001 to 2004. Effects of such Dworshak release regimes are addressed in the Fish and Wildlife Coordination Act Report (Appendix M).

AF-111 The importance of temperature on survival and ecology of all life stages of salmonids needs to be greatly expanded. Temperature significance in reducing survival and recovery potential needs to be expanded because the discussion as currently presented is a significant flaw in the current FR/EIS.

Response: See text changes in Appendix C, Water Quality, and additional discussion in Annexes to Appendix M, Fish and Wildlife Coordination Act Report.

AF-112 The importance of temperature on juveniles and adults and potential negative effects needs to be explained in more detail.

Response: See text changes in Appendix C, Water Quality, and additional discussion in Annexes to Appendix M, Fish and Wildlife Coordination Act Report.

AF-113 Comparisons of river natural diurnal changes in temperature compared to that of reservoirs should be include in the discussion of changes in temperature and effect on fish.

Response: See text changes in Appendix C, Water Quality, and additional discussion in Annexes to Appendix M, Fish and Wildlife Coordination Act Report.

AF-114 The cycle and amount of reservoir temperature changes need to be presented in more detail and compared to what effect this will have on fish habitat.

Response: See text changes in Appendix C, Water Quality, and additional discussion in Appendix B, Resident Fish, and Annexes to Appendix M, Fish and Wildlife Coordination Act Report.

AF-115 Based on comparisons to the Fraser River in British Columbia, summer maximum temperatures may in fact be reduced by the presence of dams. The Fraser River as recently as 1998 had similar temperatures in unimpounded areas.

Response: There are many physical differences between the Fraser and Snake River. Many of these could affect temperature differences. Any comparison would have to make many assumptions about how physical differences affect temperature. In short differences in temperature either up or down could not be explained on the presence or absence of dams by comparing these two rivers.

AF-116 Need to note that total dissolved gas levels less than those causing direct mortality can cause adverse effects and also confirm that levels are not causing mortality. Also note that elevated gas levels would be eliminated with Alternative 4.

Response: Additional and revised text has been added to Appendix C, Water Quality, and Chapter 5 of the FR/EIS. TDG supersaturation would not be totally eliminated with dam breaching during seasonal periods of higher water temperature or unless all plunge pools would not be restored, but TDG would be severely reduced reach-wide in the lower Snake River and restricted more geographically to areas of plunge pools associated with rapids if both of these habitat components are restored with scouring from higher water velocities. Also, see response to comment WQ-63 for second sentence response.

5.12.11 Alternatives 1, 2, and 3

AF-117 None of the non-breaching alternative will lead to the 2 to 6 percent SARs needed to achieve recovery. Alternatives 1, 2 and 3 do not address the issue of delayed mortality that both transported and in-river fish suffer.

Response: None of the alternatives, including dam breaching, will ensure achieving 2 to 6 percent SAR survival. However, actions can be taken in conjunction with alternatives other than just dam breaching that will ultimately increase survival of the stocks so that extinction potential is reduced. Recovery will require improvements in all areas (habitat, harvest, hatcheries), not just those under the control of the hydroelectric system. The NMFS 2000 FCRP Biological Opinion (NMFS, 2000a) made note of the standards to achieve recovery.

AF-118 Alternative 1 is not worth considering further as it will not meet recovery. All modeling efforts indicate it will not achieve recovery.

Response: Comment noted.

AF-119 Alternative 2 is not likely to achieve goals. Transport is already not recovering fish.

Response: Transport has contributed to prevention of extinction. Without transportation, many models indicate overall survival and run sizes would have been lower than they are now. Again, recovery will take more than just modification of the hydroelectric system.

AF-120 Alternative 3 is too narrowly defined.

- Relies on unproven technology in surface collectors that seem problematic in supplying needed survival improvements.
- May supply some benefit but does not consider any other actions and valuable time is being lost.

Response: The details of this alternative have changed and expanded. The current adaptive migration approach is intended to provide maximum flexibility by optimizing both inriver migration conditions and transport conditions.

AF-121 Turbine improvements are not justified due to the low number passing through them.

Response: Every listed fish life is considered important. While numbers lost may be small, modifying turbines does supply a solid method of increasing survival.

AF-122 Surface collectors (Alternative 3) are high risk because they concentrate fish so they are relying on one technology. This could result in increased disease or stress and, if it fails, high mortality in other areas.

Response: The Corps disagrees. The fish currently passing the dams already undergo most of the types of impacts attributed to surface collectors. Fish are concentrated and encounter more structures when passing through the screening system and then again as transported. There is no reason to believe surface systems would increase stress and disease. In fact, they may result in less stress because fish would be collected near the surface, the depth they more typically migrate at, compared to having to sound and go through the screening system at the turbine entrance. Tests to date have not indicated high mortality from these systems. They are, in fact, similar to those of Wells Dam on the Columbia River, which has very high survival.

AF-123 Surface collectors (Alternative 3) could allow insurance for poor river conditions such as low flow for fish like fall chinook and high flow with high dissolved gas for spring chinook.

Response: Comment noted.

AF-124 One commentor indicated that all of the alternatives have various problems because each relies on unproven assumptions; they do not address ways to increase survival in regions know to have high mortality outside of the system such as below Bonneville Dam; or the actions taken will cause known adverse affects without assurance they will meet the overall objectives of recovery. They recommend that because of these many problems the Corps should focus on implementing Alternative 2 or 3 until more data are obtained on causes of poor survival in other regions, such as below Bonneville Dam. Once these studies are complete, a combination of alternatives could then be developed that would improve survival and recovery.

Response: The various uncertainty and analysis problems have been considered in the final selection of actions to be taken by the Corps. As indicated in the text, following the recommendations of the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a), the Corps will be delaying any determination of dam breaching until more information is obtained and will be taking actions similar to those in Alternative 3 (NMFS, 2000a). Additionally, NMFS in this Biological Opinion is recommending that additional information be gathered and habitat areas be improved in a fashion that will help answer some of the commentor's concerns.

5.12.12 Alternative 4

5.12.12.1 Alternative 4 is the Best Chance for Fish

AF-125 PATH analysis indicates that Alternative 4 has the best chance of achieving survival and recovery standards.

- Dam breaching met the Biological Opinion standards for survival and recovery under a wider range of assumptions, including most pessimistic.

Response: PATH results found greater chance of achieving these standards with breaching. However, PATH analysis was not a consensus analysis. Some of the modelers and their models found results that indicated differences were small between breaching and other alternatives. Also, CRI analysis conducted independent of the PATH group for the NMFS 2000 FCRP Biological Opinion incorporating recent direct and indirect survival and delayed mortality data, found smaller and less optimistic differences between alternatives.

- While standards are not developed for steelhead, this alternative resulted in much higher survival estimates than others.
- Feasible improvements in habitat, harvest, and estuarine conditions did little to change results. This result needs to be included in FR/EIS.

Response: PATH's analyses for steelhead was very limited and had to rely heavily upon the spring/summer chinook analysis as a surrogate since it was not possible for the State of Idaho to construct historic run reconstruction simulations required for recruitment modeling due to lack of lifestage data specific to year of outmigration. PATH analysis did not consider the effects of major hydropower and habitat improvements, major harvest changes, or changes in estuarine survival. These factors were all considered by the CRI analysis to be potentially very important in affecting survival, as addressed in Appendix A, Anadromous Fish Modeling. Increases in early freshwater and early ocean survival were considered most critical by CRI. CRI found that little can be done further in the Snake River environment to the dams or in breaching the dams to make the changes in lifecycle survival needed to achieve recovery or sustain current or increased harvest rates.

AF-126 Appendix A, Anadromous Fish Modeling should acknowledge that dam breaching is the most risk-averse method of recovery for fall chinook, steelhead, and sockeye.

- Delayed mortality of transported fish remains high and is not argued differently by NMFS otherwise for fall chinook and steelhead.
- There would be increased habitat for fall chinook.
- Sockeye fair worse in dam diversion systems than other stocks so will likely do worse.
- PATH concludes same for these stocks.

Response: See response to comment AF-1.

AF-127 The preferred alternative in the Final FR/EIS should be Alternative 4—Dam Breaching.

- The dam removal alternative is the most likely to meet the 1995 Biological Opinion survival and recovery standards of Snake River salmon and steelhead based on the PATH analysis.
- Other alternatives are not as likely to meet these standards and are more likely to lead to extinction of stocks.
- The recovery standards should be the measure used to determine the alternative selection.

Response: When evaluating alternatives it is important that the best available information is considered. Many evaluation results and peer reviews were completed since the time of the Draft FR/EIS. The Corps has taken into account this best available information when evaluating the four alternatives. The analysis of information is presented in Chapter 6 of the Final FR/EIS.

It is noted the Feasibility Study is not the recovery plan; however, it is intended to support the recovery plan. The NMFS 2000 Biological Opinion has set up a series of performance objectives by which to evaluate the various actions. The Biological Opinion has identified that breaching is not essential to implementation of the initial actions. However, it has not taken breaching off the table.

AF-128 What is the fish mortality for reservoirs, turbine intakes, spillways at high flow (supersaturation), and fish ladders? All appear to cause substantial mortality and the only solution is to remove dams.

Response: The mortality resulting from these factors is discussed in FR/EIS Section 5.5.1 and Appendix A, Anadromous Fish Modeling. Many of these are overcome or mitigated by actions currently being taken. And, as noted, dam removal also has many negative effects to fish, both short and long term. As discussed in the FR/EIS, other solutions are being worked on to either reduce the adverse effects or mitigate the remaining adverse effects. Dam removal is not the only solution to increasing fish survival, which is the primary goal of the actions being considered.

AF-129 Dams need to be removed to prevent extinction from occurring in the near future.

Response: See response to comment AF-1.

AF-130 The points raised by NMFS and others about the likelihood of the Snake River declines not being related to the hydrosystem and that some action other than breaching would recover runs, was critiqued by CRITFIC and others. CRITFIC addressed each of the points that have been raised that have been implied to be the cause of the decline other than the hydrosystem, including such factors as differences between upper and lower river stocks, timing of decreases relative to construction, effects of hatcheries harvest, habitat, distance traveled, and uncertainty. They have concluded that none of these other factors, when analyzed on available data, can account for the

declines, that the hydrosystem is the cause and that only breaching has a chance of recovering the stocks.

Response: See response to comment AF-1.

AF-131 While ESA listed salmon and steelhead may be able to maintain under good ocean conditions, they will not be able to maintain under poor ocean conditions as a result of hydrosystem-induced mortality. So, the only acceptable alternative is to remove the lower Snake River dams and draw down the John Day reservoir.

Response: This has yet to be determined. The best estimate indicates that ocean decadal cycles, those that appear to have the largest affect on ocean production of salmon, occur for periods of 20 to 30 years. If we have entered into a "good" ocean cycle for the Columbia system, as appears to be the case, then other issues that affect salmon survival can be addressed in the "good" period that should, based on the NMFS CRI analysis, be improved to levels that will prevent extinction. Additionally we have little certainty from the data analysis that dam removal, like smolt transportation, will restore stocks under adverse ocean conditions.

AF-132 The only acceptable alternative is one that supplies a fishable surplus for tribes and non-indigenous peoples. Dam breaching (Alternative 4) is required to meet this goal.

Response: The data are not clear that: 1) dam breaching will be sufficient to meet the goals stated, and 2) that other methods may not be nearly as successful as dam breaching at increasing runs. Also, it is likely that a combination of actions with or without dam breaching would be needed to achieve the numbers of fish equivalent to recovery numbers. The actions the Corps plans to implement were designed to lead to increased survival and assist in recovery of the listed salmon species, with beneficial results to the treaty tribes' fishery, and with benefits to the Northwest region as a whole.

AF-133 NMFS latest Snake River salmon reports do not supply any suite of actions, other than dam breaching, that can achieve recovery.

Response: NMFS analysis did not indicate any one action would result in recovery, including dam breaching. Refer to the NMFS 2000 Biological Opinion (NMFS, 2000a).

AF-134 Alternative 4, while the most likely to meet recovery requirements of the alternatives presented, still falls short and needs additional modifications.

Response: See response to comment for AF-126.

5.12.12.2 Concerns/Questions about Alternative 4

AF-135 Alternative 4 has the clearest benefit, but WDFW still has serious concerns about this alternative. Another as yet unspecified alternative may be as acceptable or more acceptable. Specifically, Alternative 4:

- can benefit in the long-term juvenile and adult passage survival.
- improves water quality and fish habitat and wildlife habitat.
- will need additional actions to ensure survival and recovery.
- will take decades before benefits occur so WDFW would entertain other alternatives but analysis would need to begin immediately.

Response: There remains much uncertainty about the benefits of breaching even though some of the analysis shows this alternative has the greatest chance of achieving recovery goals. The Corps considered alternatives that were developed through scoping and the state of knowledge of what is possible, and what is likely to benefit fish. While there may be other feasible alternatives out there that could be better than those considered, the Corps is not aware of them. The Corps would, however, listen to suggestions, based on sound data, for other actions that may achieve the desired results. Any action will take a long time for results to be achieved. Those that are currently in place (e.g., fish passage facilities improvements), however, would have the shortest time for benefits to be observed because they can be implemented in the shortest time frame.

AF-136 While breaching the four lower Snake River dams alone is not enough, it is an essential component of any effort to effectively protect and restore Snake River fish.

- Breaching is essential to delist Snake River fish.
- Breaching is the only way to meet ESA requirements of the listed Snake River stocks.
- The other alternatives are most likely not to meet the ESA requirements.
- The fundamental conclusion of the main analysis methods (PATH, CRI, USFWS CAR report) is the same—that to recover Snake River fall chinook, spring/summer chinook, steelhead, and sockeye breaching must be part of the solution.
- It is necessary to rebuild runs and restore habitat leading to sustainable and harvestable salmon and steelhead populations.

Response: Considerable uncertainty surrounds the improvement that is likely to be achieved through any management action, including dam breaching.

AF-137 What will be the effects to tributary stream aquatic resources from new road and bridge construction and use under Alternative 4, and what mitigation will be developed? How many stream crossings, how much instream construction, how much impervious surface?

Response: Temporary road construction for Alternative 4 – Dam Breaching would be conducted in a manner considering impacts to the environment. This type of activity would be limited and short term. There is no anticipation of long-term new road or bridge construction for the lower Snake River, even under Alternative 4. The need to make improvements to the existing highway and railway infrastructure away from the lower Snake River has been taken into account from an economic perspective; however, the effect to the environment has not been evaluated in detail because the sites and locations where work would need to be done cannot be identified by the Corps. This area of responsibility to identify such infrastructure repairs and improvements remain with Washington and Idaho State's Departments of Transportation.

AF-138 Effects to aquatic organisms for many chemicals (zinc, copper, pesticides, and other organics) from sediment for Alternative 4 need to be presented, including the effects of dust-born sediment toxics.

Response: A discussion addressing what is known about the sediment chemical conditions and effects to organisms, based on samples was presented in both the FR/EIS and Appendix C, Water Quality. Metals and pesticides were not considered to be at levels to cause mortalities. Total DDT was estimated at levels that had the potential to cause short term chronic effects to aquatic organisms, and then only during the first year of dam removal. Un-ionized ammonia could also be a concern during resuspension of sediment under certain conditions. In general, chemicals are likely

to have a very minor or non-existent adverse affect from dam removal, especially relative to other adverse effect caused by quantity of sediment suspended during the process.

AF-139 Sediments released after breaching will kill fish and wildlife given the toxic insecticide residue released into the river system.

Response: The sediment analysis conducted in Lower Granite and other reservoirs did not indicate that in the case of dam breaching and subsequent erosion sediment concentration of toxic substances would result in levels that would be lethal to salmon, which are typically one of the more sensitive organisms. Even the highest levels, which may have some chronic effects, are only predicted to be present in the first year of reservoir drawdown. (see Appendix C, Water Quality).

AF-140 Sediment effects from dam breaching can have more serious effects than suggested in the FR/EIS. Reasons noted included:

- Effects on fish are noted but suspended sediment amounts were not updated (results based on models with only 30 percent of the expected sediment) which could indicate further adverse effects. Lack of data makes conclusions difficult to draw.
- Better information is needed on length of time suspended sediment concentrations would stay elevated in potentially lethal levels.
- Need to consider how migrating smolts would be affected by the adverse sediment effects on resident fish.

Response: See text changes.

AF-141 Extinction of some salmon runs is likely with increased sediments under Alternative 4.

Response: The analysis to date does not indicate that extinction risk would increase relative to current conditions from dam breaching. However, in the short term, adverse effects increase the uncertainty of the effects to stocks with low numbers of returning fish.

AF-142 The FR/EIS needs to look at effects of Mt. St. Helens on salmon/steelhead and relate them to breaching effects.

Response: The Corps has considered the effects of sediment to salmonids in general based on a major sediment review document plus other sources, and conditions on more than one system. PATH reviewed Mt. St. Helens published reports and data in combination with other dam breaching studies across the U.S. and in Europe to adjust input statistics for post-breach adult passage and time to equilibrium of sediment and critical habitat in their sensitivity analyses for lifestage modeling. While there may be some similarities between the two systems, there are likely to be many more differences. Comparison to just one system will supply little to the overall evaluation of potential effects of sediment to fish in the Snake River should dams be breached. It should be noted that literature from the St. Helens work was used in the anadromous fish section of the FR/EIS, especially as it related to upstream migration of adults.

AF-143 For Chapter 15, need to look at Luca (1986) regarding the rapid recovery of the Toutle following the Mt. St. Helens eruption.

Response: See response to comment AF-142.

AF-144 A total of 50 to 75 million cubic yards would pass through the Hanford reach spawning area, which is a major spawning ground for fall chinook.

Response: The area where sediment will pass from the Snake River to the Columbia River is downstream of all active and potential spawning areas in the Hanford reach and the Columbia River.

AF-145 Fall chinook in the natural river may migrate downstream to the Columbia and not rear in the Snake River, reducing the effects of elevated sediment during and following dam removal.

Response: The Corps agrees that this physical relationship also occurs for water temperature where the Columbia River is typically a few degrees cooler than the Snake River for any one month or season. Main fall chinook rearing time in the lower Snake River is mid-June through August, as flows are generally declining. Sediment transport should also be decreasing during this period. Paulsen (1998) as reported in Marmorek and Peters (1998) has shown up to 10 to 15 percent of the fall chinook outmigrating population that was PIT-tagged during good flow years in 1995 and 1996 held up and overwintered in either the lower Snake River around Ice Harbor Dam or in the Columbia River above McNary Dam. This smolt subpopulation passed McNary Dam as yearlings early the next spring and returned adults with increased SARs of 3:1 above their cohort population that passed the summer before as true subyearling smolts. There are lifestage and lifecycle strategies that fishery biologists and analysts continue to discover through PIT-tag evaluations appear to have highly either adapted or adaptable lifetstage survival strategies that the current hydrosystem infrastructure and operations and other H management practices do not consider or give priority.

AF-146 Presenting a more quantitative assessment under good, moderate, and poor estimates of suspended sediment, using methods like that of Newcombe and Jensen (1996), may help better explain the relative level of risk to fish.

Response: The technical risk discussion proposed to PATH has been added to Appendix C, Water Quality. Considering the uncertainty of both the quantity of suspended sediment, behavior of fish, and duration of their presence during high suspended sediment periods, the presentation of a discussion over the range of possibilities as suggested is unlikely to make any clearer the fact that a wide range of outcomes may occur. This is what was essentially done with citations presented in the document.

AF-147 The selection of the number of dams to be bypassed in Alternative 4 is not presented as the right amount for recovery. Instead, the premise is that a different number would have other adverse effects with transportation. The number and choices should first be based on the science of recovery.

Response: A variety of scientific analysis was used to assess which alternative should be chosen. Again, the choice of alternatives was developed during scoping. The best available science was considered in the alternatives selected. As has been pointed out in the FR/EIS, the science is not easily defined and varies from scientific group to group. The Corps has presented and considered a wide variety of evaluating methods and results, and based their selection of alternatives on a variety of facts.

AF-148 The benefit of increased spawning and rearing area in the Snake River from dam bypass has not been adequately evaluated.

- Which fall chinook (Columbia or Snake) would utilize the region is not clear.

- Goals for which fish are desired have not been made clear, but need to be if the effort is directed at recovery of listed Snake River fall chinook.
- It is not clear if specific benefits of in-river production from this reach has been modeled, but it should be for future evaluation.
- Given the low runs of Snake River fall chinook, the mixing of stocks from the Yakima/Hanford reach should be considered a positive, not a negative result of dam removal.

Response: See response to comment AF-1.

AF-149 Removal of dams and increased flow for enhancement of juvenile fish survival is likely to reduce survival of adult returning fish based on tagging data that indicate better survival at passing dams than in the natural river.

Response: We are not aware of data, radio tagging, or other, that indicate survival of fish is greater when passing dams than while migrating in the river. Available information is limited, but comparisons suggest that survival from the lower Snake River to spawning grounds may be little different with the dams than with nearly all dams absent (NMFS 1999b). While adult fish appear to migrate faster through reservoirs, they slow when passing dams and the effect is similar to the migration rate with or without dams (Bjornn et al., 1998) except under periods of very high spill or very warm water, both of which can stop migration until conditions change. We agree that increased adult upstream passage survival is not assured with dam removal; however, there are no comparable data available for the lower Snake River passage area with no dams.

As the FR/EIS indicates current adult survival is probably as high as (or higher than) what was achieved in the pre-dam era. However, there appears to be very little knowledge about adult survival in the lower Snake River before the dams were in place.

AF-150 Radio-tag data indicate greater survival through dams than natural river. Higher temperatures are also predicted for natural river that would be harmful to salmon.

Response: See response to comment AF-149. The temperature conditions are complicated. While some temperatures would be higher, others would be lower, of less duration, and at different times without the dams. The net effect on salmon would be variable.

We are unsure whether this refers to adults or juveniles. We do not have information that says we have greater survival through dams than through a natural river, either for adults or juveniles, since we do not have adequate data on passage survival or conversion rates for the natural Snake River. Temperature dynamics show that dams have shifted the warming and cooling response of the lower Snake River by a couple of weeks, although the maximum temperatures during any one year and summer season are similar between pre-dam and post-dam periods.

AF-151 Fish have been adapting to the current conditions of reservoirs and transport over the years so that the current stocks should be more adapted to survive under these conditions. Changing the conditions back to what it was (i.e., though breaching) would not be beneficial to the fish that have adapted to the current conditions.

Response: Salmon are extremely plastic and genetically variable. However, the current upstream conditions in which they exist do not appear to support self-sustaining populations.

AF-152 Lowering the reservoirs would cause large loss of resident fish which supply a food source for salmon and steelhead. The loss would take longer than 8 years to recover, based on the 1992 drawdown experiment.

Response: We have no information that indicates that resident fish supply a significant food source for any of the anadromous salmonids that rear or migrate through the reservoirs as juveniles. Juvenile anadromous salmonids primary food sources are insects and zooplankton in reservoirs or river, not other fish.

5.12.13 Dam Breaching May Not Recover Species

AF-153 PATH and CRI analyses indicate that breaching is only better than non-breaching if the following are true:

- Inriver survival is low.
- Transport to inriver survival (TIR) is low.
- D value is low.
- Extra mortality is the result of the hydrosystem.

But available data by NMFS indicate that none of these are likely to be true, with ocean conditions likely accounting for a high portion of the poor survival of these fish. These ocean conditions should be considered more fully in the analysis because they are have a much greater effect on survival than all other actions. This indicates that dam breaching and passage improvement alternatives are likely equal in benefits for spring and summer chinook. Additionally, the benefits attributed to dam breaching for fall chinook are primarily based on the assumptions about increased spawning habitat and river production; any increase in passage survival would be modest and these assumptions are speculative.

Response: See response to comment AF-1.

AF-154 Even based on the data presented in the NMFS analysis, there is little firm information that dam breaching would benefit fish over other actions:

- CRI found no single factor would restore salmon, including breaching.
- The CRI analysis indicated that the best action to improve runs is first year survival.
- Only 7 percent of historical fall chinook habitat would be gained with dam breaching, while 90 percent would remain blocked.
- Transported and untransported fish have similar survival, so delayed mortality of transported fish must be low.
- Fish behavior of transported and untransported fish is similar below Bonneville Dam.

Response: See response to comment AF-1.

AF-155 Cumulative survival through four dams is already 80 percent, and with improvements could be 90 percent. This indicates that dam removal could only increase survival maybe another 5 percent and that, while dam removal may be better, it is not likely to be substantially better and there would be no guarantee of recovery with Alternative 4.

Response: We do not know that dam removal would provide recovery. But the overall benefits of dam removal may be greater than indicated by just in-river passage survival, if delayed mortality is

substantially caused by dam passage. This remains a question to be answered with further study. (also see responses to AF-1, AF-64, and AF-98).

AF-156 The models indicate a 12 percent production rate to occur to recover salmon in less than 5 years, but dam breaching would only generate an 8 percent production rate. This indicates that even now it is too late, whatever is done.

Response: It is not clear what numbers are being cited here. It appears they relate to lambda growth rate estimates from the CRI model. It must be remembered these are model estimates, and that other actions can be occurring in the basin (both upriver and in the estuary) that can increase the production rate. Additionally, if ocean production rates increase, as they appear to be, this production rate may be achieved more easily than estimated in the model.

AF-157 It is not possible to provide recovery of Snake River stocks by hydrosystem improvements alone. Neither in-river or transported fish have the needed 1.5 percent survival to adult needed at a minimum for recovery.

Response: NMFS addressed this issue in its 2000 FCRPS Biological Opinion (NMFS, 2000a). They have reevaluated what constitutes recovery and survival and whether recovery is a reasonable goal for this action. Again, the hydrosystem changes cannot do all of the fixes that are needed to recover stocks, but the goal of the Corps' actions on the lower Snake River is to contribute to meeting these criteria.

5.12.14 Not Enough Information/Too Much Uncertainty to Breach

AF-158 The science of survival and recovery is new and is likely to change in time. The Corps should not make changes that will cost jobs and millions of dollars (from dam removal) at this time because there are so many uncertainties.

Response: The Corps' selected preferred alternative is not dam removal. See Chapter 6 of the FR/EIS for the preferred alternative details and implementation.

AF-159 We need better science before we can decide on breaching as a viable option. Try many things such as ban on harvest before seriously considering dam breaching.

Response: The current decision is to develop more information before dam breaching is considered further (see the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) for details). Control of harvest is out of the scope of the FR/EIS.

5.12.15 Consider Survival Factors at All Life Stages

AF-160 All factors affecting salmonid survival should be considered. Considering just passage survival of juveniles and adults is not adequate. Issues related to the need to consider survival of all life stages include:

- Habitat (water quality, spawning, rearing, estuaries).
- Ocean conditions.
- Harvest (sport, commercial, tribal).
- Hatcheries (competition, predation, genetic).
- Predation (fish, birds, mammals).

- Natural mortality.

Response: Although these are all important issues (on which the FR/EIS has some discussion), they are being evaluated in another regional forum called the "All-H Paper." Some additional analysis was developed and cited in this document based on information presented in the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a).

AF-161 The FR/EIS needs to address the effects of the lower Snake River dams on all salmon and steelhead life stages.

Response: The Corps believes we did address all life stages of anadromous salmonids likely to be present in significant numbers in the lower Snake River area. Rearing stages of spring chinook and steelhead are not included in the analysis because significant rearing does not occur here. Additionally, effects to these life stages would be similar to those discussed and did not need to be specifically called out. The region is primarily a migration corridor for the juveniles and adults, with some subyearling fall chinook rearing, all of which were addressed.

AF-162 We need to manage all phases of the life stage to save salmon, including: reducing harvest, reducing predation through aggressive management, and improving dams.

Response: Management scenarios targeting many life stages have potential to improve population growth rates substantially. No single management action for which the effects are currently known is likely to be sufficient to reduce extinction risk for salmon throughout the Columbia River Basin.

5.12.16 Dams Are Not the Problem

AF-163 Survival of in-river smolts is as high now as it was in the 1960s and 1970s before dams were complete and runs were still high (according to NMFS estimates). This indicates that dam removal is not needed.

Response: Yes, this appears to be true for only a few representative above average flow years, and it would lead one to believe that dam removal is not needed if this was the only (or most critical) factor in Snake River salmon population dynamic. Low flow years, such as 1973, 1977, and 1991 give different survival responses where the population responses were very negative and the subsequent adult escapements for those cohort fish returning the following 2 to 4 years were very low. However, NMFS CRI analysis concluded that even with 100 percent downstream survival, Snake River stocks would continue to decline. Other factors (pre-smolt survival and early ocean survival) appear to be more important than downstream survival. Whether dam removal would increase early ocean survival by reducing some component of the "extra mortality" is unknown. See also response to comment AF-27.

AF-164 Of 34 west coast stocks that are either listed or candidates for listing, only four pass Snake River dams, so dam removal is not the answer.

Response: Many factors influence fish survival, some unique to a specific stock, and some regional in nature. The fact that 34 stocks are listed but only a few are in the Snake River does not by itself indicate whether dam removal would restore the Snake River stocks. The FR/EIS evaluated the site-specific effects that influence these stocks and what actions the Corps can take at the Lower Snake River Project to aid their recovery. There are obviously many conditions outside of the lower Snake River that influence these and other fish. These conditions, such as climatic changes, ocean and

estuary conditions, bird and mammal predation, and land use, to name a few, were discussed and analyzed.

AF-165 The large return of over a million fish in 1984, when dams were fully operational indicates dams are not the cause of the salmon decline.

Response: Returning runs for this year have been included in the models that estimate future runs and status of the effects of the hydrosystem. In short, one strong year does not indicate there are not adverse effects. Second, not all races of fish increased during that year. Salmon do, however, have varied levels of ocean survival that do influence their return numbers. The question is whether runs can be maintained not just during very good ocean survival years but in other years when those conditions are not as good.

AF-166 Many commercially harvested fish stocks (e.g., Columbia River smelt, marine groundfish, coastal salmon) in the Northwest are decreasing in areas independent of areas with dams, while non-harvested stocks such as northern pikeminnow and American shad are thriving. This suggests that dams are not the problem but something else is.

Response: These other factors have been considered in the evaluation, including harvest and ocean conditions. Even considering these factors, effects of dams remain, some of which cause mortality of salmon in the Snake River.

5.12.17 Other Factors Have Significant Effect on Salmon Decline

5.12.17.1 General

AF-167 Salmon population started major decline long before dams were in place. Now there are too few to bring back no matter what is done.

Response: It is true that declines started long ago. However, that does not on its own indicate that salmon cannot recover. Best scientific estimates have not stated that too few fish are present for recovery. The 1995 Biological Opinion did state the levels of fish considered to be suitable to maintain survival (NMFS, 1995). Some of these levels have been exceeded for some individual stocks, but the meaning of this for future recovery has yet to be demonstrated.

AF-168 In the whole lifecycle of anadromous fish, dams cause a very low portion of total mortality. Predation by birds and mammals is high, 8 to 50 percent migrating smolts die before they reach Lower Granite Dam, and ocean mortality is high, likely from naturally poor ocean conditions or illegal harvest. The relatively low portion of mortality resulting to salmon from passing of dams should be pointed out. The point made by John McKern that removal of dams would increase mortality should also be noted. Predation and especially ocean conditions are thought by many scientists to be the major cause of poor survival. This is demonstrated by the high direct survival of barged fish while survival to adults remains low at about 0.5 percent.

Response: Even without "man-caused" mortality, extremely high mortality occurs from eggs to returning adult. With no harvest at peak production, less than 10 fish would survive to return to a spawning ground for each spawning pair, which would have laid over 5,000 eggs. The effect is that any additional mortality, above what would be considered "natural," will reduce the return. As noted, many factors contribute to declines in return, such as variability in "natural" conditions (poor oceans, poor winter conditions, increased predation). These changes in natural mortality sources can have dramatic effects, but that does not change the fact that man-caused activities also contribute.

The point of the FR/EIS is to determine what benefits can occur from possible Corps actions on these runs of fish in light of all the "natural" and other "man-caused" mortality sources.

AF-169 Study is severely flawed – need to look at overfishing in international waters and comparison to Fraser and Rogue Rivers (without dams).

Response: The FR/EIS focus is only one piece of the region's efforts to develop ecosystem information. The Corps was requested to focus its study on juvenile migration through the lower Snake River. Although this study's purpose and need is limited to the lower Snake River, the analysis does include discussions on the All Hs. Fishing in international waters is beyond the scope of this study, but the FR/EIS recognizes that it has an impact to the salmon.

AF-170 The decline of salmon stocks was the result of dam construction upstream of the Lower Snake River Project and Idaho fish management practices. During the 1930s, 40s, 50s, and 60s, many major and minor dams on the Clearwater (e.g., Lewiston), Snake River (e.g., Hells Canyon complex), and other rivers (Payette, Weiser) preceding the Lower Snake River Project greatly impeded or eliminated passage for much and, in some cases, most (e.g., fall chinook) of the historical region. Additionally, while construction of the lower Snake River dams was occurring, major dams on the upper Snake, including Brownlee (1958) and Oxbow, were just being completed, causing a loss of spawning and rearing area upstream that would coincide with completion of the lower river dams. The resulting loss of fish from the Hells Canyon complex (completed in 1967), in addition to reducing salmon directly, also changed the predator prey relationship because of loss of prey source from the lost salmon.

Response: Much of the overall reduction in Snake River salmon and steelhead runs can be traced to older activities that occurred prior to development of the mainstem Lower Snake River Project. However, even with all of the upstream dams and other perturbations that occurred, salmon runs were much higher in the 1960s than they were after all the dams on the lower Snake River were built by the 1970s. The cause of the decline is not completely clear, but dams on the Snake have contributed to reducing the numbers of fish. The effect of changing prey sources cannot be determined but is unlikely to be a major cause of decline. The real question is what can now be done to improve overall survival, and some of the factors that can help are improvement in conditions upstream of the Lower Snake River Project.

5.12.17.2 Take an All-H Approach

AF-171 The All-H strategy, which may include EDT Multispecies Framework Analysis, needs to be included for the FR/EIS analysis. This analysis evaluates the level of improvement needed under each of the Hs to increase runs under varied ocean conditions. This type of analysis indicates it is not possible to maintain salmon without improvement in all Hs and under poor ocean conditions.

Response: Management scenarios targeting many life stages have potential to improve population growth rates substantially. No single management action for which the effects are currently known is likely to be sufficient to reduce extinction risk for salmon throughout the Columbia River Basin.

AF-172 We need to focus effort on other areas than just hydropower to restore fish. This includes improving habitat for early survival improvements. Controlling predation, studying ocean conditions, controlling harvest, and managing hatcheries better

Response: While most of these areas are not directly under the Corps' jurisdictions, the Corps will be contributing to habitat restoration. The purpose is to help offset some of the passage losses that remain after implementing passage improvements selected in the FR/EIS final alternative. See the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) for details.

5.12.17.3 Habitat

AF-173 Habitat conditions are likely as good or better than they were when runs were large.

Response: Even if habitat conditions are similar to when run sizes were larger it does not mean that habitat conditions cannot be improved. Improved habitat conditions have the potential to increase survival and ultimately run sizes of listed species. More than 50 percent of the stream miles in many of the basin area above Lower Granite Dam is only considered to be of "poor to fair" conditions (Chapman and Whitty, 1993). There is documentation that some conditions have worsened, such as in the Grande Ronde. There is documentation that many of the streams where monitoring is available have had reduced habitat (loss of deep pools) since the late 1930s and 1940s to about 1990. However, monitoring has not been adequate to determine to what degree conditions are responsible for reduced runs. While some land use practices have improved since the 1960s, the ongoing cattle grazing, farming, logging, and irrigation withdrawal conditions may have worsened in many areas.

Ocean/Climate Conditions

AF-174 Ocean conditions, while likely important, cannot be blamed for the high chance of extinction.

- Ocean conditions have varied decadally for at least the last 100 years without causing extinction.
- The effect of man-caused activities such as harvest, dams, and irrigation are known to have adverse effects.

Response: Ocean conditions were considered as qualifiers in the discussion and a substantial discussion is presented in the text. Because the cycle of ocean effects is long (20 to 30 years), it is difficult to conclude that the effects cannot be substantial and may, in combination with other factors, affect the chance of extinction.

AF-175 Documented ocean survival is increasing and is likely to continue to increase, greatly increasing the chance of recovery with no further changes.

- 1997 SARs were about 1.55 percent which may go in the 3 to 4 percent range with more adult returns in 2000, up from the typical 0.5 percent in the 1990s.
- Returns of adults both in 1999, and jacks in 2000 also indicate high ocean survival.

Response: Ocean conditions are obviously a major factor affecting anadromous salmonid population growth rates. In addition, it is likely that ocean conditions have differential effects on the several ESUs in the Columbia River Basin. Snake River fall chinook, for instance, apparently have a different ocean residence than Hanford reach chinook. Many ocean conditions do signal a change in the Pacific Decadal Oscillation (PDO) in recent months. However, since Columbia River salmonids have been declining since the 1870s, ocean conditions cannot be held solely responsible

for Snake River stock declines. In addition, the mechanism of the oceanic effect on salmon populations is unknown, making predictions of the effect of climatic changes on salmon populations problematic. Moreover, our power of prediction of the duration of these ocean cycles is poor. Finally, there are indications that El Nino/Southern Oscillation (ENSO) events affect salmon populations more strongly than the PDO. Most models of global climate change predict increasing frequency and duration of ENSO events.

AF-176 Many ocean conditions in recent years signal that production changes are linked to the positive ocean decadal cycle, and are likely to continue and benefit salmon stocks.

Response: See response to AF-175.

AF-177 Several factors indicate that current conditions (salmon and steelhead similar to historical abundance, better ground water input from irrigation, pristine water quality, added nutrient increase production, streams at carrying capacity) in the mid-Columbia River Basin are in fact beneficial to anadromous salmonids and the items being addressed are not those that are limiting fish productions (e.g., oceans, winter conditions). A number of scientists believe that climatic conditions are largely responsible for salmon decline.

Response: The upper Columbia is out of the scope of the FR/EIS. Climate conditions have been noted as possible sources of the problem but data are not sufficient to determine to what level changing ocean conditions affect overall survival and conditions of the stock. Runs are not at historical levels, and in fact are much lower than estimates of historical abundance.

AF-178 The fact that the Fraser River, with no dams, has also had poor returns in recent years indicates that oceans or harvest or habitat are a major cause of the decline, not dams.

Response: Many other cases of declining populations in rivers without dams could be cited. While this certainly implies that ocean conditions play a major role in population dynamics, it does not mean that the dams were not a factor.

AF-179 Ocean conditions are likely a major cause of Snake River stock declines. This was noted by Dr. David Welch of the Canadian Department of Oceans and Fisheries, who stated there is compelling reasons to believe ocean conditions have a lot to do with the decline of Snake River spring and summer chinook.

Response: See response to comment AF-175.

AF-180 The Ocean Decadal Cycle (Pacific Decadal Oscillation) appears to have correlated with poor runs in the Snake River as well as construction of Snake River dams. The result is that ocean conditions, not dams, may be a major cause of decline. The conditions may have shifted back to more favorable conditions in just the last couple of years but has not been completely documented as changing. However, it needs to be considered before making conclusions about alternatives.

Response: See response to comment AF-175.

AF-181 The differences between Hanford reach and Snake River fall chinook stocks, including timing of migration, ocean feeding locations, and genetics, could just as easily account for the differences in production between these stocks as the presence of the lower Snake River dams.

Response: We do not know all of the factors that account for the differences in production between these stocks, but the presence of the dams does contribute to the mortality of the Snake River stocks. The overall degree, however, is not fully known. (Also see response to comment AF-139.)

AF-182 The obvious cause of the problem with fish production and survival is primarily in the oceans and early estuarine conditions. The ocean, bay, and estuary conditions need to be evaluated by NMFS before considering dam removal. The greatest fish losses occur in the ocean and migration.

Response: NMFS is addressing needs for improvement in both earlier rearing and estuary conditions in their 2000 FCRPS Biological Opinion (NMFS, 2000a). Affecting conditions outside of the Snake River region is outside of the scope of the FR/EIS. See responses also to AF-78, 79, 139, 141 and 152 for specific responses to ocean condition issues. Also see AF-1, 3,13,25, and 26.

AF-183 While current estimates are less than 3 percent of smolts returning as adults to Bonneville Dam, a minimum goal of smolt return from the ocean should be 10 to 20 percent before dam removal is considered further.

Response: Ocean survival is really out of the control of anyone, so relying on this criteria will not aid fish conditions in the freshwater, which also play a major role in overall survival. Current recommended State agency criteria is 2 to 6 percent smolt to adult return, but this has rarely been met in the last 20 years. Oceans are a factor, but not the only one influencing this overall survival rate. See responses also to comments AF-78, 79, 139, 141 and 152 for specific responses to ocean condition issues.

Habitat Enhancement

AF-184 The region should consider adding fertilizer to streams to increase survival and growth of fish; it has proven effective in Canada.

Response: Actions in the tributaries are not directly under the control of the Corps. However, NMFS has made recommendations for habitat enhancement in the tributaries as part of the 2000 FCRPS Biological Opinion (NMFS, 2000a), which may include fertilization in some areas such as sockeye lakes.

AF-185 The Corps should help fund culvert replacement for fish passage as a short-term action to help restore runs. Additionally, Federal tax credits should be given to private landowners for culvert replacement.

Response: Based on the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a), the Corps will assist in some habitat restoration.

Provide for Passage at Hells Canyon

AF-186 The only way other than breaching to supply habitat suitable to increased fall chinook numbers to harvestable levels is through supplying passage at the Hells Canyon Complex.

Response: This is out of the scope of the FR/EIS.

AF-187 The Federal Energy Resource Commission (FERC) should consider requiring passage at Hells Canyon Dam to help restore Snake River runs.

Response: Actions concerning fish passage at Hells Canyon Dam are out of the scope of the FR/EIS.

5.12.17.4 Predation

AF-188 Predation needs to be managed more fully to enhance survival and reduce demands on other resources. Some sources of predation and reasons that are of concern include:

- All predation is documented or suspected to account for large loss of listed species.
- Predation by fish in the system such as smallmouth bass and other species is not controlled.
- Marine mammals are allowed to consume fish at the dams and in other areas and may need to be controlled by bounty like squawfish.

Response: Predation management is really an issue that cannot be addressed by the Corps alone. Predation control is managed by States and other Federal agencies. While predation does have effects on survival, much of the current predation would also occur naturally. Stocks should be able to survive with some level of predation. Also, as NMFS addressed in their White Paper on Predation (NMFS, 1999d), the level of effect of many of these is poorly known, while in other cases, low. Actions to address some of the major predators are underway, although some sources of smolt loss will remain.

AF-189 Caspian terns and other birds consume high numbers of fish but essentially are protected by the same agencies (USFWS) requesting additional flow to protect the listed species.

Response: The FR/EIS, other Corps studies, and the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) do address the terns.

AF-190 We need to address predation on salmon and steelhead. This includes in such areas like Rice Island on the lower Columbia where the predation rate could be as high as 30 percent. Reduce or eliminate tern populations, and reduce or eliminate seal and sea lion populations that eat salmon Moving terns from Rice Island should be vigorously defended in court, if necessary. Seals and sea lions have been increasing at 5 percent per year since the 1970s. Reduce pressure from predators.

Response: NMFS agrees that predation is an important variable in salmon recovery. Appendix A, Anadromous Fish Modeling includes discussion of predation rates and the PATH models included predation as a mortality source for chinook salmon. Unfortunately, although there is a great deal of data on the diet, energy budget, and distribution of predators, rigorous translations of these data into rates of mortality expressed at the salmon population level are lacking. One problem is that the identity of different ESUs cannot be distinguished from stomach content samples. In the CRI matrix models, numerical experiments are conducted that simulate mortality reductions during particular lifestages, and hence represent possible improvement in population growth due to removal of

predators (see Appendix A, Anadromous Fish Modeling, which incorporates Kareiva et al., 2000). When we get better information on predation rates at the population level, these "what if" experiments can be turned into directed analyses of improvements due to better predator management. The attention CRI directs towards survival in the estuary as a key component of salmon population growth is one step towards more careful consideration of terns and other "below-Bonneville" predators.

AF-191 To reduce predation by Northern pike minnow at dams, turn lights off at night as they are sight feeders and this is the period of major passage of juvenile salmonids.

Response: It is unknown to what extent lights at dams contribute to predation by northern pikeminnow. Northern pikeminnow predation occurs in tailwater low velocity eddy conditions and in the uppermost area of the Lower Granite reservoir where pikeminnow are moving upriver to spawn and encounter downriver migrating smolts as they are slowed by the transition velocities of the reservoir. The elimination of or the hydraulic modification of these environments are the most likely beneficial effects over any surface lighting of the water during the night. Light transmission in deeper water at night is restricted considering that secchi depths in the adult ladders during the day is less than 5 feet and shallow water reservoir photic zone during daylight is maximal at 10 to 15 feet because the lower Snake River is a fairly productive mesotrophic water body. However, lights on hydropower projects are necessary for personnel and public safety as well as for the operation and maintenance of navigation, hydropower, and roadways. For these reasons, it is impractical to consider turning them off. The Corps, however, is reviewing whether some of the lighting can be decreased.

AF-192 Predation problems are greatly enhanced by human activity. Formation of dredge islands increases birds that prey on fish, slows water behind dams, and disorients fish making them more susceptible to predation. Barge releases of smolts below Bonneville Dam encourage localized concentration of predation.

Response: See response to comment AF-190.

AF-193 Because marine mammal predators were in great decline in the 19th century when 16 million salmon were estimated to be in the Columbia River system, the number may not be a realistic baseline for current comparisons. What is a more realistic number?

Response: See response to comment AF-190.

AF-194 Under the dam breaching alternative, evaluate how reduction in resident fish will affect predation.

Response: The effect of resident fish on predation without the dams was already discussed in the FR/EIS. The future effects are not clear; it depends on assumptions about future abundance and distribution of predators in the reach once the dams are breached.

5.12.17.5 Harvest

AF-195 We need better harvest management, reduction of bycatch waste including salmon, and patrolling of ocean fisheries. Also, what effect has ocean harvest had on food sources for salmon and steelhead.

Response: In the original Appendix A, Anadromous Fish Modeling, harvest was discussed only for fall chinook salmon. However, in recent months, NMFS has directed several analyses towards a critical quantitative scrutiny towards harvest and the risk it poses (if any) for ESUs. These analyses are now incorporated into Appendix A, Anadromous Fish Modeling. Appendix A incorporates a manuscript by McClure et al. (2000) regarding 11 ESUs in the Columbia River Basin; this report includes an explicit analysis and discussion of risk due to harvest for each of the 11 harvested ESUs in the Columbia River Basin. Better resolution of harvest risks will require a program in which all hatchery fish are marked, a point made in both the McClure et al. (2000) report and in the All-H document (Federal Caucus, 1999). NMFS notes the comments regarding harvest and is addressing these risks.

AF-196 Harvest takes a big toll on fish and should be reduced or eliminated.

Response: See response to comment AF-195.

AF-197 We need to improve selective harvest methods such as fish wheels.

Response: See response to comment AF-195.

AF-198 Put a moratorium on all fishing (e.g., ocean, river, tribes) and subsidize fisherman to help enhance runs. Make moratorium for 5 years extend. A 5-year no harvest plan should be included in the final report alternatives. Consider developing "no harvest" ocean zones.

Response: See response to comment AF-195.

AF-199 How can harvest, as a form of killing, be allowed for fish on the endangered species list since it is illegal for other listed species?

Response: Hatchery fish are produced for harvest. Harvest of hatchery stocks does cause incidental catch harm and mortality to the less abundant wild stocks. Under ESA, a threatened species status allows for some harvest as either direct or incidental take if long-term benefits toward recovering the stock would be result of the take and such take would not result in jeopardy to the species. An endangered species status does not allow for harvest, but realizes that some incidental take may occur. Incidental take is more limited because listing under the endangered status means that the species is closer to extinction and any action would have a higher probability to result in jeopardy to the species.

AF-200 There is much illegal harvest of salmon on the Columbia River and other areas that is not monitored. This illegal harvest is undoubtedly having an adverse effect on the listed species.

Response: See response to comment AF-195.

AF-201 Alaskan fisheries have almost no effect on listed stocks because the number in the region is very small. Alaska fishing only affects 0.25 percent of the Snake River fall chinook stock while dams kill 80 to 95 percent of chinook. Alaska has already reduced harvest by over 50 percent to

conserve Snake River fall chinook stocks and this reduction will not compensate for lost habitat and dam passage mortality in the Snake River.

Response: See response to comment AF-195.

AF-202 Harvest rate on spring chinook is essential 0 percent for commercial, while that of the dams is equivalent to 38 percent of wild stocks. Also, while harvest is higher on Snake River fall chinook, all hydroelectric losses, if converted to adult equivalents, would equal 88 percent of the run. So why are harvest restrictions still being proposed as a method to enhance runs? Restrictive harvest on Snake River stocks began on the Columbia in 1964 and was eliminated on spring chinook in 1974; still fish are near extinction, so the argument of reducing harvest to enhance runs is not one that should be expected to work in the future. Less than 1 percent of human-caused mortality of Snake River fall chinook is caused by sportfishing harvest, while hydropower systems cause 92 percent of the mortality. Yet, harvest restrictions remain a main objective of NMFS plans.

Response: See response to comment AF-195.

AF-203 One hundred years of fisheries management has decreased stock viability through selective and over harvest, likely reducing the chance for future recovery. The effect of past, present, and future harvest and fisheries management on effects of future rebuilding needs to be discussed.

Response: See response to comment AF-195.

AF-204 Reform harvest rates. You cannot harvest wild stocks at hatchery harvest rates. Current mixed harvest rates are 50 percent or greater.

Response: See response to comment AF-195.

AF-205 Can we produce more GPS marked salmon for harvest?

Response: Fish currently have no way of being marked with Global Positioning System (GPS) units. However, if we are attempting to determine harvest in the ocean of certain stocks of fish, this can be obtained using GPS technology by recording where a fish is harvested and determining its hatchery or stream of origin if it has a tag. Unfortunately, tracking juvenile salmon in the ocean using radio telemetry and GPS, similar to tracking whales or sea birds, is not possible because the signal is effectively eliminated upon entering salt water. Whales must surface whereby the signal can then be tracked by satellite; salmon in the ocean typically do not surface enough to make this a useful tool. Using acoustic tag technology is currently being attempted in the near shore area; however, the relatively large size and short battery life of these types of tags, as well as the need for hundreds of thousands of expensive listening devices, precludes tracking the juvenile fish from the mouth of the Columbia to potential harvest areas in the ocean. In addition, tagging and tracking entire stocks of fish, specifically for harvest, is a monumental (if not impossible) task when considering the ocean environment.

AF-206 Why is the loss of adults between dams reported as caused by the dams, when it could be just as easily assigned as loss due to unreported harvest.

Response: While some loss is the result of unreported harvest, it does not appear to be a major source of unaccounted fish loss because of the intensive planning and management of the harvest (Dauble and Mueller, 2000).

AF-207 Tribal fishing may need to be more closely regulated to reduce harvest.

Response: Fishing regulations are out of the scope of the FR/EIS.

AF-208 Ocean harvest and inriver netting are the major causes of salmon still in decline as indicated by the fact that American shad prosper in the same system and are not harvested in the same manner. Examples from the east coast suggest greatly reducing or eliminating harvest can greatly enhance abundance of fish. Fish harvest should be eliminated in the Columbia and Snake Rivers including Indian harvest for a few years.

Response: Harvest has been thoroughly considered and its effects substantially controlled. While a contributing factor, it is not substantial for most listed Snake River salmon stocks. Additionally, treaty obligation with Native American tribes require that some harvest will occur. American shad have considerably different lifecycle requirements (migration timing, juvenile rearing, ocean feeding) than do salmon and therefore cannot be compared directly.

5.12.17.6 Hatcheries

AF-209 We do not need to take actions to enhance runs, such as dam breaching, if we are still killing fish as "surplus" that return to hatcheries such as those at the Entiat, Leavenworth and Methow and other areas. States want enhancement programs but are still killing hatchery fish. Also, some of these systems do not appear to have wild fish anymore so why are we trying to protect them with removal of excess fish? Because of the similar life history and obvious improvement in runs like the Yakima River from hatcheries, we should develop more hatcheries and not breach dams. The fact that thousands of returning wild and hatchery fish are being killed by The Oregon Department of Fish and Wildlife (ODF&W) indicates we do not have fish problems; we have agency problems as they create the image of a fish crisis.

Response: This comment addresses the apparent discrepancy in treatment of wild and hatchery fish. Under the direction of the ESA, NMFS is required to consider recovered stocks as self-sustaining (i.e., if hatchery inputs were removed from the system, a stable population growth rate would result). Therefore, it is important that we assess the status of the wild component of the population (which can be masked by hatchery fish). Although the addition of hatchery fish may increase the numbers of fish in the rivers, this input does nothing to change the system to allow a wild population to reverse a declining trend. In fact, there are many reasons to believe that the addition of hatchery fish may actually harm wild populations.

AF-210 Developing hatchery practices (adult and juvenile) more closely approximate more natural conditions will provide fish more adapted to succeed.

Response: This is an important issue, but it is outside the scope of this FR/EIS.

AF-211 Use hatcheries in the lower Columbia River to raise fish for commercial and tribal harvest, and those in the upper river to enhance survival of these fish through early rearing stages.

Response: Ultimately, the decision about how hatcheries should be used is a management decision. However, as noted above, hatchery production can reduce the risk of extinction, but has not been shown to contribute to rebuilding of wild stocks. At the least, hatchery production should be implemented in a way to minimize potential effects on wild stocks, and should be monitored to assess those effects.

AF-212 After checking for disease, add hatchery salmon carcasses to streams, stop transfer of hatchery fish outside of their genetically suitable zone, and ensure all hatcheries have adequate operating protocols.

Response: Many studies suggest that adding salmon carcasses to streams would have beneficial effects for wild populations. Doing so in an experimental framework can help identify the salmon population response that might be expected from such actions. There are several hatchery policies that require that only local fish be used in hatcheries, and that adequate Hatchery Genetic Maintenance Plans be in place for each operating hatchery.

AF-213 Consider developing more fit salmon through selective breeding in hatcheries and put the hatcheries below the lower dam. Use hatcheries as short- and mid-term gene banks. Maintain existing hatcheries and possibly develop new ones. These fish, while not truly wild, do contain wild characteristics. While systems are recovering to normative river conditions, genes and fisheries can be maintained through hatchery use.

Response: See response to comment AF-211.

AF-214 Include hatchery operations in each of the alternatives so that these can be maintained for fish restoration and recovery under the Endangered Species Act.

Response: See response to comment AF-211.

AF-215 Hatcheries production should be cut by 50 percent, and the remainder used to produce wild fish.

Response: See response to comment AF-211.

AF-216 Expand hatchery production with intent of improving genetic diversity. If you biologists cannot tell the difference between hatchery and wild fish there should not be a statutory difference.

Response: See response to comment AF-209.

AF-217 We need to count hatchery fish in recovery statistics. Hatchery fish need to be reported in the counts and need to be considered as wild fish; fish that spawn in the wild are wild fish.

Response: See response to comment AF-209.

AF-218 The Lyons Ferry stock is likely the pure form of the native stock while those that spawn in the wild are likely a mixed stock because of past straying into the area.

Response: Comment noted.

AF-219 Explain how hatchery fish become less "genetically fit" in just a few generation in the hatchery, and how hatchery mismanagement is need to remove dams.

Response: The selection process in hatcheries is not like that in nature. It can selectively remove individuals that may have been more fit in nature or retain those that may not have survived the early life challenges had they been in the wild. This can be done by timing of individual selection when fish return, selection of mates, how juveniles are fed, their rate of growth, and how they are released. The results in genetic fitness change, can therefore be rapid. Changes are occurring in hatchery operations to reduce these types of selection to minimize effects on fitness.

AF-220 Hatcheries cannot make up for the loss of 8 million fish that occurred in the Columbia River System naturally because it would take the collection of 32 billion eggs. Even in the best of years the number of smolts produced in hatcheries was four orders of magnitude too low to produce 8 million adults.

Response: Hatchery production is out of the scope of this FR/EIS. However, it was never the goal of hatcheries to replace all of the wild runs of fish in the Columbia River System. Additionally, higher early life stage survival in hatcheries greatly reduces the need to have as many fish eggs to produce the same number of smolts as it does for fish that spawn in the wild.

5.12.17.7 Forest Fire

AF-221 Forest fires have devastated fish habitat in many Snake River subbasins, including the Grande Ronde and Imnaha Rivers as well as others. These fires influence survival of fish for at least three generations. Fires need to be controlled to protect fish and removing dams will not solve this problem.

Response: While forest fires can cause significant problems locally, their effect is limited in the Snake River Basin. We agree that basin habitat protection needs to occur. See the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) for details on recommended habitat actions to improve tributary conditions.

AF-222 Could massive fires be the problem with the current status of fish? They appear to be in certain areas including the Grande Ronde.

Response: Activities that occur in the basins upstream of the Lower Snake River Project certainly affect fish survival and production. The affect of these conditions on status of fish is under the purview of NMFS, and they have not stated that fires specifically are or have been a major problem affecting fish status.

5.12.18 Other Ideas for Helping Salmon

AF-223 A separate "bypass stream" should be constructed to eliminate the mortality of smolts caused by passing through the hydrosystem. A bypass channel with own brooding areas, lakes, gravel beds, and hatchery access would help recovery. These areas could be linked to the dams and natural organic input and could be used even if dams are removed. A bypass channel just during smolt period could be developed for the Snake River.

Response: Bypass channel was extensively studied in the System Configuration Study and was eliminated from further consideration due to cost, impracticality, concerns about avian and fish predators, vandalism and unknown fish response to such an artificial system. A Symposium of experts convened by Idaho Labs at the WSU Campus in Richland, WA in the mid-1990s concluded the same as the SCS. ISAB validated these results in the late-1990s with their recommendation that no further technological fixes are available or could be developed in the near future to provide hydrosystem survivals higher than those measured through the PIT-tag program.

AF-224 Why is there no mention of minimum gap runners as the work done at Bonneville is promising?

Response: There are a variety of technologies being tested that were not specifically called out in the FR/EIS main text. The minimum gap runner was discussed in Appendix E. Many technologies

are being considered as part of the Alternative 1—Existing Conditions and Alternative 3—Major System Improvements. The details of the alternatives from an engineering standpoint are presented in Appendix E and not all individual components are called out in the text. The Corps does not believe the details of each of these needs to be presented in this document to make a determination of the future actions being considered here. The reader also can refer to the 1999 Biological Assessment developed by the Action Agencies for the Federal Columbia River Power System to find more details of which programs are being studied in the future.

AF-225 One commentor had a variety of suggestions to aid fish recovery. These included: develop fish with better predator avoidance skills, return straying fish caused by transport back to their native stream, eliminate experimentation that requires fish marking because the handling kills fish, quit planting exotic species such as bass and let these be harvested at high rates, cut hatchery production by half to reduce genetic problems, and eliminate gill netting because it harms fish.

Response: In general, most of these suggestions are out of the scope of actions that can be taken by the Corps under this FR/EIS. Some others, such as changing the behavior of fish, are not practical. Some have been considered to various degrees such as reducing hatchery production and reducing harvest, and various levels of changes have been implemented. However, other actions that are ongoing have already had the effects of these actions, like marking, exotic predator harvest, and gill net harvest considered by managing agencies and there levels have been controlled to practical levels.

AF-226 Another proposal for passage in place of full dam breaching is proposed. The proposed method includes developing a roller compacted cascading type of stream with large pools and boulders around each dam.

Response: Many viable methods of passage have been considered. Passage methods need to have a very high chance of success because of the high cost of construction, long testing period needed to ensure function, and the long lead time needed to implement a passage. While this concept on paper appears interesting any practical form of its application would require a construction project of likely greater effort, magnitude, and expense than the current dam breaching proposal. The action would also have an even greater chance of not achieving the desired goals of the actions because of the many unknowns both in the project design and the outcome if implemented. The Corps believes the current options being considered cover the range of alternatives that have some reasonable likelihood of success. For these reasons this alternative will not be considered further. Also, we are unaware of any such facility being used anywhere to successfully pass salmon and steelhead.

AF-227 Retrieve DNA samples from the listed species now and store cryogenically. These may be of use later if any go extinct.

Response: This is out of the scope of the FR/EIS. However, some storage of genetic material does occur already with some of these species such as the Snake River sockeye.

AF-228 A new bypass system for juvenile fish, known as the Boylan Smolt Transport System should be studied for its feasibility of reducing downstream passage mortality. The system would divert fish above Lower Granite Dam by sonic methods and enter them into a piping system with light openings to pass each dam all the way to below Bonneville.

Response: The originally proposed concept was previously discussed in detail by the regional Technical Advisory Group (TAG) convened in the System Configuration Study, but was eliminated

from consideration at that time. Additions with advanced technological developments have been routinely proposed and evaluated by the Corps and through ISAB.

AF-229 All actions that have potential for increasing recovery should be explored including "new and improved barging," fish friendly turbines, fish pumping, and new artificial channels, but these should not be used to delay action at dams.

Response: The Corps, in consultation with fish management agencies, continues to consider actions to improve survival of fish. However, the Corps considers the potential benefits of each action and must consider the likely gain of the action toward increasing survival, as well as the overall cost of that action. For example "fish friendly" turbines are being considered. But the cost of replacing turbines is extremely high. Because relatively few fish pass through these turbines, and overall survival is typically high even with current turbines, active replacement of turbines to more fish friendly turbines is not a major consideration currently. But when turbines are in need of mechanical replacement the design relative to fish survival will be considered.

5.12.19 Salmon Populations/Genetics

AF-230 Define ESU in numerical terms.

Response: An Evolutionarily Significant Unit is a population or group of populations that is reproductively isolated from other nonspecific population units, and represents an important component in the evolutionary legacy of the species. As such, it fulfills the definition of a "distinct population segment" under the Endangered Species Act. While there are a number of fish that belong to any ESU at a specific time, this is variable, and changes with the population growth rate of the ESU. Therefore, it is impossible to define ESUs in numeric terms. Recovery goals for each ESU will include abundance goals as well as goals for the trend (sustainability), spatial distribution, and diversity that should be found in the ESU for it to be considered viable.

AF-231 Can Pacific Salmon species breed with other salmon?

Response: Generally not. Although some interbreeding has been documented, it is rare. However, I think the point of the question is, are the listed species and other salmon of the same species able to breed. The answer to this is yes. But the offspring of mixed stocks of the same species are more likely to produce offspring that are less adapted to either of the environments they originated from. In essence they would be less productive or not productive at all.

AF-232 Because of actual or potential interbreeding among stocks the endangered species are really not separate species even as defined by the ESA "actually or potentially interbreeding populations of organisms." So, should the individual runs die out, the Northwest species would not because they are abundant in other Northwest rivers.

Response: NMFS, as custodians of how ESA is applied to anadromous salmonids, has defined what the interpretation of this ESA language is to be. Their definition is what they call ESUs. This is discussed in the text. The interpretation that NMFS uses does not consider salmon runs from other river systems in the NW to fit the definition "actually or potentially interbreeding populations of organisms" as it relates to their definition of ESU.

AF-233 We should reintroduce Snake River sockeye into the wild as soon as possible to maintain genetics because hatcheries adversely affect genetics.

Response: Release strategy of listed stocks and determination of how hatcheries are to be operated is out of the scope of the FR/EIS.

5.12.20 Miscellaneous

AF-234 One commentor addressed their concern for the adequacy of the Biological Assessment (BA) for the operations of the Federal Columbia River Power System (FCRPS). They noted that the document did not propose "reasonable and prudent alternatives" as required under the Endangered Species Act if the Action Agencies wish to receive a "no jeopardy" decision. They did not believe the "construct" was an adequate substitute for detailed proposed actions. They did not believe it was acceptable to retain fish transport especially as it currently exists since many authorities believe fish transport will not restore listed fish runs. And finally, they conclude that if the BA is not changed, NMFS would either have to ignore the document or conclude the actions proposed would cause jeopardy.

Response: NMFS has accepted the BA as adequate and developed a Biological Opinion for the FCRPS as a response to this BA. A BA can take many forms, so this form, while different than many, served the purpose of developing consultation with the Federal ESA agencies. While many details were not directly included in the document, it referenced back to many ongoing plans, analyses, documents, and past consultation among the agencies which supplied the details needed for an evaluation by the ESA agencies. As noted in many responses, fish transport while not able to "restore" runs on its own, has been credited with reducing the rate of decline of fish stocks and is a reasonable action to retain. As such, NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a) retains transport as a viable and useful action.

AF-235 Is the genetic plasticity of salmon so unique we cannot provide them with adequate conditions to support them?

Response: Salmon are extremely plastic and genetically variable. However, the current conditions in which they exist do not appear to support self-sustaining populations.

AF-236 We would need multi-level intakes at Brownlee Dam if Snake River dams were removed to provide cool water for insurance of restoration of fall chinook.

Response: Brownlee operations are out of the scope of the FR/EIS. But Dworshak flow releases may be used to help modify Snake River water temperatures, as they are now, if Lower Snake River Dams were breached.

AF-237 Consider the effect of lost nutrients of marine origin if salmon are lost to the stream systems of Idaho. They are known to be a major source of nutrient to mountain systems.

Response: See response to comment AF-212.

AF-238 Do coldwater releases from Dworshak negatively affect Clearwater River fish?

Response: According to the USFWS, the cool water releases from Dworshak Dam for the purpose of summer flow augmentation may be causing fall chinook parr to remain in the Clearwater River too long. See Appendix M—Fish and Wildlife Coordination Act Report, Annex D.

AF-243 A reviewer critiqued comments made by Idaho Fish and Game on the analysis done by NMFS for the Draft FR/EIS.

Response: Comments were sent to NMFS for their consideration in the development of the final version of Appendix A, Anadromous Fish Modeling.

5.12.21 Adult Salmon

AF-239 Why not barge adults upstream from Bonneville Dam. This would avoid the high loss of fish from gill net drop out rates?

Response: This is a management decision. However, even if there were perfect survival through both upstream and downstream migration for Snake River spring/summer chinook stocks, extinction risk would not be mitigated.

AF-240 Removal of dams could have more adverse effects to upstream passage survival than with dams in place.

Response: The Corps has discussed the likely effects to adults from dam removal in the text. However, over the long term, they are not likely to be worse, but they also may not improve much either.

AF-241 Losses of adult salmon, especially fall chinook, in the lower river before they reach the Snake River needs to be better understood.

- Some suggestion of dying fish in Bonneville pool or possible movement up tributaries before reaching Snake for fall chinook
- Harvest losses and effectiveness of enforcement is also not clear.

Response: The State and Federal agencies, and tribes keep an accurate accounting of fish both harvested and illegally taken. The latter is a very minor component of fish loss. We have no indication of an inordinate number of dying fish in Bonneville pool, nor do the counts between Bonneville and The Dalles indicate exceptional losses there.

AF-242 Current monitoring methods of adult fish counts are not accurate because they do not cover the whole period of migration.

Response: Current monitoring methods of returning spawners tend to be highly variable for a wide range of reasons. The monitoring program to be developed under the NMFS 2000 FCRPS Biological Opinion seeks, in part, to identify life stage specific mortality rates (NMFS, 2000a).

5.13 Resident Fish

The main issue expressed by commentors in this section is that the Draft FR/EIS conflicts with a USGS report and other sources regarding predation on juvenile salmonids by non-salmonid fish. Commentors have also expressed that these documents conflict on the effects of Dworshak Dam releases. Comments on Appendix M, Fish and Wildlife Coordination Act Report are also addressed.

5.13.1 Main Report

RF-1 Include findings from Zimmerman (1999) and Peterson et al. (2000).

Response: These two publications have been reviewed and considered in the Final FR/EIS.

RF-2 Predation is not a major source of mortality.

Response: Introduced exotic predators (e.g., yellow perch, smallmouth bass, channel fish) do contribute to the decline of fall chinook salmon. The effect of predators on the other listed stocks is not as apparent.

RF-3 "Survivability" of salmon smolts is negatively impacted by increases in non-native fish caused by increases in water velocities (flushing affect) from releases from Dworshak Reservoir.

Response: Dworshak releases actually have a negative effect on non-native fish. This is because the non-native species (e.g. smallmouth bass, channel catfish, crappies, etc.) are warmwater fishes that are negatively impacted by the coldwater releases from Dworshak Dam. The velocity of Dworshak releases is of little or no consequence.

RF-4 Releases from Dworshak Reservoir are intended to provide cooler temperatures for juvenile salmonids; however, this release has mixed results and questionable future value under Alternative 4.

Response: The intent of Dworshak releases is to both augment flow and assist in lowering water temperature.

5.13.2 Appendix M, Fish and Wildlife Coordination Act Report

RF-5 There is a lack of emphasis that Alternative 4 is ecosystem restoration.

Response: The USFWS believes that Appendix M describes how ecosystem changes are expected to influence restoration of native species of anadromous fish, resident fish, wildlife, and even some invertebrates.

RF-6 Appendix M needs to consider the benefits to the entire ecosystem.

Response: The USFWS believes that Appendix M describes how these ecosystem changes are expected to influence restoration of native species of anadromous fish, resident fish, wildlife, and even some invertebrates. Also, actions resulting from decisions based on the FR/EIS could affect the entire ecosystem, not just the lower Snake River; however, the focus of the FWCAR is limited to the lower Snake River.

RF-7 Appendix L and M need to further ISG's hypothesis that salmon restoration hinges on more normative ecosystem conditions.

Response: Appendix M discusses ISG's normative ecosystem principles and recognizes that Alternative 4—Dam Breaching would eventually restore a near-natural riverine ecosystem to the lower Snake River. It also shows that Snake River salmon restoration would be greatly enhanced with near-natural ecosystem conditions.

RF-8 Additional testing and analysis should be done to determine potential impacts of contaminants on aquatic organisms.

Response: The USFWS agrees and has included several recommendations related to additional testing and analysis. These recommendations would be completed if Alternative 4 were the selected alternative.

RF-9 Appendix M is too narrowly focused on survival in the juvenile life stage and lacks appropriate data.

Response: The overall purpose of the Lower Snake River Juvenile Salmon Migration Feasibility Study was to evaluate alternative measures that were proposed to increase the survival of juvenile salmonids during their migration through the lower Snake River. Results from past and ongoing studies of juvenile salmonid migrations were reviewed and used by the USFWS for this FWCAR.

RF-10 Better measures of survival at different life stages are available and more appropriate.

Response: Survival estimates from all studies have been reviewed and are being applied to the quantitative analysis of juvenile survival, which will be included in the final version of Appendix M.

RF-11 Appendix M is lacking better sources of data that may provide estimates of survival under various alternatives.

Response: Survival estimates from all studies have been reviewed and are being applied to the quantitative analysis of juvenile survival which will be included in the final version of Appendix M.

RF-12 Results from other analytical tools should be used to compare implications regarding all H's for all alternatives.

Response: USFWS' final version of Appendix M will include in its quantitative analysis other analytical tools to compare implications regarding all Hs for all alternatives.

RF-13 Is just one study conducted in a short time frame sufficient to determine potential effects of an actual drawdown event?

Response: The USFWS used a variety of previous studies which encompassed years of data in preparing Appendix M, including the results of the Lower Granite and Little Goose drawdown test that occurred in March 1992. In addition, the USFWS consulted numerous agencies and individuals with expertise on these issues. The USFWS believes the information gathered is sufficient for making a determination of potential effects.

RF-14 How would increased turbidity and sedimentation caused by Alternative 4 affect downstream projects' ability to operate and accommodate fish passage?

Response: Annex C, Temporary Fish Passage Plan of Appendix D, Natural River Drawdown Engineering of the Draft FR/EIS addresses turbidity and sedimentation issues. Other sediment issues are discussed in Appendix C, Water Quality; Appendix F, Hydrology/Hydraulics and Sedimentation; and Appendix H, Fluvial Geomorphology.

RF-15 Why continue with the Maximum Transport Alternative investigations when the Interim Status Report says not to.

Response: The USFWS, in Appendix M, evaluated the Maximum Transport Alternative, as well as the other three alternatives, because they were specifically identified by the Corps in the Scope-of-Work and Interagency Agreement they had with the USFWS, pursuant to the Fish and Wildlife Coordination Act.

RF-16 Pre-Dam Resources section should include pre-dam conditions for habitat, harvesting, invertebrate communities, and natural river conditions to see how the ecosystem will change.

Response: Appendix M actually included all of the information mentioned for pre-dam conditions, except for harvest. In the time allotted, the USFWS attempted to gather and synthesize as much pertinent information as possible. To gather this information, the USFWS used studies conducted before the dams were constructed, studies conducted on other near-natural rivers in the vicinity, and information from various agencies and individuals with expertise on these issues. Unfortunately, there was relatively little information gathered on the lower Snake River ecosystem before dams were constructed. Some pre-dam harvest information is included in Appendix I, Economics (for example, page I5-4).

RF-17 There is no evidence to indicate that improvements in any Hs will be sufficient to recover all listed stocks.

Response: The USFWS agrees that evidence that shows improvement to the other Hs will lead to recovery of listed stocks, which presently may be lacking.

RF-18 Benefits for and against harvest of salmonids need to be included.

Response: The scope of the Feasibility Study was focused on alternative measures to improve the survival of juvenile salmonids migrating through the lower Snake River. Harvest has been addressed in the All-H paper.

RF-19 Speed at which zebra mussels reach the basin should be considered in any decision.

Response: At this point, estimating the speed that zebra mussels reach the lower Snake River Basin would be conjecture. However, a risk assessment completed by the Washington Department of Fish and Wildlife suggest, it is highly likely zebra mussels will invade the Columbia River Basin within 5 years. This event could have devastating effects on the effectiveness of all fish passage and handling structures if methods are not developed to control their population growth.

RF-20 What evidence is there for NMFS to suggest that poor survival rates of spring/summer chinook might be due to interactions with hatchery steelhead? Present evidence suggests otherwise. Are other factors indeed masking poor survival rates for spring/summer chinook SAR?

Response: Researchers from Canada and the United States have studied interactions between steelhead and chinook salmon for over 30 years, mostly more direct effects in hatchery environments and most recently with PIT-tag release methodology. Such studies have guided management toward separation of these stocks when collected at dams. Hatchery operations are not directly applicable to ecological interactions between the two stocks in the river. Ecologically, competitive interactions will cause populations to fluctuate and reach some equilibrium. Human manipulation can upset such a naturally derived equilibrium by unbalancing the number, physical size, and timing of release of one of the stocks, which has happened with steelhead. It is true that all the ecological implications of hatchery steelhead on wild chinook salmon have not been satisfactorily evaluated. This may never occur. There does exist ample evidence that 20 years of increasing output of hatchery steelhead can exceed the carrying capacity of one or more age class habitats. For example, it is likely that the ocean carrying capacity is not exceeded except for low flow years in the near ocean environment, but during the same year or set of years the estuarine carrying capacity may be exceeded. We welcome submission of existing or new evidence to the contrary. The recent ISAB responses to NMFS' questions on hatchery and harvest interactions

support the FR/EIS discussions. Other masking factors leading to lower SARs do exist, and it will always be difficult to measure or define all of them. Ocean dynamics is one of the most discussed influential factors science has begun to investigate.

RF-21 A feasibility analysis needs to be completed to ensure actions that lead to recovery involve tribal and State agency representatives.

Response: The FR/EIS involved a wide range of Federal, State, local, and tribal involvement. These groups and the evaluation process are described in Chapter 1 of the FR/EIS. The Corps is committed to a public involvement process as part of its decision making.

RF-22 Management recommendations and methods to reach decision-making should be included.

Response: The Fish and Wildlife Coordination Act (FWCA) provides that fish and wildlife conservation must receive equal consideration with other project features. The Corps has worked with the USFWS to prepare a FWCA Report (Appendix M). This report deals rather specifically with fish and wildlife resources and their habitats. It also contains a variety of recommendations to facilitate their management. This information can and should be used by those making decisions on this Feasibility Study. However, the USFWS does not believe it is appropriate to include actual methods to facilitate decision-making in Appendix M. This is addressed, in part, in the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a).

RF-23 There is a shift in emphasis away from hydrosystems and towards other Hs.

Response: Actually, Appendix M looks primarily at the effects of the current hydrosystem and how changes to it would impact fish and wildlife resources and their habitats. This is one of the parameters the USFWS is working with under the Scope-of-Work and Interagency Agreement between the USFWS and the Corps.

RF-24 Colonial nesting birds will increase due to newly available habitat, over the long-term, increasing predation on smolts.

Response: The USFWS believes that colonial-nesting birds that prey on salmon smolts will not increase over the long-term if the lower Snake River dams are breached. There was no documented nesting of these species along the lower Snake River before the dams were constructed and likely would be little, if any, after dam breaching. Also, with dam breaching, salmon smolts would no longer have to pass through the variety of structures along the lower Snake River which caused them to be more susceptible to avian predation.

RF-25 There is no assurance that recommendations for addressing water temperature control and TDG will be enforced since they are outside the scope of this FR/EIS. Therefore, responsibility of addressing water temperature concerns is still an issue.

Response: Of the alternatives evaluated by USFWS, Alternative 4—Dam Breaching is the best for improving both water temperatures and total dissolved gases related to operation of the Federal facilities. Removing the reservoirs would allow the water to both cool and heat faster throughout the year. Projected water temperatures with the dams removed suggest that higher temperature peaks may occur during summer months, but the duration of elevated water temperatures would be shortened. Riverine conditions in the lower Snake River would help dissipate total dissolved gas levels; therefore, improving conditions for anadromous fish and other aquatic life. However, the

USFWS agrees that it would be necessary to work with non-Federal projects in the basin to adequately address temperature and gas supersaturation issues.

RF-26 Productivity will still be capped by limitations on spawning habitat.

Response: Although spawning habitat certainly can limit productivity, and does in some areas, this is not a problem in the Snake River Basin. Existing spawning habitat in the Snake River Basin is greatly under-utilized and can support a much greater level of spawning activity than currently occurs. Furthermore, under Alternative 4—Dam Breaching, additional spawning habitat for fall chinook would be made available.

RF-27 Appendix M is a very useful non-quantitative document discussing the effects of alternative that can be easily understood by non-technical experts.

Response: Comment noted.

RF-28 The Corps should change the name of Appendix M to "Short and long-term ecological and species effects of the four lower Snake River dams and the four Alternatives: A Qualitative Analysis by USFW". The current name does not clearly indicate what information is found in this appendix and is misleading to the public.

Response: While the name you suggest would be more explicit, it does not match the naming methods used for appendices. The title of Appendix M, while not completely descriptive, adequately notes the areas covered (fish and wildlife).

RF-29 Is there probability survivorship information on spring/summer chinook and steelhead similar to that presented for fall chinook in the "Post Dam Resources" section that can be added to Appendix M? Also this should include estimates in adult returns as well relative to the numbers needed for recovery.

Response: This information was developed from various passage studies. There are similar data for steelhead and spring/summer chinook found in other passage studies. The major impact analysis for anadromous fish is based on the analysis done by NMFS presented in Appendix A, Anadromous Fish Modeling, so the Corps does not see the need to present additional data in Appendix M. Also, since Appendix A, Anadromous Fish Modeling was the primary quantitative vehicle used for this analysis, the Corps does not see the need to provide more information in Appendix M on adult returns. Because NMFS chose a variety of other methods not requiring this information, it was not needed for determination of impacts of the alternatives.

RF-30 What is the need for Appendix M, the Fish and Wildlife Coordination Act Report? The USFWS note that fish and wildlife species would be better off with drawdown but not whether the actions would recover the listed species. Their approach misses the purpose of the FR/EIS because of this approach.

Response: Federal law requires assessment of the considered project actions by the USFWS. This document is included because it meets this requirement, representing the views and analysis of the considered actions by the USFWS. It does not represent the overall views and analysis developed in the FR/EIS.

5.14 Vegetation

VEG-1 Comparisons between gains and losses of riparian and wetland habitat are not well balanced or expressed.

Response: We use Habitat Evaluation Procedure (HEP) numbers for these comparisons. Changes have been made to the FR/EIS to better express gains and losses.

VEG-2 Wetland and riparian habitat gains are more significant along several miles of Columbia River shoreline than stated.

Response: There is potential for gains due to the creation of more shoreline from sediment deposition. But the tradeoff that balances these potential gains would be the potential for land bridging and loss of island habitat.

VEG-3 Large increases in riparian habitat for Alternative 4 are unavailable with any other alternative. This large value should be accounted for and emphasized in terms of migration, spawning, feeding, etc.

Response: We cannot make any definitive decision based on a prediction of how much vegetation changes will affect these and other factors important to salmon. Even with potential vegetation changes related to Alternative 4, there still could be little shade and higher water temperatures than currently exist.

VEG-4 Wetland impacts with Alternative 4 associated with the transportation infrastructure (slope stabilization, roadbeds, embankments) and as a consequence of dam breaching are not discussed adequately, if at all.

Response: Compared to pre-dam conditions, the road infrastructure would actually be further away from the river under Alternative 4, opening a wider floodplain for wetland vegetation. Therefore, there is no negative impact. Changes have been made to the FR/EIS to address this issue.

VEG-5 No mention of economic value of restored riparian habitat uncovered by dam removal in Alternative 4, and contradictory acres of currently inundated riparian habitat given.

Response: It is difficult to place an economic value on this habitat. There is a biological gain, but not necessarily an economic gain. Any economic gains related to potential increases in hunting opportunities and fishing habitat are captured in the recreation analysis that feeds the economic analysis for the FR/EIS. The Corps is confident that any contradictions in acres have been reviewed and revised, as appropriate.

VEG-6 There is no mention of economic gains/losses and subsequent costly habitat actions for partial dam removal.

Response: Changes have been made to the Vegetation section of the FR/EIS to address this issue. Also, costs for these restoration and revegetation costs are rolled into the Economic Analysis.

VEG-7 A Noxious Weed Plan is needed with a schedule for implementation and a monitoring plan is included.

Response: A plan and schedule would be developed if Alternative 4 were the selected alternative.

VEG-8 Additional consideration to invasive noxious weeds in Alternative 4 needs to be given.

Response: See response to comment VEG-7.

VEG-9 The possibility of cheatgrass establishment prior to the establishment of desired native species is likely and needs mention.

Response: Cheatgrass was a common type of vegetation prior to dam construction, and we have considered this possibility. A mitigation plan, including measures to prevent cheatgrass from establishing, would be prepared if Alternative 4 were the selected alternative.

VEG-10 Alternative 4 is lacking in discussion regarding reverting to a natural river bed condition. What parts along the lower Snake River will be reverting to this condition?

Response: See Appendix F, Hydrology and Appendix H, Fluvial Geomorphology, for maps showing predicted depths. In terms of predicting which areas are going to develop vegetation, that is difficult to predict with any accuracy because the river system is constantly changing.

VEG-11 McNary, Strawberry Island, and other National Wildlife Refuges could have short-term damage from siltation following breaching.

Response: There is not likely to be a threat from bridging the islands. Actually, there would likely be a benefit because the islands would accrete soils that are currently being eroded. Downstream there is a potential for bridging, which could affect waterfowl and colonial bird nesting due to increased access for predators. Overall, we would actually gain islands and end up with more habitat.

VEG-12 What are the short-term losses of wildlife?

Response: As discussed in the FR/EIS, there could be short-term losses due to exposed mudflats, stranding in mud, and the combination of less vegetative cover along the river where the animals go to drink water. However, these short-term losses are not likely to be significant for any population.

VEG-13 Wetlands and riparian habitat could be damaged from a surge in siltation and increased annual siltation. What are these adverse impacts, both long and short-term?

Response: There really is only a benefit because the silt would result in more riparian areas.

5.15 Wildlife

5.15.1 FR/EIS

WIL-1 Sediment behind the dams contain substantial insecticide residue that will affect the food chain, including threatened and endangered species.

Response: There is very little insecticide residue. There was a historical use of DDT upstream of Hells Canyon, but none in the area of the project. While there have been measures of these chemicals in sediments, none of them have been found to be at toxic levels. There is some potential for short-term minor effects on bottom-dwellers, but there would likely be only a negligible effect on any species. In the event of a drawdown, the Corps would monitor water quality for aquatic species, and also drinking water for other species. Refer to the 1992 Drawdown test for more information on sediment testing and monitoring. Resuspension of sediments will be monitored for

contaminants. Appropriate measures will be taken to ensure compliance with CWA, ESA, and other applicable laws and regulations.

WIL-2 Impacts of this action will have to be determined and discussed.

Response: The discussion of this issue has been expanded in the FR/EIS.

WIL-3 Release of these residues a violation of the Clean Water Act.

Response: Before implementation of an action in an area designated for possible disturbance, scientific and situational data concerning sediment would be evaluated for compliance with not only the Clean Water Act but ESA, and other applicable laws.

WIL-4 There is a significant increase in the available land base with Alternative 4, so opportunities for hunting, birdwatching, and wildlife viewing should also increase significantly. These increased opportunities should be discussed as benefits of Alternative 4.

Response: These activities benefit people, not wildlife. They are discussed in the recreation sections of the FR/EIS, and the economic benefits are captured in the recreation analysis.

WIL-5 Validation of the claim that Alternative 4 has a positive effect on wildlife in general needs to include costs, possible outcomes, etc., assuming riparian zone is managed for wildlife.

Response: The focus in the wildlife section is on biological effects of the alternatives, not economic effects. Economic effects are included in the recreation and economics sections and analyses.

WIL-6 What effects are there on raptors from the various alternatives?

Response: There would be no change in habitat under Alternatives 1 through 3, so conditions for raptors would be the same as they are now. Under Alternative 4, there is potential for increased raptor activity because of exposed flats. There would be no cover for animals drinking from the river. There is potential for long-term increases in populations of fish-eating raptors because there would be better perch sites in the long term. There could be some negative effects related to perch sites at first. The discussion of this issue has been expanded in the FR/EIS.

WIL-7 HMUs currently in place don't need to be maintained after dam removal. Free-flowing river would make maintenance of artificial habitat blocks obsolete.

Response: We still have mitigation obligations under the Lower Snake River Compensation Plan. Existing HMUs need to be maintained to preserve current habitat because it will take a while for beneficial habitat changes to occur. Initially, we don't want to lose upland habitat. A long-term new mitigation plan would determine where shifts would need to be made 50 years down the line.

WIL-8 The FR/EIS applies a standard of "anticipated authorization" but does not do so in assessing wildlife habitat mitigation.

Response: It is unclear what kind of authorization the Corps would have under Alternative 4 regarding wildlife habitat mitigation. The Corps' recommended plan (preferred alternative) assumes continued wildlife mitigation.

5.15.2 Appendix L, Lower Snake River Mitigation, History, and Status

The General comment was that current mitigation as outlined is not satisfactory.

WIL-9 Rather than maintaining current conditions, as suggested, habitat still need to mature, diversify, and non-native vegetation needs to be removed.

Response: Current conditions include these management goals.

WIL-10 Established mitigation goals are currently unachievable. The current program needs to be reviewed and updated.

Response: Current management goals were agreed to in 1991 (Christiansen, Ross, Sandler, Blair). They were initially laid out in a special report to Congress in 1983. BPA may take the lead on all Columbia River mitigation, so they would also need to be petitioned about any changes. The program is scheduled for evaluation on a 10-year cycle, and is currently being reassessed. A report on potential future changes to the program will be produced at the end of the assessment period. Current compensation goals are not likely to be achieved with non-breach alternatives.

WIL-11 Current assumptions and assessments will need to be revisited.

Response: The State has given us full credit on our lower Snake River plantings. Whatever we do now is above and beyond what was requested. California quails are the only exception, and there is consensus that those numbers were unreasonable.

WIL-12 The hatchery program will need to be altered to respond to different productivity goals for Alternative 4.

Response: The Corps Lower Snake River Comp Plan was based on what hatcheries could produce. The USFWS wants to base production on desired returns (ratio). If Alternative 4 is selected, the Comp Plan will be reevaluated and necessary modifications will be considered at that time.

WIL-13 Funding for the Dworshak National Fish Hatchery is for Dworshak mitigation, not the Lower Snake River Project.

Response: The Dworshak National Fish Hatchery was expanded for Lower Snake River compensation. Appendix L, Lower Snake River Mitigation, History, and Status, has been revised to clarify the role of the funding for the Dworshak National Fish Hatchery.

5.16 Cultural Resources

5.16.1 FR/EIS

CR-1 Section 4.7 of the DEIS should incorporate cultural resource information from reports developed by cultural resource protection staff of CTUIR and the Nez Perce Tribes. These reports, presented as appendices to Meyer Resources (1999), indicate that the estimate of 375 archaeological sites in the four reservoir area is likely an underestimate if cultural properties are also included in this total. The revised section should address present day circumstances of the tribes based on information provided in the main text of Meyer Resources (1999), as well as the appendices.

Response: Cultural properties are not included in the total presented in Section 4.7 of the FR/EIS. The Corps is currently working with the tribes to identify traditional cultural properties. Present-day circumstances of the tribes are addressed in Sections 4.8 and 5.7 of the FR/EIS, as well as Chapter 5 of Appendix I, Economics. Further, the report prepared by Meyer Resources on behalf of the Columbia River Inter-Tribal Fish Commission (CRITFC) entitled *Tribal Circumstances and Impacts of the Lower Snake River Projects on the Nez Perce, Yakama, Umatilla, Warm Springs and*

Shoshone Bannock Tribes is available on the Corps website at http://www.nww.usace.army.mil (Meyer Resources, 1999).

CR-2 Section 4.7 provides some narrative of general interest to understanding how cultural resources are defined and treated but provides virtually no specific and useful information concerning the present circumstances of the five study tribes as they relate to the four study reservoirs and the diminished opportunity for harvest of salmon.

Response: As noted in response to comment CR-1, present-day circumstances of the tribes are addressed in Sections 4.8 and 5.7 of the FR/EIS, as well as Chapter 5 of Appendix I, Economics. Further, the report prepared by Meyer Resources on behalf of the Columbia River Inter-Tribal Fish Commission (CRITFC) entitled *Tribal Circumstances and Impacts of the Lower Snake River Project on the Nez Perce, Yakama, Umatilla, Warm Springs, and Shoshone Bannock Tribes* is available on the Corps website at http://www.nww.usace.army.mil (Meyer Resources, 1999).

CR-3 Section 5.7 of the FR/EIS does not adequately address the benefits from renewed access to recovered cultural properties under Alternative 4. Tribal cultural protection investigators recognized positive impacts from draining the reservoirs through restored access to traditional cultural properties and also the need to develop effective cultural resource protection plans to protect those resources. It was concluded by the tribes and their experts that, on balance, the benefits from renewed access to recovered cultural properties would substantially outweigh associated management costs under dam breaching. Section 5.6 of the FR/EIS leaves exactly the opposite impression – spending virtually all its space discussing negatives and costs – while mentioning positive benefits only in passing.

Response: Section 5.6 of the FR/EIS discusses the potential impacts that the four proposed alternatives would have on historic and cultural properties primarily from a resource management perspective. Potential cultural resource benefits associated with Alternative 4—Dam Breaching are noted on Page 5.6-6 of the FR/EIS. Potential benefits include those associated with renewed access for scientific research, direct cultural resource management (e.g., site evaluations, National Register of Historic Places [NRHP] nominations), and traditional cultural practices.

5.16.2 Appendix N, Cultural Resources

CR-4 Although discussions on requirements pertaining to cultural resources were identified extensively throughout the Draft FR/EIS, no quantifiable assessments can be made due to the lack of cultural resource surveys and tribal input to Alternative 4—Dam Breaching. Specific concerns include the following.

- It is unclear at this time how the Draft FR/EIS will comply with Section 106 of the National Historic Preservation Act.

Response: Consultation with SHPO will be initiated following the selection of a preferred alternative. The successful conclusion of this process will be shown by inclusion of a concurrence letter from the SHPO as an attachment to Appendix Q.

- There is no discussion of coordination with the State Historic Preservation Officer (SHPO), no new in-depth cultural resource studies for the project, no testing measures, and limited discussion of parties views.

Response: New comprehensive cultural resource surveys for this project have been completed at the Ice Harbor, Lower Monumental, Little Goose, and Lower Granite reservoirs since publication of the Draft FR/EIS. Site evaluations were completed at Ice Harbor in 2000 and are scheduled for Lower Monumental in 2001. A final cultural resources management plan will be developed for the lower Snake River projects. This plan will include a site monitoring plan and law enforcement coordination at all four projects (see Chapter 4 of Appendix N, Cultural Resources).

- There are no properties identified that National Register criteria and determination of effect can be applied to. Determinations of National Register-eligible properties are essential for determining the impacts that the project will have on historic properties.

Response: The NRHP process is discussed on pages N1-3 and N4-1 of Appendix N, Cultural Resources of the Draft FR/EIS. The Corps is currently evaluating inventoried cultural resource sites at the four reservoirs through Determinations of Eligibility for the NRHP.

- Has this document been submitted to the Advisory Council for Historic Preservation?

Response: A copy of the Draft FR/EIS was submitted to the Advisory Council for Historic Preservation, as noted on page 13-1 of the Draft FR/EIS.

- Adverse effects appear unavoidable. Extensive planning, scheduling and costs will be needed for mitigation once the effects have been determined.

Response: Cultural resources management would continue as it currently exists for the non-breach alternatives. For Alternative 4—Dam Breaching, a Cultural Resources Management Plan with aggressive resource treatments and preservation strategies would need to be developed and implemented. This plan would address newly exposed lands and resources as a special circumstance.

CR-5 Dam breaching would result in increased traffic on existing roads and may result in the need for widening and/or new roadways.

- Any disturbance of previously undisturbed soils would also require surveys, potential testing, and determinations of eligibility and effect.

Response: Potential cultural resource impacts that are determined to be the responsibility of the Federal government would be addressed in accordance with all applicable laws.

- Erosion and/or slope stabilization have the potential to destroy known archaeological sites, as well as expose new ones. What measures would be taken to prevent this? Would these measures be acceptable to the affected tribes?

Response: Erosion and slope stabilization measures that would be directly associated with Alternative 4—Dam Breaching are discussed in Appendix D, Natural River Drawdown Engineering.

- Are there any historic structures within the project area (buildings, bridges, landmarks, etc.) that are eligible and/or listed in the National Register?

Response: Cultural resource properties within the four reservoirs of the lower Snake River are discussed in Chapter 4 of the FR/EIS and in Appendix N, Cultural Resources. Additional cultural resource surveys and site evaluations are presently being conducted, as discussed in response to comment CR-4. There are no NRHP- or NRHP-eligible structures on the project lands owned by the Corps.

CR-6 Revised regulations of Section 106, effective June 17, 1999, now require tribal consultation in the early stages of project planning. Tribal and SHPO concurrence on the Areas of Potential Effect (both off and on tribal lands) is also required. The importance of tribal input is thoroughly discussed, but there is no documentation of tribal opinions and exchange of ideas regarding the project. Most of the focus was understandably on the salmon issues pertaining to the tribes. However, other cultural resource issues, such as artifacts, sites, districts, and traditional cultural sites, will need to be identified and assessed. Visual, audible, alterations to property, and atmospheric elements will also need to be assessed. The document does not reflect meaningful consultation to address concerns of all the directly and indirectly affected tribes.

Response: The importance of tribal input into the Section 106 process is discussed on pages Q7-1 to Q7-2 of Appendix Q, Tribal Consultation. The tribes will be directly involved in the Section 106 process when it is initiated following the selection of a preferred alternative.

CR-7 Appendix Q of the Draft FR/EIS states that a copy of the Cultural Resources Appendix was distributed to the "five participating tribes" in May 1999 and that no response was received through September 30, 1999. This statement is misleading because:

- Coordination should have been through the DREW Tribal Effects Workgroup. The DREW Tribal Effects Workgroup passed all their draft material to the Corps cultural resource specialists at Walla Walla. The Corps, in contrast, worked on Appendix N independently and did not respond to the DREW Tribal Effects Workgroup's request for a copy of the document in July 1999.
- At a "government-to-government" level, to the best of our knowledge, the Corps failed to formally convey Appendix N to any tribal government for review. Instead the Corps states that they "distributed" Appendix N to a group of unidentified persons at a meeting in Walla Walla held for a separate purpose.

Response: The Corps mailed copies of a draft version of Appendix N to the designated representatives of the cultural resources programs for the Colville, Nez Perce, Umatilla, Yakama tribes and also to the Wanapum in March 1999. The intent was to obtain a technical review of the document and allow tribes to participate in an early review process. The District customarily requests Section 106 reviews from tribes under the National Historic Preservation Act in this same manner. Although tribal programs leaders are not tribal leaders, they often convey tribal interests to Federal government representatives at technical levels. When the DREW Tribal Effects Workgroup was active it neither represented tribal governments nor their cultural resources programs.

The Walla Walla District participates in monthly meetings with tribal cultural programs through the Payos Kuus Cuukwe co-operating group (Corps, BPA and participating affected tribes are members). In August of 1999 at such a meeting, attending tribal cultural program members were again invited to provide comments on the May draft document. As noted in response to comment CR-1, the Corps is currently working with the tribes to identify traditional cultural properties in the project area. The Corps understands that consultation with affected tribes is an ongoing process. Further, as noted in response to comment CR-6, the tribes will be directly involved in the Section 106 process when it is initiated following the selection of a preferred alternative.

CR-8 The tribes provided substantial cultural resources information to the Corps in Meyer Resources (1999), which would have corrected errors in the Corps' Draft FR/EIS. To date, this information has not been incorporated into Appendix N.

Response: As noted in responses to comments CR-4 and CR-1, respectively, the Corps is currently conducting new cultural resource surveys and evaluations for this project, as well as working with the

tribes to identify traditional cultural properties. (Appendix N, Cultural Resources has been revised to incorporate these new findings.) Further, as noted in response to comment CR-1, the report prepared by Meyer Resources (1999) on behalf of CRITFC entitled *Tribal Circumstances and Impacts of the Lower Snake River Projects on the Nez Perce, Yakama, Umatilla, Warm Springs and Shoshone Bannock Tribes* is available on the Corps website at http://www.nww.usace.army.mil/lsr.

5.17 Native Americans

5.17.1 FR/EIS

NAI-1 The Draft FR/EIS fails to accurately disclose and consider information in Meyer Resources (1999) that is crucial to understanding the impacts of the lower Snake River dams on Indian tribes, how these impacts would continue if the dams are retained, and how some of these impacts could be addressed if the dams were breached.

Response: The Draft FR/EIS incorporates information from Meyer Resources (1999) in Section 5.7 of the main Draft FR/EIS and sections 3.6 and 5 of Appendix I, Economics. Further, the full text of the report prepared by Meyer Resources (1999) on behalf of CRITFC is available on the Corps website at http://www.nww.usace.army.mil/lsr.

NAI-2 The Draft FR/EIS misidentifies Meyer Resources (1999) as the Tribal Circumstances and Perspectives report and replaces objective wording used in this report by characterizing information taken from this report as tribal "views," "perspectives," "feelings," "beliefs," as well as using the phrase "according to the tribes." While this might be appropriate for some of the tribal conclusions in the report, it should not be applied to information gathered and synthesized from numerous independent sources, such as the US Bureau of the Census, the US Indian Health Service, PATH, and so on.

Response: The report prepared by Meyer Resources (1999) on behalf of CRITFC is entitled *Tribal Circumstances and Impacts of the Lower Snake River Projects on the Nez Perce, Yakama, Umatilla, Warm Springs and Shoshone Bannock Tribes*. This report provides a tribal perspective on the proposed alternatives, as well as discussing present tribal circumstances from the perspective of the tribes. References to this report as the Tribal Circumstances and Impacts Report in the Draft FR/EIS will be changed to the Tribal Circumstances Report. The full reference will also be added to the references section (Chapter 14) of Appendix I, Economics. Information on the web location of this report will be included with this reference, as well as added to the reference provided in the Literature Cited section of the main FR/EIS document. Places where factual information is incorrectly characterized in the manner described in the comment will be corrected.

NAI-3 How does the tribal analysis, which was obviously not prepared by the Corps, fit in with the rest of the analysis presented in the Draft FR/EIS?

Response: The tribal analysis was conducted by Meyer Resources (1999) on behalf of CRITFC and provides a tribal perspective on the proposed alternatives, as well as discussing present tribal circumstances from the perspective of the tribes. The revised tribal sections presented in the Final FR/EIS include additional information developed by the Corps.

NAI-4 The Corps should work with the tribes to place a dollar value on the effects of restoring the tribal fishery. Not quantifying these impacts in dollar terms has the effect of assigning them a value of zero in the NED analysis.

Response: As discussed in Section 3.6 of Appendix I, Economics, the tribes feel that it is not possible to assign dollar values to tribal ceremonial and subsistence harvest or to the relationship between salmon and tribal culture, spiritually, material well-being, and health. While revenue from commercial sales of salmon is an important source of tribal income, it does not represent the greatest part of the value that tribal peoples associate with salmon. Dollar revenue, as a result, is considered by the tribes to be a severely limited indicator of tribal value that can provide distorted impressions of the full impact on the tribes. The report prepared by Meyer Resources on behalf of CRITFC, therefore, assesses the effects of restoring the tribal fishery from the perspective of the tribes without quantifying these effects in dollar terms. Commercial tribal catch is, however, assigned a dollar value in the Anadromous Fish analysis presented in Section 3.5 of Appendix I, Economics. This value is included in the Commercial Fishing category of the NED analysis. Tribal commercial, ceremonial, and subsistence harvest totals are included in this value. Ceremonial and subsistence harvests are assigned a food value only. They are not assigned an additional intrinsic dollar value. As noted in the following comment, CRITFC does not agree with the value assigned to this catch.

As discussed in Chapter 1 of Appendix I, Economics, the structure of the economic and social analysis developed for the Draft FR/EIS is based upon the Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies developed by the U.S. Water Resources Council (WRC) (WRC, 1983). These guidelines recommend that the evaluation and display of the effects of the proposed alternatives be organized into four accounts: national economic development (NED), environmental quality (EQ), regional economic development (RED), and other social effects (OSE). Potential tribal impacts are addressed under the EQ account. Tribal benefits and costs associated with the alternatives are, therefore, not only included in the commercial fishing dollar estimates but are also addressed as a separate category in the summary of effects and executive summary sections of Appendix I, Economics. Regional economic development effects, social effects, and passive use values are also addressed as separate categories and are not incorporated in the NED analysis.

NAI-5 The dollar value placed on tribal catch by non-tribal technical experts (page I3-144) disregards tribal technical advice and it is, therefore, inaccurate to represent these estimates as "findings of the Anadromous Fish Economic Analysis prepared by the DREW Anadromous Fish Workgroup" (I3-119). Rather, they represent subsequent calculation by the Corps and non-tribal consultants – not agreed with by the tribes and their technical experts.

Response: The DREW Anadromous Fish Workgroup prepared the analysis presented in Section 3.5 of Appendix I, Economics. The full report that section 3.5 is based upon is available on the Corps website at http://www.nww.usace.army.mil/lsr. In general, it should be noted that the technical studies developed for this study were prepared under the direction of DREW, with specific workgroups overseeing and providing technical support for each area of analysis. Full consensus between DREW workgroup members was not, however, possible in all cases.

NAI-6 The Draft FR/EIS does not explain how each alternative would fulfill the treaty rights of the Columbia River Basin's American Indian tribes. The tribes believe that alternatives 1, 2, and 3 discriminate against the tribes and violate their treaty rights by requiring the tribes to sacrifice their treaty reserved rights so that non-Indians can continue to enjoy subsidized transportation and

electricity. Dam breaching is necessary to rebuild and restore the salmon runs and rebuild their habitat leading to sustainable, harvestable salmon populations consistent with tribal treaty rights and the Federal government's trust responsibility to the tribes.

Response: The Draft FR/EIS states that the report prepared by Meyer Resources (1999) on behalf of CRITFC concludes that only Alternative 4—Dam Breaching would redirect river actions toward significant improvement of the cultural and material circumstances of the five study tribes (see page 5.7-4 of the main Draft FR/EIS). The text on page 5.7-4 also notes that the Meyer Resources report concludes that the other alternatives under consideration are unlikely to meet tribal salmon recovery objectives within a reasonable timeframe. The Corps perspective presented on page 5.13-30 of the Draft FR/EIS is that any alternative that brings more salmon back to the lower Snake River would benefit the tribes. Federal treaty and trust obligations are addressed in Appendix Q, Tribal Consultation and Coordination.

NAI-7 Would breaching the dams have only detrimental effects on American Indians? Can we assume that American Indians receive no benefits from the power, river transportation, and reservoir recreation provided by the current river system?

Response: The regional and social analyses summarized in Chapters 6 and 7 of Appendix I, Economics, and Sections 4.14 and 5.13 of the main Draft FR/EIS, address the economic and social impacts of the proposed alternatives on the population of the region. American Indians are included as part of this population. Both these analyses address power, transportation, and recreation-related impacts, among others. In addition, the Corps funded a study prepared by Meyer Resources on behalf of CRITFC that evaluated present tribal circumstances, as well as the likely impacts of the proposed alternatives, from a tribal perspective.

NAI-8 All navigable waters of the United States are subject to a Federal navigational servitude, which is superior to rights possessed by the States, Indian nations, or private parties.

Response: The Corps is very familiar with navigational servitude and how it relates to its responsibilities on the lower Snake River. The FR/EIS has discussed navigation and the impacts associated with each alternative.

NAI-9 The Draft FR/EIS fails to explain how the tribes would be compensated for the Federal government's failure to meet its treaty responsibilities. It also fails to account for the legal costs that might be involved in resolving lawsuits filed by the Columbia River Basin tribes.

Response: The Corps has every intention of continuing to meet its treaty responsibilities. Potential litigation costs are impossible to predict and are not included.

NAI-10 Everybody is forgetting that the Umatilla and Warm Springs tribes were paid $4,047,800 and $4,198,000, respectively, by then Governor McKay and the Corps for the loss of their 1855 Federal fishing rights at Celilo Falls and on the Columbia River.

Response: The settlement referenced relates to the effects of The Dalles Dam and its impoundment of a stretch of the Columbia River on the treaty reserved fishing rights held by four affected tribes. The great Celilo fishing ground as well as other fishing grounds/stations were at issue. When the lower Snake River dams were built, treaty-reserved rights to fishing stations and grounds were not extinguished; however, no treaty-based in lieu fishing stations were established. The lands for the Lower Snake River Project were purchased from individual landowners. This did not have the

effect of abrogating tribes' off-reservation fishing rights. Tribes' treaty rights of access to usual and accustomed fishing places continue.

NAI-11 There is likely a correlation between the tribes' success in establishing their fishing rights and the decline of anadromous fish in the Columbia and Snake Rivers. The Federal government should regulate tribal fishing.

Response: Federal regulation of tribal fishing is the responsibility of the NMFS and beyond the scope of this study.

NAI-12 Section 4.8, Native Americans provides insufficient evidence concerning the specifics of present tribal circumstances, and the linkages of these circumstances to the four dams and the actions being considered.

Response: Section 4.8, as noted in the full comment, provides summary information on the 14 Native American Indian tribes and bands whose interests and/or rights may be affected by the proposed alternatives. Sections 4.8.2 through 4.8.4 address tribal resources, current tribal circumstances, and government-to-government communications. These sections also refer the interested reader to other parts of the document and the report prepared by Meyer Resources (1999) for more detailed information.

NAI-13 Section 4.8.2 (lines 4-7) incorrectly explains why the five study tribes were selected. These tribes were selected because it was felt that they would experience the largest potential impacts from the proposed actions.

Response: Comment noted.

NAI-14 The suggestion on page 4.8-2 (lines 28-29) that tribal peoples have become "acculturated and (native) communities adapted to local American lifestyle" is unsupported by any of the evidence made available in Meyer Resources (1999) and conflicts with it. This assertion should be substantiated or deleted.

Response: A careful edit of the sentence/paragraph will be made in consideration of this comment. It is well recognized that tribes have always maintained as an integral part of tribal life the importance of historic treaty reserved rights, native religions, traditional life ways, values, and beliefs. Tribes have a complex socio-economic circumstance in which tribal fishing rights remain a core interest and concern. The ability to meaningfully exercise these treaty rights has direct implications for their communities' well being. Tribes and their citizenry have changed since 1855 in response to neighboring social and cultural environments. Affected tribes are living in modern tribal communities, which require considerations of individual socio-economic circumstances. Tribes are expected to continue to adapt in ways consistent with their unique cultural identities.

NAI-15 The Draft FR/EIS provides little substantial information with respect to tribal Treaty rights and affected fisheries. This should be remedied by incorporating appropriate sections of Meyer Resources, 1999. The Draft FR/EIS specifically excludes the following from Meyer Resources (1999):

- Losses of tribal fisheries to the present day (specifically Table 40 in Meyer Resources, 1999).
- Extensive information on the importance of affected salmon resources and tribal lands for present-day tribal culture, material well-being and health, despite linkages between tribal health and salmon abundance and fishing opportunities reported by tribal health experts (Meyer Resources, 1999; 204-6).

Response: Additional information regarding these issues is provided in Appendix Q, Tribal Consultation and Coordination, Chapters 3 through 5. Copies of the text from the applicable Tribal treaties have been added as a new attachment to Appendix Q, Tribal Consultation and Coordination.

1. Information on the losses of tribal harvests compiled from Table 40 of the Meyer Resources report is included in Table 5-2 on page I5-4 of Appendix I, Economics. Meyer Resources, 1999 is referenced as the source of the information presented in this table.
2. Pages 4.8-9 and 4.8-10 of the Draft FR/EIS main text refer interested readers to Meyer Resources, 1999 for additional information on these issues.

NAI-16 The Draft FR/EIS conclusion that "Federal agencies have implemented actions specifically designed to benefit salmon" and that "(t)his focus is consistent with treaty and trust responsibilities" (page 4.8-11) could be interpreted as implying that current Corps actions meet treaty and trust responsibilities. That inference is the exact opposite of the conclusion of Meyer Resources (1999) which explicitly states that the "status quo," and actions offering little change from the status quo, do not meet Federal treaty and trust responsibilities (Meyer Resources, 1999; 235).

Response: The Corps believes it is meeting its treaty and trust responsibilities. Comment noted.

NAI-17 Section 4.1.2 disposes of the tribes in two generalized lines that impart no specific information useful to the analysis. This should be expanded by referencing Meyer Resources, 1999. This passage also begins the practice of grouping Native Americans and other "minorities" in the same paragraph and dealing with them sequentially. This acts to discount the treaty and trust obligations of the Federal government to the tribes and should be corrected.

Response: Section 4.1.2 provides a summary overview of the human environment of the Snake River Basin. Section 4.1.1 provides an overview of the physical environment. Section 4.1.2 is intended to provide a generalized introduction to the study region. Native Americans are discussed in more detail in sections 4.8 and 5.7. The reference to Native Americans is appropriately located in the summary paragraph that addresses regional population growth and cultural diversity.

Native American Indian issues are specifically addressed in sections 4.8 and 5.7 of the main Draft FR/EIS and sections 3.6 and 5 of Appendix I, Economics. These sections are dedicated to Native American Indian issues and do not address "other 'minorities'." Tribal consultation and coordination for this Feasibility Study is discussed in Appendix Q, Tribal Consultation and Coordination of the Draft FR/EIS.

NAI-18 Despite extensive information developed in Meyer Resources, no substantive information is included in Section 5.7 of the Draft FR/EIS except for PATH-based fish harvest impact estimates. This section excludes the following important information provided in Meyer Resources, 1999:

- The main conclusion of the Meyer Resources report that dam breaching would represent an effective step toward meeting Federal treaty and trust responsibilities, while the non-breaching alternatives would not.

Response: Section 5.7 of the FR/EIS presents the main conclusion of the Meyer Resources report that only Alternative 4 - Dam Breaching would redirect river actions toward significant improvement of the cultural and material circumstances of the five study tribes (page 5.7-4). The text on this page also notes that the Meyer Resources report concludes that the other alternatives under consideration are unlikely to meet tribal salmon recovery objectives within a reasonable timeframe.

- The tribal environmental justice impact analysis that followed EPA environmental justice guidelines and concluded that dam breaching would provide significant relief from environmental injustice for the tribes, while the non-breaching alternatives would perpetuate environmental injustice.

Response: The tribal environmental justice impact analysis is presented in Section 5.13.3. A sentence noting the location of this analysis will be added to Section 5.7 in the Final FR/EIS.

- The Draft FR/EIS incorrectly states that there would be no impact on tribal land use (pages 5.7-4 and 5.7-5) ignoring ongoing inundation of tribal ceded lands by the four reservoirs under the non-breaching alternatives (see Meyer Resources, 1999).

Response: The FR/EIS states that Alternatives 1 through 3 would "continue current land management practices and would not impact the current land use of the tribes" (emphasis added). The intent of this sentence is to convey that current tribal land use activities would not be affected by these alternatives. The word "impact" has been replaced with "change" to help clarify this point in the text.

NAI-19 The statement in Section 5.13 that "..the Corps concludes that any alternative that brings more salmon back to the Snake River would benefit the tribes" (page 5.13-30) is a truism but says nothing about the magnitude of the expected recovery – the key issue for presently destitute tribal peoples.

Response: This statement represents the Corps' position, which, as noted in the full statement on page 5.13-30, contrasts with the findings of the environmental justice analysis prepared by Meyer Resources. The findings presented in Meyer Resources (1999) are summarized in the preceding section. In addition, information on the expected magnitude of the recovery taken from Meyer Resources (1999) is presented in Tables 5.7-1 and 5.7-2 of the Draft FR/EIS. The same tables, which provide estimates of tribal harvest of wild and hatchery Snake River stocks in pounds by species for Alternatives 1, 2, and 4, are also included as Tables 5-7 and 5-8 in Appendix I, Economics. Additional analysis was conducted by the Corps and added to Section 3.6 and Chapter 5 of Appendix I, Economics.

NAI-20 Section 9.13.5, Tribal Treaties provides the reader with no effective information respecting the important relationship between tribal Treaties and this project.

Response: Additional information regarding the relationship between tribal treaties and the Lower Snake River Juvenile Salmon Migration Feasibility Study is included in Appendix Q, Tribal Consultation and Coordination.

NAI-21 The Corps entirely excluded the treatment of tribal environmental justice issues presented in Meyer Resources (1999) from the Tribal Circumstances section in Appendix I, Economics, despite the fact that this analysis following EPA Environmental Justice guidelines was a central element of this report.

- This exclusion is inconsistent with economic principles because the measurement of benefits and costs (however measured) is a standard field for economic analysis, and that is the central concern of the EPA Environmental Justice guidelines.
- The location of the environmental justice discussion should be identified in this section.
- Environmental justice concerns are inappropriately buried in a few indexed pages 475 pages deep in the main document and appear nowhere else in the FR/EIS main report or appendices.

Response: The treatment of environmental justice issues presented in Meyer Resources (1999) is summarized in Section 5.14.3 of the FR/EIS. This section entitled Effects to Low Income and/or Minority Populations in the FR/EIS addresses potential environmental justice effects associated with the proposed alternatives following Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. This section addresses potential environmental justice effects to Native Americans and Irrigated Agriculture Farm Workers. This section is appropriately located in the Social Resources section of the report, which addresses the impacts of the proposed alternatives upon regional employment, population, and local communities, as well as examining potential environmental justice impacts. Section 5.14.3 will be retitled Environmental Justice in the Final FR/EIS and this section will be cross-referenced in Chapter 5, Tribal Circumstances of Appendix I, Economics, as well as in Section 5.8, Native Americans of the FR/EIS.

NAI-22 The FR/EIS inaccurately characterizes all information on tribal circumstances and impacts as "qualitative" in a number of places (e.g., ES-13, I-3, I3-146, I5-1). The analysis presented in Meyer Resources (1999) relies on a substantial amount of quantitative information, as well as qualitative information.

Response: The term qualitative is primarily used to distinguish this analysis from the other analyses presented in the appendix that quantify potential impacts in dollar terms in accordance with the NED framework. While the analysis does not attempt to quantify potential tribal impacts in dollar terms, it does, as noted in the comment, draw upon both quantitative and qualitative information. References in the text have been revised accordingly.

NAI-23 Corps editors have used the footnotes associated with their Table 5-2 (page I5-4) to express their opinions. These changes conflict with Meyer Resources, 1999, and are not agreed to be CRITFC. Indicating that Meyer Resources is the source of these footnotes is professional misrepresentation. Corps editors have also changed some numbers in the table.

Response: The information summarized in the footnotes, with the exception of footnote 1, which simply notes that "(t)hese data are presented in pounds of fish which are not easily compared to other fish data presented in this FR/EIS in terms of numbers of fish," is taken from Meyer Resources (1999) and is believed to be factual. This information was compiled from a number of different sections of the Meyer Resources report to explain the numbers in the table. Citing Meyer Resources (1999) as the source of this information seems appropriate. However, the source will be changed from "Meyer Resources, 1999a" to "Compiled from Meyer Resources, 1999a." In addition, the table will be reduced from seven to five rows to ensure that there is no confusion regarding the numbers.

NAI-24 Corps editors have reduced 29 summary pages and extensive supporting discussion concerning the effects of Lower Snake River Project alternatives on the tribes presented in Meyer Resources, 1999, to six pages in the main text of the Draft FR/EIS (pages I5-8 to I5-13). Virtually all of the following information has been excluded from the Draft FR.EIS, with virtually all of the space in Section 5.6 of Appendix I, Economics talking only about fish numbers, leaving the independent reviewer with little information and no sustaining facts to support the conclusions summarized in Table 5-9, page I5-13 of Appendix I, Economics.

- Meyer Resources provided estimated losses in tribal harvest associated with the lower Snake River dams, identified the present extent of tribal harvest above and below the lower Snake River dams, and

evaluated impacts and cumulative impacts of alternative actions being considered by the Corps (Meyer Resources, 1999; Table 43).

- Meyer Resources' summary assessment of the ability of project alternatives to meet Federal treaty and trust responsibilities and achievement of environmental justice (Meyer Resources, 1999; pages 230-235).

Response: The Draft FR/EIS draws heavily upon information presented in Meyer Resources (1999) to address the potential impacts of the proposed alternatives from the perspective of the five study tribes. Further, the reader is referred to the report prepared by Meyer Resources on behalf of CRITFC, which is readily available on the Corps website. Additional analysis was conducted by the Corps and added to Sections 3.6 and 5 of Appendix I, Economics.

NAI-25 CRITFC argues that the people preparing the Draft FR/EIS have largely disregarded, marginalized, and in some cases altered the extensive body of evidence presented in the Meyer Resources report prepared on behalf of CRITFC and funded by the Corps, in apparent deference to the Corps' own beliefs regarding tribal circumstances and impacts. Meyer Resources, 1999, states that in almost all prior processes concerning Columbia-Snake River System dams, tribal concerns and impacts on the tribes have been ignored or marginalized. If maginalization occurs in the current process, tribal peoples will continue to suffer and be disempowered, regardless of existing Treaty protections, and environmental injustice will be exacerbated. The Draft FR/EIS can be expected to have precisely this effect.

Response: The Corps respectfully disagrees that tribal information has been marginalized or disregarded. The Corps has cited information from various sources in the Final FR/EIS, including references to the Meyer Resources report (Meyer Resources, 1999). The Final FR/EIS has been revised to clarify the references and, as in the Draft FR/EIS, made the Meyer Resources report (unchanged) available on the study website. The FR/EIS analyzes the impacts of all alternatives with regard to Native Americans and cultural resources.

5.17.2 Appendix Q, Tribal Consultation and Coordination

NAI-26 A much better understanding and consultation process should have been implemented from the start. Even the hiring of one tribal representative would have gone a long way to alleviate tensions between the tribes and the Corps.

Response: The tribes were directly included in the study from the beginning through the Drawdown Regional Economic Workgroup (DREW) process. The Corps funded a tribal economic impact analysis prepared by Meyer Resources on behalf of CRITFC. This tribal representative actively participated in the DREW process. Consultation and coordination with affected American Indian Tribes and Bands to date is discussed in Chapter 7 of Appendix Q, Tribal Consultation and Coordination.

NAI-27 Numerous treaties and executive orders are mentioned but none are included. These documents need to be stated in whole, verbatim so a truly in-depth analysis may be made of the impact of each alternative upon individual tribes and Native Americans as a whole. Please include these in the final.

Response: Copies of the treaties between the five study tribes and the Federal government will be included as an attachment to Appendix Q, Tribal Consultation and Coordination in the Final FR/EIS.

NAI-28 The Draft FR/EIS mentions treaties with Indian tribes, even includes relevant excerpts of treaty language in Appendix Q, but never addresses the significance of these treaties or their effect on Corps' actions and options. The document's glossary provides the only "discussion" of the significance of member tribes' treaties:

Treaty: An agreement or contract between two or more nations or sovereigns ... A treaty is not only a law, but a contract between two nations and must, if possible, have all parts given full force and effect (Black's Law Dictionary, 1968)

The Draft FR/EIS does not attempt to give "full force and effect" to the treaties between the United States and Indian tribes. Alternatives 1 to 3 under some assumptions, that do not withstand scrutiny, might yield salmon numbers to meet some of the criteria of the ESA but they do not produce results that "give full force and effect" to the tribes treaties.

Response: The FR/EIS is an evaluation to determine potential structural and operational changes to the Lower Snake River Project that could result in improved juvenile salmon passage. The Corps considered the impacts of the potential alternatives, including impacts to Native Americans. The preferred alternative is consistent with Corps' obligations under the tribal treaties.

NAI-29 Appendix Q discusses the Federal government's Regional Forum as if it provided a meaningful forum for CRITFC's member tribes. The tribes did their best to participate in good faith in this process but withdrew from the process in May 1997 due to, among other things, the Federal government's insistence that Federal government middle managers should have the authority to make policy decisions regarding the protection and restoration of treaty-reserved resources. The tribes expect decisions, such as the decision to continue to fund the Lower Granite surface collector project, to be made in government-to-government consultation forums at the highest possible policy level.

Response: Comment noted. See Appendix Q for discussion of government-to-government consultation efforts.

5.18 Transportation

5.18.1 Transportation Costs

TR-1 The transportation cost analysis should be based on transportation rates not the costs of providing the service. The potential transportation cost impact of dam breaching has two components:

- The cost of moving from one transportation mode to another (i.e., the difference between market rates for barge transportation and either rail or truck).
- The possibility that the cost of rail or truck transportation will increase without competition from barge transportation.

The FR/EIS distinguishes between rates and costs, contending that costs are the only valid factor. Transportation rates depend almost entirely on what the market will bear, and much less on the cost of providing the service. Farmers pay for transportation services based on rates, not costs. Therefore, rates are the appropriate unit for measuring impacts to farmers. The Corps cannot make any sort of realistic analysis of the dam breaching alternative without taking into account its effect on inter-modal transportation competition. Farmers presently face a monopoly within the railroad

companies. The loss of barge transportation will allow them to raise their prices. It is unlikely that the trucking industry will be able to provide meaningful competition to the railroads.

Response: The transportation analysis presented in the Draft FR/EIS addresses the National Economic Development (NED) costs of the proposed alternatives. NED analysis is concerned with the net effects of a proposed action upon a nation. The transportation analysis addresses changes in transportation costs. In cases where rates are competitively set, Corps policy permits the use of rates rather than costs. Rates were not used in this study because analysis of costs and rates in the barge industry showed that barge rates are not competitively set—rates are much higher than costs. From an NED perspective, rates that are in excess of costs represent income transfers among different groups rather than changes in the value of the national output of goods and services. In the case of the trucking industry, analyses conducted for the study found that long-haul truck rates are below long-run marginal costs. TransLog Associates (Upper Great Plains Transportation Institute) conducted the analysis of rates and costs and the implication of dam removal on modal rates for the Corps. The analysis and the report prepared by TransLog Associates, *Lower Snake River Juvenile Migration Feasibility Study Transportation Study: Implications of Changes in the Columbia-Snake River System Waterway on Grain Logistics from the Traditional Portland Market Gathering Territory* (TransLog Associates, 1999), are briefly discussed in Section 3.3 of Appendix I, Economics. A more detailed discussion of the study is contained in the technical report on transportation system impacts of dam removal. The report prepared by TransLog Associates is included in the technical report on transportation as Technical Exhibit C, and can be viewed at http://www.nww.usace.army.mil/lsr/products.htm.

TR-2 The Upper Great Plains Transportation Institute (UGPTI) study that concludes there would essentially be no rate impacts under the dam breaching scenario is flawed, as indicated by evidence in their own data tables. If unconstrained by competition, railroads have the ability to charge what the market will bear. The question is not whether rail rates would rise but by how much. A study conducted by Whiteside and Associates (1999) estimated that transportation savings provided by barge competition to Montana and Idaho producers at $50 million and $30 million per year, respectively. Rail rates will go up by a significant share of that $80 million, if not more, without a competitive transportation mode to constrain rates.

Response: The Corps acknowledges there is a significant difference between the findings of the two studies. However, the Corps disagrees that the study conducted by TransLog Associates (UGPTI) is flawed. Even with dam removal, truck-barge transportation of grain will continue to be a viable alternative to rail transportation. This assumes commodities will be trucked down the Columbia River and loaded onto a barge at this point. The ability of the rail industry to raise rates will continue to be limited by the rates charged by the combined truck-barge mode. The data shows that truck rates are currently at or below long-marginal costs, while barge rates are significantly above long-run marginal costs. Thus, the truck component of the truck-barge mode lacks any ability to lower rates with dam removal to maintain market share. The data, however, show that the barge industry could lower rates sufficiently to prevent any increase in rail rates or a shift of grain to rail, while still making a profit. Of course, if the industry were to adopt this type of rate strategy, its profit margin would be substantially reduced from its current level. There is no way to know how the barge industry might actually respond to dam removal. Nevertheless, the barge industry would be in a leadership role in setting rates. The rail industry can be expected to follow the lead of the barge industry and adjust rates in response to rate changes made by the barge industry. One conceivable scenario is that barge rates will be lowered somewhat to limit the shift of grain to rail

and rail rates will increase somewhat to maintain the current level of competition between the two modes. Studies conducted by TVA and TransLog Associates (UGPTI) found that truck-barge transportation presently has a limited range of competition and is only an effective competitor within 150 to 250 miles from Lewiston, Idaho.

TR-3 Specific problems with the UGPTI report include:

- Grouping Montana and North Dakota into one homogenous region for analysis. While they might both be considered "long distance" markets there are a number of key differences. Lack of competition in Montana grain transportation is itself a compelling reason to group Montana with Idaho and eastern Washington, or to consider Montana by itself.
- The UGPTI report identifies differential pricing in rail transportation costs that indicates that the existence of competing types of transportation (i.e., river transportation) constrains rail rates.

Response: We have reviewed the reasons cited by TransLog Associates for grouping Montana and North Dakota together and find that the grouping used for the study is appropriate, especially for that portion of Montana that lies east of the Continental Divide. Western Montana may, in fact, be somewhat more like eastern Washington than eastern Montana, but the volume of grain involved is so small that changing the groupings used in the analysis would not likely have a significant effect on the results.

Regarding competing types of transportation, the Corps expects modal competition to continue with dam removal (see response to comment TR-2).

TR-4 The transportation model should be subject to a careful, independent peer review to address the inconsistencies and errors that currently exist. These include the following:

- The model shows cost decreases for some origin-destination pairs, meaning that the model is comparing a non-optimized base condition with an optimized post-dam breaching scenario, thereby understating and minimizing the impacts of dam breaching.
- The model shows increased ton-miles for grain shipped by barge for every State covered in the model. This means that the model somehow assumes that either more grain will be shipped by barge, or that the grain being shipped will be shipped for a longer distance. Since the FR/EIS shows a decrease in the volume of grain shipped by barge and because an increased shipping distance on the river for any commodity is improbable, these results cannot be correct.
- The model incorrectly calculates shipping and handling costs for some areas. Such obvious errors raise questions about other possible calculation errors that have not been caught.

Response: The transportation analysis that is presented in the Draft FR/EIS was reviewed by the Northwest Power Planning Council's (NPPC) Independent Economic Analysis Board (IEAB). Formal comments on this analysis were made by the IEAB following publication of the Draft FR/EIS. The DREW Transportation Workgroup reviewed and responded to each of these comments and adjusted the analysis, as appropriate. These comments and the formal responses made by the DREW Transportation Workgroup are available on the Corps website at http://www.nww.usace.army.mil/lsr. The Corps agrees with the comment and the IEAB that there are errors in the model. However, the Corps and the IEAB also agree that the errors are not sufficiently large that correcting them would materially change the results of the analysis.

Regarding cost decreases for some origin-destination pairs, the model does show cost decreases in some cases under Alternative 4—Dam Breaching. These cost decreases were "zeroed out" and not

included in the cost analysis. These decreases total approximately $800,000. Potential cost increases were estimated to be about $23 million. The model compares a non-optimized base condition, i.e., costs based on actual current grain movements, with an optimized post-dam breaching scenario because it is not possible to accurately predict the system-wide effects of non-optimal behavior if Alternative 4—Dam Breaching were to occur. The uncertainties of the marketplace and the operations of specific firms would likely result in non-optimized conditions but it is not possible to predict these types of outcomes. If dam removal is recommended for further, more detailed study, the model will be revised to eliminate this feature (i.e., origin/destination pairs that show decreased costs with dam removal will not have the decrease zeroed out). For the Final FR/EIS, the report has been revised to include a discussion of the significance of the adjustment within the context of the total estimated transportation cost impacts of drawdown.

Concerning increased ton-miles for grain, the transportation model does not show increased ton-miles for grain shipped by barge for every State as is stated in the comment. However, research of the FR/EIS shows that Table 3-7 of Appendix P does show very substantial increases in bushel-miles for all States and all modes of transportation, except for Idaho for which a decrease is shown and for Oregon for which no change is shown. The data shown in Table 3-7 are incorrect. Drawdown barge bushel-miles will decrease significantly, both because of closure of Snake River grain ports and because of diversion of grain from barge transport to rail transport. Table 3-7 has been corrected for the Final FR/EIS.

The shipping and handling cost errors noted in this comment are identified as an unresolved issue on page I3-91 of Appendix I, Economics released with the Draft FR/EIS. As noted on that page, Corps modelers had corrected this problem prior to publication of the Draft FR/EIS but not in time to be included in the document. Because the errors exist in exactly the same amounts both with and without dam removal, they have no effect on the net effect of dam removal on transportation system costs. For this reason and because of the time and expense that would be incurred to correct the error in the report, these errors will not be corrected for the final report. While there may be other "errors" in the model, the results of the model are consistent with results from the Columbia River System Operation Review (BPA, 1995) and the Eastern Washington Intermodal Transportation Study—EWITS. The Corps believes that the estimates of transportation system impacts that have been made are sufficiently accurate for this FR/EIS. If dam removal is recommended for more detailed study, the model will be reviewed in detail and corrections will be made as needed.

TR-5 Potential Potlatch transportation cost increases alone suggest that the annual estimated transportation cost increase of $43.8 million is likely an understatement.

Potlatch estimates that transportation costs for its operations, which represent a small part of current barge movements on the Columbia and Snake rivers, would increase by $6-10 million per year. Longview Fibre estimates that dam breaching would increase its annual shipping costs by about 133 percent or $2 million. In addition, they would need to construct rail sidings and chip loading facilities at their Port of Wilma and Lewiston operations.

Response: The NED transportation analysis did not develop transportation cost estimates for specific firms or industries. Therefore, projected cost increase estimates made by potentially affected firms are not directly compatible with the findings of the transportation cost analysis presented in the FR/EIS. However, the RED analysis in Section 6.5 of Appendix I, Economics has quantitatively addressed the impacts.

TR-6 Transportation costs have been inaccurately assessed in the Draft FR/EIS because the analysis:

- Assumes a static, unresponsive transportation market that would not change if dam breaching occurred. Jessup and Casavant (1998) indicate that closure of the lower Snake River waterway combined with strategic investments could lead to a net gain for shippers by re-establishing competition in the transportation marketplace.
- Ignores the costs and benefits of imbedded subsidies.
- Uses inflated forecasts of future transportation volumes.
- Artificially restricts alternative rail shipping points.
- Exaggerates the cost of additional rail cars.
- Ignores cost savings for Idaho shippers and Washington road maintenance. An EWITS report indicates that a shift from barge to rail would eliminate or reduce wear on county roads, saving road maintenance costs throughout eastern Washington. The FR/EIS includes increased maintenance as an additional cost but does not view decreased maintenance as savings.
- Ignores the fact that existing river elevators would be available for storage after dam breaching if they are used as rail shipping elevators.

Response: Regarding a static, unresponsive transportation market, the DREW transportation analysis assumes that some adjustments would be made if dam breaching were to occur. The analysis, for example, assumes that new grain elevators would be developed at the Tri-Cities. The costs for developing this type of infrastructure are identified in Section 3.3.5.6 of Appendix I, Economics for information purposes. The costs of these improvements that are not covered by the existing rate/cost structure will be estimated and will be added to NED costs in the final report. While the Corps agrees that diversion of commodities to the rail system could result in improved economic viability of the industry within the region, especially the short-line railroads, this aspect of potential impacts was considered to be too speculative to evaluate quantitatively.

The treatment of subsidies in the overall economic analysis for the FR/EIS is discussed in Section 1.5.3 of Appendix I, Economics. The transportation analysis conducted for the Draft FR/EIS addresses NED effects, or, put another way, the net effects of the proposed action on the nation. It does not address the distribution of the costs and benefits associated with the current transportation system. Analysis of the economic effects of subsidies is considered to be a policy issue that is beyond the scope of this analysis. However, it should be noted that an implicit assumption of the analysis is that subsidies will remain at about their current levels throughout the period of analysis. Otherwise, production levels, especially of grain, and transportation costs for all modes could be significantly different from those on which the analysis is based.

The DREW transportation analysis considered a range of potential future transportation volumes. High, low, and medium long-range forecasts of future volumes were developed. The analysis presented in the Draft FR/EIS uses the medium numbers as these were felt to be the most representative. However, as is true of all forecasts, the accuracy of the forecast used in the analysis is not certain. The basis for the forecasts for both grain and non-grain shipments is average shipments over the 10-year period of from 1987 to 1996, inclusive. Inspection of historic data shows that growth in export of grain from the lower Columbia River does not occur at a uniform rate from year-to-year. In fact, the growth rate over this period has an extreme range of an increase of 23.7 percent from 1987 to 1988 and a decrease of 30 percent from 1988 to 1989. Overall, the growth rate was positive in 6 years and negative in 4 years over the 10-year period. In addition,

growth was negative during the last 2 years, with decreases of 2.0 percent and 6.2 percent in 1995 and 1996, respectively. A number of factors could have played a part in these decreases including, economic conditions in middle and far eastern markets, grain production in these same countries, grain production in competing grain producing countries, and marketing strategies of grain exporters and exporting countries in both the United States and abroad. It is also possible that the Asian market for grain will continue to be soft until those economies recover. Despite the decreases in 1995 and 1996, exports increased by a total of more than 8 percent over the entire period. Although analysis of the data clearly shows that exports are likely to continue to grow, there is substantial uncertainty about what the actual growth rate will be. If the growth in exports and grain production were actually lower than projected, the volume of grain shifted from the river would be decreased along with costs. Since a decrease in the actual volume of grain shifted and it would not have an effect on unit modal costs, the effect of a decrease can be estimated on a proportional basis. For example, a 1 percent decrease in the volume of grain shifted should result in a 1 percent decrease in costs. To extend this example, if the volume of exports for 1997, which is 25 percent below the 10-year average, were used as the basis for the forecast, volume of grain shifted and transportation costs would likewise be decreased by a similar amount.

Selection of rail shipping points for grain was based on objectives of minimizing farm and country elevator truck transport distance to elevators with rail loading facilities and minimizing the cost of infrastructure requirements. Also, it should be noted that transportation models consist of a set of nodes. The model used in this study uses grain producing counties (except for Montana, which uses four regions, and North Dakota, which is treated as a single point of origin) as the nodes of origin of grain and distances are computed from the center of each county. This level of detail reduced the number of elevators with rail loading facilities that were needed for the model. Review of the number of rail elevators that were used in the model showed that adding elevators would not result in a significant change in the model study results.

The estimated costs of acquiring new rail cars are based on studies conducted by the DREW Transportation Workgroup and HDR Engineering, working on behalf of the Washington State Legislative Transportation Committee. While the market price of grain rail cars varies from year-to-year and season-to-season and the cost of rail may currently be lower than the cost assumed for this study, the cost that was used is considered to be a relatively accurate estimate of the long-run cost. Accordingly, the cost used is considered to be appropriate for this study. In response to concerns expressed by the IEAB that infrastructure costs could result in an increase in long-run marginal costs, potential revenue (the fixed cost component of the increase in rail shipment costs) will be calculated and compared with the cost of rail system improvements to determine if there would be adequate revenue to pay for the improvements. If the analysis shows there would be a shortfall in revenue, costs in excess of revenue will be shown in the Final FR/EIS as a NED cost.

The Corps agrees that cost savings in road maintenance in Idaho (truck miles would decrease by an estimated 1.4 million miles with dam removal) was not accounted for in the report. However, there was not sufficient time or resources for the DREW Transportation Workgroup to conduct the required analysis. In the case of Washington, the study shows that truck miles would increase by about 4.0 million miles. (The findings cited from the EWITS apparently refer to a scenario in which all grain shifts to rail.) As stated above, estimates of road maintenance costs were not developed as part of the DREW Transportation Workgroup's analysis. Cost estimates presented in Appendix I, Economics are drawn from the above-referenced study conducted by HDR Engineering. The findings from the EWITS report are presented in Table 5.8-9 on page 5.8-11 of the FR/EIS. For the

Final FR/EIS, highway system improvement costs for Washington will be compared with potential revenue from fuel taxes and license fees to determine if it would be sufficient to cover the costs. If revenue is not sufficient, costs in excess of revenue will be included as a NED cost.

TR-7 Is the role of subsidies taken into consideration in the economic evaluation of alternative forms of transportation? If subsidies do exist, does agriculture in this region enjoy a comparative advantage in the absence of such subsidies? If agriculture does not possess a comparative advantage can it exist in the absence of subsidies? If agriculture cannot exist in the absence of subsidies then the transportation costs associated with Alternative 4 (shown in Table 1 on pg 36 of the summary document) would be reduced.

Response: The transportation analysis conducted for the Draft FR/EIS addresses NED effects, or, put another way, the net effects of the proposed action on the nation. It does not address the distribution of the costs and benefits associated with the current transportation system. The treatment of subsidies in the overall economic analysis for the FR/EIS is discussed in Section 1.5.3 of Appendix I, Economics.

TR-8 The Corps analysis does not appear to incorporate the findings of the Translog Associates study conducted for the Corps. This study concluded (page 42) that there would be little or no diversion of grain traffic from barge to rail under Alternative 4. This contrasts with the statement that approximately 29 percent of grain would likely be diverted to rail. This study also concluded that barges have a profit margin to play with in meeting future competition from railroads. How would these conclusions affect the Corps' estimates of transportation cost changes if they were incorporated into their analysis?

Response: TransLog Associates' study examined a number of marketing or rate strategies of the competing modes of transportation and their potential effect on the intermodal shift of grain. Alternative rate strategies in response to dam removal were evaluated to determine the potential range of the effect that dam removal might have on modal rates. The current profit margin of the barge industry was one of the reasons for evaluating alternative rate strategies. Although the findings of the TransLog Associates study provide insight into how alternative rate strategies of the barge and rail industries might affect the actual Intermodal shift of grain, they cannot be directly compared to model study results. The TransLog Associates study and report (TransLog Associates, 1999) are discussed in the Technical Report-Transportation and the report is included as a Technical Exhibit. The report is available at http://www.nww.usace.army.mil/lsr//lsr. The Final FR/EIS incorporates the findings of the TransLog Association's study.

5.18.2 Capacity and Associated Costs

TR-9 The FR/EIS incorrectly assumes that if dam breaching were to occur, modal, handling, and storage capacity could be expanded on a regional basis to meet geographic shifts in demand without significant increases in long-run marginal, average, or unit costs. The long run for this study is 100 years. With this length of time it is possible to assume away a large number of problems. However, if dam breaching were to occur, construction and operation of the new facilities would be necessary prior to implementation. The FR/EIS states that 12 river elevators would be abandoned and that construction of the necessary loading capacity in the Tri-Cities could cost $300 million. It would be impossible to recover this expense without an increase in incremental cost.

Response: With dam removal, revenue from shipping charges will be available to pay for rail system improvement; revenue from handling charges will be available to pay for elevator system improvements; and, fuel taxes and license fees will be available to pay for highway system improvements. To determine if these revenues would be sufficient to pay for the infrastructure improvements that would be needed, the fixed cost component of these revenues will be identified and compared with estimated costs of new infrastructure. Any costs that are in excess of the estimated revenue would result in pressure to increase rates to recover costs. These excess costs will be included with NED costs in the final report.

TR-10 The DREW transportation study's treatment of associated costs is inconsistent with agency guidelines. The purpose of the NED transportation analysis is to estimate the difference in cost of delivering a commodity. One way to do this is to add up all the costs, the other is to rely on rates if rates are equal to long-run marginal costs. The cost approach requires that all costs required to achieve the benefits be included. This includes new capacity where there is specific evidence that existing capacity is not sufficient. The Draft FR/EIS, page I9-6, indicates that the associated costs of infrastructure required to shift tonnage to other modes are included in the NED analysis, but the annualized value of just the associated costs that would be needed to make rail and truck viable alternatives would exceed the total increment of costs claimed in the report.

Response: See response to comment TR-09.

TR-11 The Draft FR/EIS reference to a study done by TVA/Marshall University (TVA and Marshall University, 1998) as justification for not including the associated cost of capacity expansion is misleading because:

- The capacity cost used in the TVA report was $71.6 million, including interest at 8 percent, about 42 percent higher than the cost in the FR/EIS. This overstates the incremental cost expressed on a cost per ton or cost per ton-mile basis.
- The TVA study assumed that 2.7 million tons would be displaced to rail, compared to 1.1 million tons in the FR/EIS. This significantly understates the incremental cost.
- The TVA study addresses the impacts that breaching the four lower Snake River dams would have upon average rates rather than identifying the increased cost for the increased tonnage. Averaging increased cost over a larger number of tons conceals the fact that revenue from the increment of traffic does not justify the incremental cost.
- The TVA study draws conclusions based on average rate impacts and is silent on the real economic efficiency criteria.

- TVA capacity estimates based on the average maximum load of system components are questionable.

Response: The Corps acknowledges that there are differences between the TVA study (TVA and Marshall University, 1998) and the results of the transportation system impacts analysis prepared for the FR/EIS. The TVA study was done before completion of the FR/EIS and used preliminary estimates of possible diversions of grain from the river to the rail system. Ideally, the TVA study would have been done using the results of the FR/EIS. Despite the differences, the results of the TVA study are considered to be adequate for assessing potential congestion effects and infrastructure costs of dam removal on rail traffic. The costs of rail system improvements that were used in the FR/EIS were selectively adapted from the TVA report and other sources. The costs used are considered to be adequate for the purpose of establishing a basis for identifying salmon survival strategies that warrant further study. If dam removal is recommended for further study, rail system capacity impacts and costs will be studied in greater detail. The analyses by TVA and by the DREW Transportation Workgroup are both systems analyses because rail costs and rates are based on the operation of the system rather than segments of the system. A systems analysis is considered appropriate because the infrastructure improvements that would be needed would benefit all shipments, not just diverted grain shipments. However, to determine if incremental revenue with dam removal would be sufficient to cover the cost of the needed improvements, revenue (fixed cost component of the change in rail system shipping costs) will be compared with infrastructure costs. Costs in excess of revenue have been added to the NED account in the Final FR/EIS.

TR-12 The FR/EIS does not treat associated costs consistently.

In contrast to the transportation analysis, the hydropower and irrigation analyses both explicitly include the associated non-Federal cost as part of the NED effect. Associated costs addressed in the hydropower analysis include the increased operational cost of non-Federally owned generation facilities as shown in Table 3.1-11. Associated costs included in the water supply analysis include the loss of irrigated farmland value, cost of municipal and industrial pump stations, and the cost of privately-owned wells.

Response: See response to comment TR-11.

TR-13 The cost of expanded capacity needs to be included in the estimated compensation costs outlined in Section 13.3.3 of Appendix I. If dam breaching were to occur, increased shipping costs would eventually be passed on to the shippers. Part of these increased costs would be the costs of expanding capacity.

Response: The Corps agrees that infrastructure costs that are in excess of revenue from shipping and handling charges are NED costs and could result in increased rates for these services. In the Final FR/EIS, infrastructure costs in excess of revenue are included in the NED account. In addition, these costs are shown as potential compensation costs in Section 13.3.3 of Appendix I as has been suggested.

TR-14 Compensation should be in the form of a Federal guarantee that post-project transportation costs will not exceed pre-project costs.

Response: This is a policy issue that must be debated and resolved in the Congress. The Corps does not have the authority to make the suggested guarantee. Furthermore, implementation of the suggested guarantee would be precedent setting as it is inconsistent with actual practice in this nation. Accordingly, the comment is acknowledged but no changes will be made to the FR/EIS.

TR-15 Barges fill a unique requirement that cannot be met by rail or trucks.

Barge transportation on the lower Snake and Columbia Rivers is designed to accommodate seasonal demands. The tonnage that would displaced to rail and truck transportation would not be averaged throughout the year but would occur at peak times. Rail hopper cars and large semi-trucks cannot be kept on a year-around basis (as most barges are today) to be available promptly to meet surges in downriver demands. Railcars and trucks would leave the region after a surge in demand and would not be available when the seasonal needs were greatest to move cargo down the Columbia.

Response: Historical shipments of grain from the Columbia River have occurred throughout the year, although the volume of shipments has varied from month to month. Within this variation; however, the Corps recognizes that peaks in exports can occur in response to specific grain export orders. There is no reason why the rail system cannot respond to these peaks in demand. As to trucks, within the study area they have historically provided support to the barge industry. With dam removal, they will continue to be an essential component of the truck-barge grain shipment alternative. On this basis, the Corps disagrees with the assumption that this equipment will leave the region. The Corps also disagrees with the argument that the service provided by the rail system is not sufficiently reliable to meet the demands of the grain export market.

TR-16 The Corps should consider the realistic availability of grain railcars and the availability of trucks needed to increase movement by 2.6 million miles in Washington.

Response: Estimates of the availability of grain railcars and trucks that are included in the FR/EIS are considered to be realistic. However, if dam removal is studied in greater detail, this issue will be examined in greater detail.

5.18.3 Infrastructure Costs

TR-17 While there is much uncertainty about how much waterborne traffic would be diverted to rail if breaching were to occur, the Corps identified specific rail improvement projects and costs in the FR/EIS. The Draft FR/EIS indicates that required improvements to mainline and light-density railroads, additional rail car capacity and rail-related improvements at local elevators are estimated to cost between $69 million and $106 million. These costs do not include geotechnical stabilization costs for railbeds, embankments, bridges and track, nor needed rail improvements at some ports and railheads. These costs need to be included in the Corps analysis.

Response: Analyses required to determine the need for and cost of geo-technical stabilization of the rail system were not completed for this study, partly because there was no indication that improvements of this type might be needed and partly because of time and resource constraints. Based on currently available information, the Corps questions the need for geo-technical stabilization of mainline railroads. The increased volume of traffic with dam removal does not appear to be that significant in comparison with the present level of traffic. In fact, a representative of the Burlington Northern and Santa Fe Railroad stated that no improvements would be needed. As to the need for rail improvements at ports and railheads, costs were included in the Draft FR/EIS for those improvements the Transportation Workgroup was able to identify. Additional improvements that are identified during the review process, such as those identified in comments provided by Potlatch, have been assessed and are included in the Final FR/EIS.

TR-18 The Draft FR/EIS incorrectly characterizes the cost estimates developed in the HDR Engineering study developed for the Washington State Legislative Transportation Committee.

These estimates only include those routes that would experience major impacts and require important capital improvements. The Corps needs to consider the full range of capital improvements to State and local road systems. It is the Federal government's responsibility to identify, address and/or mitigate adverse transportation impacts. Environmental and mitigation costs associated with required transportation projects must be fully documented by the Corps in the FR/EIS.

Response: The impacts discussed have been identified, but the detailed analyses mentioned are beyond the depth of information for a Corps Feasibility Study. If dam removal is recommended for further, more detailed study, impacts to the highway system will be analyzed in detail in coordination with the State departments of transportation.

TR-19 The Corps should identify the following for each alternative:

- Specific transportation impacts (capacity improvements, pavement and intersection projects, track improvements, bridge piers).
- Specific projects required to respond to these impacts.
- Environmental impacts of these projects.
- Environmental and other costs of these projects.
- Required mitigation that would result from these projects.
- The cost of this mitigation.

Response: See response to comment TR-18.

TR-20 Are local and State governments in the affected regions and railroad companies serving the region capable of financing the $712 million to $1.2 billion estimated by Lund Consulting and HDR Engineering to be needed to improve transportation infrastructure? Road funding is a perennial and difficult issue in most States and localities. Class I railroad companies are still shouldering massive debts as a result of recent consolidations, and short-line and regional railroads are chronically short of capital.

Response: The Transportation Workgroup did not consider the ability of the States and others to finance infrastructure improvements that would be needed. This issue will be addressed in detail, if dam removal is recommended for further study.

TR-21 Increased rail traffic may result in existing road-railroad crossing protection becoming inadequate and in need of upgrading. This needs to be addressed for the dam breaching scenario.

Response: The need for mainline rail system improvements with dam removal was evaluated in a study conducted for the Corps by the TVA and Marshall University. The report is included as Technical Exhibit F of the Technical Report: Transportation. The title of the report is as follows: *The Incremental Cost of Transportation Capacity in Freight Railroading: An Application to the Snake River Basin* (TVA and Marshall University, 1998). This report is available at http://www.nww.usace.army.mil/lsr//lsr.

TR-22 Failure to make necessary transportation infrastructure investments in a timely manner could have substantial impacts on the region's transportation system and economy. The Corps should more thoroughly examine potential adverse impacts resulting from the failure to make timely and necessary investments in infrastructure.

Response: The Corps agrees that infrastructure improvements must be made in a timely manner. If dam removal is recommended for more detailed study, the actual need for improvements and their timely implementation will addressed in detail.

TR-23 Do sufficient grain facilities exist at either the Tri-Cities or Portland to unload the grain that formerly arrived by barge from trucks and trains? How would needed improvements to these private facilities be financed? The Draft FR/EIS simply assumes this problem away (pg I3-60).

Response: The statement that the analysis assumes away the problem of elevator capacity is incorrect. The Transportation Workgroup found that there are sufficient grain elevators in the Portland area, but that a new facility would be needed in the Tri-Cities area. The need for additional elevator capacity and other infrastructure improvements is summarized in Section 3.3.5.6 of Appendix I, Economics. The analysis is discussed in much greater detail in the report *Technical Report*: *Transportation System Impacts Analysis* (DREW Transportation Workgroup, 1999a). This report was not published but may be viewed on Walla Walla District's website.

TR-24 Increases in rail traffic due to dam breaching could worsen the Portland area's existing and emerging rail capacity constraints.

Response: Potential rail system capacity constraints were evaluated for the study (see response to comment TR-21). The evaluation showed that with relatively minor improvement, rail system congestion in the Portland area would not worsen. The evaluation was provided to the Burlington and Santa Fe Railroad and the Union Pacific Railroad for review and comment. A representative of the BNSF informally stated that the increased rail traffic could be handled without any system problems. The Union Pacific did not provide any comments. However, if dam removal were recommended for more detailed study, it would be appropriate to conduct further studies of this issue.

TR-25 The Corps should review and incorporate findings from three current studies that could significantly alter the transportation impact estimates in the Draft FR/EIS.

- Washington State Legislative Transportation Committee and HDR Engineering are conducting a second study to determine the impacts of dam breaching on other State highways and county and city highways.
- State of Washington/Port of Benton Investment Study. One finding is that the practical capacity of BNSF's Columbia River Gorge and Stevens Pass mainlines will be reached in 2005 or 2006 given current rail traffic growth rates. Although the Stampede Pass line would not reach its capacity until the 2020s, it is only 12 trains per day. The Corps should address potential east-west mainline capacity constraints as part of its transportation impact analysis.
- WSDOT-funded study on the benefits of 286,000-pound and 315,000-pound rail cars on light-density rail lines in Washington State.

Response: The assessment of rail capacity impacts of dam removal that was conducted by the Transportation Workgroup is considered to be adequate for the FR/EIS. However, if dam removal were recommended for more detailed study, it would be appropriate to study these impacts in greater detail. The findings of the studies would be reviewed as a part of that study.

TR-26 Will the geography of the region permit the substantial improvements to the road and rail transportation systems that will be necessary to move 126 million bushels of grain? Many roads and railroads are already built in river valleys where there may not be suitable corridors to expand transportation capacity.

Response: The total volume of grain currently shipped on the Snake River is estimated at 126 million bushels. About 36 million bushels of that volume would be diverted from the river to rail. The remaining 90 million bushels would remain on the waterway but would need to be trucked over various routes to new or existing ports on the Columbia River for transshipment to lower Columbia River export elevators by barge. The analysis conducted by the Transportation Workgroup shows that existing railroads and highways, with relatively minor improvements, are adequate to transport the grain that would be diverted away from the Snake River with removal of the dams. No new highways or railroads would be needed.

TR-27 Sediment released from behind Lower Granite Dam would be deposited in Lake Wallula and could impact the vital navigation channel to the Tri-Cities ports. The channel to the Tri-Cities port docks passes the mouth of the Snake as it approaches the Tri-Cities. Regular O&M dredging might be needed if channel access is impacted. Potential conflicts between dredging needed after siltation might conflict with a fish mitigation period and could affect the viability of port operations.

Response: The analysis of sediment transport with dam removal concluded that the area most susceptible to sediment deposition is the east bank of the Columbia River, between its confluences with the Snake and Walla Walla Rivers. Although the potential depth of sediment deposition in Lake Wallula is not likely to present navigation problems, if the new grain elevator were located on the east bank of the Columbia River between the mouths of the Snake and Walla Walla Rivers, navigation access to the dock could be affected by sediment deposition. This potential problem could be avoided by not locating elevator facilities in this area. For this reason, the Transportation Workgroup did not evaluate potential dredging costs and effects on port operations.

5.18.4 Other External Costs

TR-28 The costs of delay, noise, air emissions, and public safety risks that would occur as a result of increased rail and truck transportation are not adequately addressed in the FR/EIS.

- Delay has unmentioned external costs not captured in how much the operator has to pay because his equipment is delayed, rerouted, or is in gridlock.
- The FR/EIS maintains that highway congestion will not increase if highways are improved, but left out the cost of doing anything.
- A June 1998 report by the TVA estimated that the average net pollution abatement savings attributable to shipment by barge were $1.05 cents per ton on the Tennessee River.
- The FR/EIS erroneously states that rail and barge accident rates are almost identical. National data for 1991 identified 1,194 rail-related fatalities compared to 8 for barge. These data indicate that increased rail tonnage associated with dam breaching could result in an increase of 1 fatality and 22 injury accidents each year. Based on average national data that addresses how much people are willing to pay to protect themselves, this additional fatality and injuries would be valued at $3.3 million annually.

Response: Concerning external costs of delay, the analysis conducted by the Transportation Workgroup shows that with some rail and highway system improvements there would be no significant increase in traffic congestion and rail or highway system delay. The most significant

impact of increased highway traffic would occur in the Tri-Cities. If dam removal were recommended for more detailed study, it would be appropriate to study this issue in greater detail.

Concerning highway costs, the cost of making highway improvements is discussed in Section 3.3.5.6 and they are displayed in Table 3.3-19 of Appendix I, Economics.

Concerning pollution abatement savings attributable to barges, the Corps acknowledges the comment about net pollution savings to barging on the Tennessee River. However, analysis of the economic benefits and costs of changes in the transportation with dam removal was not addressed by the Transportation Workgroup. Analysis of these potential costs and benefits for the Final FR/EIS is not considered to be necessary.

Concerning barge/rail accident rates, the data presented in Appendix P has been reviewed and was revised for the Final FR/EIS.

TR-29 The Corps needs to reevaluate fuel efficiency between alternative modes, specifically with regard to the fleet and tow size used on the Snake River inland system. Waterborne transport on the most efficient river segment is more than three times as efficient as the most fuel efficient railroad and more then 10 times as efficient as truck transportation on a ton-miles per gallon basis. Recent regional studies specifically related to drawdown erroneously treated fuel efficiency of alternative modes as almost equal (372 Btu/ton-mile for barge and 374 Btu/ton-mile for rail).

Response: While the relative efficiencies of alternative transportation modes were not directly addressed in the transportation study, the economic costs associated are included in the modal cost analysis that was conducted. The costs associated with fuel efficiency of each mode is embedded in its total cost. The analysis did not assume "almost equal" fuel efficiencies for barge and rail, as other regional studies may have. Additional analysis of this issue as part of the transportation system impacts analysis is not considered necessary.

TR-30 The Draft FR/EIS does not address the hazardous waste issues associated with increased quantities of goods transported by highway and rail.

Response: Hazardous wastes are not currently transported by barges on the Lower Snake River Project; therefore, there would be no increased transfer of hazardous wastes to truck or rail under Alternative 4—Dam Breaching. The types of commodities transported by barge up and down the lower Snake River include grain, petroleum products, wood chips and logs, and wood products. See Chapter 4, FR/EIS for further discussion on Transportation.

TR-31 The Draft FR/EIS does not address the deposition of truck and rail traffic-related airborne contaminants to soil, water, and sediments.

Response: Airborne contaminants are discussed in Appendix P, Air Quality, and in Chapter 5 of the FR/EIS.

5.18.5 Regional Effects

TR-32 The FR/EIS assumes that current and projected levels of exports from the region would continue to be maintained if dam breaching were to occur. This rules out potential alternative export routes and ignores tonnage that might be displaced to other points of export. This assumption has the effect of restricting the study area and placing an artificial limit on the assessment of economic and environmental effects. This could be viewed as contrary to the purpose of an EIS.

Response: The analysis conducted for the FR/EIS is a least-cost analysis. The Corps recognizes there are alternative routings that could have been identified and used. However, on the basis of the information available for the study, all of these other potential routings (Puget Sound, for example) would all be more costly. One reason for using the lower Columbia River as the final internal destination for grain shipments is that the Portland area is where the infrastructure exists for export of soft white wheat. Review of grain export data for the Port of Seattle shows that only hard red wheat is exported from that port. Thus, there is no base for an assumption that tonnage displaced from the Snake River would be shipped to a port other than the existing ports on the lower Columbia River.

TR-33 The FR/EIS needs to include the findings of the State of Oregon/Port of Portland study entitled *Breaching the Lower Snake Dams*: *Transportation Impacts in Oregon.* Key findings of this study include:

- Up to 9,000 full containers currently shipped through the Port of Portland each year could be diverted to the Puget Sound or other ports.
- Four of the six ocean carriers currently calling in Portland might stop if containers could no longer be shipped on the lower Snake River. Two are considered "likely" to stop calling; two others are considered "vulnerable."
- If fewer ocean carriers serve Portland, shippers who use the Port of Portland to ship export containers may need to ship containers through Puget Sound area ports, with associated increases estimated at $200 per container on average. This would result in a possible loss of export markets, increased congestion and wear on road and rail infrastructure, and increased energy consumption and air emissions.
- Barge companies would lose between $4 and $11 million in business annually, and their rates to the remaining customers on the Columbia River would likely increase.
- Agricultural land with yields less than 45 bushels per acre may be at risk of being taken out of production due to higher transportation costs. Low yield dryland wheat farm acreage in Wallowa County, Oregon, and Lincoln and Adams counties, Washington is at greatest risk for being removed from production.
- Increased transportation costs could reduce the value of some farmland in eastern Oregon and Washington by an estimated $88 per acre.

Response: The Final FR/EIS has been revised to include a reference to the State of Oregon/Port of Portland study. The findings of the study as indicated in the comment have also be included in the FR/EIS. It should be noted that from an NED perspective, shifts in transport activity among modes, and/or among west coast ports, represent transfers of revenue.

TR-34 Potlatch would ship products to the Puget Sound for shipment overseas because costs would be lower and the choice of shipper greater. Products would not be trucked to the Tri-Cities for barge shipment to Portland.

Response: Comment is acknowledged.

5.18.6 Unresolved Issues

TR-35 The numerous unresolved transportation issues presented in Appendix I, Section 3.3.8 need to be resolved because they could have significant effects on the outcome of the analysis. As noted by the IEAB, transportation models need to demonstrate realistic outputs prior to being applied as part of the economic analysis.

- The storage and handling cost model error that overestimated storage and handling costs for grain shipped from Montana and North Dakota needs to be corrected.
- Mixing storage and handling rates, with shipping costs is inconsistent and needs to be corrected. Mixing rates and costs makes it nearly impossible to consistently quantify the NED effect.
- The NED effects of severing the roadways that are linked by the lower Snake River dams should be quantified. Loss of these crossings would increase transportation costs, as well as being a major inconvenience.

Response: While we agree that storage and handling cost error in the model needs to be corrected, we do not propose to correct it at this time because the correction would have no effect on the change in storage and handling costs with dam removal—the costs are the same in the model with and without dam removal.

In NED analyses, mixing storage and handling rates with transportation costs is acceptable provided that rates are based on costs, i.e., they are not significantly higher or lower than costs. The Transportation Workgroup found that storage and handling rates met this criterion and could be used. Transportation rates were not used because rates were significantly different from costs in some cases.

The issue of severing roadways that cross Snake River dams was raised late in the study but no data were available at the Corps or the State of Washington on which to base an analysis of potential transportation cost increases. The limited anecdotal information that was available from persons with first-hand knowledge of these roads suggested that the increase in transportation costs would be relatively small, although significant to those persons that would actually be impacted. The Final FR/EIS will include a discussion of this issue. These potential impacts are discussed in the Technical Report for Transportation (DREW Transportation Workgroup, 1999a). This report is available for review on Walla Walla District's website.

TR-36 Identified errors in modeling and costs should be corrected. The adjustment that the transportation model adds to the alternative shipping cost if the alternate costs is less than the base case cost should be eliminated, as recommended by the IEAB. The assumption of a perfectly efficient market in the base case unreasonably adds to the cost of the dam removal alternative. This is not an unresolved issue, but an inaccuracy that should be eliminated. Other cost factors, such as inflated truck and deflated barge costs mentioned in the unresolved issues section (Draft FR/EIS, Appendix I, Table 3.3-26 and p. I3-90) should also be corrected.

Response: Although the use of this type of adjustment is somewhat unconventional and was opposed by the IEAB, there is insufficient time and resources to determine why the grain

movements in question actually move as they do. The issue has been discussed with the IEAB. The adjustments represent slightly more than 3.5 percent of the total increase in transportation costs with dam breaching. At this magnitude, the potential error in the estimate of the increase in transportation costs with dam breaching is not considered to be significant, and verification of the assumption through acquisition of more data or revising the model is not warranted for the FR/EIS. However, if dam breaching is recommended for more detailed study, review of this issue and possible revision of the transportation model should be undertaken.

TR-37 The transportation analysis should incorporate the findings of the American Rivers study prepared by G. Edward Dickey (1999).

Response: The report prepared for American Rivers by G. Edward Dickey focuses on how infrastructure improvements could be financed and implemented if there were a decision to remove the Snake River dams. This is an important issue, but it is a policy issue rather than one that deals directly with the analysis of transportation costs. Accordingly, a reference to this report and a summary of the findings and recommendations has been included in the Final FR/EIS in the section in Appendix I (Chapter 13) that deals with compensation.

TR-38 While the assumption of a perfectly competitive market, as noted on page I ES-9 of Appendix I, Economics, may be convenient for modeling purposes, this assumption may not be correct. Table 3.3-11 indicates that there is only one rail line for each origin listed, which implies the existence of a monopoly. In the absence of regulated rail freight rates, it is likely that freight rates would be higher than those shown in the Draft FR/EIS, which assumes a perfectly competitive system. At a minimum, higher monopolistic freight rates should be addressed through a sensitivity analysis.

Response: The Corps agrees that the inference in the FR/EIS that the transportation analysis assumes a perfectly competitive market is not appropriate. Clearly there is not perfect competition in transportation of grain, but, while there is only one rail line for each rail origin, truck transport with connection to barges on the Columbia River would be an alternative transportation mode. Competition between the two available modes of transportation (rail and truck/barge) would continue to impose constraints on potential rate increases with dam removal. Thus, monopolistic pricing is not an issue that needs to be addressed. Actually, an analysis of modal rates and costs showed that competition between modes would likely increase with dam removal because the difference between costs would be decreased. A reference to the study is included in the response to comment TR-1. The Final FR/EIS has been revised to correctly describe the type of competition that actually exists in the grain transportation industry.

TR-39 The analysis also assumes that "if inland navigation capacity is reduced, competing surface transportation modes either possess or would add the capacity necessary to accommodate additional traffic." (page I3-60). There could easily be distortions in the market that would cause only a few or one firm to enter this segment of the market with resultant higher freight rates. At a minimum, this scenario should be addressed through a sensitivity analysis.

Response: Analysis of the existing transportation system shows that it consists of just two non-competing railroads; essentially one barge company (one company transports almost all of the grain); and, numerous trucks. Nothing in the analysis that was conducted by the Transportation Workgroup suggests there is even a remote possibility that the industry would significantly change in the future with or without dam removal. In fact, the analysis points in the opposite direction—

dam removal could result in a more diverse grain transportation sector because diversion of grain from the river to the rail system could improve the economic viability of the short-line railroads. For information on potential impacts of dam removal on transportation rates and the modal shift of grain with dam removal, please also see the response to comment TR-1.

TR-40 The Draft FR/EIS states that the transportation analysis addresses the cost of transporting products as an NED cost but does not assess the loss of revenue and profits by barge companies. Excluding this loss of revenue from the economic analysis prevents the decision-maker from being apprised of the magnitude of adverse effects on a major transportation sector that would be directly affected by Alternative 4—Dam Breaching.

Response: Loss of revenue or profits is a regional impact, rather than an NED impact. Potential income and employment effects to water transport services—barge marine cargo, cruise ships, and marinas—that require reservoirs and locks are discussed in Appendix I, Economics, Section 6.5.1. Approximately 134 direct jobs in this sector were identified in the lower Snake River study area (see Table 6-22).

TR-41 The transportation cost analysis presented in the Draft FR/EIS does not take into account the Federal subsidies that presently keep barge transportation costs artificially low. Breaching the dams would essentially transfer the real costs of moving goods to the transporter rather than the tax-paying public. Existing subsidies need to be incorporated into the transportation analysis to provide a true accounting of the real costs and benefits of dam breaching.

Response: The Corps agrees that subsidies cause distortions in the marketplace. In the case of this study, the barge industry is not the only industry engaged in producing or transporting commodities in the study area that receives or has received subsidies. The railroads were heavily subsidized in the early years of their operation and grain farmers receive subsidies to grow and to not grow their crops. The trucking industry has received (and may continue to receive) subsidies through the Federal highway construction program. And, finally, grain exporters have also received subsidies in various forms but most commonly through price supports and loan guarantees to purchasing nations. Analysis of the effects of all these past and existing subsidies on grain production, transportation, and export markets are beyond the scope of this study. Federal guidelines for conducting NED analyses require that they be conducted on the basis of efficiencies of the existing economic system, subsidies included. Separate analyses of the economic effects of subsidies are typically made and provided to decision makers to aid in their decisions on implementation of subsidies.

TR-42 The Draft FR/EIS should identify actual shipping rates for grain transportation by barge, rail, or truck.

Response: Actual shipping rates and costs are shown in the report prepared for the Corps by TransLog Associates. A reference to this report is included in the response to comment TR-1. Appendix I, Economics to the FR/EIS has been revised to include a discussion of rates and costs and a comparison of modal rates and costs for selected origin destination pairs.

5.19 Power

5.19.1 Power Costs and Rate Impacts

POW-1 The existing conditions baseline assumed in the hydropower analysis overstates the amount and cost of energy that would need to be replaced if the dams were breached.

- The analysis baseline is based on hydropower generation possible under the 1995 Biological Opinion, while actual existing conditions are dictated by the 1998 Supplemental Biological Opinion that provides more spill and allows less hydropower generation.

Response: The 1998 Biological Opinion had not been issued when the hydropower study began (NMFS, 1998). Using conditions under the 1995 Biological Opinion as the baseline for the analysis slightly overstates the amount of energy generated by the four lower Snake River dams (NMFS, 1995). Conditions have changed as a result of the 1998 and 2000 FCRPS Biological Opinions (NMFS, 2000a), but not significantly. A comparison of average hydrosystem generation between conditions under the 1995 Biological Opinion and those under the 1998 Biological Opinion was conducted as a sensitivity analysis in response to this comment. The comparison of the average annual generation with the 1995 Biological Opinion and the 1998 Biological Opinion, as defined by the HYSSR model, showed that annual generation from the four Snake River dams is about 4 percent lower with the 1998 Biological Opinion operation than with the 1995 Biological Opinion operation. However, the majority of the generation reduction occurs in the months of April and May which have the lowest economic value. So, the impact on power benefits from the Snake River dams would be considerably lower than the 4 percent reduction in annual generation with the 1998 Biological Opinion. For this reason, it was judged that the relatively small change was not significant enough to warrant a re-analysis of the economic impacts associated with reduction in hydropower with dam removal.

- The analysis ignores the additional burdens that would be imposed on the hydroelectric system to achieve compliance with the Clean Water Act.

Response: Water temperature and dissolved gas levels within the four lower Snake River reservoir systems have been identified as important water quality parameters that affect fish and that are sometimes found at levels above State standards. To reduce water temperatures within the lower Snake River reservoirs, the Dworshak reservoir is currently operated to release 1.2 MAF of cold water during July and August each year. Structure modifications have been made at the dams to reduce total dissolved gas levels found at the lower Snake River reservoirs. These improvements, which include adding end bay deflectors and modifying the deflectors and pier extensions, are planned to decrease gasification and improve water quality.

- The analysis ignores additional controlled spill and flow augmentation measures that would be necessary if the dams remain in place.

Response: Alternatives that have additional flow augmentation levels were not carried forward into the FR/EIS. Earlier in the study effort, an alternative that contemplated additional flows was considered. Additional flow augmentation was eliminated from further analysis in this study due to issues/concerns raised in BOR's "Snake River Flow Augmentation Impact Analysis Appendix, February 1999." Some of those issues/concerns include the following:

1. Insufficient storage space in the Snake River basin under BOR and Corps exclusive control to provide large amount of water for flow augmentation without significant impacts to natural resources, recreations, and economic sectors

2. Inability of BOR to meet its historic obligations and commitments to project beneficiaries if additional flow augmentation was required
3. Inability of BOR to fully meet all congressionally authorized project purposes if required to provide 1,427,000 acre-feet for flow augmentation
4. Affected states general opposition to flow augmentation
5. Congressional action could be needed to clarify BOR's responsibilities or additional authorization and appropriate may be needed.

If additional flow augmentation is contemplated in the Biological Opinion, the BOR and other entities would likely study this alternative more, likely in a separate environmental review process.

- The analysis does not identify Federal subsidies imbedded in the dams that are essentially an ongoing transfer of wealth from the national taxpayer to private interests in the Pacific Northwest.
- Part of the agreement behind the Federally funded dams and associated low cost power is that the BPA would ensure long-term survival and protection of Columbia and Snake River salmon. Failure to meet this part of the agreement could lead to a withdrawal of Federal funding and a doubling of Northwest power costs.

Response: The hydropower analysis conducted for the Draft FR/EIS addresses NED effects, or, put another way, the net effects of the proposed action on the nation. In this case, NED analysis evaluates the production cost savings of hydropower over the next best alternative. It does not address the distribution of the costs and benefits associated with the production of hydropower or alternative forms of energy. The treatment of subsidies in the overall economic analysis for the Draft FR/EIS is discussed in Section 1.5.3 of Appendix I, Economics.

POW-2 The hydropower analysis may understate potential rate impacts associated with breaching. The FR/EIS estimates that wholesale power rate increases would range from 1.07 mills/kWh to 5.86 mills depending on how the costs are spread (main report 5.9-8). In reality, potential costs would fluctuate with potentially higher rate impacts associated with the timing of the breaching plan. For example, estimates used for the current BPA power rate case showed total fish and wildlife impacts for a scenario that includes breaching the four lower Snake River dams could average $649 million per year for 2002 to 2006 and $830 million per year for 2007 to 2011. Studies associated with this rate case estimated that wholesale rates could increase by anywhere from 6 to 11 mills starting in 2007 as a result of breaching the four lower Snake River dams.

The FR/EIS attempts to illustrate how costs might be spread in an average monthly electrical bill. Averaging costs on a per person basis across large populations would tend to underestimate impacts. Increased costs are not averaged in the real world. Customers most reliant on electricity would experience greater effects.

Response: The potential rate impacts estimated in the Draft FR/EIS only reflect incremental rate increases that would likely be associated with breaching the four lower Snake River dams. These impacts are included in BPA's 6 to 11 mills estimate but they are not the only factors contributing to these totals. Other factors not related to actions on the lower Snake River are also likely to influence power rates in the future. The hydropower analysis conducted for this study was co-chaired by staff from the Corps and BPA. BPA participated in the hydropower analysis presented in the Draft FR/EIS and incorporated the findings of this analysis into the power rate case analysis referenced in the comment.

As noted in the Draft FR/EIS, pages 5.9-6 to 5.9-10, it is difficult to determine how increased wholesale rates would translate into increases in monthly power bills for different customers. Each utility purchases different amounts of BPA's wholesale electricity to serve its residential, commercial, agricultural, and industrial customers. Some Pacific Northwest utilities purchase almost no power from BPA and therefore rate increases would be very minimal to the customer. Other utilities rely exclusively on purchases from BPA and potential rate increases could be passed directly to the customer. The average possible increases in monthly bills presented in the Draft FR/EIS are for illustrative purposes only. The absolute dollar increase would be greater for those consuming more electricity. The potential regional and social effects of possible rate increases are addressed in sections 6 and 7 of Appendix I, Economics.

POW-3 Statements that increases in electricity rates of between 1.9 and 6.7 percent would have little social and economic effects because of low electricity rates in the region significantly underestimates potential impacts on electricity-dependent manufacturing facilities.

- Electricity rate increases would be greater for these industries than on average because generating costs comprise a larger portion of their total electricity costs on a per-kilowatt-hour basis resulting in relatively high percentage rate increases.
- While residential power rates in the Northwest are considerably below national averages, rates for aluminum smelters in the Northwest are higher than those for like facilities elsewhere in the world. Increased electricity rates would significantly affect the ability of these firms to compete.
- A 6.7 percent increase in power rates would represent an increase of $35,000 per year for Three Rivers Timber, Inc. in Kamiah, Idaho, a significant increase for a small business operator.
- A 5 percent increase in power rates would represent an annual increase of nearly $600,000 for Boise Cascade facilities, including $500,000 per year for the Wallula Paper Mill.
- Increases in this range would significantly affect irrigators and food processors in the region. Increases in power rates would decrease the competitiveness of regional food processors.

Response: The Draft FR/EIS recognizes that potential electricity rate increases associated with breaching the four lower Snake River dams could have significant effects on individual businesses and utilities. These potential effects are discussed in the RED analysis presented in Chapter 6 of Appendix I, Economics.

POW-4 The amount of replacement capacity appears to have been estimated based on average energy ignoring the value that peak hydro capacity can bring to the system.

Response: The hydropower analysis accounted for seasonal, daily, and hourly variations in power generation and value. All three power system models used in the hydropower analysis accounted for virtually every hour in the system and two of the models accounted for every water year. As a result, the analysis accounts for those hours when the value of energy is higher.

POW-5 The cost of serving unserved load is improperly estimated. The hydropower analysis arbitrarily determined that the cost of serving unserved load could be up to 5,000 mills/kWH. An estimate of willingness-to-pay is essential to determine the NED effect of unserved load and the amount of new resources is very sensitive to assumptions about the cost of this unserved load. It is doubtful that the value of one unit of electricity would have a marginal value product approaching the 1,000-5,000-mill range.

Response: The Corps disagrees that a value of 5,000 mills/kWh for unserved load was used in the analysis. This 5,000-mills/kWh analysis was only used in a sensitivity analysis to determine the significance of valuing the unserved load, and the basic analysis used graduated values in the range of 50 to 1,000 mills/kWh. This sensitivity test was explained in section 3.1.6.3 of Appendix I. The Corps agrees with the statement that the amount of new resources is very sensitive to the assumed value of unserved load. However, what is of most importance to the economic analysis is the magnitude of the NED costs as defined by the Total System Production Costs. As shown in Figure 3.1-4 of Appendix I, the Total System Production Costs did not increase significantly (on a percentage basis) with the increase in new replacement resources. Hence, the study team determined that the valuation of unserved loads in the 50 to 1,000 mills/kWh range was a reasonable approach. The recent market prices in the summer of year 2000 tend to support these relatively high values in periods of extreme temperatures, low water, and/or high demand.

POW-6 Since economies of scale are necessary to justify adding a generating unit there will always be some unmet load. These effects are not addressed in the hydropower analysis.

Response: The hydropower analysis addresses the issues of marginal costs, unmet loads, and capacity additions raised in this comment in Section 3.1.6.3 of Appendix I, Economics of the Draft FR/EIS. Additional information is provided in Section 5.4 of the Technical Report on Hydropower Costs and Benefits (DREW Hydropower Impact Team [HIT], 1999b), which is available on the Corps' website at http://www.nww.usace.army.mil/lsr.

POW-7 Secondary energy is incorrectly defined in paragraph 3.1.1 in Appendix I, Economics. This discussion incorrectly defines secondary energy as being excess over average conditions. Secondary energy is generally defined as energy that is excess over generation during a critical period. A critical period is a historic period of several months of low flows when energy generation is critical with respect to load requirements. This is usually the low water year of 1936/37. There is ordinarily a significant difference between generation in an average year and generation of a critical year.

Response: The text in paragraph 3.1.1 of Appendix I, Economics has been revised.

POW-8 The Draft FR/EIS addresses the increases in pollution and costs associated with breaching but does not address the real costs involved and bases its analysis on questionable assumptions. For example, the Corps assumes that 3,500 megawatt (MW) can be replaced with only 890 MW based on computer models that the public has not had the opportunity to review.

Response: The hydropower analysis estimated that a total of 1,550 MW of new capacity would be required to replace the hydropower generation that would be lost if the four lower Snake River dams were breached. This amount of new capacity is required to address both generation and transmission impacts. The 890 MW referenced in the comment is the amount of new capacity that would be required if the existing transmission system is assumed to remain reliable after the dams are breached. The cheapest way to maintain transmission system reliability would; however, be to

construct an additional 660 MW of additional generating capacity rather than build new transmission lines. This is discussed further in Section 3.1.6.3 of Appendix I, Economics.

The models used for the hydropower analysis are proprietary but widely used by electric utilities, the Northwest Power Planning Council, BPA, and the Corps. These models are described in Section 3.1.5 of Appendix I, Economics. Additional detail on the models is provided in Chapter 4 of the DREW HIT report.

POW-9 The Draft FR/EIS does not address the findings of the recent study by the NPPC, which estimated that there is a 24 percent chance that the region will be unable to serve loads at some level in winter months. The NPPC estimated that almost 3,000 MW of new capacity would be required to reduce the probability of blackouts to 5 percent. Dam breaching would exacerbate regional energy supply concerns. Breaching the four lower Snake River dams would also directly impact the reliability of the transmission system.

Response: The NPPC report identifies new additions required by 2003. The hydropower analysis conducted by DREW HIT recognizes that additional capacity will be required to meet load growth over time and assumes that these additions will be made, as necessary. Capacity additions required for 2010 and 2018 are shown in Table 25 of the DREW HIT report (1999b). These additions will be required regardless of whether dam breaching occurs. The hydropower analysis prepared for the FR/EIS only addresses the impacts associated with breaching the four lower Snake River dams. The effects of this action on the reliability of the transmission system are discussed in Section 3.1.6.3 of Appendix I, Economics.

POW-10 The Draft FR/EIS states that the analysis of Alternative 4—Dam Breaching did not include any hydropower impacts that may occur with changes in irrigation withdrawal from the lower Snake River reservoirs (pg. ES-6). Please clarify the purpose of this statement.

Response: A reduction in water withdrawal would result in more water available for hydropower generation. The hydropower analysis does not include the economic effects of any potential increases in water because it is not known how or if irrigation withdrawals would be affected by dam breaching. There would be an annual economic benefit to hydropower of about $2 million if all irrigation withdrawals were stopped as a result of dam breaching. This represents less than one percent of the estimated annual economic impacts of dam breaching. This issue is discussed further in Section 5.7.1 of the DREW HIT report (1999b).

POW-11 The Draft FR/EIS provides an inadequate and cursory review of the energy market in the region and how dam removal or retention affects that market. The System Operations Review looks at the Federal system in a static way that fails to consider how the system fits into the regional market. BPA's Business Plan and Final EIS is the most recent analysis of the dynamic energy market, and the FR/EIS should reflect the energy efficient scenario that BPA studied. BPA found that increased investments in cost-effective conservation would save BPA and the region's ratepayers' money while providing for cleaner air and allowing greater instream flows for salmon.

Response: A new section has been added to Appendix I, Economics that addresses conservation as an alternate source of replacement power. The findings of this new section have also been incorporated into the text of Section 5.9 of the main FR/EIS. The conservation measures identified in this new section are consistent with the cost-effective conservation measures in the referenced BPA plan.

5.19.2 Replacement Power Sources

POW-12 The Draft FR/EIS (page I3-13) states that combined cycle natural gas plants are the most cost-effective type of replacement power source over a wide range of factors but does not identify what is being measured. Is the intent to maximize power, minimize cost, or something else? From the EPA's perspective the goal should be to minimize environmental impacts. Cost should be considered concurrently with the benefits of achieving a cleaner environment.

Response: The intent is to minimize cost. The selection of combined cycle natural gas plants is based on the findings of an analysis of cost effective power sources conducted by the NPPC. The DREW HIT has also analyzed the use of conservation and renewable energy as possible replacement sources for the power that would be lost if dam breaching were to occur. This analysis has been added as a new section to Appendix I, Economics.

POW-13 The FR/EIS fails to recognize the effects of fossil fuel dependence.

Response: The Power Section of the FR/EIS has been revised to include a brief description of fossil fuel and its alternatives. The Transportation Section has also been revised to include a discussion of potential changes in fossil fuel use due to changes in transportation that would result from dam breaching.

POW-14 The Corps should investigate and report on the alternative energy sources and conservation options available for meeting potential energy needs and identify the potential air quality impacts associated with their use.

Response: A new section has been added to Appendix I, Economics that addresses conservation and renewable energy as an alternate source of replacement power. The findings of this new section have also been incorporated into the text of Section 5.9 of the main FR/EIS.

POW-15 The Corps should address a zero-carbon strategy where foregone power would be replaced through clean cost-effective energy conservation and non-hydropower renewable resources. The Corps should incorporate the findings of the Natural Resources Defense Council's report *Going with the Flow*: *Replacing Energy from Four Snake River Dams* that address this issue into the FR/EIS.

Response: The DREW HIT has addressed the findings of this report and references it in the new section on conservation and renewable energy that has been added to Appendix I, Economics.

POW-16 The Draft FR/EIS does not address the feasibility of obtaining replacement power through the installation of turbines at traditional flood control dams.

Response: The NPPC considered the addition of extra turbines at existing dams in the Columbia River System but this alternative was found to be less cost-effective than the construction of new combined cycle natural gas plants. New combined cycle natural gas plants were, as a result, considered in the DREW HIT analysis. As noted in preceding responses, a new section on conservation and renewable energy has been added to Appendix I, Economics.

POW-17 The cost of maintaining the environment at its base condition, i.e., the condition with dams in place, should be included in the NED analysis because the cost of mitigating noise, thermal, and air pollution are NED effects. New combined cycle natural gas plants could meet existing air

quality standards but still contribute to the degradation of the environment when compared to existing conditions. These costs also need to be captured.

Response: The costs of mitigating noise, thermal, and air pollution to meet existing air standards are included in the replacement power costs. Costs to reduce potential noise, thermal, and air emissions below existing air quality standards are difficult to quantify and are not included in this analysis. A new section that addresses alternate replacement power sources has been added to Appendix I, Economics.

POW-18 The Draft FR/EIS does not adequately address difficulties associated with developing replacement power sources if the dams were breached. Problems with the current analysis include the following:

- The Western Systems Coordinating Council (WSCC) is too large an area. The focus should be on the Pacific Northwest where most of the impacts would be.

Response: The WSCC is an integrated power system and, as a result, potential impacts need to be evaluated for the entire WSCC area. The focus of the analysis is, however, on the Pacific Northwest with potential impacts examined at the level of the WSCC, as appropriate.

- The Northwest Power Planning Council identified electricity reliability problems in the region in a December 1999 report. The solution to the reliability problem identified in the report is construction of 3,000 MW of power production, probably gas-fired units. This shortfall should be addressed before replacement power plants for lost hydropower.

Response: The DREW HIT analysis recognizes that additional capacity will be required to meet load growth over time and assumes that these additions will be made, as necessary. This is discussed further in response to comment POW-9.

- The difficulties and environmental effects associated with plant siting and construction must be identified and considered in the FR/EIS.

Response: The Corps is not proposing to construct or operate the combined cycle natural gas generating plants that could potentially serve as replacement power sources if the four lower Snake River dams were breached. Rather, it is assumed that private entities would develop these plants in response to market demand. It is possible, as assumed for the purposes of analysis in the DREW HIT analysis, that three of these plants could be located east of the Cascade Mountains, with another three located west of the Cascades, most likely in the Puget Sound region. However, these are just educated guesses and, therefore, examining site-related impacts is not possible at this time. Potential air quality impacts associated with these plants are, however, addressed in some detail. The potential economic and social effects are also discussed in detail in sections 6 and 7 of Appendix I, Economics.

- The FR/EIS should address the effects of replacement power sources on transmission systems in conjunction with the effects of new capacity required to address projected regional power shortfalls.

Response: As noted in response to comment POW-9, the DREW HIT analysis recognizes that additional capacity will be required to meet load growth over time and assumes that these additions will be made, as necessary. These additions will, however, be required regardless of whether dam breaching occurs. The hydropower analysis prepared for the FR/EIS only addresses the impacts associated with breaching the four lower Snake River dams. The effects of this action on the reliability of the transmission system are discussed in Section 3.1.6.3 of Appendix I, Economics. The potential effects of replacement power sources on transmission systems are discussed further in Technical Exhibit C of the DREW HIT report available on the Corps' website at http://www.nww.usace.army.mil/lsr (DREW HIT, 1999b).

- The hydropower analysis seriously underestimates present and future expected gas prices in its analysis of potential replacement power sources. This is also the case with present and expected oil costs. The Draft FR/EIS should also consider the effects on natural gas pipeline development in conjunction with the effects of new capacity required to address projected regional power shortfalls.

Response: The current prices of natural gas and oil are considerably higher than those used in the analysis. However, this may represent a cyclical phenomenon that is not uncommon in commodity markets and has occurred often in the natural gas and oil prices of the past. This study tried to identify the long-term outlook for commodity prices. Changes in long-term trends come about slowly and it is always hard to know when they change because the trends are hidden in the wild fluctuations. This type of uncertainty was recognized in the power analysis. The analysis included three possible forecast scenarios of low, medium, and high, which included a range of future values for several key parameters including gas and oil prices. These are documented in the DREW HIT report. If the current high prices are representative of a shift in the long-term prices of natural gas and oil, then the economic effects for hydropower losses would be closer to the high forecast. But, since no new long-term price forecast studies have been done since the completion of the power analysis, we have no supportable basis to change the initial findings at this time.

- Replacement power sources for lost hydropower need to be in place and operating before any hydropower is removed from the system. The Draft FR/EIS should provide a timetable that addresses the activities necessary to develop replacement power sources.

Response: All of the identified replacement power sources would not necessarily need to be in place and operating before the dams were breached. The existing power system would adjust to meet the loss of power by operating existing resources to a higher level until additional generating plants would be built. The DREW HIT analysis addresses the cheapest way of replacing the generating resources that would be lost if breaching were to occur. The replacement power discussion presented in the Draft FR/EIS assumes that new combined cycle natural gas generating plants would be phased in over time. Three new plants would go online in 2008 with three more plants constructed in 2009, 2010, and 2016, respectively. This timing assumes that new generating sources would be added in the most cost effective manner possible and also considers associated transmission requirements. Timing is also an important component in the conservation and renewable energy analysis that has been added to Appendix I, Economics.

POW-19 Hazardous waste issues associated with replacement power generation (thermal or nuclear) need to be addressed in the Draft FR/EIS. The economic impact study discusses energy replacement in terms of thermal power cost versus hydropower cost; it does not expressly state quantities of coal and/or fossil fuels to be transported or piped, nor does it discuss potential spills and explosions associated with transportation or piping of large quantities of these materials.

Response: The replacement power generation analysis has been expanded to include an analysis of conservation and renewable energy in addition to the analysis in the Draft FR/EIS, which assumes that lost hydropower would be replaced with combined cycle natural gas generating plants. The DREW HIT analysis does not quantify the minimal hazardous waste concerns that would be associated with these types of power production.

POW-20 The assumption that there will be no change in technology over the 100-year timeframe considered in the Draft FR/EIS is probably naïve and unrealistic. This assumption results in very high costs that represent 75 percent of the total projected costs associated with breaching the four lower Snake River dams. Advances in alternative sources of energy, such as solar, wind, or fuel

cells are highly probable. While these changes may not be immediately available, the hydropower analysis should offer several probable technology change options and associated cost estimates.

Response: A new section has been added to Appendix I, Economics that addresses conservation and renewable energy as an alternate source of replacement power.

POW-21 Why is there such a small range in the NED cost estimate, $251 million to $291 million, a 16 percent difference, but large ranges in the projected rate changes, $1.20 to $6.50 per month, a difference of 540 percent for residential users and $170 million to $940 million a month for aluminum companies, a 550 percent increase?

Response: The range of potential NED costs for power impacts is actually much larger than the $251 to $291 million range. The $251 to $291 million range represents the range with the medium forecast of several economic parameters. Table 5.9-4 in Appendix I of the FR/EIS shows the range of system power costs considering the low-, medium-, and high-range estimates of economic conditions. This NED range is $220 to $362 million for the dam breaching alternative. The rate impact analysis combines this range of NED effects with additional uncertainties of who might pay for these impacts, and this leads to a much wider range of potential rate impacts. These additional uncertainties are explained in Section 5.9.3 of Appendix I, Economics. The wide range comes from the fact that four different load groups were considered for spreading the rate impacts, and two different assumptions of whether the implementation costs would be allocated to hydropower rate payers were used. This wide uncertainty range is also applied to the different user groups in Tables 5.9-5 and 5.9-6.

POW-22 Are the projected monthly cost increases for aluminum companies calculated at the same rate as those for other potentially impacted consumers. Why would a loss of 5 percent of regional power generation result in such high increases for these users?

Response: See response to comment POW-21.

POW-23 The hydropower analysis presented in the Draft FR/EIS projects an annual power replacement cost of $271 million but the underlying DREW analysis acknowledges that given deregulation of wholesale electricity markets, replacement power from other sources is available at competitive rates. The Draft FR/EIS is, therefore, arguing that power rates would have to go up not to provide consumers with electric power at competitive rates but in order to cover the loss of past BPA revenues.

Response: The DREW analysis for power was based on detailed system modeling that fully recognized the availability and costs of replacement power that now exists and power resources that will be needed in the future to meet load growth, with and without the dam breaching alternatives. The NED costs primarily reflect the higher costs associated with generating from the alternative resources. The rate impact analysis simply identifies the wide range of possible ways to spread these costs over ratepayers.

POW-24 The hydropower analysis overstates the impacts of Alternative 4—Dam Breaching by estimating the net cost to replace each kilowatt at 5 mills when market values for wholesale power support a price differential of 3 mills or lower. The bias is further overstated by failing to adjust for the "substitution effect" of reduced demand for electricity in the face of higher prices. As result, replacement costs are overestimated by more than $100 million per year.

Response: The Corps could find no basis for the numbers stated in this comment, and there appears to be a misunderstanding on how the power analysis was done. The concern with "substitution effect" probably relates to the fact that price elasticity was not considered in this analysis. This was recognized as a limitation to the analysis. See Section 3.1.5.3 of Appendix I for discussion of this point.

5.20 Water Supply

WS-1 The Draft FR/EIS misleads public/decision makers on cost estimates for maintaining water supplies under Alternative 4 because it ignores other more cost-effective means. The Water Supply section in Appendix I, Economics partially justifies the limited scope of the analysis by stating that water supply NED impacts are small compared to the impacts associated with other resource areas. While this might be true from an NED perspective, more than half of the long-term job loss predicted by the regional analysis is based on the assumption that all lands presently irrigated by Ice Harbor pool would go out of production. The analysis needs to examine the following issues.

- Less expensive modifications to irrigation pump systems. Earlier engineering studies suggested that extensions of individual irrigation pumps to near-natural river elevations are feasible at a total cost of $37 million (Anderson & Perry, 1991), which is significantly less than the $300 million estimated in Draft FR/EIS.

Response: The study team is fully aware of the system and associated costs described in Anderson-Perry (1991). Unfortunately, it was determined that this type of system could not provide the water demanded under the near-natural river conditions. Refer to Annex O of Appendix D for the engineering discussion.

- Replacing existing surface water supply with groundwater. While Section 3.4 (Water Supply) of Appendix I suggests that it would not be feasible to replace the existing water supply with groundwater, information presented elsewhere in this section suggests that groundwater wells are already a significant, functional source of irrigation water.

Response: Although it is not clear what other information about groundwater wells is referred to in the above comment, the Corps agrees that groundwater is an important component. Unfortunately, it is unlikely that additional groundwater can be relied on as a replacement for loss of surface irrigation water under dam breach conditions. As noted in Annex P, Appendix D section P.1, the aquifers adjacent to the river could be greatly affected by the dam breach and it is probable that current well users will experience a loss of water that will be difficult to restore. Even though it is unlikely that surface water can be replaced with groundwater sources, a sensitivity analysis of this scenario is included in Appendix I, Section 3.4, Water Supply to show how economic impacts would be changed.

- Modifying irrigation pump systems for the highest value acreage. The Water Supply analysis presented in the Draft FR/EIS assumes that dam breaching would lead to a loss of production from all 37,000 acres presently irrigated by Ice Harbor pool. However, as noted on page I6-15 of Appendix I, Economics,

about 21 percent of the irrigated land represents 51 percent of the total value of all production and over half the jobs, income, and business sales that would be lost if the dams were breached. The FR/EIS should, at a minimum, investigate pump modifications to supply just these 7,750 acres.

Response: The irrigation system presented in the water supply report is considered the only system that would work for all current irrigators. Any further alternative analysis to determine what proportion (if any) of the farm land could stay in production would require a detailed evaluation of individual operations and their on-farm systems, and consideration of where they are located and the types of crops they grow. Significant issues preclude us from pursuing this scenario or assuming that permanent crops can be kept in production. As noted in Annex P, Appendix D section P.1, the aquifers adjacent to the river could be greatly affected by the dam breach and it is probable that current well users will experience a loss of water that will be difficult to provide in the short run and potentially the long run as well.

Even though it is unlikely that surface water can be replaced with groundwater sources, a sensitivity analysis of this scenario is included in Appendix I, Water Supply Section 3.4 to show how the most-likely estimate of economic impacts would be changed.

In addition to direct economic impacts, the sensitivity analysis does provide information that was used to indicate the potential range in the regional economic impacts. The RED analysis presented in Chapter 6 of Appendix I, Economics uses two scenarios to assess the regional impacts (impacts on jobs, personal income, and business transactions) associated with agricultural land irrigated from Ice Harbor Reservoir. The first assumes that all 37,000 acres of cropland would go out of business. The second assumes that 21 percent of the irrigated land might support development of alternate water supplies to replace lost irrigation water. The impact figures used in the overall regional summary use the midpoint between these two estimates (see response to comment SR-13).

- Errors and lack of evidence in the analysis of private wells presented in the Draft FR/EIS. This analysis concludes that partial dam removal would impact 40 percent of private wells and calculates the associated modification cost based on a typical cost per well. There is no evidence supporting the conclusion that 40 percent of wells would be affected and the typical well modification cost is inflated because several large irrigation wells were included in the Corps sample, even though they comprise a small portion of the private wells in the potentially affected area. Further, the Draft FR/EIS suggests that nearly 10 percent of the wells may not be functioning but includes them in the analysis.

Response: The text in Section 5.10 of the EIS and Section 3.4 of Appendix I, Economics will be revised to correct the number of wells that could be potentially affected.

- The costs to irrigators if the four lower Snake River dams are not breached. The Draft FR/EIS does not address the costs to irrigators of additional flow augmentation that would be necessary if the dams were not breached. The BOR estimates that annual increased flow augmentation costs to southern Idaho farmers and taxpayers would range between $151.3 million and $1.3 billion. Further, water utilities in Idaho project additional surface water demands in the very near future and are concerned that flow augmentation limits their access to surface water.

Response: As discussed in Section 3.6 of the Draft EIS, additional flow augmentation was eliminated from detailed evaluation because the probability of implementation was unlikely due to cost and relative benefit. For additional information about the BOR flow augmentation analysis refer to the BOR study report *Snake River Flow Augmentation Impact Analysis Appendix* prepared for the Corps, February 1999 (BOR, 1999).

WS-2 The estimated net cost associated with reductions in irrigated agriculture appears to be unrealistically high because it assumes that all production would be lost on this acreage.

- If the assets were subsequently acquired at low cost, alternative crops, farm practices and irrigation techniques may be economically feasible to sustain some portion of existing production.
- Conservation measures, such as night and drip watering in addition to the selection of crops that require less water and heavy mulching to reduce water loss, could allow the current level of agricultural use to continue and should be evaluated.

Response: Please refer to the response to comment WS-1.

WS-3 Breaching the dams would result in groundwater depletion. The FR/EIS needs to address potential effects of lowering ground water from increased drilling and pumping. If Alternative 4 is selected, what is the effect on percolation and depth of water table with new pumping? How will breaching affect the water table within 5 miles of Snake River? Low flows in the summer months may not allow withdrawal if dam breaching were to occur.

Response: We concur that there are many uncertainties. If dam breaching is the preferred plan, further refinement and analysis of the water supply impacts will be required. This need is acknowledged in Annex P of Appendix D and Appendix I, Sections 3.3 and 3.4.

WS-4 Breaching the dams would impair existing water rights. The Clarkston Golf & Country Club, for example, has a water permit to withdraw from the lower Snake River. If the dams were breached, the Country Club would no longer be able to use its existing system to irrigate its golf course and would incur significant costs to develop alternative water supplies.

Response: We concur. The potential economic impact is incorporated in the water supply analysis and the cost to modify the intake has been included. Refer to Appendix I, Section 3.4.3 and Appendix D, Section 8.3 for a discussion of this issue.

WS-5 The Draft FR/EIS needs to be consistent among sections on the number of existing wells that could be potentially affected by Alternative 4—Dam Breaching. Page 5.10-7, line 33, identifies 209 functioning wells within one mile of the lower Snake River. Page D8-3 of Appendix D, Natural River Drawdown Engineering identifies approximately 180.

Response: We concur. As noted in response to comment WS-1, the water supply section in the FR/EIS and in Appendix I, Economics, has been updated to match information presented in the engineering appendix.

WS-6 The identified cost of modifying less than 100 wells ($56.5 million) seems extremely high. There should be some discussion of the analysis used to generate these estimates. The costs of recently constructed wells in the region should be included for comparison.

Response: Because of the high level of uncertainty in the actual number of wells that would be impacted and what would be required to restore them, a large contingency cost has been included. Refer to Chapter 8, Appendix D. If dam breaching is the preferred plan further refinement and analysis of the water supply impacts will be required.

WS-7 The FR/EIS needs to look at the value of water not used by irrigators. This is a valuable commodity for fish, hydropower downstream, and less costs are associated with electricity required for pumping when not used.

Response: This issue is addressed in Section 5.7.1 of the Technical Report on Hydropower Costs and Benefits (DREW HIT, 1999b), which is available on the Corps' website at http://www.nww.usace.army.mil/lsr. It was determined that a reduction in water withdrawal would result in more water available for hydropower generation. The hydropower analysis does not include the economic effects of any potential increases in water because it is not known how or if irrigation withdrawals would be affected by dam breaching. However, it was determined there would be an annual economic benefit to hydropower of about $2 million if all irrigation withdrawals were stopped as a result of dam breaching.

WS-8 Boise Cascade has fiber farms below the mouth of the Snake River that would be significantly affected if dam breaching were to occur. These farms, which grow cottonwood trees for Boise Cascade's paper mill at Wallula, are irrigated from Ice Harbor reservoir. Siltation associated with breaching, as well as the need to obtain a permit for water withdrawal from the free-flowing Snake River, would significantly affect Boise Cascade's operations. Boise Cascade estimates that replacing and relocating pumping stations and increasing irrigation system filtration would cost between $14 million and $23 million. In addition, the new pumping station would need to be constructed prior to breaching Ice Harbor Dam, as the cottonwood trees need a continuous source of water. These impacts need to be addressed.

Response: We agree that there would be significant impacts to farm operators who pump out of Ice Harbor under dam breach conditions and have incorporated this into the water supply analysis. Modifications to individual plants were considered but rejected because of sedimentation, shallow depth, and fluctuation of the natural river issues and construction timing considerations. As a result, a corporate single intake system to be used by all farm operations was developed. The associated costs are included in the economic analysis. Please refer to Appendix I, Section 3.4 and Appendix D, Annex O.

5.21 Land Ownership and Use

LOU-1 The FR/EIS should discuss ownership of the beds of navigable waters in the areas associated with the dams in more detail. There currently is not enough information to determine ownership.

Response: Lands ownership and status is discussed in paragraph 5.11.2.2 of the FR/EIS. More detail is presented in Appendix K, Real Estate. The land below the ordinary high water line of the original river bed was never acquired by the Federal government, and therefore remains in State ownership. Lands which would become exposed as a result of Alternative 4—Dam Breaching, would be retained by the Federal government for restoration purposes. If any lands were no longer required, they would be reported to GSA for disposal. Additional information on fee lands and public domain lands versus State owned lands has been provided in the Final FR/EIS.

LOU-2 The FR/EIS should identify that the lands that would be exposed if dam breaching were to occur would remain under Federal ownership with public access managed and maintained by a Federal land management agency such as the Forest Service or Bureau of Land Management.

Response: Lands ownership and status is discussed in paragraph 5.11.2.2. More detail is presented in Appendix K, Real Estate. The land below the ordinary high water line of the original river bed was never acquired by the Federal government, and therefore remains in State ownership. Lands that would become exposed as a result of Alternative 4—Dam Breaching, would be retained by the Federal government for restoration purposes. If any lands were no longer required, they would be reported to GSA for disposal.

LOU-3 What role would the Corps have in the lower Snake River region if the dams were breached? What would happen to all the land presently owned by the Corps? Would these lands be returned to private control? If not, why not?

Response: Lands ownership and status is discussed in Subsection 5.11.2.2. More detail is presented in Appendix K, Real Estate. The land below the ordinary high water line of the original river bed was never acquired by the Federal government, and therefore remains in State ownership. Lands that would become exposed as a result of Alternative 4—Dam Breaching, would be retained by the Federal government for restoration purposes. If any lands were no longer required, they would be reported to GSA for disposal. The Corps would continue to function in the region per mandates of Congress.

LOU-4 The FR/EIS needs to describe any right-of-way use authorizations that have been granted by the Corps in the past and how these easements would be affected by each of the alternatives. This description should include information on who the easements are granted to and for what purpose, as well as the agreed upon life of the easement.

Response: Appendix K, Real Estate, addresses those outgrants issued by the Corps. This information has been brought into the Final FR/EIS main report, as will an assessment of impacts by alternatives. Maps associated with Appendix K, show the location for all the outgrants along with a reference number. The names of individual grantees and outgrant specifics will not be identified in this report, however, the information is public record and is on file in the Walla Walla District office.

LOU-5 The Washington Department of Natural Resources would need to see detailed plat maps of any DNR-managed lands that the Corps would need to acquire.

Response: Appendix K, Real Estate, discusses the steps to acquire rights-of-entry or other agreements in order to perform mitigation on private or other public lands. Activities such as extending recreation facilities below the ordinary high water line of the original river bed would require such interaction with the States of Washington and Idaho. If Alternative 4—Dam Breaching was selected as the preferred alternative, activities as described in Appendix K would occur during the Plans and Specifications stage of project development when specific sites for mitigation would be selected.

LOU-6 What areas, if any, does the Corps expect to revert to DNR management?

Response: Lands ownership and status is discussed in paragraph 5.11.2.2 of the FR/EIS main report. More detail is presented in Appendix K, Real Estate. The land below the ordinary high water line of the original river bed was never acquired by the Federal government, and therefore

remains in State ownership. Lands that would become exposed as a result of Alternative 4—Dam Breaching, would be retained by the Federal government for restoration purposes. If any lands were no longer required, they would be reported to GSA for disposal. The Corps does not manage any DNR lands on the lower Snake River.

5.22 Recreation

5.22.1 DREW Recreation Analysis

REC-1 The recreation economic effects associated with breaching are underestimates. The analysis presented in the Draft FR/EIS should be corrected in the following ways:

- Use the middle estimates of recreation use.

Response: The rationale for selecting $82 million as the most likely estimate of net changes in recreation value if dam breaching were to occur is explained on page I3-56 of Appendix I, Economics of the Draft FR/EIS. This value has been revised to $71 million, primarily in response to technical review comments provided by the Northwest Power Planning Council's Independent Economic Analysis Board (IEAB). The new likely estimate is presented and discussed in the Final FR/EIS.

- Do not average high and low per-day values. In addition to averaging estimated per-day values for existing and free-flowing rivers, the Corps bases its analysis solely on travel cost, ignoring other recreation spending that makes a major contribution to the economy.

Response: See above response. As stated on page I3-46 of Appendix I, Economics of the Draft FR/EIS, for the purposes of analysis, economic values associated with recreation are separated into direct and indirect economic values. Direct values, which represent the recreationist's willingness to pay for recreation, are measured in the NED recreation analysis using a hybrid Travel Cost Method based on contingent behavior. Indirect values, which measure the effects on local economies associated with recreation-related expenditures on lodging, gas, food, etc., are evaluated in the Regional Economic Development analysis presented in Chapter 6 of Appendix I, Economics and summarized in Section 5.13 of the Draft FR/EIS.

- Use more reliable per-day values. A 1999 study by the Idaho Fish and Game Foundation, for example, found that a restored salmon fishing season would bring $72 million per year in spending for fishing recreation and $170 million per year in economic activity with a per day value of $189, which is much higher than the figure used in the Draft FR/EIS.

Response: The recreation analysis presented in the Draft FR/EIS is being evaluated further. Additional information has been added to the recreation analysis in the FR/EIS. The revised recreation analysis yielded a low and high value per day, $38 and $87, respectively. The low value per day is based on a survey of existing anglers on the lower Snake River. The high value is based on the Natural River Contingent Behavior survey conducted for this project. The new point estimate used in the NED analysis uses the high per day value, which is reportedly consistent with literature values for anadromous fishing as reported in Walsh, Johnson, and McKean, 1992, adjusted for inflation.

- Include the value of downriver and ocean recreation harvest. Estimated recreation benefits are presently limited to the lower Snake River above its confluence with the Columbia.

Response: Direct downriver and ocean recreation harvest values are presented in Section 3.5 Anadromous Fish of Appendix I, Economics. Indirect values are summarized in Chapter 6. Additional detail on this analysis is presented in the October 1999 report prepared by the DREW Anadromous Fish Workgroup, which is available on the Corps website at http://www.nww.usace.army.mil/lsr. Total NED benefits

associated with recreation are summarized at the beginning of Section 3.2 of Appendix I, Economics and Section 5.12 of the main FR/EIS.

- Reassess the assumptions that limit out-of-region visitors. By not counting non-respondents in the low-use and other scenarios, the Draft FR/EIS reduces and distorts the potential economic contribution of visitors from outside the region. The analysis presented in the Draft FR/EIS also fails to evaluate the possibility of visitors from outside the Pacific Northwest and California, even though the Draft FR/EIS states that data from other wild rivers show that 33 percent of visitors to free-flowing rivers in central Idaho come from more than 1,000 miles away (page I3-49). Further, the Northwest Sportfishing Industry Association's experience is that one-quarter of the angler days in the region are from out-of-State clientele.

Response: This and other assumptions were reassessed. Additional information was added to the recreation analysis in the FR/EIS.

REC-2 The DREW recreation analysis limits the number of fishing trips to the lower Snake River based on species availability. The number of annual trips is limited to 500 for the first 5 years and then 14,000 over the next 95 years. This contrasts significantly with the actual results of the very limited 1997 chinook season on two Salmon River tributaries in Idaho. According to the Idaho Department of Fish and Game, the very brief season produced 14,714 trips over a few weeks.

Response: The DREW recreation analysis reflects data gathered on the amount of time necessary to catch salmon and the projected availability of each species. This is consistent for all alternatives. On page I3-49 of Appendix I, Economics, we discussed that the availability of salmon for harvest was estimated by the interagency PATH biologists and extended by the DREW Anadromous Fish Workgroup. The DREW recreation analysis reflects data gathered for steelhead angling on both the unimpounded stretch of the Snake River above Lewiston and on the lower Snake River reservoirs. The limited availability of salmon for recreation fishing was assumed to constrain the number of angler trips. Additional discussion of the calculation procedures used to estimate the recreational angling NED benefits has been added to Appendix I, Economics, Section 3.2.

REC-3 Fishing benefits associated with breaching are highly dependent on estimates developed from the results of the PATH analysis. These results have been called into question by NMFS's more recent CRI analysis. As a result, the recreation estimates are also extremely uncertain.

Response: Comment noted.

REC-4 The recreation analysis presented in the Draft FR/EIS identified two cost per day values for recreational fishing—$39 and $76 (page I3-51). The analysis took an average of these values to develop the point estimate for recreation benefits under the dam breaching scenario. The high value was based on the recreation surveys that specifically addressed this issue. The Idaho Department of Fish and Game surveyed those who actually fished in the limited 1997 season and found per day expenditures of $145.38 for the first trip and $86.39 for the last trip. These findings suggest the high value identified by the DREW Recreation Workgroup is more accurate than the low or middle estimate.

Response: The revised point estimate in the Final FR/EIS uses ($71 million). This figure is the result of combining the low NED value for non-angling or the general recreation Middle Estimate 2 ($59.5 million) with the high NED value for sportsfishing ($45.23 million) and subtracting the existing reservoir recreation value ($31.6 million), and the increased annual operation and

maintenance costs of additional campsites ($2.605 million). The high (per-day) rate for sportsfishing is $87. The low (per-day) rate for general recreation is $77.

REC-5 Variable travel costs should be divided by number of persons per vehicle, usually 2.7. There is no indication that this has been done. If it has not, dividing the total by 2.7 would reduce the recreation benefit to about 37 percent of the claimed value.

Response: Both the McKean and Loomis valuation models used trips because it is a logical way to ask respondents their costs. However, the trip values were then divided by the length of trip and converted to days.

REC-6 The recreation analysis does not consider that a number of visitors who indicated that they would visit a near-natural lower Snake River would otherwise visit another location offering a similar type of recreation experience. If this is the case, a portion of the estimated NED benefits may in fact be a transfer from one location to another and not NED benefits. If the data cannot support that the lower Snake River is the only destination, the WRC guidelines that this study is based upon do not allow the use of the Travel Cost Method (TCM).

Response: The issue of whether a portion of the estimated NED benefits may actually be a transfer from one location to another and not NED benefits is being assessed. This issue has been briefly addressed in the revised recreation analysis presented in Appendix I, Economics, Section 3.2.

REC-7 WTP estimates appear to be made per trip and not per user day, as required. The benefit evaluation also appears to be based on use estimates of a single year with no growth in the future.

Response: See response to comment REC-5. There is no requirement to calculate WTP estimates based on days as opposed to trips. The benefit evaluation for non-anglers is based on a single point in time with no assumed growth for any alternative.

While growth was not considered for non-anglers, growth was assumed for the calculation of angling benefits. This growth was directly tied to the number of fish available for harvest, which is projected to increase over time. The growth function for angler benefits was based on the actual number of fish available for harvest, which is a physical change over time and not an intangible rate of change based on the time value of the resource.

REC-8 The recreation analysis needs to include the site development costs that would be necessary to accommodate new visitors. Current capacity is only adequate to accommodate 35 percent of the projected free-flowing river use. Questions surround existing site capacity and site suitability. The Draft FR/EIS indicates that some sites will not be suitable for up to 20 years and also identifies aesthetic problems that may not be factored into the evaluation. This will affect use and user day values. The costs of extending all existing recreation access to the river level that would exist if dam breaching were to occur should be included in the assessment of Alternative 4-Dam Breaching.

Response: The DREW Recreation Workgroup assumed that the existing number of developed campsites would double in the first decade following dam breaching. While the benefits from this assumed doubling of developed campsites were included in the Draft FR/EIS, the associated construction and O&M costs were not. Both construction and O&M costs are now presented in the FR/EIS. The effects of dam breaching on individual recreation sites are discussed in Section 5.12 of the Draft FR/EIS.

REC-9 The number of visitors projected under the dam breaching scenario assumes that breaching would result in a pristine natural wonder. Breaching the four lower Snake River dams could equally result in a putrid river meandering over immense mud flats, with few fish and sparse vegetation on its barren banks for years to come. The recreation analysis should take this potential outcome into account.

Response: Comment noted.

REC-10 Fifty years ago the Snake River was a wild dam free river and very few people visited it.

Response: Comment noted.

REC-11 The use of the rivers for recreation has increased immeasurably since the dams were built.

Response: Comment noted.

5.22.2 Presentation of Analysis and Results

REC-12 The recreation analysis is not clearly presented. The Corps should revisit and present the underlying assumptions more clearly for the benefit of decision-makers and the public. The revised recreation analysis should also discuss contrasting views on the difference between recreational fishing under existing conditions and the dam breaching scenario.

Response: The presentation is being revised and will more clearly explain the underlying assumptions and methodology, as well as the results. Additional information has been added to the recreation analysis section in the FR/EIS.

REC-13 Is the TCM application net of all without project conditions? Reservoir use in the without-project condition was accounted for but no adjustments beyond that are apparent based on the summary provided in Section 3.2 of Appendix I, Economics.

Response: The NED recreation benefits estimated for Alternative 4—Dam Breaching are net of Alternative 1—Existing Conditions. These results are presented in Table 3.2-7 of the Draft FR/EIS Appendix I, Economics. The text immediately below this table states these are net effects. In the case of Alternative 4—Dam Breaching, existing reservoir recreation benefits are subtracted from projected benefits. There are, however, some formatting problems with the final three rows of Table 3.2-7, which may have caused some confusion. These errors have been corrected and additional text has been added to clarify the methodology and results of the DREW recreation analysis.

REC-14 The recreation analysis presentation does not illustrate where the benefits associated with breaching come from in terms of net change from the without project condition or the calculations needed to turn the projections into equivalent annual values.

Response: Additional information has been added to Section 3.2 of Appendix I, Economics to clarify the methodology and results of the DREW recreation analysis.

REC-15 There are discrepancies in the recreation value associated with Alternative 4 - Dam Breaching. The executive summary for the Draft FR/EIS identifies an average annual value of $82 million, while information provided in Table 3.2-7 and the Risk and Uncertainty section of Appendix I, Economics suggest a value of $196 million annually.

Response: The revised point estimate in the Final FR/EIS uses ($71 million). This figure is the result of combining the low NED value for non-angling or the general recreation Middle Estimate 2 ($59.5 million) with the high NED value for sportsfishing ($45.23 million) and subtracting the existing reservoir recreation value ($31.6 million), and the increased annual operation and maintenance costs of additional campsites ($2.605 million). The high (per-day) rate for sportsfishing is $87. The low (per-day) rate for general recreation is $77. For additional information see Table 8-1 on page 18-4 of Appendix I.

5.22.3 Direct and Indirect Recreation Values

REC-16 The recreation analysis does not distinguish between the amounts spent by local visitors and those from out of town who would travel long distances to fish for salmon and steelhead, staying in hotels/motels at their destination and using other services such as restaurants and marinas.

Response: The NED economic effects of breaching the four lower Snake River dams were calculated based on willingness-to-pay estimates estimated using a Travel Cost Method. The Travel Cost Method uses the number of trips taken and the visitor's travel cost to develop a statistical demand curve. This approach is described on pages I3-43 and I3-44 of Appendix I, Economics. The distinction between direct and indirect recreation values is discussed in the response to REC-1, bullet two and on page I3-43 of Appendix I, Economics.

REC-17 Washington State Tourism estimates that $149 per party of 2.7 is spent per day in Washington State. In order to reach $82 million, dam breaching would have to result in 4,084 visitors a day for the entire year. A total of 1,490,909 people would use only 33 developed recreational sites annually. Further, daily visitation rates would be even higher during the peak months from May to September.

Response: This comment confuses direct and indirect recreation values. Average daily tourism expenditures are not comparable to the travel costs developed by the DREW Recreation Workgroup. After further review, the $81 million recreation benefits associated with Alternative 4 has been changed to $71 million in the Final FR/EIS. The distinction between direct and indirect recreation values is discussed in the response to REC-1, bullet two and on page I3-43 of Appendix I, Economics.

REC-18 As a whitewater rafter and a power boater, I fail to see how there can be the same economic impact from rafting as there is for boating. When rafting we bring all our supplies from home and we purchase no fuel. Power boating involves paying for a campground spot, buying local food and beverages, and fuel.

Response: See response to REC-17.

REC-19 The identified recreation benefit of $82 million projected in the Draft FR/EIS should be reduced by the replacement costs of all listed boats within the 150 miles of the stretch of river between Pasco and Lewiston.

Response: See response to REC-17.

5.22.4 Recreation Costs and Benefits Excluded from the Analysis

REC-20 No one really believes that removing four dams will cause hordes of tourists to come to eastern Washington and spend $150 million a year, which the Draft FR/EIS identifies as the single largest benefit of dam removal. Anyone can write a survey that will get people to say they'll come and visit, but common sense says development brings more people than anti-development.

Response: Comment noted.

REC-21 The Draft FR/EIS does not discuss current river recreation or gains and losses to those uses if dam breaching were to occur. The sale of boats and boating equipment would, for example, be significantly impacted.

Response: Current river recreation uses and gains and losses to these uses are discussed in Sections 4.13 and 5.12 of the Draft FR/EIS. In addition, economic values are assigned to these uses through a series of surveys, as discussed in Section 5.12, as well as Section 3.2 of Appendix I, Economics.

REC-22 Hunting opportunities would increase with drawdown. These benefits, as well as those associated with changes in sightseeing, wildlife viewing, birdwatching and other non-consumptive recreation activities, should be incorporated into the recreation section and economic analysis.

Response: These benefits were not discussed directly in the FWCAR. The FWCAR did discuss habitat alteration and reestablishment of vegetation after dam breaching. If the habitat reestablishes along the exposed shoreline with poplars and willows, birdwatching will improve after about 20 years. The bird variety will improve somewhat, but if the HMUs are not maintained, some diversity will be lost. Wildlife viewing and sight-seeing may actually be worse because visibility of the shoreline will be reduced as the vegetation matures. Access to the river will be somewhat restrictive because only jet boats and non-motorized boats will be able to use the river. The number of people actually viewing the river corridor may be less. If the water quality at the established parks is bad after dam breaching, less people will swim in the river. If the Snake River were a pristine river, this would not be a problem. However, it is a major river which goes through a lot of farmland before reaching Hells Canyon Dam. Hiking may improve along the river because the natural shoreline will be flatter in many areas. If trail building occurs from established parks and HMUs, wildlife viewing could improve over time. Visual beauty should not improve dramatically except at rocky canyons such as Anchor canyon (near Fishhook Park) or the Palouse River. The DREW recreation analysis incorporated general or non-angling recreation activities in the analysis in Section 3.2 of Appendix I. Fourteen recreation activities were presented as choices in the contingent behavior survey. Three of these activities involved angling. The remaining 11 general recreation activities are grouped in Table 3.2-8 of Appendix I.

REC-23 The Draft FR/EIS does not take into account other types of recreation activities that would be affected by breaching. The Tri-Cities and the Mid-Columbia are "a vibrant waterfront location offering year-round golf, wine tourism, enhanced parks and trails, state-of-the-art sports facilities, regional events and heritage experiences associated with the Lewis and Clark Bicentennial," as well as agriculture-related festivals and events. Potential recreation-related effects of breaching that are not taken into account by the Draft FR/EIS include the following.

- The financial impact of new pumps and irrigation systems would, for example, put many of the 80-plus tourist friendly wineries in the region out of business, as well as negatively affect agricultural and food processing activities that presently attract many visitors to agricultural events and festivals. Pasco is the

site of the largest open air fresh produce farmer's market in the State which supports many small businesses and has been the center of efforts to revitalize the downtown area.

Response: The Draft FR/EIS addresses the possibility that the 37,000 acres presently irrigated from the Ice Harbor Reservoir would go out of business if dam breaching were to occur. The regional economic effects of this scenario are addressed in Chapter 6, Regional Economic Development of Appendix I, Economics and summarized in the main text of the Draft FR/EIS.

- Sports marketing in the region is dependent on irrigated sports facilities, such as golf courses and soccer, softball, and baseball fields that host national tournaments and nationally-recognized sporting events.

Response: The Water Supply analysis, presented in Section 3.4 of Appendix I, Economics, addresses the potential effects of reductions in water supply if dam breaching were to occur. Dam breaching is not expected to affect irrigated sports facilities with the possible exception of the Lewiston Golf Course.

- Thousands of visitors that come to the rivershore parks each year to view national hydroplane race activities would be discouraged from visiting these areas which would be severely impacted by erosion, silt, and fluctuating water levels if dam breaching were to occur.

Response: Hydroplane race activities are on Lake Wallula (behind McNary Dam) on the Columbia River. As a result, breaching the lower Snake River dams is not expected to affect these activities.

- The DREW transportation analysis (Section 3.5.6, Appendix I) acknowledges that, with dam breaching, there would be an increase of approximately 95,200 truck trips to the Tri-Cities area in Washington. However, with the implementation of the highway improvements identified in the DREW transportation analysis, the report indicated that highway congestion should not increase. However, if dam breaching is selected as the preferred alternative, more detailed engineering and traffic studies would be required to determine what highway improvements would actually be needed.

Response: This is theoretically possible, but there are too many unknown variables for any kind of estimate of possible economic impact to be made.

REC-24 Increased highway traffic that would result if the four lower Snake River dams were breached would interfere with gateways to wild and scenic areas. Highway 12, east of Kooskia in the designated Federal Wild and Scenic area of the Middle Fork Clearwater River, would become a "trucking freeway" to the Port of Lewiston. This would not be compatible with this Federally-designated area.

Response: Comment noted.

5.23 Social and Regional Resources

5.23.1 Regional Demographics and Employment

S/R-1 The Draft FR/EIS should clearly state that 2,988 long-term jobs with an average income of $33,066 would be lost, while 2,277 jobs averaging an annual income of $22,226 would be gained. Please provide more information on the types of jobs that would be lost and those that would be gained. Given the recreation benefits projected for the dam breaching alternative in the Draft FR/EIS it is likely that most of the new jobs would be recreation-related. Many recreation-related jobs are seasonal. If this is correct, what would the impacts be during the off-season? The Corps should evaluate the characteristics of existing recreation-related jobs in the Lewiston, Idaho area, particularly those related to the Snake and Clearwater Rivers upstream of Lewiston. Do people involved in the recreation industry claim unemployment benefits in the off-season, do they move

elsewhere for other work, and what is the cost to local communities from this type of change in employment?

Response: It is clearly stated on page 5.13-8 of the Draft FR/EIS that the lower Snake River study area would gain 2,277 jobs with an average income of $22,266, while the same area would lose 2,988 jobs with an average income of $33,066. The same paragraph summarizes the types of jobs gained and lost. Additional detail on employment change is provided in Appendix I, Economics, Chapter 6. Additional detail beyond that available in Appendix I is presented in the DREW Regional Analysis Workgroup report, which is available on the Corps website at http://www.nww.usace.army.mil/lsr. These numbers have changed between the Draft and Final FR/EIS in response to comments made by reviewers.

Local chambers of commerce in the area upstream of Lewiston indicate that jobs gained in recreation are sometimes seasonal and pay less than forest products type jobs. Recreation jobs related to fishing are nearly full season jobs with some slowdowns occurring in winter months. Some of the jobs lost in recreation are students going back to school. In these cases, there are usually no unemployment claims.

S/R-2 Provide the economic characteristics of the jobs gained and lost in the region outside the lower Snake River study area.

Response: Information on employment change is provided in Appendix I, Economics, Chapter 6 with additional detail presented in the DREW Regional Analysis Workgroup report, which is available on the Corps website at http://www.nww.usace.army.mil/lsr. More detail on the projected job changes related to commercial fishing and ocean recreation, which are presented in Appendix I, Economics, Section 6.4, is provided in the DREW Anadromous Fish Workgroup Report (1999c) also available on the Corps website. The Final FR/EIS will be revised to more clearly define impacts outside of the lower Snake River study area.

S/R-3 Short- and long-term employment and income change should not be viewed simply in net terms but in terms of their impact to local populations. Would short-term construction jobs, for example, go to the people that would be negatively affected by dam breaching or would they go to workers skilled in the relevant construction activities who would move to the area for work and then move elsewhere following conclusion of the job?

Response: See response to comment S/R-2. Impacts to local populations are further discussed in Chapter 7 of Appendix I, Economics, with additional detail provided in the DREW Social Analysis Report (1999d), which is also available on the Corps website. What companies would bid on and win such contracts is unknown. It is likely that local construction union shops would bid on related construction jobs from Tri-Cities to Lewiston. Some of this employment would filter down to local members in these communities but it is difficult to say how much. It is also difficult to speculate how many workers affected by dam breaching would modify their skill levels to benefit from the changes. The net calculations from short- and long-term job and income changes gives no extra weight to the benefits created at the beginning of the study period. It thereby assumes all the short-term personal income changes leave the area after those processes are completed. This may not be completely true. Some families who move into the area from other locations may stay there after the initial construction is completed. It is nearly impossible, however, to quantify in numbers.

5.23.1.1 Fishing

S/R-4 The employment analysis presented in the Draft FR/EIS is based on a definition of the impacted region that excludes coastal, tribal, and river communities that stand to benefit from recovered salmon and restored fishing. This exclusion results in significant undisclosed benefits from dam breaching and must be corrected.

Response: The DREW Anadromous Workgroup evaluated the employment effects associated with potential increases in the commercial harvest of salmon and steelhead as part of the Anadromous Fish Economic Analysis. This analysis, as noted on pages I6-11 and I6-12 of the Draft Appendix I, Economics, addressed employment changes in Oregon, Washington, Alaska, and British Columbia and also included the employment effects of increased ocean recreational fishing in these areas. The results of this analysis are presented in Tables 5.13-3 and 5.13-5 of the main FR/EIS and discussed in Section 6.3.3 of Appendix I, Economics. A more detailed discussion of this analysis and its findings is presented in the DREW Anadromous Fish Workgroup Report (1999c). This report is available on the Corps website at http://www.nww.usace.army.mil/lsr. Employment estimates presented in both the Draft and Final FR/EIS include employment gains associated with tribal commercial harvest. In addition, the Corps funded a study prepared by Meyer Resources on behalf of CRITFC that addressed the impacts of the proposed alternatives upon the four CRITFC tribes, as well as the Shoshone-Bannock Tribes. The findings of this study (Meyer Resources, 1999) is available on the Corps website and the Draft FR/EIS draws on these and other findings to evaluate the potential effects of the proposed alternatives on Native Americans. Potential effects upon tribal communities are, for example, addressed in sections 5.8 and 5.14 of the main FR/EIS, as well as in Sections 3.6 and 5 of Appendix I, Economics.

S/R-5 The Draft FR/EIS does not account for economic benefits that would flow to American Indian Tribes and their communities from salmon and steelhead restoration. Tribal employment and other community impacts are not included in the regional or social impact analysis.

Response: As noted in response to S/R-4, the potential effects of the proposed alternatives on tribal communities are addressed in a number of sections of the Draft FR/EIS. The Corps funded the tribal economic analysis prepared by Meyer Resources on behalf of CRITFC. The Draft FR/EIS draws on the findings of this analysis. The Meyer Resources report is available on the Corps website (Meyer Resources, 1999). The regional economic development analysis prepared for the Draft FR/EIS assesses potential effects at a regional scale and, therefore, includes potential effects to tribal communities located within the study area. This is also the case with the commercial fishing regional economic analysis developed by the DREW Anadromous Fish Workgroup.

S/R-6 The Draft FR/EIS seriously undervalues the positive economic impacts of salmon restoration on the downriver and commercial fishing industry. The Draft FR/EIS estimates that dam breaching, which would open 140 miles of prime fall chinook spawning and rearing habitat—a nearly 80 percent improvement—would create only 249 long term harvest jobs in the lower Columbia River and the entire coast. Even modest increases in these populations to allow even a few of the Snake River fish to be taken incidental to harvesting other healthy stocks, such as Hanford Reach fall brights, would open harvest opportunities that would have huge economic benefits from the treaty Indian fisheries to Southeast Alaska.

Response: The 249 jobs referenced in this comment also included jobs that would be generated as a result of increased recreation harvest. The average number of commercial fishing jobs estimated to

be created over the 100-year study period under Alternative 4—Dam Breaching is actually estimated to be 171 (see Table 6-12 in the Final FR/EIS Appendix I, Economics). This estimate is directly tied to the number of fish projected to return under this alternative. Projected fish returns were developed by PATH. The DREW Anadromous Fish Workgroup expanded the PATH results to represent all Snake River wild and hatchery stocks and allocated the projected returns by fishery based on the historical distribution of catches. This is discussed further in Sections 3.5.3 and 3.5.4 of the Final Appendix I, Economics. The DREW Anadromous Fish Workgroup's regional analysis is summarized in Section 6.3.3 of the Final Appendix I, Economics and discussed in more detail in the DREW Anadromous Fish Workgroup Report (1999), which, as previously noted, is available on the Corps website. The DREW anadromous fish economic analysis did not assess the economic costs or benefits that may be associated with the possible effects that increases in Snake River stocks could have on the harvest of other healthy stocks, such as Hanford Reach fall brights.

The capacity of the currently available fall chinook spawning habitat above Lower Granite Dam is estimated to be around 14,400 to 18,000 fish (7,100 to 9,000 redds under optimum full spatial capacity). This is much higher than the current population, indicating that there is little to be gained from additional spawning habitat until this population level is reached. Only 32 to 55 percent of this 140-mile stretch is thought to have potential for spawning habitat following dam removal. Furthermore, it is thought that it would not be functional as spawning habitat for 10 to 20 years due to continued downstream movement of fine sediments during that time period. If fish were to spawn in these regions, high fine sediment concentrations would likely reduce spawning success and egg survival for several years. Finally, stray fish from hatcheries and other areas are known to frequent the lower Snake River. There is a possibility that these fish could spawn in this newly developed habitat and result the loss of the genetic integrity of the entire Snake River fall chinook ESU. See revised text and analyses in Appendix I, Economics and its revised section on Tribal Circumstances.

S/R-7 The Draft FR/EIS should discuss the effects on lower river communities that could benefit from salmon and steelhead increases. Possible examples include a description of the effects on Astoria, Oregon, Westport, Washington, or the fishing fleet in Seattle.

Response: The Draft FR/EIS addresses these effects at the regional scale rather than for individual communities. In addition, NMFS funded a study that addressed the potential effects of breaching the four lower Snake River dams on the fishing communities of Astoria and Westport. These results were not available for inclusion into the Draft FR/EIS. The results of this study have been added to the existing discussion of community impacts in the main FR/EIS.

S/R-8 The Draft FR/EIS vastly underestimates the economic benefits of dam breaching to the salmon and steelhead sportfishing industry. According to a 1999 Idaho Fish and Wildlife Foundation study, the benefits of a restored salmon and steelhead fishery in Idaho alone would be $172 million per year. The effects of a restored fishery in upriver areas in Oregon and Washington appear to have been omitted.

Response: The economic benefits of increased sportfishing in central Idaho and northeast Oregon were evaluated by the DREW Regional Analysis Workgroup (1999f). Economic benefits to the region were estimated based on the number of fish that would be available for harvest over time. The DREW Recreation Workgroup converted estimated numbers of fish into angler days. Estimated angler days were used by the DREW Regional Analysis Workgroup to estimate the regional benefits that would be associated with changes in recreational angling along the lower Snake River and in Central Idaho. Values were assigned to angler days based on the results of surveys of current

recreation users conducted for this study. The results of these studies are presented in a series of reports available on the Corps website. The results of the regional analysis are summarized in Section 6.3.2 of Appendix I, Economics, and discussed in more detail in the regional analysis report prepared for this study by the DREW Regional Analysis Workgroup. This more detailed report is available on the Corps website at http://www.mww.usace.army.mil/lsr. The DREW Anadromous Fish Workgroup (1999c) estimated the benefits associated with ocean recreational fishing based on the projected number of fish available for recreational harvest over time (see response to comment S/R-6).

S/R-9 The Draft FR/EIS fails to address the net economic losses to commercial, recreational, and Tribal fishing communities that have resulted directly and indirectly from declines of salmon caused by the Snake River dams. Since construction of the dams, 25,000 family jobs have been lost with a cost to the regional economy of as much as $500 million per year.

Response: The FR/EIS examines the effects of the four proposed alternatives on existing economic conditions. Alternative 1—Existing Conditions is used as the baseline for this analysis. Costs and benefits associated with alternatives 3 and 4 are measured net of Alternative 1—Existing Conditions. Assessing the effects of dam construction on the national and regional economy is beyond the scope of this study. Information on the tribes historical perspective is, however, provided in the report prepared by Meyer Resources on behalf of CRITFC (Meyer Resources, 1999). This report is available on the Corps website at http://www.nww.usace.army.mil/lsr.

S/R-10 The Draft FR/EIS fails to include the potential loss of Idaho's $90 million a year steelhead fishery under the three non-breaching alternatives. This loss would have significant adverse effects upon Idaho communities such as Riggins, Orofino, Salmon, Challis, and Stanley.

Response: Potential recreation impacts are addressed in Section 3.2 of Appendix I, Economics. This analysis included two surveys of sportfishers in the Snake River Basin in Central Idaho. Surveys were primarily distributed in the towns of Salmon, Riggins, and Orofino. This information was used to evaluate the potential recreation effects of each alternative. The economic impacts of the proposed alternatives on sportfishing were assessed based on the number of fish that would be available for sportfishing harvest under each alternative. See the response to comment S/R-8 for more detail on the methodology used to assess the effects of the proposed alternatives on sportfishing in Idaho. The regional economic effects associated with changes in sportfishing are assessed in the RED analysis developed for this study and discussed in Section 6.3.2.1 of Appendix I, Economics, as well as in the DREW Regional Analysis Workgroup Report (1999f), which is available on the Corps website. Section 6.3.2.1 specifically addresses sportfishing in the upriver subregion, which consists of one Oregon and eight Idaho counties and includes the communities of Riggins, Orofino, Salmon, Challis, and Stanley. Estimates of future harvests under each alternative developed for this study (see response to comment S/R-8) do not suggest that current harvest levels would decline under Alternatives 1 through 3 (see Table 3.5-5 in the Final Appendix I, Economics).

5.23.1.2 Flow Augmentation

S/R-11 The Draft FR/EIS fails to account for the costs that would be incurred if the four lower Snake River dams are not breached and additional summer flow augmentation is required to improve flows and salmon survival. These costs include:

- The findings of the BOR study that concluded that the acquisition of an additional one million acre-feet of flow augmentation would take nearly 650,000 acres of irrigated farm land in southern Idaho out of production at a cost of $151.3 million to $1.3 billion annually and the loss of 4,203 to 6,530 jobs.
- The likely reduction in sportfishing revenues in the upper Snake River (e.g., Henry's Lake, Henry's Fork) that are likely if the four lower Snake River dams are not breached and additional summer flow augmentation is required to improve flows and salmon survival.

Response: The BOR report identified the potential impacts associated with acquisition of additional flow augmentation levels that could affect agricultural lands in Idaho. Earlier in the study effort, an alternative that contemplated additional flows was considered. Additional flow augmentation was eliminated from further analysis in this study due to issues/concerns raised in BOR's "Snake River Flow Augmentation Impact Analysis Appendix, February 1999." Some of those issues/concerns include the following:

1. Insufficient storage space in the Snake River basin under BOR and Corps exclusive control to provide large amount of water for flow augmentation without significant impacts to natural resources, recreations, and economic sectors
2. Inability of BOR to meet its historic obligations and commitments to project beneficiaries if additional flow augmentation was required
3. Inability of BOR to fully meet all congressionally authorized project purposes if required to provide 1,427,000 acre-feet for flow augmentation
4. Affected states general opposition to flow augmentation
5. Congressional action could be needed to clarify BOR's responsibilities or additional authorization and appropriate may be needed.

- The adverse economic impacts to upriver communities in southern and eastern Idaho. This omission is particularly disturbing as U.S. Senator Mike Crapo requested that the Corps expand its social impact analysis to include upriver communities.

Response: The social impact analysis was expanded to include nine focus communities in southern Idaho. The results of this study are addressed in sections 4.14.2 and 5.13.2 of the Draft FR/EIS.

S/R-12 The Draft FR/EIS does not address the requirements for flow augmentation under Alternatives 1 through 3 and seems to suggest that it would not be necessary. There is, however, room to doubt this conclusion even within the document itself. Table 4.14-10 Base Case Conditions for Selected Southern Idaho Focus Communities by Community Type identifies flow augmentation as the key relationship between all nine focus communities and the lower Snake River.

Response: None of the alternatives considered in the FR/EIS would result in additional flow augmentation. As noted in the preceding comment, potential impacts to upriver communities were included. The main connection between these communities and the lower Snake River is, as noted in Table 4.14-10, existing flow augmentation. This existing relationship should not be interpreted as an indication that additional flow augmentation would be required under Alternatives 1 through 3.

5.23.1.3 Water Supply

S/R-13 Estimates of the loss of 2,200 direct, indirect, and induced jobs associated with irrigated agriculture could be unduly pessimistic because it is not clear that all production would be lost on the affected acreage. If the assets were subsequently acquired at low cost, alternative crops, farm practices and irrigation techniques may be economically feasible to sustain some portion of existing production. In addition, it is likely that some of the indirect and induced job losses would occur where opportunities for reemployment are possible. Economic growth provided by transition activities and the projected growth in recreation would provide new employment opportunities.

Response: Based on conversations with people who resided in the area prior to construction of the dams, if irrigation were lost in that area, the land would only be suitable for grazing for sheep and cattle on a very limited basis. The potential loss of 2,256 jobs does, however, represent a worse case scenario that assumes that all 37,000 acres of cropland would go out of business. An alternate scenario assumes that 21 percent of the irrigated land might support the development of alternate water supplies to replace lost irrigation water. If fruit orchard and vineyard production continued on 7,735 of the 37,000 acres, a total of 901 jobs would be lost. The irrigated agriculture-related job loss total presented in the Draft FR/EIS, 1,579, (see Table 6-19) represents the mid-point between these two scenarios.

Economic growth and new employment opportunities are addressed in the FR/EIS, with new employment opportunities identified by subregion. Possible increases in employment include those associated with potential recreation opportunities and implementation of Alternative 4—Dam Breaching. Point estimates, as well as a year-by-year evaluation, of overall net job changes are presented for Alternative 4—Dam Breaching in Section 6.4.2.2 of Appendix I, Economics, as well as in Section 5.12 of the main FR/EIS.

S/R-14 The conclusion in the Draft FR/EIS that all of the agricultural lands irrigated from the Ice Harbor would go out of production under the dam breaching alternative is incorrect. The Corps has engineered a way to keep the irrigation system in operation, albeit at a higher cost, and the decision whether to sell their property or remain in production should be made by the property owners not the Corps.

Response: The Water Supply analysis presented in the Draft FR/EIS concludes that the most likely consequence of dam breaching would be that the 37,000 acres would lose access to the irrigation water that they currently withdraw from the Ice Harbor Reservoir. It is possible that the land could be kept in production. However, the economic analysis completed for the FR/EIS determined that providing irrigation water under dam breach conditions would cost about twice what the irrigated land is valued at. Thus, in terms of measuring economic effects associated with dam breach, the appropriate measure is the loss of irrigated agriculture and the associated value. From a NED perspective this resulted in annual costs of $9,241,100 assuming a 6.875 percent discount rate and a 100-year period of analysis, about 4 percent of total projected annual NED costs using this discount rate. The RED analysis did not assume that all 37,000 acres would go out of business, as discussed in response to comment S/R-13 above.

S/R-15 The existing Ice Harbor irrigation system should be retrofitted to keep presently irrigated land in production. Even with the Corps' vastly inflated estimates of these costs, it would be a relatively small portion of the overall dam removal cost and would save many local jobs.

Response: Comment noted. As stated in Section 13.3.4 of the Compensatory Actions section of Appendix I, Economics, there is no current means to mitigate or compensate for the potential losses related to irrigated farmland. This section notes that "(I)f congressionally authorized and funded, potential mitigation/compensation efforts could include:

1. payment for required improvements, and
2. potential purchase of farm land." (Draft FR/EIS, Appendix I, Economics, page I13-5).

S/R-16 The Draft FR/EIS fails to distinguish between full-time permanent and part-time seasonal employment in irrigated agriculture. The Draft FR/EIS estimates an employment loss of 1,579 jobs in irrigated agriculture if dam breaching were to occur (Table 5.13-3). However, the total number of permanent full-time and regular part-time jobs at risk is 700. The other 879 are seasonal part-time jobs (page 5.13-30).

Response: The results of the RED input-output analysis presented in Table 5.13-3 and the estimated irrigation-related employment totals presented in Table 5.13-11 (page 5.13-30) are not directly comparable. As discussed on page 5.13-6 of the Draft FR/EIS, the employment impacts presented in Table 5.13-3 are impacts caused by changes in spending and include indirect and induced jobs. The estimated 1,579 lost jobs are, therefore, distributed throughout the regional economy and not just concentrated in the irrigated agriculture sector where the initial change in spending occurs. Further, as discussed in response to comment S/R-13, the point estimate of 1,579 jobs does not assume that all irrigated agriculture jobs are lost. The employment totals in Table 5.13-11 were, in contrast, identified through a direct survey of farms conducted in 1997 and 1998 and are for all 37,000 acres. The projected job totals presented in Table 5.13-3 include both full-time and part-time employment. An average national conversion factor to translate full- and part-time employment into full-time employment equivalents is 0.88 (see Appendix I, Economics, Section 6.4.2.2) Multiplying the point estimate of 1,579 jobs by this factor suggests that the equivalent of 1,390 full-time equivalent jobs would be lost.

S/R-17 Stemlitt Management, Inc., which owns an orchard presently irrigated from the Ice Harbor reservoir, estimates, based on its own actual costs, that 7,767 acres of orchards contribute approximately $82 million "to the community" each year and employ 2,334 annual full time equivalent workers. This is higher than the estimates used in the Draft FR/EIS.

Response: Estimates of employment on the land irrigated from Ice Harbor Reservoir were obtained through a survey of the affected farms in 1997 and 1998. The results of this survey are presented in Table 5.13-11 of the Draft FR/EIS. Thank you for providing us a detailed description and analysis of your operation and how it contributes to the region. Although our estimates do not directly correlate with your data, we feel the analysis in the EIS generally captures the scope of the social and regional impacts associated with the alternatives.

S/R-18 Boise Cascade operations at Wallula would be affected by breaching. The Boise Cascade mill is Walla Walla County's largest taxpayer and provides many family-wage jobs. Boise Cascade estimates that replacing and relocating pumping stations and increasing irrigation system filtration would cost between $15 million and $25 million. Annual operating costs at the Wallula Paper Mill

and associated fiber farms are estimated to increase by $1.24 million. These impacts need to be addressed.

Response: In Section 6.5.1 (Potentially Affected Businesses) of Appendix I, Economics, the analysis acknowledges that communities would experience direct job losses. Substantial proprietary information about each firm or plant would be required to allow prediction of those businesses that would close or relocate. These types of information are not publicly available, and therefore, it is not possible to identify those firms or plants that would be likely to close if dam breaching were to occur. However, Table 6-42 on page I-6-46 of Appendix I estimates the number of jobs that could be directly affected by dam breaching for a number of potentially affected economic sectors. These are just direct jobs, and do not include the multiplier effect that would occur with business closure.

5.23.1.4 Transportation/Agriculture

S/R-19 The diversion of traffic from Portland to Puget Sound ports would result in job loss and a loss of economic activity at the Port and in the surrounding community.

Response: The FR/EIS analysis assumes that grain and other commodities would be rerouted by truck to river elevators on the McNary pool, and transshipped by barge, or would be shipped by rail directly to lower Columbia export elevators. The DREW Transportation Workgroup found that there are sufficient grain elevators in the Portland area. However, the FR/EIS will mention recently completed and ongoing studies that have identified contrary assumptions. The State of Oregon and the Port of Portland, for example, completed a study in which they assume up to 9,000 full containers currently shipped through the Port of Portland each year could be diverted to the Puget Sound or other ports. Additionally, four of the six ocean carriers currently calling in Portland might stop if containers could no longer be shipped on the lower Snake River. If fewer ocean carriers serve Portland, shippers who use the Port of Portland to ship export containers may need to ship containers through Puget Sound area ports.

S/R-20 The Draft FR/EIS does not address the effects of displaced tonnage through other non-Columbia River ports.

Response: That is correct. The analysis assumes that grain and other commodities would be rerouted by truck to river elevators on the McNary pool, and transshipped by barge, or would be shipped by rail directly to lower Columbia export elevators. The Transportation Workgroup found that there are sufficient grain elevators in the Portland area, but that a new facility would be needed in the Tri-Cities area. The need for additional elevator capacity and other infrastructure improvements is summarized in Section 3.3.5.6 of Appendix I, Economics. The analysis is discussed in much greater detail in the report entitled DREW Transportation Workgroup *Technical Report: Transportation System Impacts Analysis (1999a)*, which is available on the Corps website. In addition, please see the response to comment S/R-19.

S/R-21 If dam breaching were to occur, Potlatch would need to shift from barge transportation to rail and truck transport. This would likely result in a loss of jobs at the Port of Lewiston because loading and receipt would all take place at the Potlatch plant. The same effect would likely occur with other shippers presently using barges. Potlatch would ship products to the Puget Sound for shipment overseas because costs would be lower and the choice of shipper greater. They would not be trucked to the Tri-Cities for barge shipment to Portland.

Response: In Section 6.5 (Potentially Affected Businesses) of Appendix I, Economics, the analysis acknowledges that communities would experience direct job losses. Substantial proprietary information about each firm or plant would be required to allow prediction of those businesses that would close or relocate. These types of information are not publicly available, and therefore, it is not possible to identify those firms or plants that would be likely to close if dam breaching were to occur. However, Table 6-42 on page I6-46 of Appendix I estimates the number of jobs that could be directly affected by dam breaching for a number of potentially affected economic sectors. These are just direct jobs, and do not include the multiplier effect that would occur with business closure.

S/R-22 If dam breaching were implemented, barging activities would likely be transferred to the Tri-Cities area. Are the potential increases in employment in this area included in the estimated effects on employment presented on page 38 of the Summary Document?

Response: Short-term transportation-related construction job impacts are included in the projected employment effects identified in the Draft FR/EIS. Additional analysis on potential transportation effects is included in the Final FR/EIS.

S/R-23 The Draft FR/EIS fails to adequately assess the positive transportation-related impacts that the Port of Pasco and Kennewick would experience if dam breaching were to occur. After breaching, these ports would become the inland terminus for the Columbia River transportation system. The Tri-Cities is presently poised to become a major western rail hub. A major regional rail maintenance center was recently established in Richland and negotiations are under way with the U.S. Department of Energy for transfer of the unneeded rail system at the Hanford Site to local port authorities.

Response: A new section that addresses the regional economic effects that would result from projected losses in grain farm income and grain transport revenues to barge companies, as well as regional gains that would be associated with increased grain transportation-related railroad and trucking revenues, has been added to the regional analysis in the Final FR/EIS. The NED cost related to transportation effects have been revised from $24 milllion to $37 million in the Final FR/EIS.

S/R-24 The Draft FR/EIS states that the transportation analysis addresses the cost of transporting products as an NED cost but does not assess the loss of revenue and profits by barge companies. Excluding this loss of revenue from the economic analysis prevents the decision-maker from being apprised of the magnitude of adverse effects on a major transportation sector that would be directly affected by Alternative 4—Dam Breaching.

Response: As noted in response to the preceding comment, a new section that addresses grain transportation-related regional effects has been added to the regional analysis in the Final FR/EIS. This new section addresses the regional impacts of the potential loss of revenue by barge companies under Alternative 4—Dam Breaching. The NED cost related to transportation effects have been revised from $24 milllion to $37 million in the Final FR/EIS.

S/R-25 The Draft FR/EIS acknowledges that transportation costs would increase if dam breaching were to occur but does address how these increased costs would directly affect the viability of farms in the lower Snake River region that produce grain for export. Increased transportation costs if passed onto overseas importers would have the effect of reducing the competitiveness of, and the demand for, lower Snake River grain exports. The FR/EIS should discuss lower Snake River grain export price sensitivity vis-a-vis the competitions and how reduced overseas demand for lower Snake River grain exports would impact the viability of farms in the lower Snake River region.

Response: A new section that addresses the regional economic effects that would result from projected losses in grain farm income has been added to the regional economic analysis in the Final FR/EIS. This analysis assumes that increased transportation costs would result in a corresponding decrease in grain farm income that would negatively affect local and regional business transactions, employment, and income. For additional information, see Table 6-35 on page I6-35 of Appendix I.

S/R-26 Rate increases or decreases designed to reduce the impact to barge operators would affect producers using barge services along the entire length of the Columbia-Snake River system, not just those who previously used lower Snake River ports. This could affect a large portion of Oregon's wheat crop, as well as other Oregon commodities shipped in containers, such as hay cubes and french fries.

Response: The transportation analysis developed for this study assumes that dam breaching would not affect transportation rates. A new section that addresses the effects of increased transportation costs on grain farms has been added to Chapter 6 of Appendix I, Economics, which comprised about 76 percent of the tonnage passing through Ice Harbor Lock between 1992 and 1997. There is not sufficient data available to analyze the regional impacts associated with the other commodities presently shipped on the lower Snake River.

S/R-27 The Corps acknowledges that some marginal land may be taken out of production, at least in the short-term, due to dam breaching. However, most of the land would be recapitalized at lower values and remain in grain production. In other words, the other owners would likely go bankrupt, and different operators could purchase the land at lower values that would allow resumption of grain production at a new cost equilibrium. No assessment is made of the value lost as these properties drop in price. The impacts on the families who currently own or farm the land are also not addressed.

Response: The economic analysis developed for this project did not attempt to value potential positive or negative changes in property values that could occur as a result of dam breaching. The revised RED analysis presented in Chapter 6 of Appendix I, Economics of the Final FR/EIS addresses the effects of increased transportation costs on farm-related income and employment.

S/R-28 The analysis also does not allow for the fact that the new owner may use the land for grazing rather than grain production or the associated difference in the value of sales. There appears to be little potential for other dryland crops, specifically oilseed crops such as canola, to replace dryland wheat. A sensitivity analysis should address this potential impact and address the resultant regional impacts.

Response: The regional analysis conducted for this study did not assess the regional economic effects of possible changes in operations that might result from the transfer of agricultural land.

S/R-29 Lost agricultural production would result in additional income losses in these communities from the reduced need for farm inputs, equipment, labor, and other production variables. Decreased land values would reduce tax revenues to local governments.

Response: The economic analysis developed for this project did not attempt to value potential positive or negative changes in property values that could occur as a result of dam breaching.

S/R-30 Potential electricity cost increases between 1.9 and 6.7 percent could significantly impact farmers and make the difference in whether their farms remain profitable and in business. Potential regional power impacts have not been adequately addressed.

Response: Reduced spending as a result of potential rate increases is projected to result in a loss of 2,382 jobs statewide. It is not possible to estimate whether farmers would go out of business as a result of increased power costs. Some of the farms in the western section of the reservoir subregion would probably be more susceptible because they grow strictly wheat and set aside land every other year in fallow. The farms in the eastern section of the reservoir subregion show greater yields and diversity of crop rotations.

5.23.2 Potentially Affected Businesses

S/R-31 Power costs are a major factor in the ability of electricity-intensive industries to compete. Breaching the dams would have significant negative impacts on the Northwest Alloys magnesium smelter located in Addy, Washington. The economic base of Stevens County depends heavily on this facility, which directly employs 350 people. Stevens and adjacent Ferry and Pend Oreille counties presently have the highest unemployment and lowest per capita incomes in the State.

Response: Section 6.5 (Potentially Affected Businesses) of Appendix I, Economics, acknowledges that communities would experience direct job losses. However, substantial proprietary information about each firm or plant would be required to allow prediction of those businesses that would close or relocate. These types of information are not publicly available, and therefore, it is not possible to identify those firms or plants that would be likely to close if dam breaching were to occur.

S/R-32 Breaching the four lower Snake River dams and taking barges off the river would disrupt Longview Fibre's vital raw material supply line, create costly energy concerns, substantially raise their overall costs, and could jeopardize employment at the company's Longview operations. These operations employ about 2,000 people and have an annual payroll of $92 million, with yearly local purchases and tax payments of approximately $86 million.

Response: In Section 6.5 (Potentially Affected Businesses) of Appendix I, Economics, the analysis acknowledges that communities would experience direct job losses. Substantial proprietary information about each firm or plant would be required to allow prediction of those businesses that would close or relocate. These types of information are not publicly available, and therefore, it is not possible to identify those firms or plants that would be likely to close if dam breaching were to occur. However, Table 6-42 estimates the number of jobs that could be directly affected by dam breaching for a number of potentially affected economic sectors. These are just direct jobs, and do not include the multiplier effect that would occur with business closure.

S/R-33 In contrast to the statement on page I7-38, Potlatch operates in a competitive market and is unable to pass along increased costs to consumers. Potlatch would be affected under a dam breaching scenario in the following ways:

- Increased transportation costs.
  - Transporting goods to market.
  - Transporting wood fuel and chips from Potlatch's Boardman tree farm to Lewiston.
  - Transporting large pieces of equipment, such as dryers, to Lewiston.
  - Obtaining chips, sawdust, and pulp from west of the Cascades.
  - Sale of logs and chips from the Clearwater Valley to western pulp mills.
  - Inbound delivery costs for materials such as chemicals and clay.
- Water intake and discharge.
- Power costs.
- Natural gas costs.
- Silting drip irrigation systems.

Absorption of these costs would affect the economic competitiveness of Potlatch's Lewiston operations. Discontinuation of or a decrease in Potlatch's Lewiston operations would significantly effect the northern Idaho lumber industry and the value of timber in northern Idaho because Potlatch uses large quantities of residual chips and sawdust, as well as waste wood and bark from many sawmills in northern Idaho. There is no other readily available market for the bark and waste wood and the nearest large chip and sawdust market is west of the Cascade Mountains.

Response: It is hard to estimate how dam breaching would affect the operations of individual businesses. Potential effects to the forest products industry are discussed qualitatively in Appendix I, Economics, Section 6.5.1.

S/R-34 The employment impacts described in the Draft FR/EIS do not address lost jobs at the Wallula pulp mill, agricultural warehouses for raw products, Broetje Orchards, loss of sales of fertilizers, pesticides, and the associated affects on the local economy. Ignoring potential job losses in private industry that cannot be calculated puts a very bright face on potential job losses associated with dam breaching.

Response: The potential sources of the employment impacts presented in the Draft FR/EIS are discussed in Appendix I, Economics, Chapter 6. Additional information is provided in the full-length technical report prepared by the DREW Regional Analysis Workgroup (1999f). This report is available on the Corps website at http://www.nww.usace.army.mil/lsr//lsr. Job losses in private industry that would result from quantifiable changes in spending patterns are included in the job estimates presented by resource area in the Draft FR/EIS. Potential direct impacts to private industry that cannot be addressed quantitatively are discussed qualitatively in Section 6.5, Potentially Affected Businesses, Table 6-42, page I6-46 of Appendix I, Economics, Section 6.5.1. It is noted in the executive summary and main text of the Draft FR/EIS that increased electricity rates and transportation costs may cause affected firms or plants to reduce output and employment or possibly close or relocate to another region. These documents also note that possible job losses in these sectors are unknown. These potential job losses are not ignored. A range of impacts on food processors is discussed in Section 6.5.1, Food Processing, page I6-47 of Appendix I, Economics. Detailed industry studies (that include an assessment of the dynamic linkages between the food production and food processing sectors, as well as increased power and water costs, the financial

health of each company, and the relationships between these companies) would be needed to evaluate the effects of cost increases.

S/R-35 The region's economy is moving away from dependence on commodity production, toward other areas of economic activity. A near-natural lower Snake River would encourage and stimulate general economic growth. The Corps must consider the information in the ECONorthwest study on the FR/EIS.

Response: The Corps has considered the EcoNorthwest report. In addition to the earlier letter, they prepared an April 28, 2000 report that specifically critiques the Draft FR/EIS. The Corps has considered this report also.

S/R-36 If the Draft FR/EIS chooses to indulge in qualitative speculation about impacts that have not been studied, or plans to do further study, it should include a balanced consideration of positive economic responses and impacts that restoring a near-natural river could bring. As noted in the Draft FR/EIS, "Population has grown more rapidly in the 1990s, with areas offering high quality scenery and recreation opportunities often experiencing particularly rapid growth rates" (Appendix I, p. 12-1). This premise should be carried through to the projections of possible consequences associated with restoring a near-natural lower Snake River.

Response: This comment presumably pertains to Section 6.5.1 of the Draft FR/EIS Appendix I, Economics, which provides a qualitative discussion of those industries that could potentially face increased costs under Alternative 4—Dam Breaching. This section has been revised to note that regional businesses could be affected by dam breaching in both positive and negative ways.

S/R-37 The DREW analysis underestimates the employment benefits associated with the dam breaching alternative by failing to accurately calculate recreational benefits to local economies. The DREW analysis, for example, accounts only for tourist dollars spent on gasoline to travel to the region not for the food and lodging dollars spent when they arrive.

Response: The DREW Recreation Analysis (1999e) estimates the willingness-to-pay of would be recreationists using a hybrid travel cost model. The DREW Regional Analysis assesses the direct, indirect, and induced effects of changes in recreation on the local economy. Potential regional benefits assessed in this analysis include those associated with increased food and lodging dollars spent in the lower Snake River area. These effects are summarized in Table 5.13-3 of the main FR/EIS and discussed in Section 6.3.2 of Appendix I, Economics. The analysis employed to assess these effects is discussed at greater length in the DREW Regional Analysis Report (1999f) which is available on the Corps website at http://www.nww.usace.army.mil/lsr//lsr.

S/R-38 The Draft FR/EIS fails to account for property value increases that would occur along rivers after the dams are removed and salmon and steelhead runs are restored.

Response: This is correct. The economic analysis developed for this project did not attempt to value potential positive or negative changes in property values that could occur as a result of dam breaching.

S/R-39 The Draft FR/EIS does not include the benefits to the Idaho construction sector that would accrue under the dam breaching alternative. Hundreds of miles of river affected by better fishing would lead to increased demand for recreation-related residential and commercial development that would generate jobs in the heart of the community - the carpenters, plumbers,

electricians, heavy equipment operators, roofers, lumber yards, and hardware stores. These jobs would benefit distressed rural communities, such as Clayton, Challis, and Salmon, that have traditionally relied upon extractive industry.

Response: The regional effects of increased recreation visitation in Central Idaho (the Upriver Subregion) are addressed in Section 6.3.2.1 of Appendix I, Economics, as well as in the long-term employment impact summaries presented in Appendix I and the main FR/EIS. These effects were estimated using input-output analysis to assess the effects that increased spending in the recreation sector would have on the regional economy as a whole (see Appendix I, Section 6.2 for a discussion of this approach).

5.23.3 Communities

S/R-40 The Draft FR/EIS statement that rural and economically-distressed communities "would likely adjust" to the physical and economic changes that would result from dam breaching places too much faith in too little information. Forecasting "net employment gains as a result of expected increases in recreation and tourism associated with a free-flowing river and increased fish runs" without stipulating how and where those infrastructure and development funds would come from is sheer fabrication. Communities where traditional forms of economic activity are displaced would have great difficulty developing tourism destinations or activities that would replace the jobs and dollars lost without significant investment and financial support from the State and Federal government.

Response: This conclusion presented in the Executive Summary of the Draft FR/EIS reflects the results of a detailed social analysis that used data developed by other DREW workgroups, as well as community-specific information collected through interactive community forums held in 17 communities located throughout the lower Snake River study area. The growth in general recreation projected for the reservoir area, which is estimated to generate 543 jobs by 2025 if dam breaching were to occur, is, however, partially predicated on the assumption that the number of campgrounds in this area will double within the first decade following breaching. There is presently no indication that Federal funds will be available for this construction. Further, it is not known at this time whether this type of additional development would be restricted in order to further protect salmon runs. If these campsites were not developed, recreation and tourism-related employment gains may actually be less than those projected in the FR/EIS. This caveat has been added to the appropriate sections of the main FR/EIS and Appendix I, Economics.

S/R-41 The City of Kennewick disagrees with the findings of the Social Impact Analysis that projected changes in the human environment associated with the dam breaching scenario would not exceed historical experiences in Kennewick. Breaching the four lower Snake River dams would adversely affect the community values held by Kennewick residents.

Response: Comment noted. This conclusion is discussed in Section 7.4.1.4 of Appendix I, Economics. More detailed information is presented in the DREW Social Analysis Report (1999d) and the Phase I Community-Based Social Impact Assessment prepared by the University of Idaho (1999). Both of these reports are available on the Corps website at http://www.nww.usace.army.mil/lsr.

S/R-42 The Port of Lewiston disagrees with the finding of the Draft FR/EIS that dam breaching would result in "a projected net gain in employment" for Lewiston. For comparison purposes, the

port provided the Corps with a port-commissioned University of Idaho study that found that 1,580 jobs are directly tied to water commerce by the three ports. These jobs and many more would be put at risk if the four lower Snake River dams were breached.

Response: While the DREW Social Analysis Workgroup did conclude that dam breaching could result in a net employment gain, it also found that dam breaching could result in both increases and decreases in employment in Lewiston. These findings are discussed in Section 7.4.1.7 of Appendix I, Economics and summarized in Table 5.13-7 of the main FR/EIS.

S/R-43 The Draft FR/EIS does not address the regional loss of economic diversity that would occur if the four lower Snake River dams were breached. The Draft FR/EIS states that "(d)isplaced human and capital resources would be employed in their next best use within the community" but does not address the displacement of families in the community.

Response: Community impacts are discussed in Section 7.4 of Appendix I, Economics. More detailed information is presented in the DREW Social Analysis Report (1999d) and the Phase I Community-Based Social Impact Assessment (Harris et al., 1999). Both of these reports are available on the Corps website at http://www.nww.usace.army.mil/lsr.

S/R-44 The Draft FR/EIS does not provide specific information on where the identified minority and low income groups reside, nor does it provide sufficient information on the potential impacts to minority and low income communities.

- The Draft FR/EIS, for example, provided information on the economic impacts on the Hispanic population as a result of decreased agricultural opportunities if the dams were breached but did not discuss the economic effects of increased electricity rates on this particular population. The Draft FR/EIS also did not provide information on whether these impacts would be disproportionately greater on the Hispanic communities compared to other communities in the area.
- While the Draft FR/EIS contains some discussion on cumulative impacts, these discussions are incomplete and nonspecific to minority and low income communities.
- The Draft FR/EIS does not identify the demographics of the participants in the 18 community forums held in the lower Snake River study area, nor does it specifically inform the reader of the perspectives of minority and low income communities. As a result, it is not possible to determine if minority and low income communities in the study area were afforded an opportunity to participate in the public process in a meaningful way.

These shortcomings need to be addressed before it can be determined that environmental justice requirements under Executive Order 12898 as part of complying with NEPA have been met for this project.

Response: The Draft FR/EIS states on page 5.13-31 that based on the information presented in the preceding section "it appears that if these farms were to go out of business, persons of Hispanic origin would be disproportionately affected." Further information has been provided in the Final FR/EIS.

S/R-45 Information from the Corps indicates that operation of the four lower Snake River dams results in flood levels 5-6 feet lower in parts of Kelso, Washington than they would otherwise be. Breaching these dams would require Kelso to raise their levees and modify all of their systems to accommodate higher water levels. This would include purchasing businesses and homes and relocating residents and would be very costly.

Response: The Lower Snake Project is not designed or operated to provide flood control benefits. The Dworshak Dam located upstream on the Clearwater River currently provides congressionally authorized flood control benefits for the lower Snake River and further downstream on the Columbia River. Dworshak Reservoir has a gross storage capacity of 3,453,000 acre-feet, of which 2,000,000 acre-feet are used for local and regional flood control. This is discussed in Section 3.7 of Appendix I, Economics.

S/R-46 The Community Forum in Boise was not adequately advertised, the people attending were not representative of the population of Boise, the University of Idaho social scientists facilitating the forum did not document where their scientific information came from and refused to discuss alternate scientific information, and the assumptions made were unrealistic and twisted the results. The Community Forum method employed does not establish valid economic impact information. It simply allowed people to express their own value judgments. The results of these meeting will not provide a valid set of economic impacts because the information presented by the University of Idaho was one-sided and inaccurate in some instances. The presentations were designed so that participants could only arrive at the conclusion that breaching is the only option to recover fish.

Response: The same methodology was used to identify and advertise community locations for public forums for all communities. The University of Idaho social scientists did not limit or control who attended any of these public forums.

5.24 Aesthetics

There was only one specific comment related to aesthetics.

AES-1 Breaching the dams will leave behind ugly mud flats and devastate recreation use along the river. This was the case with the experimental drawdown in Lewiston.

Response: The potential aesthetic impacts of Alternative 4—Dam Breaching are discussed in Section 5.15.2.4 of the Draft FR/EIS.

5.25 Economics

5.25.1 General

ECO-1 The economic effects of the alternatives should be compared to total regional and national production and the effects of other Federal natural resource protection measures, such as those surrounding the Northern Spotted Owl.

Response: The projected regional employment and income effects are compared with total employment and income in the 25-county lower Snake River study area used for the regional analysis, as well as the States of Washington, Oregon, Idaho, and Montana in Tables 5.13-2 through 5.13-5 in the main text of the Draft FR/EIS. The Multi-Species Framework Human Effects Workgroup estimates that the total gross value of production in the four-State region is about $300

billion a year. The estimated average annual NED costs associated with Alternative 4—Dam Breaching in the Draft FR/EIS were about $246 million, which represents about 0.08 percent of total annual regional production. These costs were revised in the interim between the Draft and Final FR/EIS. The revised average annual NED costs are about $267 million, or 0.09 percent of total annual regional production. These projected NED costs represent a smaller proportion of total annual national production.

For comparison purposes, it may be noted that approximately 22,700 direct and indirect jobs were expected to be lost as a result of the Management of Habitat for Late-Successional and Old-Growth Forest Related Species with the Range of the Northern Spotted Owl. This was the total projected for Alternative 9 in the FR/EIS published in 1994 (U.S. Forest Service et al., 1994; 3&4-297). These losses were expected to occur in Washington, Oregon, and California. Long-term job loss associated with Alternative 4—Dam Breaching was projected to be 1,257 jobs in the Draft FR/EIS. This estimate was revised in the interim between the Draft and Final FR/EIS. The revised estimate, 1, 372 jobs (Lower Snake River Subregion) plus 918 jobs over the four-State study region, for a total projected job loss of 2,290. This loss represents 10 percent of the total projected job loss for the Northern Spotted Owl Alternative 9. The Spotted Owl job losses included Statewide effects over Washington, Oregon and California; therefore, the lower Snake River should also include the Statewide effects.

ECO-2 Costs appear to be the basis for an agency bias against breaching the four lower Snake River dams. These costs are not infeasible based on the value of total and regional production and there is nothing in NEPA that says costs should be the basis for making this type of decision. The decision should be based on science not economics.

Response: The Corps is required to conduct an NED analysis on its projects. In this instance, the Corps also conducted a RED analysis in addition to presenting tribal circumstances and passive use values. The NEPA allows agencies to consider costs along with other environmental effects to arrive at the preferred alternative. The Lower Snake River Juvenile Salmon Migration Feasibility Study did not consider costs as the deciding factor. Social, environmental, and economic effects were integrated and factored into the decision. (See Chapters 6 and 7 of the FR/EIS.)

ECO-3 The Executive Summary of Appendix I, Economics provides separate tables summarizing the economic effects by resource area for each alternative. This information should be aggregated into one table.

Response: The findings for each resource area are aggregated in one summary table, Table ES-11 of the Executive Summary, which presents the Average Annual Economic Effect by alternative and resource area in 1998 dollars. This table, which currently just presents the findings using the primary discount rate of 6.875 percent, has been expanded to show the results of the analysis using the other two discount rates—4.756 and 0.0 percent—used in the study.

5.25.2 Methodology

ECO-4 Changes in some of the assumptions employed in the economic analysis presented in the Draft FR/EIS would change the results of the NED analysis from an annual economic loss of $246 million to an annual economic gain of $467,426,000.

These could be achieved by the following adjustments (in $000s):

Discount Rate	78,700
Dewatered Lands	44,000
Changes in Flow Augmentation	171,200
Passive Use Values	420,000
Total Adjustment	**713,900**

Response: Comment noted. Specific questions about these issues are answered in response to comments in the following sections.

ECO-5 The analysis of alternatives presented in the Draft FR/EIS selectively uses the products produced by the various DREW workgroups. The DREW analyses figure prominently in the power, water supply, transportation, and social resources section of the main text.

- DREW is not, however, cited as the source for information presented in the Native Americans section, Section 5.7, rather the report produced as part of the DREW process is referred to as Meyer Resources, 1999. Why is this? The section of this report presented in the Draft FR/EIS is greatly truncated from the original version and excludes important economic information.

Response: As noted in several places in the Draft FR/EIS, the discussion of the potential impacts of the proposed alternatives upon Native Americans is drawn from a number of different resources, including the report prepared as part of the DREW process by Meyer Resources on behalf of CRITFC (Meyer Resources, 1999). The fact that this report was developed as part of the DREW process is noted in the Final FR/EIS. The full text of this report, which is approximately 250 pages in length and referenced throughout the Draft FR/EIS, is readily available on the Corps website at http://www.nww.usace.army.mil/lsr.

- The Recreation and Tourism section, Section 5.12 tends to diminish the input of the DREW Recreation Workgroup.

Response: The Draft FR/EIS does not diminish the findings of the DREW Recreation Workgroup. These findings are summarized in Section 5.12.4.4 (Recreation Use and Economic Benefits) of the main FR/EIS document and Appendix I, Economics. The DREW recreation analysis, which was prepared as part of the NED analysis, is discussed at greater length in the Section 3.2 of Appendix I, Economics. The findings of this analysis are also discussed in other parts of Section 5.12, which addresses the effects of breaching upon specific recreation facilities, activities, and users. The report produced by the DREW Recreation Workgroup (1999e) is available on the Corps website at http://www.nww.usace.army.mil/lsr. The findings of this analysis were, however, revised in response to comments on the Draft FR/EIS. These revisions were made by Dr. John Loomis, the study's principal author.

- The original DREW reports should be included in a separate appendix to aid the region in analyzing the total costs and benefits of the alternatives. The Corps should explain where the Draft FR/EIS analysis departs from the analysis developed by the various DREW workgroups and explain why.

Response: Including the DREW reports as a separate appendix is not practical given the length of some of the reports, such as those produced by the DREW Anadromous Fish Workgroup (1999c) and Regional Analysis Workgroup (1999f). These reports are cited in the appropriate sections of the Draft FR/EIS and readily available on the Corps website for interested reviewers. The Draft FR/EIS clearly identifies the one instance where the Corps had significant enough concerns with a DREW analysis to select a lower NED value than the mid-point suggested by the analysis. This is noted in the discussion of the recreation findings on pages I3-55 and I3-56 of Appendix I, Economics, as well

as page I ES-8. However, as noted in the preceeding response, these findings were subsequently revised by the study's principal author in response to technical comments from the NPPC's IEAB.

ECO-6 The economic analysis presented in the Draft FR/EIS overemphasizes NED costs and benefits and uses an unrealistic timeframe for analysis. The analysis should address more precise, localized effects and employ more realistic time frames.

Response: The NED analysis is just one way in which the economic analysis addresses the potential effects of the four alternatives. While the NED account addresses gains and losses in terms of their contribution to national rather than regional economic efficiency, the effects being measured are local and regional effects. Localized effects are addressed throughout the NED analysis, with specific impacts on local business sales, employment, and income specifically addressed in the RED analysis. Localized impacts are further addressed in the DREW social analysis through a series of case studies of potential affected local communities. Case study communities were selected to be representative of the range of potentially affected communities. In addition to the analyses performed as part of DREW process, interactive community forums were conducted in 17 communities located throughout the lower Snake River study area. The results of the RED and social analyses are presented in sections 6 and 7 of Appendix I, Economics, respectively. The full length reports produced by the respective DREW workgroups are available on the Corps website at http://www.nww.usace.army.mil/lsr.

ECO-7 The assumption that most of the actions that would be necessary if the dams were breached—building new power plants, constructing tidewater railcare storage, etc.—would be completed within a year of the decision is unrealistic.

Response: The economic analysis presented in the Draft FR/EIS does not assume that replacement power facilities would be built within 1 year of a decision to breach the four lower Snake River dams. A possible construction schedule is identified in a number of locations in the document including page I6-9 of Appendix I, Economics. There are six new power plants planned. The first two are to be constructed in one year and the other five will each be constructed in one year staggered over a 10-year period, but not one year from any decision date. In general, construction activities that would likely be necessary if dam breaching were to occur are expected to be temporary and last less than 10 years.

5.25.3 Discount Rate

ECO-8 The choice of a primary discount rate of 6.875 percent is critical because this high discount rate coupled with a long time horizon results in less favorable impacts for alternatives with costs that occur early in the process and benefits that extend far into the future, as is the case with Alternative 4—Dam Breaching. Lower discount rates are typically considered when inter-generational social discounting involves very long time horizons, such as the 100-year timeframe being considered in the Draft FR/EIS. Lind et al. (1982) and the Northwest Power Planning Council (1991), for example, consider a three percent discount rate appropriate for long-term investments. The Corps should consider estimating and presenting the results using this rate also. The summary presentation in the Summary should be expanded to include the results for all three discount rates used in the study because the effect of these different rates on the NED costs and benefits relative to the status quo is substantial, as shown elsewhere in the Draft FR/EIS.

Response: The Draft FR/EIS employs three discount rates: 6.875 percent—the rate used in economic analyses by the Corps, 4.756 percent—the rate customarily used by BPA, and zero percent—which was included in the analysis on behalf of the tribes represented by CRITFC. Discount rates are discussed in Section 1.5.2 of Appendix I, Economics of the Draft FR/EIS. This section notes that while three discount rates have been used to accommodate a variety of perspectives, the use of these rates has little effect on the ranking of alternatives. As a result, while the Summary of Effects presented in Chapter 10 of Appendix I, Economics presents the findings of the NED analysis for all three discount rates, the summaries of this analysis presented in Section 5.15 of the main FR/EIS, and the Summary of the Draft FR/EIS only present the findings using the 6.875 percent rate. The summaries in Section 5.15 of the main FR/EIS and the Executive Summary of Appendix I, Economics have been revised to include the results with all three discount rates. These numbers will not, however, be added to the main Summary document due to space constraints.

ECO-9 While the choice of discount rates does not affect the ranking of the alternative considered in the Draft FR/EIS, as stated on page I2-10 of Appendix I, Economics, it does affect the projected costs of the alternatives. Reducing the future benefits by discounting defeats the purpose of the study which is to determine how to restore salmon and steelhead runs for future generations. Using the zero discount rate reduces the average annual cost of Alternative 4 from $246.2 million to $167.6 million.

Response: The revised report illustrates the NED costs of Alternative 4, Dam Breaching at $266.7 million using the 6.875 percent discount rate and $158.4 million using a zero discount rate. The projected fish populations resulting from the alternative actions are not discounted. For additional information see Tables 9-1 and 9-6, of Appendix I.

ECO-10 The tribal discount rate of zero percent should be deleted from the economic analysis because it will contribute to poor decision-making, is inappropriate, and sets a dangerous precedent. The use of a discount rate reflects the reality that benefits or costs that occur in the near future should be weighed more heavily than those occurring in the far distant future.

Response: Comment noted.

5.25.4 Subsidies

ECO-11 The Draft FR/EIS states that "(t)he analysis does not take into consideration the effects of taxes or subsidies, which represent transfer payments within the national economy" (page I3-62). While taxes and subsidies are considered transfer payments that are not accounted for in NED analysis, they have economic effects in the lower Snake River region and should be presented in the document. Lansing (1998) concluded the following on the basis of BPA and NPPC figures:

- Taxpayers and electric ratepayers subsidize electric power production, river transportation, and irrigation, and that when all these subsidies are accounted for, the "benefits" of these dams actually amount to a net loss to the economy of $114 million annually.
- Electric power generated by the dams is not cost competitive when all the costs, such as necessary mitigation costs, are included in the total.
- River transportation on the lower Snake River is expensive by comparison to rail costs and can only be cost competitive because it is heavily subsidized. Dickey (1999) estimates that current users of the

lower Snake waterway currently receive a subsidy of $10 million per year. Others suggest that these annual costs could range from $10 million to as much as $35 million.

- Federal taxpayers pay for the Northwest preference on electricity generated at the dams, as well as for the operation and maintenance of the dams navigation locks that are not paid for by the barge companies or their customers. The four alternatives carry different costs and benefits for those residing outside the lower Snake River region and these should be accounted for. These dams would not exist if it were not for the Federal subsidies that created and maintain them. To make an argument about the economic impacts of removing the dams without taking into account the Federal subsidies for barging and irrigation does not allow a balanced evaluation of the costs and benefits of breaching the lower Snake River dams.

Response: The DREW was a regional process through which the economic analysis was conducted. Membership was open and participation was welcome. The assumptions and methodologies were decided upon through the DREW process. Calculating all areas that are being subsidized and not being subsidized is beyond the scope of this study.

ECO-12 The economic analysis presented in the Draft FR/EIS should carefully distinguish between marginal agricultural and other commercial enterprises that exist only with Federal or other subsidies and profitable enterprises that do not need subsidies. Otherwise the results of the analysis will be skewed.

Response: The Draft FR/EIS does not try to quantify potential impacts at the level of the individual enterprise with the possible exception of potential impacts to the 37,000 acres presently irrigated by water from the Ice Harbor reservoir. Potentially affected businesses are addressed qualitatively in Section 6.5.1 of Appendix I, Economics.

5.25.5 Costs Excluded from the Analysis

ECO-13 The following costs of maintaining the status quo are not included in the Draft FR/EIS analysis.

- The costs of compliance with the Clean Water Act, which, if the dams are not removed, could run as high as $900 million.
- The Draft FR/EIS reduces the frequency of turbine rehabilitation from two regular cycles to one over the 100 year study timeframe. This reduces the avoided cost estimate by half or $380 million.
- The costs of past studies, failed or ineffective measures, and payments in lieu of and other compensatory payments made to third parties that have been incurred from attempts to maintain the present system intact.

Response: The Corps is required to follow Planning Guidance in which costs and benefits are measured as changes from the base case or existing condition. Turbine life is usually good for a 50-year cycle. The existing four powerhouses going into operation from 1960 to 1975 would experience two rehabilitations instead of one between 2005 and 2104 (the full study cycle). Two rehabilitations were accounted for in the avoided costs for drawdown. In addition, compensatory costs to third parties were not included as NED costs, but rough estimates were included in Appendix I, Table 13-3, page I13-5.

ECO-14 Page I2-10 of Appendix I, Economics states that alternatives that would change upper Snake River flow augmentation levels are not being carried forward at this time. There is no

analysis or accounting for changes in the cost of flow augmentation water taken from the upper Snake River. The system currently uses 427,000 acre-feet of upper Snake River water for flow augmentation. According to the Bureau of Reclamation study conducted on behalf of the Corps this augmentation presently costs $9.5 million, an additional one million acre-feet would cost $171 million. It is not clear why these results are not included in the Draft FR/EIS. Assuming that additional flow augmentation would be needed if breaching did not occur, these costs should be added to the costs of alternatives 1 through 3 in the Draft FR/EIS.

Response: The cost of the existing flow augmentation requirement of 427,000 acre feet of water is identified as an O,M,R,R&R cost in Table 3.8-3 and discussed on page I3-155 of Appendix I, Economics of the Draft FR/EIS. Earlier in the study effort, an alternative that contemplated additional flows was considered. It was eliminated due to lack of known benefits to fish and Federal criteria for completeness and public acceptability. If additional flow augmentation is contemplated in the NMFS 2000 FCRPS Biological Opinion (NMFS, 2000a), then the BOR and other entities would likely study this alternative more, and in a separate environmental review process.

ECO-15 The costs and impacts of habitat actions that would be required if the dam breaching alternative is not selected are not addressed. Findings of the NMFS All-H paper and the Multi-Species Framework suggest that alternatives that do not involve breaching the dams would require that severe restrictions be placed on the use of public and private lands. The high associated costs must be included in the FR/EIS and decision-making process.

Response: The Corps has considered all costs associated with the Lower Snake River Fish and Wildlife Compensation Plan as part of the O&M program. For Alternatives 1 through 3, mitigation costs are part of the O&M. There would be no additional habitat mitigation as suggested by the comment. Access to the lower Snake River and to public lands adjacent to the lower Snake River are controlled to restrict unauthorized uses. It has not been shown that current uses of the lower Snake River by users have created impacts to the habitat, therefore, it is not anticipated that things would change for Alternatives 1 through 3. There are extensive discussions throughout Chapter 5 of the FR/EIS of the impacts and benefits of exposing approximately 14,000 acres of inundated lands. The need to incorporate these lands into the overall mitigation program for habitat has been discussed and the costs associated with that effort have been identified.

ECO-16 The Draft FR/EIS fails to address the net economic losses to commercial, recreational, and Tribal fishing communities which have resulted directly and indirectly from declines of salmon caused by the Snake River dams. Direct costs include the actual landed value of salmon. Indirect costs are those incurred from tying up capital for a fishing season that is shortened as a result of the scarcity of these endangered fish.

Response: The purpose of the Feasibility Study is to assess the potential effects of the proposed alternatives. The Corps is required to follow Planning Guidance in which costs and benefits are measured as changes from the base case or existing condition. Researching potential costs before year 2000 is outside the time period and scope of this study.

ECO-17 The Corps fails to take into account the economic restrictions, such as restrictions on fish harvest, that are currently in place to assist recovery of Snake River salmon.

Response: Economic restrictions, such as restrictions on fish harvest, are considered part of the base case. The Corps is required to follow Planning Guidance in which costs and benefits are measured as changes from the base case or existing condition.

ECO-18 The Draft FR/EIS ignores the economic costs of extinction. Salmon recovery in the Columbia Basin is a legal obligation of the United States under multiple Federal laws as well as treaties with Canada and the sovereign American Indian Tribes. Salmon extinctions in the Snake River Basin would represent an obvious violation of these legal duties. NMFS recently acknowledged in the press that penalties for the United States might run to $10 billion—far more than any proposed salmon recovery plan. Treaty tribes have estimated the costs of extinction to be much higher. Further, some believe that this bill for salmon extinction would lead to the repeal of the Federal Northwest preference for electricity rule. This, they contend, would lead to a worst-case scenario that would see a loss of salmon, as well as cheap regional energy, transportation, and irrigation water.

Response: NMFS addresses extinction and recovery in the 2000 FCRPS Biological Opinion (NMFS, 2000a). The Corps has consulted NMFS regarding its proposed action. In the 2000 FCRPS Biological Opinion, NMFS sets forth RPAs for the Corps to implement (NMFS, 2000a). This FR/EIS is to evaluate potential changes to dam structures and/or operations to improve the passage of juvenile salmon through the Lower Snake River Project. The Corps plans to implement an alternative that meets that goal.

ECO-19 Appendix K, Real Estate states that approximately 14,000 acres would be dewatered if dam breaching were to occur. The Corps paid $22.13 million for this land in the 1950s and 1960s (K2-5). Land values have significantly increased since that time. The Draft FR/EIS assigns values of $10,000 to $32,000 per acre for mature orchards on adjacent lands. Assuming that non-farm use would be worth more than agriculture, the value of the dewatered land would be at least $440 million. The Corps states that the lands would most likely remain under Corps management but ownership of these lands does not affect their value. This value needs to be included in the economic analysis.

Response: As discussed in Section 5.11.2 of the main text of the Draft FR/EIS and Appendix K, Real Estate, considerable uncertainty surrounds the future of the currently inundated lands that would be exposed if dam breaching were to occur. Potential land values are too uncertain to quantify with the degree of accuracy necessary to include them in the economic analysis. Further, the Corps disagrees with the suggestion that ownership of these lands would not affect their value. Assigning lands that would most likely be managed by the Federal government for conservation and restoration purposes "at least" the same value of irrigated agricultural land seems unrealistic.

ECO-20 The Draft FR/EIS fails to account for existing economic benefits in the form of reduced highway traffic, reduced highway maintenance expenditures, and values attributable to aesthetics and unequaled recreation opportunities.

Response: The existing benefits of reduced highway traffic and associated highway maintenance expenditures are accounted for in the existing conditions that form the baseline for the transportation and economic analyses presented in the Draft FR/EIS. Existing aesthetic conditions and recreation opportunities are addressed in Sections 4.15 and 4.13 of the main FR/EIS, respectively. Recreation is also addressed in Section 3.2 of Appendix I, Economics. Regional and local impacts associated with changes in recreation opportunities are further addressed in Chapters 6 and 7 of Appendix I, Economics.

5.25.6 Mitigation

ECO-21 The Draft FR/EIS does not consider mitigation and transition programs that would alter the relative cost and impacts of dam removal and retention alternatives. Mitigation and transition investments might not only decrease costs associated with dam breaching, but might also make significant improvements in the local or regional economy. The transportation analysis, for example, fails to fully explore the potential economic benefits that might be associated with selective investments in transportation infrastructure, even though a recent EWITS study suggests that the loss of the lower Snake River portion of the Columbia-Snake Inland Waterway combined with strategic investments could lead to a net gain for shippers by re-establishing competition in the transportation marketplace. Although the Corps notes that this type of mitigation and transition spending is beyond the scope of its authority, it is required by NEPA to disclose all relevant costs and benefits associated with the foreseeable implications of a proposed Federal action.

Response: Chapter 13 of Appendix I, Economics discusses Compensation and Mitigation.

ECO-22 The brief mitigation section of the Draft FR/EIS, pages I13-3 to I13-6, states that a $20 million increase in spending to maintain wildlife would be required if dam breaching were to occur but gives no value to the 14,000 to 34,000 acres of riparian land that would be exposed, either as habitat or in some other use.

Response: The difficulties associated with assigning a value to these lands are discussed in response to comment ECO-19. Even if it were possible to assign a realistic value to these lands, there would be no reason to present this value in the implementation cost portion of the mitigation discussion where potential fish and wildlife mitigation costs are identified.

5.25.7 Cost Effectiveness

ECO-23 The economic analysis compares alternatives that have widely differing possibilities of success in achieving the goal of meeting ESA requirements. However, no adjustment is made to the costs of the alternatives to reflect this variation in effectiveness. If you want to compare the costs of the four alternatives, these costs need to be adjusted to take into account the differences in effectiveness of the four alternatives.

Response: Chapter 9 of Appendix I, Economics assesses the cost effectiveness of the four proposed alternatives based on the NED analysis prepared for this study. This analysis seeks to address the least cost method for providing various levels of output and meeting the NMFS jeopardy standards.

ECO-24 Salmon mortality caused by the four lower Snake River dams should be calculated against the cost of maintaining the dams.

Response: The cost effectiveness analysis presented in Chapter 9 of Appendix I, Economics addresses the issue of the costs of meeting the NMFS jeopardy standards based on NED costs and benefits.

ECO-25 The Draft FR/EIS needs to account for the relative costs of delay. A cost of delay analysis may include both increasing costs for actions extended over time and increasing value for those actions that would have immediate benefit. This may require a type of "cost-effectiveness" analysis, as actions with immediate benefits have higher biological value and actions encompassing delay have additional extinction risk.

Response: The costs of different alternatives over time are addressed by discounting cost and benefit streams that occur in the future. This analysis assigns commercial and recreation harvest values to salmon that increase with increased returns. The issue of time is also addressed in the Tribal Circumstances analysis, which emphasizes the importance of increasing salmon runs for Native Americans. The cost effectiveness analysis presented in Chapter 9 of Appendix I, Economics addresses the biological value of the alternatives in terms of the costs of meeting the NMFS jeopardy standards.

5.25.8 Avoided/Implementation Costs

ECO-26 The Corps only includes the direct costs of dam operations and maintenance in its avoided cost analysis. It does not include:

- the costs of existing transportation and other mitigation programs. Estimates of these costs range from $194.4 million to $230 million a year.
- "Foregone revenues" resulting from required spill program mitigation measures that would no longer be required under Alternative 4—Dam Breaching.

Response: Refer to Appendix I, Economics, Section 3.8.1 Implementation/Avoided Costs. Table 3.8-2 Total Construction and Acquisition Costs reflects changes in costs for mitigation and transportation programs for Dam Breaching and non-breaching alternatives.

Foregone revenues resulting from the required spill program are covered as line items under "Fish Improvements and Anadromous Fish Evaluation Program" in the Implementation/Avoided Cost Section 3.8.1. The net differences in power revenues between Dam Breaching and non-breaching alternatives are reflected by comparing power revenues from existing conditions (non-breaching) to the power revenues for the Dam Breaching alternative.

ECO-27 Operation and maintenance costs associated with Habitat Management Units and parks would end when the current project lands are transferred by the Corps to others about 20 to 25 years after dam breaching. The avoided costs analysis and other areas in the report related to O&M costs need to take into account the Corps intention to relinquish ownership of project lands relatively soon following dam breaching if it were to occur.

Response: The Corps has no stated plans to relinquish ownership of project lands if dam breaching were to occur.

ECO-28 Are planned and other future wildlife mitigation costs, aside from O&M costs at HMUs, included as avoided costs under the dam breaching alternative? If the dams are breached, these mitigation measures should no longer be necessary and their projected cost should be considered an avoided cost. This should be clarified in the text of the Draft FR/EIS.

Response: See response to comment ECO-27.

ECO-29 The costs presented in the Draft FR/EIS omit the implementation costs of additional juvenile fish bypass and transportation measures required for alternatives 2 and 3.

Response: Additional transportation and fish facility improvement costs associated with Alternatives 2 and 3 are identified in Table 3.8-2 of Appendix I, Economics and included in the avoided cost category of the NED analysis.

ECO-30 While a $1 billion cost estimate for engineering and construction activities that would be required if dam breaching were to occur is a large number, it is likely an underestimate because if dam breaching were the selected alternative there would be significant time delays for appeals and litigation, legal costs associated with these delays, as well as design changes for unseen and unanticipated conditions.

Response: Although we cannot foresee all potential delays and related impacts that would affect the overall cost to implement the dam breaching alternatives, contingency funds have been included in the cost estimate in an effort to reflect the likelihood of unseen and unanticipated conditions.

ECO-31 Tables 3.8-3 and 3.8-4 should be in agreement for the O&M items. The difference does not appear to be the result of discounting and annualizing because the amounts in Table 3.8-3 do not agree with those in Table 3.8-4 when they are converted to annualized amounts. The non-project related costs ($58,955 in row 1) are not described in the text. It is not possible to determine what is included or if everything is accounted for.

Response: In response to the first question, Table 3.8-4 displays the Anadromous Fish Evaluation Program (AFEP) costs separate from the other operation, maintenance, repair, replacement and rehabilitation costs (average annual), whereas Table 3.8-3 summarizes these categories together and are present value numbers. The combined average annual AFEP and the operation, maintenance, repair, replacement and rehabilitation cost column numbers in Table 3.8-4 equates to the total present value amounts listed in Table 3.8-3. In response to the second question, the Corps assumes the $58,955 mentioned is from Table 3.8-5. This particular number reflects all current dam operation expenses including the existing fish hatchery costs.

5.25.9 Passive Use Values

ECO-32 Passive use values should be removed from the Risk and Uncertainty analysis. The existence of a Federally funded program is itself evidence that passive use values have already been applied to this issue. We have already recognized that the resource is worth saving. The passive use value concept has been applied to create the programs we already have.

Response: The risk and uncertainty analysis has been revised and a more careful distinction will be made between passive use and NED values. The purpose of the passive use analysis is discussed in Chapter 4 of Appendix I, Economics. Additional text has been placed in the Risk and Uncertainty Section (Section 8.4.4) to discuss uncertainty that surrounds the passive use estimates.

ECO-33 The studies used in the benefit-transfer are not comparable to the lower Snake River case because those studies attempted to evaluate significantly different outputs. In addition, none of the existing studies attempted to deal with planning periods comparable to the 100-year time horizon used in this case.

Response: Comment noted.

ECO-34 The passive use analysis does not account for the significant uncertainty involved in meeting goals such as a doubling of fish numbers. A person's estimated willingness-to-pay might change if they are aware that the prospects of success are slim.

Response: Comment noted.

ECO-35 Passive use value analysis increases the prospects of double counting because it is difficult to separate one set of non-market outputs from another.

Response: The Draft FR/EIS addresses two sources of non-market outputs: passive use and NED recreation values. The passive use analysis employs three different benefit-transfer approaches to estimate the passive use value for salmon. In each case, projected passive use value per year per household is applied only to the estimated population of non-users. Non-user households were defined for the purposes of analysis as households that do not hold fishing licenses. This approach was intended to avoid double counting non-market values.

ECO-36 Passive use value estimates do not net out unintended effects. A personal willingness to pay might be based on a desired result that does not take into account the tradeoffs necessary to achieve this goal.

Response: The passive use value analysis does not address the costs or tradeoffs involved in implementing a proposed alternative. Rather, it seeks to identify the value that individuals place on a natural resource independent of their direct use of that resource. This is discussed in more detail in Chapter 4 of Appendix I, Economics. Implementation and other direct costs of a proposed alternative are evaluated independently of the passive use value analysis.

ECO-37 The passive use values associated with existing conditions, such as lakes, are not accounted for or netted out. Without any objective data to support the point, it assumes that the public only values a "near-natural" lower Snake River. One might also argue that people rest easier at night knowing that the power system is reliable, transportation costs are reasonable, local potatoes and fruit are being produced in the Basin, our power is clean and renewable, and that we have jobs.

Response: As noted on page I4-2 of Appendix I, Economics in the Draft FR/EIS, while it is possible that man-made objects such as dams may have existence value, economic theory, and empirical evidence to date suggest that this is likely to be small. The text does point out that for some individuals, breaching these dams may be regarded as a retreat from technological progress and these individuals may value the continued operation of the dams, even though they may not directly benefit or use the dams or reservoirs themselves. New text has also been added that notes that people may also hold passive use values for a traditional way of life, such as commercial fishing or the family farm. No effort is made to measure these types of value in this analysis. Instead, the majority of the value of development, such as dams or barge transport, is assumed to come from the market outputs created or the non-market recreation use values. These values are assessed elsewhere in the economic analysis.

ECO-38 Passive use is almost impossible to reliably quantify and serves to cloud rather than clear the picture of economic impacts from breaching. The entire section should be dropped from the report.

Response: The Corps' policy, which is applied nationally, does not support inclusion of passive use values into the NED account. However, these values have been included in the economic analysis as additional information available to decision makers. This determination was supported by the Independent Economic Analysis Board (IEAB) of the Northwest Power Planning Council.

ECO-39 Passive use values are underestimates because the existing studies did not mention threatened or endangered species and valued larger potential increases in salmon. At a minimum these points should be raised in the footnotes to Table 4-1 (Appendix I, Economics) and some

quantifiable value or range of values should be presented for this increase. This underestimation should also be explained in both the main and summary FR/EIS documents. It is also not clear whether the estimated passive use values include "option values" - the value that individuals place on a resource to ensure its availability at some future date if they wish to exercise that option.

Response: The passive use value analysis is discussed in detail in Chapter 4 of Appendix I, Economics. It is also addressed in a separate report prepared by the DREW Recreation Workgroup (1999e). This report is available on the Corps website at http://www.nww.usace.army.mil/lsr.

ECO-40 There needs to be a human face on the salmon recovery debate. We've seen it in the faces of the non-Indian fishermen and their families, and the many communities that depended on them, all up and down the Columbia and along our coasts. Its time we recognized the human face of extinction.

Response: The public has been involved with this study from the very beginning with public scoping meetings. Throughout the 26 community forums, and regional public meetings attended by nearly 9,000 people combined with 230,000 comment documents, the study team has had an opportunity to hear, read, and understand many viewpoints. For additional information see Chapter 7, Social Impact Analysis, Appendix I.

ECO-41 The Draft FR/EIS notes the controversy surrounding the measurement of passive use values and then excludes them from the cost-benefit analysis. They should be included in the cost-benefit summary because having wild steelhead and salmon in the Snake River has value to many people beyond the amount associated with recreation, tourism, and direct uses of the fishery.

Response: Passive use values are discussed in Section 10.24.3 of Appendix I, Economics. This is the section that summarizes the costs and benefits associated with the proposed alternatives. They are also addressed in Section 5.15 of the main text of the Draft FR/EIS. As noted in the text, these estimates are not part of the NED analysis and are, therefore, presented in a separate section.

ECO-42 A summary of the existence value estimates should be provided in the Summary document, along with an explanation of its relevance to the NED summary. A good place would be immediately following the NED discussion on pages 36 and 37. This discussion should indicate that if included in the "Total Cost-Benefits" of the NED summary table (Table 1, page 36), the net estimate for Alternative 4—Dam Breaching could be positive.

Response: A brief discussion has been added to the Summary document of the Final FR/EIS. The incremental passive use values for the increase in anadromous fish due to the dam breaching ranges from a high of $879 million for households in the Pacific Northwest and California to a low of $66 million with a middle range between $142 and $508 million. Also, based on the existing literature, there appears to be a passive use value of $420 million annually for returning the Lower Snake River to a near-natural condition, independent of any effect on salmon populations. NED estimated middle range costs are $266.8 million. Note passive values are very subjective and were extracted as a "benefit transfer" estimation from other studies here in the Northwest. Please visit: http://www.nww.usace.army.mil/lsr/REPORTS/misc_reports/passive.htm for more information.

ECO-43 The Draft FR/EIS (page I ES-17) states that there are negative passive use values for the non-breaching alternatives. Positive values calculated in the analysis should be assigned to Alternative 4-Dam Breaching and negative values should be assigned to the non-breaching alternatives.

Response: As stated on page I ES-17, one portion of the estimated passive use values are calculated for salmon on a per fish basis based on the preliminary PATH results, as extended by the DREW Anadromous Fish Workgroup. Values were calculated for Alternatives 2 through 4, net of Alternative 1. Passive use values calculated in this way are negative for Alternatives 2 and 3 because the 1998 model results project lower average annual returns of salmon under Alternatives 2 and 3 than under Alternative 1. These negative values are presented in Table 4-1 of Appendix I, Economics, which summarizes the results of the passive use value analysis.

5.26 Cumulative Effects

The issues on the cumulative effects analysis revolve around three different themes. The first is that many commentors expressed desire to see much more depth in the analysis of cumulative effects. The second area of concern involves the desire to see many more specific "other reasonably foreseeable actions" considered when evaluating the impacts of the alternatives in this Feasibility Study. The third area of concern involves a desire for more analysis of ongoing cumulative impacts arising from hatcheries, continuing habitat losses, continuing harvest, and ongoing land and water management activities.

CE-1 The desire to see more depth in the analysis of cumulative effects was expressed in general terms and is not necessarily specific to any one area of the analysis. Commentors often expressed concern by stating that the cumulative impact discussion is short, too general and inadequate. Some commentors expressed desire for Corps to draw more specific conclusions about possible future actions rather than highlighting the uncertainty of future resource conditions. The State of Oregon pointed out that a summary of effects is appropriate if the appendices provide a deeper analysis of cumulative effects in each respective resource area.

Response: An explanation has been added to Chapter 1 of the FR/EIS to explain why and how cumulative effects for each resource are treated throughout Chapter 5 of the FR/EIS. Resource cumulative impacts are considered within the resource area.

CE-2 Several commentors listed other "reasonably foreseeable actions" they desired to be included in the analysis. These include:

- The Corps channel deepening project on the Lower Columbia River and Dredge Material and Management Plan for lower Snake and McNary Dam
- Snake River water rights adjudication
- Enhancement measures in Northwest Power Planning Council's Fish and Wildlife Program
- Oregon went on to suggest that the cumulative analysis should further draw on analyses in the Power Planning Councils' Artificial Production Review program and the Multi Species Framework ecosystem analysis.
- Many commentors requested much more consideration be given to potential outcomes of the Hells Canyon Project relicensing.

Response: The Corps will include a general discussion of the relevant actions that are reasonably foreseeable, in addition to ongoing effects resulting from the Basin-wide Species Recovery Plan and State/County Programs for habitat improvement.

CE-3 Under cumulative effects, consider increased upstream flow augmentation or "upstream releases to protect resident fish"

Response: The BOR would be responsible for implementing upstream flow augmentation. At this time, this action is not reasonably foreseeable. NMFS consultation regarding upstream flow issues with the BOR and Idaho Power is currently ongoing, but separate from the FR/EIS process.

The desire to see more analysis of ongoing cumulative impacts arising from hatcheries operations, continuing habitat losses, continuing harvest, and on-going land and water management activities was expressed widely throughout many comment documents. Some themes relating to this concern include:

CE-4 A desire to fully consider the effects the alternatives have on recovery potential by examining how other efforts described in the All-H paper might contribute to salmon recovery.

Response: See Section 5.17 of the FR/EIS for discussion on Basin-wide Species Recovery Plan (Federal Caucus, 1999).

CE-5 A need for more discussions about management of ocean fisheries and the role Canada or international relations plays in such management.

Response: Please see section in Relevant Agreements called Pacific Salmon Treaty.

CE-5 A need to use to the Oregon Salmon Plan Report to describe habitat conditions in terms of the extent of problems with culverts and how improvements to road culverts could change the outcome of any Lower Snake alternative.

Response: Section 5.17 of the FR/EIS has been revised to include a discussion of the Oregon Salmon Plan.

5.27 Federal Statutes

FED-1 Dam breaching is the most risk averse method of assuring compliance with all applicable laws.

Response: If dam breaching is selected, further analysis would be done during the plans and specifications development in order to determine more details of potential impacts. Whether compliance with all applicable laws is achieved would depend on what the analysis reveals and the conditions at the time of breach.

FED-2 Chapter 9 of the FR/EIS should include more discussion about compliance with the Clean Water Act.

Response: See the Clean Water Act 404(b)(1), Appendix T, for further information.

FED-3 Environmental Justice sections provided by CRITFC should be incorporated in its entirety.

Response: The Environmental Justice Section of the FR/EIS contains information on minority populations, including Native American Indian and Hispanic populations. This section provides sufficient information, but the Meyer Resources Report is referenced and available to the public.

FED-4 If breaching would require changes to certain laws and statutory requirements, then why can't the Corps recommend a change in ESA to facilitate compliance?

Response: In order for the Corps to implement a breaching action, Congress would need to authorize it and appropriate the money for implementation. Under very specific circumstances, the Corps can request an exemption to Chapter 7 compliance. The ESA mechanism for addressing exemptions can be found in Section 1536(e), Endangered Species Committee.

FED-5 Need to add a section on:

- Compliance with the mandates under *US v. Oregon*.
- Compliance with the Regulatory Flexibility Act [5 USC Section 601, et. seq.].
- Compliance with the Doctrine of Discovery [Johnson v. M'Intosh 21 U.S. (8 Wheat) 543 (1823)].
- Compliance with authorities through the Commerce Clause and other aspects of Rivers and Harbors Act 1899 and other legislation authorizing navigation and court cases that uphold navigation rights on the Columbia and Snake Rivers or other similar rivers in the US.
- Compliance with Section 203 of the Flood Control Act of 1962 .

Response: Follow up analysis of the five requested items commentors requested to be added into the Feasibility Study has shown that only the Rivers and Harbors Act of 1899 would be directly relevant to the Feasibility Study and thus only that Federal Act has been added to Chapter 8 of the FR/EIS. The remaining items were not included as follows:

- *US v. Oregon* refers to several court cases dating from the 1970s. These court cases pertain to States regulatory authority and protection of Treaty Tribes reserved fishing rights. The Feasibility Study does not propose or recommend any potential changes in State harvest regulations.
- The Regulatory Flexibility Act (RFA) of 1980 as amended by the Small Business Regulatory Enforcement Fairness Act of 1996, mandates that agencies consider the impacts of regulatory proposals on small entities and determine in good faith whether there were equally effective alternatives that would make the regulatory burden on small business more equitable. The Feasibility Study is not a regulatory proposal and thus these Acts are not directly relevant to the action since no new regulations are being contemplated by the Corps.
- The Doctrine of Discovery was a 19th Century set of principals that dealt with nations discovering and claiming new lands and is not relevant to improving fish passage or any of the alternatives considered in the Feasibility Study.
- The Flood Control Act of 1962 specifically authorized numerous water resources projects but did not include any of the lower Snake River dams. The lower Snake River dams are not authorized, designed, or operated for flood control.

FED-6 The Clean Water Act cannot be used to impede provisions for navigation given through legislation of Congress as authorized through its authorities granted under the Commerce Clause powers.

Response: Comment noted.

6. Public Meeting Summaries

6.1 Public Meeting Overview

The Corps and the Federal Caucus held joint public meetings in Washington, Oregon, Idaho, Montana, and Alaska in February and March, 2000 (Figure 2-1). These meetings addressed the Lower Snake River Juvenile Salmon Migration Feasibility Study Draft Feasibility Report/Environmental Impact Statement (FR/EIS); the John Day Drawdown Phase 1 Study; and the Federal Caucus, Columbia River Basin Fish Recovery, All-H Paper. The Federal Caucus is a group of nine Federal agencies responsible for Federal actions in the Northwest that affect salmon, steelhead, bull trout, white sturgeon and snails listed under ESA. The Federal Caucus, which includes the Corps, is working with regional, tribal, State, and stakeholder representatives to lay the groundwork for a unified and coordinated approach throughout the Columbia River Basin, to restore ESA-listed species and achieve a healthier ecosystem. The All-H Paper examines salmon recovery options that involve all four "Hs"—habitat, hatcheries, harvest, and hydropower—and each stage of the salmon's lifecycle. The conceptual alternatives presented in the All-H Paper combine different options from each H. One of the options under hydropower is to breach the four lower Snake River dams. The main purpose of these meetings was to allow the public to comment on the material and findings presented in the FR/EIS and other available reports. These public meetings and the overall comment period (December 17, 1999 to April 30, 2000) also met the Corps' obligation under the National Environmental Policy Act (NEPA) to provide an opportunity for public comment on the Draft FR/EIS for consideration and evaluation in revising the FR/EIS.

Some of the meetings consisted of both afternoon and evening sessions, while others consisted of just an evening session. Each session began with an overview of the three studies followed by a question-and-answer session based on written comments submitted by members of the audience. This was followed by the public comment period. Public comments were limited to 3 minutes each. People signed up to comment prior to the meeting and were called to speak in the order that their name appeared. Speakers who identified themselves as publicly elected officials were allowed to speak first. People wishing to provide oral comment also had the option to tape record their comments. This was especially important at the larger meetings. With the exception of the Clarkston, Washington meeting, evening sessions continued until everybody who wanted to present comments directly to the panel had had a chance to speak. People were also able to present written comments at the meetings. Some people presenting directly to the panel also submitted written copies of their speeches. Each meeting also included an open house area with agency staff available to discuss the studies and answer questions, as well as provide copies of the FR/EIS and associated Summary document. Other groups also had displays at the meetings.

An estimated 9,000 people attended the 15 public meetings held throughout the region. A total of 1,787 people presented oral comments. These comments were either presented directly to the panel or tape recorded. The volume of comments per meeting was generally higher at the meetings in Washington and Idaho. Relatively few people commented at the Montana and Alaska meetings (Table 6-1).

Table 6-1. Estimated Meeting Attendance and Number of Comments by Location

	Estimated Number of Attendees	Number of Comments
Portland, Oregon	1,200	126
Spokane, Washington	800	138
Clarkston, Washington	1,800	319
Astoria, Washington	200	43
Pasco, Washington	1,200	242
Boise, Idaho	1,100	200
Seattle, Washington	550	165
Kalispell, Montana	120	42
Missoula, Montana	225	63
Idaho Falls, Idaho	520	141
Twin Falls, Idaho	600	178
Ketchikan, Alaska	72	16
Sitka, Alaska	130	43
Juneau, Alaska	151	43
Petersburg, Alaska	91	28
Total	**8,759**	**1,787**

Note: The percent of total column does not sum to 100 due to rounding.

People who identified themselves as representing organizations presented 295 or 16 percent of the comments (Table 6-2). About 130 of these people represented environmental organizations. Other organizations represented included labor, agriculture, fishing, and recreation, as well as local and regional business and development organizations. A total of 165 elected officials spoke. These included 42 tribal representatives, as well as county commissioners, city councilmen, and the mayors of surrounding cities and towns. Forty-three speakers stated that they represented particular businesses. The remaining 1,284, 72 percent of those commenting, were individuals who did not declare an affiliation.

A number of people provided comments at more than one meeting. Others speakers, particularly those representing organizations, also provided separate written comment documents at some point during the comment period.

Table 6-2. Comment Breakdown by Speaker

	Total Number of Comments	Percent of Total
Individuals	1,284	72
Tribal Representatives	42	2
State/Local Government	123	7
Environmental Organizations	130	7
Other Organizations	165	9
Business	43	2
Total	**1,787**	**99**

The main purpose of these meetings was to allow the public to comment on the material and findings presented in the FR/EIS and other available reports. The majority of speakers did not directly question or comment the findings in the FR/EIS. Rather, they presented statements for or against dam breaching. The intent of the public meetings was to gather additional information that would ultimately assist in selection of a preferred alternative based on science, not to obtain what might be considered votes for or against breaching.

6.2 Evaluation of Oral Comments Made at Public Meetings

Each transcript was analyzed to identify FR/EIS issues. Most commentors did not specifically address the findings in the FR/EIS. Rather, they presented statements for or against dam breaching, often based on their own experience and/or perceptions. Issues raised that relate to the Feasibility Study are presented within the following sections for each public meeting. These issues were evaluated by technical experts and are rolled into and addressed by resource area in either Chapter 4 or 5 of this document, depending on how specific the comment. Each issue in Chapter 6 contains a reference to the applicable comment number in Chapter 4 or 5. If the issue identified by the speaker is so broad that it is difficult to tie to a specific comment/response, the reader is referred to a subsection number in Chapter 5. Applicable additions/corrections to the FR/EIS based on the comments raised were made as indicated in Chapter 5. The transcripts in their entirety can be found under the Feasibility Study on the Corps' website at http//www.nww.usace.army.mil/lsr.

6.3 Portland, Oregon Statements

Nearly 1,200 people attended the Portland Public Meeting held on February 3, 2000 in two sessions at Holiday Inn at the Airport, 8439 NE Columbia Boulevard, Portland, Oregon. A total of 105 people provided public comments to the panel at the Portland Public Meeting, 53 in the afternoon session and 52 in the evening. An additional 31 people tape recorded their comments at the meeting. About 93 percent, or 126 of the 136 comments made at the Portland meeting specifically addressed the Lower Snake River Juvenile Salmon Migration Feasibility Study. Table 6-3 provides a breakdown of the declared affiliations of the speakers.

Table 6-3. Portland Meeting Breakdown by Speaker

	Afternoon Session	Evening Session	Tape Recorded	Total Number of Comments	Percent of Total
Individuals	26	27	23	76	60
Tribal Representatives	3	0	0	3	2
State/Local Government	1	0	1	2	2
Environmental Organizations	3	11	5	19	15
Other Organizations	12	6	2	20	16
Business	3	3	0	6	5
Total	**48**	**47**	**31**	**126**	**100**

6.3.1 Comments on the FR/EIS

The following sections present portions of speakers' comments that specifically address the document and its findings.

Hydrology—Sedimentation

In the 2-year to 5-year period of which we are going to be implementing dam breaching we are going to cause massive sediment to move down stream. We are going to be disrupting the habitat for steelhead and fall chinook, the whole variety of species. (See response to comment GI-9 in Chapter 4.)

Hydrology—Sedimentation

One hundred fifty million tons of sediment are now deposited behind the dams and are accumulating four million tons a year. By the time the dams will be removed, we will have over 200 million tons of sediment. On page 5.34 of the report it states that 50 percent of the sediment will wash out in the first three years perhaps. This is all estimates. But that would mean the river would be carrying ten times or a thousand percent more sediment than it normally carries. That's my big concern. I question whether any fish could survive, even the carp. I wonder if any fish could survive in this three-year mud flow. They are certainly going to very likely annihilate the salmon runs in this first three-year mud flow period. (See response to comment GI-9 in Chapter 4.)

Hydrology—Flood Control

It's been said there is no flood control whatsoever of the Snake River dams. That is not entirely the case. They were not authorized as flood control, but there is a flood control plan for Lower Granite and the Snake plants. I have log sheets from the dams there that show in February '96 flood those plants were called upon to do their part in helping stopping the flood that came within five inches of flooding downtown Portland. (See responses to comments GI-8 in Chapter 4 and HY-5 in Section 5.10.2.)

Anadromous Fish—CRI

Trout Unlimited and American Rivers have contracted with one of the region's most qualified experts on decision modeling. Dr. Ooserout is working with scientists. They have examined the work that provides much of the scientific basis for the DIH and LH documents. What she has found is a series of major errors that compromise the science in those documents and, more importantly, the policy discussions related to the alternatives that have been presented to the region. She has exposed these errors in a document entitled "Seven Questions About the Columbia River Initiative," which we are entering into the record if I can do that now.

The CRI chose a quasi extinction threshold of one fish or fewer to analyze the risk of extinction. That threshold is virtually unheard of in conservation biology. It gives an overly optimistic view. Dr. Ooserout has taken the same model that CRI has used, the Dennis model, and calculated the expected time to extinction using more commonly used quasi extinction thresholds. (T)he time changed dramatically when different values are used. You can see Marsh Creek goes from 40 to 49 years with one fish or fewer, 15 fish at 6.6 years, and 50 fish at 2.2 years. Actually, the prospect for extinction is even gloomier than that table, as the CRI has done other things to the data that leads to

optimistic projections, as well. On that chart Marsh Creek fish are already extinct on the CRI definition, having had less than one fish returned in 1999, having zero fish.

In contrast to the CRI science, we are also entering into the record a study by one of the region's scientists, Phil Mundy. The spring-summer chinook will be functionally extinct: Dr. Mundy's projections seem to be far more accurate. The point is not that the CRI is wrong. The point is the agency is making decisions without the best scientific and economic evidence available. We call on the National Marine Fishery Service to respond to the seven questions. We also call on the Federal Caucus to choose the alternative that is based on this science." (See response to comment AF-84 in Section 5.12.7.1.)

Anadromous Fish—CRI

The NMFS CRI model is flawed, as it poorly accounts for effects of river flows in the mainstem Columbia and Snake on the salmon's lifecycles. NMFS needs to use a lifecycle model such as flush or cohort model that has more sensitivity to main stem river flow. (See response to comment AF-91 in Section 5.12.7.2.)

Recreation—Economic Effects

The Corps of Engineers has constructed many dams throughout the United States. Is there any incidence where recreational use of the water ways did not increase after the dam was installed? Why does the Corps believe recreation will increase with dam removal? There was no recreation vessels on this stretch of the Snake River before dam construction, except by me. I made a few trips and never passed a soul on a 140-mile trip. I was the only one. (See responses to comments GI-31 and GI-32 in Chapter 4.)

Economics—RED

First, the Corps has underestimated economic impact by excluding impacts associated with quality of life and liveability here in the Pacific Northwest.... we see removing the lower Snake dams as a way of restoring unique national resource. And jobs and income will be attracted to the resource, to see this resource, and live near this resource. The Corps excluded these impacts from their analysis and, therefore, underestimated the potential positive impact associated with dam removal....

Second, the Corps' EIS overestimates the negative economic of removal. The agency does this by assumptions on the input and output analysis. This provides a mere snapshot of an economy at one point in time, in this case 1994. The fundamental flaw in this case is that the economies, whether local, regional, or national scale, are not static and continue to evolve. The Corps' economic analysis does not allow for consideration for important international and natural resources. Mr. Stelle's conservation plan, in turn, impacts the economic consequences of this addition. Further, the Corps' analysis does not minimize losses or capitalize on new opportunities.

Finally, the Corps' Feasibility Report and Environmental Impact Statement considers economic losses and costs that are easily quantified. However, culture and tribal impacts and cost benefits are more difficult to quantify or deemphasize. The Corps' analysis of impacts is based on principles and guidelines that were recently reviewed by the National Research Counsel and found to have significant flaws. (See response to comment GI-36 in Chapter 4.)

Economics—RED/NED

There is zero dollars in your analysis for down river benefits. We really feel that that's an important benefit that needs to be put in there. That's a huge dollar figure. I am not the expert, but that should be a dollar figure that would be included. I think, also, some of the other economics that were not looked at or were misleading, I believe, is that you low balled a lot of the benefits, as well. It's very complicated to go into and I won't go into that. Please take some of the advice that folks said, to look at the median range of some of the economic numbers because that will definitely bring the cost down quite a bit. You will see that dam breaching is not that expensive for the region. (See response to comment GI-36 in Chapter 4.)

Economics—NED

First, in 1855, this country signed treaties with native peoples that promised they would always have salmon to catch. If the salmon go extinct, American tax payrolls are looking at tens of billions of dollars in reparation costs to the tribes. What's more, we will be burdened with the knowledge that we were instrumental in destroying an integral part of native people's culture and religion. We shouldn't and don't need to be responsible for these results if wise decisions are made now.

Second, allowing the salmon runs to go extinct will put our Northwest low cost power rates at risk. Part of the agreement in allowing the Northwest to have access to low cost power created by the Federal dams was that the BPA would insure long-term survival and protection of Columbia and Snake River salmon. If we let the salmon go extinct, we have reneged on our part of the agreement and there would be no reason for the rest of the country to allow us to continue to have this sweetheart deal. In fact, other regions of the country are asking why they pay for salmon recovery efforts that simply hasn't and won't work while the Northwest continues to have one of the lowest electric rates in the country. Losing BPA and the special power deal will double the Northwest power costs. (See responses to comments GI-23 and GI-34 in Chapter 4.)

Economics—NED

Removing these dams makes sense economically. In fact, a comprehensive look at all costs and benefits including those omitted by the Corps Draft EIS, such as Clean Water Act compliance, suggests that dam bypass save at least $50 million annually. (See responses to comments GI-34 and GI-36 in Chapter 4.)

Economics—NED

I participated in many of the meetings on economics, the DREW meetings, and so on, and I must say that the final product seems to have been very selective. The cost of breaching the dams seem to be scrupulously accounted for, but the cost of keeping the dams seem to have been minimized and the cost of extinction essentially ignored.

Some of these costs that have not been fully accounted for include the cost of flow augmentation at the dams if the dams are kept. Everyone agrees that if the dams are kept, we are going to need a lot of water from Idaho. The cost of that had not been included in the alternatives where the dam is kept. Another cost is compliance with the Clean Water Act. Again, to bring temperatures in compliance is going -- there is going to have to be some very expensive measures done with those dams if they are kept. Those costs have not been accurately accounted for.

The cost of harvest reductions has not been accounted. There is -- if we have to reduce harvest more, the cost of communities and jobs up and down the West Coast has not been accounted for as a cost of keeping the dams. The cost of changing agriculture and timber harvests and practices have not been fully accounted for. If we do not remove these dams, the need to change habitat to try to compensate will be very expensive and these costs have not been included in the cost of keeping the dams. The costs of native cultural decline and even possible collapse of native cultures has not been calculated in the keep the dams alternatives. In addition, the cost of broken treaties with the tribes and Canada has not been calculated. In looking at the difference in expectations of restoration levels, it's clear that the scientists have said removing the dams will increase the likelihood of restoring the salmon. That delta needs to be multiplied by the price of broken treaties with tribes in Canada. That cost has not been accurately accounted for.

And finally the existence value to present and future generations seems to be ignored or trivialized as if it doesn't matter. I think if you ask the citizens of this country, they will agree that simply having these salmon for future generations is extremely important. Therefore, when the true costs and benefits of the alternatives are honestly added up, the decision essentially becomes a no-brainer. (See responses to comments GI-34, GI-36, and GI-37 in Chapter 4.)

Economics

The Corps seemed to compare the economic cost of different alternatives, assuming that all those alternatives would somehow restore salmon. That didn't really look at the economic cost if some of those alternatives cause those salmon to go extinct. (See response to comment GI-36 in Chapter 4.)

Removal of the four lower Snake River dams are the most effective economical way to restore the essential habitat for salmon. The alternatives we heard earlier tonight that might be under consideration have no clear evidence of effectiveness, would be far more expensive for the purpose and economically disruptive to far more people. (See responses to comments GI-4, GI-34, and GI-36 in Chapter 4.)

6.3.2 Issues

Many of those commenting at this meeting did not specifically question the findings in the FR/EIS. Rather, they presented statements for or against dam breaching often based on their own experience and/or perspective. The main themes of these presentations are summarized below.

Future Generations

- Avoid extinction of the endangered salmon runs for the benefit of future generations.
- Concerned with the legacy that would be left for future generations, as well as the spiritual and other intrinsic values associated with salmon runs, particularly in their role as a dominant symbol of the Pacific Northwest.
- The importance of future generations should be weighed against the risk that dam breaching will not restore the endangered salmon runs.
- We have a moral obligation to save salmon for future generations.

(See response to comment GI-37 in Chapter 4.)

Study Process

- The focus of the salmon recovery effort should be on restoring salmon, not just protecting what is left. (See response to comment GI-14 in Chapter 4.)
- Money should not be the basis for the decision. (See response to comment GI-2 in Chapter 4.)
- Delays in breaching the dams are not warranted and are harmful to salmon. (See response to comment GI-4 in Chapter 4.)
- This process and decision seem to be based on what is politically expedient, rather than what is technically true. (See response to comment GI-4 in Chapter 4.)
- One commentor noted that the late change in venue from the Governor Hotel to another location was inconvenient for organizations encouraging members to attend. (See response to comment GI-1 in Chapter 4.)

Spawning Habitat

- Breaching the dams would bring back more spawning habitat for fall chinook. (See response to comment GI-14 in Chapter 4.)

Economic Effects of Breaching

- Economic effects from job losses are not significant in the big picture. We can help those who are displaced.
- Restoring salmon runs would revitalize the economy.
- The FR/EIS does not address the cost of letting the dams stay and destroying salmon runs. (See responses to comments GI-34, GI-35, and GI-36 in Chapter 4.)

Tribes

- We made a promise to the tribes through treaties to supply salmon and we should honor that by breaching dams to speed salmon recovery and increase numbers. Cultures, religion, and economies of tribes depend on salmon. (See responses to comments GI-23, GI-34, and GI-37 in Chapter 4.)
- The Federal government will face lawsuits over broken treaties and violations of the Clean Water Act if the dams are not breached. (See responses to comments GI-11, GI-23, and GI-34 in Chapter 4.)
- If dams are breached, tribes will have better access to cultural properties that are currently under water. (See response to comment CR-6 in Section 5.16.2.)

Dams

- While breaching isn't the only thing that should be done to improve salmon survival, it should be central to the recovery effort. (See responses to comments GI-4 in Chapter 4 and AF-1 in Section 5.12.1.)
- Dams shouldn't have been built in the first place. A normative river is better. (See responses to comments GI-4 and GI-14 in Chapter 4, and AF-136 in Chapter 5.)

PATH

- The Corps should follow PATH and make the most risk-averse decision—to breach dams. (See responses to comments GI-4 and GI-14 in Chapter 4, and AF-125 and AF-126 in Section 5.12.12.1.)

Other Measures to Help Salmon

Commentors suggested several measures:

- Improve fish ladders.
- Remove sand islands in the lower Columbia.
- Reduce the number of Caspian terns.
- Cover barges so birds don't eat fish.
- Look at habitat issues.
- Improve hatcheries.
- Environmental restoration is the answer for saving fish, not barging and trucking.

  (See responses to comments GI-12, GI-13, GI-15, GI-16, GI-17, and GI-18 in Chapter 4; and Section 5.12.17.)

Power

- The power generated by the dams will be important as demand on our current power supply increases. (See responses to comments GI-26 in Chapter 4 and POW-9 in Chapter 5.)
- Do more to curb our growing demand for energy by conservation than by creating new sources of energy. (See responses to comments GI-27 in Chapter 4 and POW-14 in Section 5.19.)
- We could lose our "special power deal" that results in low Northwest power costs if BPA can not live up to its "obligation" to contribute to the long-term survival and protection of salmon. (See response to comment POW-1 in Section 5.19.1.)

Harvest

- There is little benefit to further restrictions on harvest. (See response to comment GI-16 in Chapter 4.)
- Those in the fishing industry are negatively affected economically by declining salmon runs and have been for years; the jobs of people in that industry should be no more important than the jobs in industries associated with maintaining the status quo. (See response to comment GI-26 in Chapter 4.)

Negative Economic Effects

- Breaching dams would bring personal economic hardship. (See response to comment GI-33 in Chapter 4.)

Transportation

- Rail is the most efficient way to move commodities; losses to barging would not be crippling, and trucking is not the only way. (See response to comment GI-25 in Chapter 4.)

Farming

- Subsidies for farming (irrigation and barging) amount to corporate welfare. (See response to comment GI-29 in Chapter 4.)
- The water rights farmers have to take water from Snake River reservoirs would not be lost with breaching. Farmers would just need to move or extend their pipes. (See response to comment GI-29 in Chapter 4.)

6.4 Spokane, Washington Statements

An estimated 800 people attended the Spokane Public Meeting in two sessions held on February 8, 2000 at the Doubletree Hotel, 322 North Spokane Falls Court, Spokane, Washington. A total of 138 people provided oral testimony. Public testimony was presented to the panel during afternoon and evening sessions, with 112 people presenting their comments to the panel and other meeting attendees. The remaining 26 speakers tape recorded their comments. Table 6-4 provides a breakdown of the declared affiliations of the speakers.

Individuals typically identified their place of residence, occupations, as well as their relationship to the river and salmon. Many presented anecdotal information about themselves and family members. The majority of people commenting resided in Spokane, Cheney, Coeur d'Alene, Idaho and surrounding communities.

Table 6-4. Spokane Meeting Breakdown by Speaker

	Afternoon Session	Evening Session	Tape Recorded	Total Number of Comments	Percent of Total
Individuals	32	41	24	97	70
Tribal Representatives	0	0	0	0	0
State/Local Government	2	1	0	3	2
Environmental Organizations	9	9	0	18	13
Other Organizations	12	2	1	15	11
Business	2	2	1	5	4
Total	**57**	**55**	**26**	**138**	**100**

6.4.1 Comments on the FR/EIS

The following sections present portions of speakers' comments that specifically addressed the document and its findings. In most cases people identified issues that they feel the FR/EIS does not address.

Purpose and Need

What are the goals? What are you trying to achieve? How will we know when we get there? (See response to comment FS-18 in Section 5.4.3.)

Purpose and Need

On all of these documents I still have not found the answer to two paramount questions. Number one: What is our goal here? What are we trying to accomplish for the fish? And incredibly nowhere in the thousands of pages in these documents do the agencies tell us what we must do to meet our requirements under law and treaty. That's incredible that so many Federal agencies would fail to answer that vital question. (See responses to comments GI-34 in Chapter 4, FS-18 in Section 5.4.3, FED-1 in Section 5.27, and responses to comments in Section 5.12.7.)

Purpose and Need

I do not hear a real clear crisp sense of direction in the sense of things that have to be done and also a declaration of exactly what our goals are. Are we going to save the salmon or not? (See response to comment FS-18 in Section 5.4.3.)

Anadromous Fish—Model Analysis

And what I have found most disturbing from the science coming out in the Corps of Engineers report is that we've lowered the bar. We're talking about what will it take to preserve these fish from extinction. And that should not be our goal. And that should not be the question. We should be talking about what does it take to restore these fisheries to healthy, harvestable levels, to support communities, to support people in their jobs, and to support businesses. (See response to comment GI-14 in Chapter 4.)

Anadromous Fish—PATH/CRI

The FLUSH model put forth in the PATH process represents a failed characterization of smolt passage. Realtime PIT tag data reveals the limited capacity of PATH as a tool for characterizing the dynamic lifecycle of anadromous species. In contrast, CRI analysis indicates that dam passage improvements and fish transport measures implemented since the late '70s have likely prevented the extinction of spring summer chinook and possibly others. (See response to comment AF-77 in Section 5.12.6.1.)

Anadromous Fish—CRI

The CRI is focused on extinction risks which is important and necessary analyses, but it's chosen quasi-extinction threshold of one fish or fewer. This has enormous policy implications. Obviously if you're using a standard of one fish, it makes the extinction rate seem further off and we don't think that is the case here. (See response to comment AF-87 in Section 5.12.7.1)

Anadromous Fish—CRI

The CRI was focused exclusively on avoiding extinction. To be honest I don't think I've ever seen recovery standards identified under the 1994 proposed Snake River salmon recovery plan. The bottom line is the region needs to know what your alternative is to recover fish, that it provides the best chance to recover wild, naturally sustaining harvestable fish. That's what's required by law. That's what's required by treaty. We need to know that to make a decision. (See responses to comments in Section 5.12.7.)

Anadromous Fish

Are the salmon really endangered? The use of the evolutionary significant units seems to be political more than scientific. Separating fish into regions or basins where they're separated by natural barriers does not constitute a new or different species. Grizzly bears in Yellowstone are the same as grizzly bears in Alaska; just separated populations isolated by space. And our river salmon are the same as Wenatchee River salmon, just separated by mountains.

I also challenge the notion that hatchery and wild fish are genetically different enough to classify them as two separate species. Years of unabated cross breeding between them has eliminated any genetic differences, while the behavioral and survival differences may be due to upbringing, hatchery versus wild environments. I also challenge the notion that the hatcheries are destroying runs. Captive breeding programs are used in other endangered species programs for species recovery. A good example are the California condors. Behavioral modifications can be made at the hatcheries to make for a smarter, more survivable fish.

I also challenge the notion of incidental takings. This is not part of the Endangered Species Act. It's a policy set by the Secretary of Interior. It circumvents the intent of Congress and the ESA by allowing endangered species to be killed and sold for profit. Bald eagles and owls are not allowed to have takings. They carry heavy fines and imprisonment. If salmon are really endangered, treat them as such: No. 1, stop all fishing. No. 2, stop all habitat encroachment, including building, development, point and nonpoint pollution, timber harvest, mining, recreation, boating, swimming and predation; also, improve captive breeding programs within the hatcheries to help recover their numbers. (See responses to comments GI-15, GI-19, and GI-20 in Chapter 4.)

Anadromous Fish

A comment on the salmon. If they're supposed to be extinct or an endangered species, why are they still being harvested in the ocean and in the mouth of the Columbia? To spell it out as an endangered species and you can't harvest it anymore, but the salmon, they're on the endangered species list and they're still harvesting like nothing changed. (See response to comment GI-15 in Chapter 4.)

Anadromous Fish

I would also like to say that I don't think (breaching the dams is) going to create 140 miles of habitat. Its only going to create about 5 percent of that or less than a mile of real habitat the fish can use. (See response to comment GI-13 in Chapter 4.)

Anadromous Fish

The effects of capping turbines on downstream smolts is greatly exaggerated. That impact is less than 5 percent as per the Normandeau studies. A female salmon which lays 3,100 eggs needs to have a .06 return rate to maintain a healthy run. I don't think the dams, even at 5 percent each, could come anywhere near that problem -- near that number. .... I think that the science that has been done by Normandeau Associates, National Marine Fisheries and all the studies that all of the utilities have put out should be publicized to explain to people exactly what does kill fish and the impacts of the dams. (See response to comment AF-168 in Section 5.12.17.1.)

Anadromous Fish

If the dams are the reason for the decline, then why are rivers and streams that have no dams in trouble? History shows that salmon go through cycles of large numbers and low numbers. (See responses to comments GI-12 and GI-13 in Chapter 4.)

Recreation

The lakes behind the dam provide recreation. The comment that if you breach the dams it's going to increase tourism. For the life of me I can't figure out anybody who would want to go see a big mud hole. (See response to comment GI-32 in Chapter 4.)

Economics—NED

February '96 brought severe flooding to the Pacific Northwest. Just as the Willamette River was about to flood the city of Portland, the head of BPA ordered the locks and gates closed on all Columbia and Snake River dams in order to allow Willamette River flood waters to drain unimpeded into the lower Columbia. This disproves the point made by many that Snake River dams serve no purpose for flood control. To the contrary, they played an important role in preventing what would have been the 1996 Portland flood. We feel an economic analysis should include that aspect. (See responses to comments GI-8 in Chapter 4 and HY-5 in Section 5.10.2.)

Economics—NED

What the document doesn't do well, the FR/EIS, if at all, is describe the consequences of failure. What will the disappearance of salmon cost us in dollars? ..... And what will it cost to compensate the commercial and sports fishing disappearance. And what are we going to pay the Indians when they'd rather have the fish anyway? (See response to comment GI-34 in Chapter 4.)

Economics—NED—Recreation

There was a comment made on the Corps that there was no economic damage to the recreation that was not put in the study. I have a real problem with that. What about the current recreation that's there and you're cutting it off? You didn't have that in your study. I don't see where -- you have no dollars of what you're knocking out right now. There is going to be many more boats or are many more boats and etc. on that river right now than there ever will be canoes or whatever you're going to come down this river with. (See response to comment GI-32 in Chapter 4.)

Economics—NED

You have a legal obligation to restore the salmon. The ESA, the Power Planning Act, U.S. Canadian and tribal treaties all require a sustainable fishery. By ignoring these huge legal obligations, you underestimate the cost of salmon extinction and exaggerate the cost of dam removal. Breaking the tribal treaties alone would cost billions of dollars. (See responses to comments GI-34 and GI-37 in Chapter 4.)

Economics—RED

I would suggest that you look at some of the reports by Dr. Ed Whitelaw, which I have great respect for, in which he says in these days the Corps underestimates the benefits of breaching and overestimating the costs. For example, the study in the EIS estimates that there will be about 400 jobs and 7 million dollars in benefits. On the other hand Dr. Reading's report in 1997 feels that there would be 2,100 jobs and 72 million. (See responses to comments GI-34 and GI-36 in Chapter 4.)

Economics—RED

And the studies that we have seen put the dollars and the job figures pretty high, much higher than what the Corps found. One study done by the Idaho Department of Fish and Wildlife Foundation, which is a nonprofit foundation in Idaho, did a great study looking at the economic benefits of restored steelhead and salmon fishery. And what they found is that if we had a restored fishery, we would see 2,100 new jobs, we would see 72 million dollars in revenue coming in the State of Idaho. When you include indirect revenues, you're talking 5,000 jobs and 172 million dollars. (See responses to comments GI-34 and GI-36 in Chapter 4.)

Economics—Mitigation

You need to better analyze and mitigate the economic impacts like improving the roads and rail service for farmers. (See response to comment GI-35 in Chapter 4.)

Economics—Mitigation

The Northwest Power Planning Council recommended against funding 42 million dollars in the salmon recovery projects that had failed to meet an independent scientific review. This is one-third of Bonneville's 172 million dollar recovery budget. I was wondering if this money cannot be allocated to compensate the impact of businesses and individuals along the lower Snake. (See response to comment GI-35 in Chapter 4.)

6.4.2 Issues

Many of those commenting at this meeting did not specifically question the findings in the FR/EIS. Rather, they presented statements for or against dam breaching often based on their own experience and/or perspective. The main themes of these presentations are summarized below.

Science

- The science clearly points towards breaching. (See responses to comments GI-4 and GI-14 in Chapter 4.)
- Dam breaching alone would not lead to salmon recovery, but it should be a cornerstone in ongoing efforts. (See response to comment AF-136 in Section 5.12.12.2.)
- Salmon should be viewed in a wider ecosystem context. (See responses to comments in Section 5.12.17.)
- Efforts to date have proved ineffective and time is running short for the salmon. (See responses to comments GI-4 and GI-14 in Chapter 4.)

- The FR/EIS is too narrowly focused on hydropower. (See response to comment GI-6 in Chapter 4.)
- Dams are just one of many factors. The Federal agencies should examine other factors more thoroughly. Frequently identified factors include ocean conditions, harvest, and natural predators. (See responses to comments in Section 5.12.17.)
- A great deal of uncertainty surrounds the scientific process. (See responses to comments AF-158 and AF-159 in Section 5.12.14.)
- Take sufficient time to evaluate the existing system. (See response to comment GI-5 in Chapter 4.)
- Dam breaching should not be considered because it does not represent a "transferable solution" that could be implemented. (See response to comment GI-5 in Chapter 4.)

Impacts

- Breaching the dams would represent "anti-progress" or a "step backward." (See response to comment GI-33 in Chapter 4.)

Local Communities and Jobs

- Dam breaching could have significant potential effects on local communities and jobs. (See response to comment GI-33 in Chapter 4.)
- Dam breaching and the loss of barge transportation would affect local farmers. (See response to comment GI-34 in Chapter 4.)
- Job losses (related to dam breaching) in some industries would be balanced by increases in others, particularly the commercial fishing and recreation sectors. (See responses to comments GI-35 and GI-36 in Chapter 4.)
- Breaching the lower Snake River dams would also attract other types of economic activities. (See response to comment GI-36 in Chapter 4.)

Mitigation

- The potential effects of dam breaching on local communities and individuals should be mitigated. (See response to comment GI-35 in Chapter 4.)
- Some of the Federal money presently spent on salmon recovery efforts should be used to fund mitigation efforts. (See response to comment GI-35 in Chapter 4.)
- Significant social and economic costs would be incurred if dam breaching does not occur. These economic costs include what a number of people have referred to as the costs of the extinction. (See response to comment GI-36 in Chapter 4.)

Transportation

- The loss of barge transportation would directly translate into additional trucks on the road and associated air emissions. (See responses to comments GI-6 and GI-24 in Chapter 4.)
- The current river transportation system does not make sense. (See response to comment GI-25 in Chapter 4.)

Power

- Replacement power is a concern with dam breaching, especially in light of possible shortfalls in regional capacity and potential air emissions associated with replacement sources. (See response to comment GI-26 in Chapter 4.)
- The loss of five percent of the region's power supply could be mitigated. (See response to comment GI-27 in Chapter 4.)

Sediment

- The effects of the sediment that would be released into the river are of concern. (See response to comment GI-9 in Chapter 4.)

Technology

- The potential impacts of breaching on transportation and power generation could be solved if technology is applied to technological rather than biological problems. (See response to comment GI-27 in Chapter 4.)

Temporal and Geographic Context

- The decision making process should be viewed in a long-term context. (See response to comment FS-60 in Section 5.4.8.)
- This is a national and not just a local issue. (See response to comment FS-60 in Section 5.4.8.)
- A local decision is required. (See responses to comments FS-40, FS-45, and FS-47 in Section 5.4.5.)

Identity and Heritage

- Salmon are significant to the Northwest region's identity and heritage.
- Breach the dams to avoid extinction for the benefit of future generations.
- Salmon preservation via dam breaching is a moral obligation.

(See response to comment GI-37 in Chapter 4.)

Treaty Rights

- Uphold treaty rights by breaching dams. Salmon are significant to tribal communities. (See responses to comments GI-34 and GI-37 in Chapter 4.)

6.5 Clarkston, Washington Statements

A total of 146 people provided public comments to the panel in two sessions at the Clarkston Public Meeting held on February 10, 2000 at the Lewis-Clark Convention Center, 800 Port Drive, Clarkston, Washington. The afternoon session had 64 commentors, and 82 spoke at the evening session. An additional 173 people tape recorded their comments at the meeting. Table 6-5 provides a breakdown of the declared affiliations of the speakers.

Table 6-5. Clarkston Meeting Breakdown by Speaker

	Afternoon Session	Evening Session	Tape Recorded	Total Number of Comments	Percent of Total
Individuals	43	56	164	263	82
Tribal Representatives	3	0	0	3	1
State/Local Government	5	14	2	21	7
Environmental Organizations	3	6	1	10	3
Other Organizations	5	4	3	12	4
Business	5	2	3	10	3
Total	**64**	**82**	**173**	**319**	**100**

6.5.1 Comments on the FR/EIS

The following sections present portions of speakers' comments that specifically address the document and its findings.

Purpose and Need

In all of the thousands of pages in these documents you, the Federal Agencies, did not answer the three most important questions. One, what do the fish really need? Two, what are our legal obligations under law and treaty? Three, how do we make salmon recovery work for the fish and people? (See responses to comments GI-34 in Chapter 4, FS-18 in Section 5.4.3, FED-1 in Section 5.27, and responses to comments in Section 5.12.7.)

Hydrology—Sedimentation

In June of 1976 a large dam in Eastern Idaho was breached. This was the Teton dam .... Now over 20 years later chronic high sediment levels and excessive spring sediment flush still is occurring. The Teton dam was very new when the dam failed, and only a small amount of sediment had been accumulated behind this structure. To this date, rainfall and snowmelt events continue to load significant levels of sediment into the Teton River water. Only time can heal this condition. Obviously, the fishery, both above and below the dam, have been impacted as a result of the unintended consequences from the breaching of the Teton dam. This is a real science model that can be comparable to what will occur if any of the lower Snake River dams are breached. Years and decades of sediment had accumulated behind these structures. Suspended sediments resulting from dam breaching obviously will have an adverse effect on all aquatic organisms present in the river system.

How critical is the suspended sediment to any fish living and migrating through the river system? The sediment loading in the spring and during the winter storm events will produce increase sedimentation for weeks at a time. Any salmon exposed during those times will be at great risk. The impact of the millions of cubic yards of sediment that will be released for years will cause severe adverse impacts to every class of salmon. Existing reports have even stated that the amount of sediments held behind the dams have been grossly underestimated, even as much as 70 percent.

(See response to comment GI-9 in Chapter 4.)

Anadromous Fish

We are opposed to breaching the lower Snake River dams. According to your Feasibility Study, the dam breaching alternatives result in higher downstream passage mortality for salmon than the other three alternatives when the loss of transport is considered. (See response to comment AF-16 in Section 5.12.2.)

Transportation

What happens to our transportation if you were to breach? Shipments of fuel, fertilizers, grains, forest products and other commodities by other modes of transportation; regional air freight is incapable of handling bulk products currently barged on the river; the rail system is currently operating at or near capacity and cannot accommodate large increases in tonnage without major infrastructure investments; grain cars are more efficiently and economically utilized for the long-hauling mid-western grains to our coastal ports; and, therefore, are in short supply regionally.

Many of our roads and highways are currently experiencing structural inadequacies and bordering upon congestion and capacity problems and are inadequate to transport said commodities without significant structural and capacity improvements. Road taxes and user fees will go up to offset impending damage due to increased freight hauling. Loss of river barging as a freight hauling option would reduce competition and would inherently result in increased freight mobility costs via truck and rail and prices to the consumer. (See responses to comments GI-24 and GI-25 in Chapter 4.)

Transportation

The other thing that hasn't been addressed is the number of deaths that will be resulting from increased traffic. There will be 7 to 9 deaths per year based on the volume of traffic increase that would occur on those highways. And the pollution from that will be equivalent to a million cars per year. (See response to comment GI-24 in Chapter 4.)

Economics—NED

I have considerable problems with the economics that have been done on the study, and particularly the way the costs of breaching have been determined. Benefits have been brought back through time and costs have not. I'd like to see the economics done in a way that is more amenable to how amenity resources are being valued in today's society, not just the raw cost of breaching the dam. (See response to comment GI-36 in Chapter 4.)

Economics—NED—Transportation

Tonight, I would like to propose a solution that addresses the concerns of the shippers that ship about four million tons of commodities through the lower Snake River corridor. Currently, the 139 mile trip from Lewiston to Pasco costs $1.48 per ton. This is the cost that shippers are asking to protect. $148 per ton. The true cost of shipping by barge, of course, is much higher.

Averaging 20 years of ACOE data which includes channel dredging, lock repairs, operations and maintenance, amounts to a little under four million dollars per year. Divide this by 4 million tons of commodities shipped per year, amounts to a little under $1 per ton. This is a cost not paid by shippers. Another cost is hydropower revenue that is lost when water is used to move a ship through the locks rather than producing hydroelectricity. This amounts to about 14.5 cents per ton.

Combine these subsidies amount to about $1.11 per ton. For the moment let's also consider the $435 million dollars per year that BPA ratepayers currently pay for salmon recovery efforts. Let's recall that Congress authorized these dam projects based on a 1930's ACOE report which assigned navigation with 18.5 percent of the "cost-carrying abilities."

18.5 percent of $435 million dollars is about $80 million dollars. Divide this by 4 million tons per year amounts to another $20 per ton that shippers do not pay. Let's ignore this $20 per ton for now, and focus on the $1.11 per ton costs of dredging, repairs, operation and maintenance and forgone power revenues.

If shippers were asked to pay this additional $1.11 per ton, I am quite certain they would shift their commodities to rail, an alternative that currently exists and is very competitive with the $1.48 per ton that the shippers wish to protect.

From listening to the shipper's valid concerns and the goal of causing no economic effect, I propose that along with the dam breach alternative, shippers be guaranteed this $1.48 per ton rate. Any rail costs in excess of $1.48 would be rebated to the shippers. Estimates that I have seen suggest this amount will be on the order of 5 to 10 cents per ton. Remember, the current subsidy is $1.11 per ton. A 5 to 10 cent per ton rebate would represent a substantial savings, and shippers would continue to receive the $1.48 per ton cost that they are striving to protect.

Additionally, I would also encourage the extension of Washington State's very successful "Grain Train" program. The program was designed to alleviate the shortage of hoppers in Washington that occurs at peak times when hoppers tend to congregate in the Midwest. To quote from the June Wall Street Journal report about the "Grain Train" program: "For most Washington farmers and grain elevators, the lack of hoppers means they must rely on trucks and barges to move their wheat, a more expensive option:

A 1996 Washington State University study of the grain trains first year, said that rail rates, on average, were about 6.6 cents a bushel lower than the truck/barge mode." An extension of the "Grain Train" program would ensure hopper availability for shippers. Thank you very much. No economic effect need be felt. Thank you for your time. (See response to comment TR-6 in Section 5.18.1.)

Economics—RED

It is amazing to us that after five years of study, spending millions of public dollars, your Draft Feasibility Study concludes that dam breaching would result in a projected net gain of employment for Lewiston. By comparison, we provided you with a Port Commission University of Idaho study which indicated that 1,580 jobs were directly tied to water commerce by the three ports. By removing the dams, those jobs and many more were at risk. (See response to comment S/R-42 in Section 5.23.3.)

Economics—RED

I think to consider the full economic impact of dam removal, you must consider the Midwest farmers and the Montana lumber mills, both of whom use the Port of Lewiston in order to keep their export shipping costs low enough to compete in the world market. (See response to comment S/R-2 in Section 5.23.1.)

Economics—RED

The economic ripples of dam removal have not been fully captured by your economic analysis. (See response to comment GI-34 in Chapter 4.)

Economics—RED

We talk about the jobs that will be lost and the jobs that will be created, but nobody ever talks about the average income of those jobs that will be created. We have living wage jobs. Jobs that have all kinds of benefits. Jobs we've worked for all our lives, and that is not the same as flipping burgers at McDonald's, ladies and gentlemen. We need to talk about the gross income generated for the jobs for a change instead of just the numbers gained and lost. If you have twice as many jobs, you get half as much income, it doesn't make a lot of sense. But everybody conveniently avoids that issue. (See responses to comments S/R-3 in Section 5.23.1, S/R-40 in Section 5.23.3, S/R-43 in Section 5.23.3, and ECO-6 in Section 5.25.2.)

Economics—Community Impacts

Our agriculture is suffering through some of the worst prices in history, and we can ill-afford a drop in income because of a breaching of dams and higher transportation costs. I personally did an analysis of the costs of breaching to our Ag sector and far from the 6 cents to 21 cents in Montana, I found that the bottom line impact was 35 cents per bushel or more in our region of Idaho. The price received in Lewiston, Idaho is roughly 2.55 to the grower. This is a drop of around 14 percent when profit margins are breaking even to a little above and a little below, depending on the producer. I believe the one issue that remains secondary in your work is the economics of the people impacted. (See response to comment GI-33 in Chapter 4.)

Economics—Hydrology

In the section outlining the Effects on Water Supply and Irrigation on page 32 of the summary document, the analysis outlines the economic cost of modifying pumps and pump intakes. What the analysis fails to offer is the impact on available water for use by either irrigators or municipal users. Focusing solely on the cost of pump modifications does not capture fully the economic impact of crop failure resulting from inadequate water supplies. Presenting the cost associated with the loss of irrigation lands simply shows that this alternative is not really feasible.

If dam removal is a feasible alternative, then dam removal and a reliable supply of irrigation water cannot be mutually exclusive. I would like to know what analysis the Corps has completed on hydrology. Has the Corps assumed that flows during dry periods will be augmented by drawdowns from Dworshak reservoir?

One could make quite a good argument that the costs for the water withdrawal modifications are more economical than the status quo expenditures that have yet to yield measurable benefit. My point here is that the economic analysis simply looks at pump modifications or changing land values associated with loss of water, but nothing in between these two extremes. Therefore, in my opinion, the cost analysis and evaluation do not represent a complete alternative for breaching the dams. (See response to comment WS-1 in Section 5.20.)

Economics

I have been listening here today, as you have, to the folks here that are worried about their jobs in their communities if the dams are breached. And I believe their fears and concerns are real. But your failure to complete a full analysis of the costs if these dams stay, I think, has led to some of the concerns and to some of the misunderstandings we have heard here today.

Let me give you a couple of quick examples of where I think those failures exist. First, the Federal documents completely ignore the social impacts to the coastal and tribal communities if the salmon continue to decline, not to mention the price loss of a culture and religion that require these magnificent fish, or the 25,000 jobs that have already been lost in these communities because of the decline in salmon.

Second, the Federal analysis completely ignores the cost of the dam's compliance of the Clean Water Act requirements. A cost that Federal analyses have shown could be as much as 900 million dollars.

And third, none of the documents completely explains what would really be required from all those other agents if the dams stay in place. We heard today a number of times that there was no -- we wouldn't see Idaho water and see no dam breaching. Well, you and I both know that we can't recover these fish and have both of those things be true. (See responses to comments GI-10, GI-11, GI-34, and GI-36 in Chapter 4.)

6.5.2 Issues

The majority of people commenting at the Clarkston Public Meeting did not directly address the findings of the FR/EIS. Rather, they presented general statements for or against dam breaching. The following summarizes some of the main themes from these presentations.

Negative Effects on People/Area

- Concerned about the future of the Lewiston-Clarkston Valley if dam breaching were to occur. Humans and the socioeconomic impacts of dam breaching are a fifth "H" that should be considered in any discussion of the so-called four "H's" – hydropower, harvest, hatcheries, and habitat. (See response to comment GI-33 in Chapter 4.)
- Dam breaching would "devastate" the local economy. (See responses to comments GI-33 and GI-34 in Chapter 4.)
- Although they had originally supported construction of the dams in the 1960s, some opposed breaching the dams now because they are an integral part of their "way of life." (See response to comment GI-33 in Chapter 4.)
- The Corps sold the region the idea of the dams and has a responsibility to continue to live up to their promise of economic prosperity. (See response to comment GI-33 in Chapter 4.)
- Decisions that have serious implications for the region's future are being driven and made by people from outside the region. (See response to comment FS-45 in Section 5.4.5.2.)
- Federal agencies should weight the opinions of local residents who would be most affected by dam breaching more heavily than those of people who reside elsewhere. (See response to comment FS-40 in Section 5.4.5.2.)
- The ongoing Federal decision making process is very stressful for the local community. (See responses to comments in Section 5.4.5.2.)

Positive Effects on People/Region

- We must preserve salmon for future generations to enjoy, and dam breaching could help accomplish this. (See response to comment GI-37 in Chapter 4.)
- People in the region would be fine with breaching. Communities are resilient. Jobs could be preserved and families protected through economic mitigation. (See responses to comments GI-35 and GI-36 in Chapter 4.)
- More fish mean more jobs. (See response to comment GI-36 in Chapter 4.)
- Breaching is the best option for people in the region because failure to breach would result in measures that would take a larger toll on the region in the long run. (See responses to comments GI-34 and GI-36 in Chapter 4.)

Science

- There is insufficient scientific evidence to warrant breaching the dams. (See response to comment GI-5 in Chapter 4.)
- While there is no guarantee that breaching the dams would bring back the salmon, it is certain that this action would negatively impact the local economy. (See response to comment GI-5 in Chapter 4.)

Dams

- The dams are not at fault for salmon decline. Look at the statistics on the success of current barging and bypass programs. Look at ocean conditions. (See responses to comments GI-12 and GI-18 in Chapter 4.)
- The dams cannot be responsible for the declining lower Snake River runs because salmon runs have declined on other rivers and streams where there are no dams. (See response to comment GI-13 in Chapter 4.)
- While dams may have contributed to the decline in runs, they are just one of many possible factors. Use a "more balanced" or "common sense" approach that does not involve breaching the four lower Snake River dams. (See response to comment GI-5 in Chapter 4.)
- Federal agencies should examine other factors more thoroughly. Frequently identified issues included ocean conditions, ocean and in-river commercial, recreational, and tribal harvest, and natural predators. (See responses to comments GI-15, GI-17, and GI-18 in Chapter 4 and responses to comments in Section 5.12.17.)
- Salmon are the only endangered species that can be legally harvested. All harvesting should be stopped. (See response to comment GI-15 in Chapter 4.)
- It is difficult to really consider salmon an endangered species when it is readily available in the local supermarket. (See response to comment GI-20 in Chapter 4.)
- An ecosystem approach would be best for restoring salmon; dam breaching alone is not a silver bullet. (See responses to comments GI-6, GI-15, GI-17, and GI-18 in Chapter 4, and responses to comments in Section 5.12.17.)

Physical Effects of Breaching

- People were concerned about the effects of the sediment that would be released into the river if the dams were breached. (See response to comment GI-9 in Chapter 4.)
- Others drew attention to their experiences with the 1992 test drawdown of Lower Granite Dam to characterize the likely physical effects of dam breaching. (See response to comment GI-33 in Chapter 4.)
- Construction and operation of the dams has changed the river's ecosystem and it is no longer possible to turn back the clock and return to pre-dam conditions. (See response to comment GI-5 in Chapter 4.)

Public Meeting/Comment Issues

- The testimony being presented at the meeting was not representative of the community. The opinions of the local and State elected officials who commented – all of whom opposed breaching – should be taken as generally representative of the area. (See responses to comments GI-1 and GI-2 in Chapter 4, and responses to comments in Section 5.4.5.2.)
- Some did not agree with the elected officials who testified. (See responses to comments in Section 5.4.5.2. and responses to comments GI-1 and GI-2 in Chapter 4.)

Power

- Removing the dams would jeopardize our source of clean, cheap power, and that replacement power would cause air pollution. (See responses to comments GI-7 and GI-26 in Chapter 4.)

Transportation

- Changes in transportation (trucks versus barge) would affect air quality. (See response to comment GI-7 in Chapter 4.)
- Extensive concern over economic losses resulting from the elimination of barging in Lewiston. (See response to comment GI-34 in Chapter 4.)

Urgency

- Delays in dam breaching are not acceptable for salmon or people. Breach dams now. (See response to comment GI-4 in Chapter 4.)
- Breaching dams and increasing salmon runs are essential for us to "make good" on our treaty obligations with the tribes. (See response to comment GI-23 in Chapter 4.)
- The science clearly indicated dam breaching is the best approach; get on with it. (See responses to comments GI-4, GI-12, and GI-14 in Chapter 4.)

6.6 Astoria, Oregon Statements

A total of 38 people provided public comments to the panel at the Astoria Public Meeting held on February 15, 2000 at the Clatsop County Fairgrounds, 92937 Walluski Road, Astoria, Oregon. Five people tape recorded comments. Table 6-6 provides a breakdown of the declared affiliations of the speakers.

Table 6-6. Astoria Meeting Breakdown by Speaker

	Evening Session	Tape Recorded	Total Number of Comments	Percent of Total
Individuals	19	4	23	53
Tribal Representatives	1	0	1	2
State/Local Government	5	0	5	12
Environmental Organizations	4	1	5	12
Other Organizations	7	0	7	16
Business	2	0	2	5
Total	**38**	**5**	**43**	**100**

6.6.1 Comments on the FR/EIS

Five people providing comments at the Astoria meeting specifically addressed the FR/EIS and its findings. Portions of these speakers' comments are provided here.

Economics

Concerns were expressed that the economic analysis in the FR/EIS does not adequately capture the benefits of dam breaching to downriver fishing communities.

I also push the Corps' economic study which says there's only $2 million benefit. I'll challenge that. Just in my small business alone, I have a processing plant, there's more than that economic impact to myself, and people that work for me. It's just one little processing business.

Finally, I want to talk about the economic study that the Corps proposed. It was called improving salmon passage of December 1999. I find it unbelievable that on page 39, the Corps would purport that dam breaching, which would reopen 140 miles of prime fall Chinook spawning and rearing habitat, a 70 percent improvement, would create only 249 long-term jobs in the Lower Columbia and on the entire coast. You will have to excuse me, but I remember what the existing fishery was like. Even modest increases in populations would allow a few incidental takes in harvest and have enormous benefits from the treaty Indian fishery clear to southeast Alaska. That a public agency would pointedly ignore such factors in its economic analysis is not surprising to a cynic like myself, it is after all an election year.

With the economic study, I would like to see a continuance of the study outside of the basin, down river through to the Columbia River plume. Can you imagine how many hundreds of millions of dollars that represents that the Corps has not invited into the discussion?

People also noted that the economic analysis seems flawed because it appears to assume baseline costs of zero and does not take into account the downriver economic effects of historic declines in salmon runs.

One of the problems with your analysis, and I think it upsets people in my industry more than any other thing, is you completely ignore the fact that the fishing industry in the lower river has been strangled over the last 30 years to provide heavily subsidized transportation in the upper river for a handful of interests.

There are people in this room who no longer have homes, who no longer have livelihoods, and who no longer have boats because of the impacts of the upper river Snake River dams. I think that has got to be included in your analysis.

You assume the baseline economics is zero. In fact, the status quo has a high cost. Anywhere from 300 to 400 million dollars a year in mitigation costs, in spill costs, in transportation costs, and subsidies, subsidies to farms, subsidized irrigation. Those are all costs that must be calculated in your economic equation, otherwise you're really not comparing apples to apples, you're comparing apples to nothing at all.

We lost (inaudible) in a spring Chinook fishery in the main stem that totaled 150,000 angler days. Angler days are valued in direct expenditures at $83 a day. That's over $12 million in one lost fishery. There are many others. Now, if you take the fact that we manufacture as an industry, that makes the economic benefit $150 a day and you (inaudible) that $12 million. That one fishery equals the total value of our study.

We've lost 25,000 jobs here in the Astoria area, Columbia River, to this salmon problem caused by the dams. (See response to comment GI-36 in Chapter 4 and responses to comments in Section 5.23.1.1.)

6.6.2 Issues

The majority of people commenting at the Astoria Public Meeting did not directly address the findings of the FR/EIS. Rather, they presented general statements for or against dam breaching. The following summarizes some of the main themes from these presentations.

Biology and Habitat

- Breaching the four lower Snake River dams would not only benefit Snake River wild stocks, but salmon runs throughout the basin. (See responses to comments GI-4 and GI-14 in Chapter 4.)
- The decision to breach should be viewed in the context of the entire basin. (See response to comment GI-6 in Chapter 4.)
- While other fish recovery actions may be necessary, "(n)one of them will succeed without addressing those four dams." Relatively healthy runs above McNary Dam on the Columbia River support the idea that the four lower Snake River dams need to be breached to restore the endangered Snake River salmon stocks. (See responses to comments GI-4 and GI-14 in Chapter 4.)

Moral Responsibility

- The decision to breach is a moral decision that has significant implications for future generations. (See response to comment GI-37 in Chapter 4.)
- The agencies should be talking about increasing the Snake River runs rather than simply trying to avoid extinction. (See response to comment GI-14 in Chapter 4.)

Politics

- The process is very political. (See response to comment FS-46 in Chapter 4.)
- Construction and operation of the dams created jobs in farming and transportation at the expense of fishing jobs downriver. "I want to know why a job in Lewiston is more important than a job in Astoria.

All we have done is shifted. I don't think that's right." (See response to comment GI-36 in Chapter 4 and responses to comments in Section 5.23.1.1.)

- Provide mitigation to the communities that would be affected by breaching. (See response to comment GI-35 in Chapter 4.)

6.7 Pasco, Washington Statements

An estimated 1,200 people attended the Pasco public meeting at the Double Tree Hotel, 2525 North 20th Avenue, Pasco, Washington. A total of 242 people provided oral testimony. Public testimony to the panel began at 1:50 p.m. and continued until 10:50 p.m., with 140 people presenting their comments to the panel and other meeting attendees. The remaining 102 speakers tape recorded their comments. Table 6-7 provides a breakdown of the declared affiliations of the speakers.

Several people commenting were concerned that many of the people providing comments at the Pasco meeting were not from the region and that would prevent the Federal agencies from getting "a true feeling of the pulse of this region." One speaker suggested that people testifying should identify where they are from and hypothesized that a large portion of the people providing comments "came in buses from Portland or Seattle or wherever to taint the picture, the image of what our opinion locally is." The transcripts of both the comments presented to the panel and those tape recorded suggest that the majority of the people testifying at the meeting were from the Tri-Cities area and surrounding communities. Speakers typically identified their place of residence and often noted how long they had lived in the region.

Table 6-7. Pasco Meeting Breakdown by Speaker

	Afternoon Session	Evening Session	Tape Recorded	Total Number of Comments	Percent of Total
Individuals	51	37	87	175	72
Tribal Representatives	4	6	1	11	5
State/Local Government	15	1	3	19	8
Environmental Organizations	2	3	2	7	3
Other Organizations	14	4	8	26	11
Business	3		1	4	2
Total	**89**	**51**	**102**	**242**	**101**

Note: The percent of total column does not sum to 100 due to rounding.

6.7.1 Comments on the FR/EIS

The following portions of speakers' comments specifically addressed the Draft FR/EIS and its findings.

Hydrology—Sedimentation

According to the Army Corps of Engineers report, the east bank the Columbia River between its confluence of the Snake River and Walla Walla Rivers will be impacted with sediment deposits if the dams are breached. The fact sheet that the Corps put together speaks of a hundred to 150 million cubic yards of sediment currently deposited behind the four Snake River dams. The Corps predicts

half of that total, 50 to 75 million cubic yards, will be carried down river shortly after dam breaching. Much of it deposited in the Lake Wallula. A lot of it deposited at the Port of Walla Walla. It's likely it will put the Port of Walla Walla out of business with this sediment deposit.

It may jeopardize the economic viability of the Boise Cascade pulp and paper mill. They must have clean water to run the plant. In addition to all the jobs that they create, for Walla Walla County, Boise Cascade pays 8 percent of all the property taxes in Walla Walla County. We also have a paper recycling plant that's environmentally friendly that would be jeopardized. This sediment damage also I think violates the National Marine Fisheries prohibition of a taking. (See response to comment GI-9 in Chapter 4.)

Hydrology—Sedimentation

Lastly, buried in the appendices is the information on sedimentation, and it indicates that it may well exceed lethal exposure for adults in the McNary pool. This is ignored in Appendix A. No, my problem here is the sediment would risk damage to the healthy Columbia fish runs that outmigrate during the same years. Would you please explain why that is ignored, why this environmental issue is ignored in the report? Some estimates of the legality in your own report followed at 25 percent. (See response to comment GI-9 in Chapter 4.)

Hydrology—Sedimentation

And the silt would come down from the river ... would come in around on the east side of the river, the pumping stations from the South Columbia Irrigation District, Warden Farms, for the McGrow Farms, for the Boise Cascade, which incidentally they employ about 350 people, would be a major problem for all of this, even if they could overcome it. To lower the Snake River up above, our neighbor up there with the big orchard, Broetje, how is he going to get water out of that river if you lower it that much, and he needs a lot of water. It's going to ruin one of the finest orchards in the world. (See response to comment GI-9 in Chapter 4.)

Hydrology—Sedimentation

What are the benefits of pulling the lower dams? How long will the river be too muddy for the fish to survive in? If it's more than four years, you have already wiped out all returning fish, plus the smolts. (See response to comment GI-9 in Chapter 4.)

Anadromous Fish—Analysis

Breaching is necessary and it may be sufficient. I am especially concerned that this won't happen because quasi science has been used by the National Marine Fisheries Service to delay admitting the failing hydro system is now driving the fish to extinction.

You can read several critiques of the FR/EIS, including the indices, and you will come up with this same inescapable conclusion. There is one out there from the Idaho Department of Fish and Game, there is another critique from the PATH team members from the States Fish and Wildlife and the Tribes and U.S. Fish and Wildlife, but not NMFS and the others. There's the critique by the Independent Science Advisory Board. And finally there's a recent one out called Seven Questions About the Accumulative Risk Initiative recently published for Trout Unlimited. These reports show that, one, NMFS broke Director Stelle's commitment and Judge Marsh's mandate to collaborate

with State and tribal scientists and avoided any review before they released their anadromous fish appendix to the FR/EIS.

And NMFS has managed the smolt pit tag data in order to discredit the PATH findings that breaching is the best way to recover the salmon. NMFS scientists grouped and ignored data that is needed to get the results they wanted in order to give the opinion that transportation options could possibly recover salmon as well as the natural river.

NMFS has created this new process CRI, even though the time required to get scientific certainty results probably doomed some of the populations to extinction. NMFS came up with optimistic determinations of salmon. And now they have juggled scientific analyses to focus attention away from the hydro systems as the best way to improve survival. I have trouble accepting the legitimacy of the All-H process since the very scientific foundation is so flawed. The Federal Caucus should plan on for rocky road consensus until NMFS corrects their unprofessional performance. (See responses to comments concerning NMFS' CRI analysis in Section 5.12.7.2.)

Anadromous Fish—Analysis

The FR/EIS subsections of the appendices are worse than others currently so fraught with deficiency that it disqualifies itself as a platform for public policy making. Statistical significance is inconsistently treated. Information from the ancestral documents is ignored or obviously omitted from the draft, the one that you have now, Appendix I and A, when it did not support the thesis. And the thesis of the body of the EIS is that dams kill fish directly, and those that survive are killed by delayed mortality, and those that still survive die of other mortality in the ocean, due from some unknown mechanisms. Most obviously, due to dams. Yet the ocean is implicated as a major factor, again in quotations, because it is feared salmon stocks do not pass any dams, company from any rivers that you have heard before, and also in quotations, it is unlikely that any single factor is responsible for salmon declines. ... The delayed mortality value. Developed from the recent pit study -- pit tag studies are significantly higher than the models show, barging is much more effective. Why doesn't the study wait for the developments here since the outcome and recommendations are highly dependent upon the values? (See responses to comments GI-12, GI-13, and GI-14 in Chapter 4.)

Anadromous Fish

The thing that's bothered me about this debate from the very beginning is a lot of these fish have been listed as endangered, yet we still sanction the killing of them. They are the only endangered species that I am aware of that is legal to kill. In fact if I kill a -- another endangered species, even by accident, I can go to jail, or be heavily fined. So I don't understand how you can be endangered, yet enough of them to harvest. That confuses me. I would like to have that defined some day for me. (See response to comment GI-15 in Chapter 4.)

Anadromous Fish—Analysis

My comments are on the National Marine Fisheries Service Appendix A. The document is seriously outdated. The cool, wet climate regime of the Pacific Decadal Oscillation, PDO, has begun, not in 2005 as in Section 4.4.4.1, and is now measurable in increased quantities and size of the anadromous salmonids in Washington and Oregon and subsequent decreases in Alaska. Since the pink salmon spends nearly all its lifecycle in the ocean, it is very sensitive to ocean conditions. The average size

of the 1999 Alaska commercially caught pink salmon was only 2.9 pounds, a pound less than normal. In contrast, Washington's previous pink salmon record catch of 6.38 pounds was broken seven times in 1999 in less than 30 days and an 8.3 pounder stands as the State record.

The 1999 spring chinook jack count of 8,900 over Bonneville Dam could predict an adult return of 200,000 spring Chinook salmon this year, about 150,000 more than last year, and the most since 1977. There should be even more salmon for the next two or three decades. Since Appendix A discounts the PDO climate effects on salmon, the text pushes for a decision to be made quickly to prevent extinction. We now have no need to rush to judgment. Appendix A is more of a justification for (unintelligible) and readily obscures any real salmon survival data. (See responses to comments in Section 5.12.4.1 on deficiencies in Appendix A, Anadromous Fish Modeling.)

Anadromous Fish

I do want to caution you about the idea of barging the young salmon being a solution. When you barge salmon, you take them out of the water close to where they were hatched out, and hauled them down to the mouth of the river and turn them loose and expect them to get back to where they started. It won't happen. When they migrate down the river, they taste the water as they go and they develop an imprint in their brain that lets them follow the same trail back when they reach maturity. You break the trail when they hit the end, they don't know where to go. They may end up in coastal rivers, they may end up in rivers below the dams, they don't know that they need to go above because it doesn't taste right. (See responses to comments AF-15, AF-17, and AF-18 in Section 5.12.2.)

Electric Power

I would like you to explain the firm energy effect, trickle down effect that eliminating 5 percent of the grid generation will initiate. Voltage stability. Would you please comment on that. How taking out 5 percent of the generating power will affect the voltage stability on the entire grid. (See response to comment GI-26 in Chapter 4.)

Agriculture—Irrigation

From listening to the irrigators' valid concerns, and with the interest of the goal of minimizing any economic effect, I would agree that along with the dam breach alternative, irrigators should continue to receive up to 600 cfs of irrigation water at the current shoreline altitude of 440 feet above sea level. A plan similar to the system of pumps and pipes suggested in the Corps draft report would work, but I would ask that you consider a system that uses gravitational energy more efficiently. Consider collecting water a few miles above Lower Monumental dam at 500 feet above sea level. A pipe along the old railroad grade flooded 30 years ago would work. This railroad grade is an excellent grade, runs all the way to Ice Harbor dam. With bridges over ravines, still in place. (See response to comment GI-28 in Chapter 4.)

Agriculture—Irrigation

A concern of the agricultural industry that plays a big part in Benton County ... is the impairment of the existing water rights, decreased property values and groundwater depletion. All of these need to be figured into your formula. (See response to comment GI-28 in Chapter 4.)

Recreation

What is going to make this area into a major recreational attraction now when only some 30 years ago as teenagers, us boys would go down there and have miles and miles of this river all to ourselves? I don't get it. (See response to comment GI-32 in Chapter 4.)

Economics—NED—Transportation

On page 31 of the Corps' summary it says, quote, transportation cost would increase because barge transport is less costly, unquote. ... Let's look beyond these assumptions for the truth. First, taxpayers pay about $11 of the $13 cost per ton of shipping grain from Lewiston to Portland. Second, the DREW Committee uncovered evidence that the barge companies are making a profit of between 70 to 200 percent on their operations. Third, and most interesting, is a report from the Transportation Energy Data Book, Edition 18, 1996, from the Oak Ridge National Laboratory. The results are rail transport is more efficient than either barge or truck. On page 2-17 rail Btu per ton mile is 368 and water borne commerce is 412. So much for the assumed efficiency of barge transport. I am enclosing a copy of this report. Is it cheaper?

Last summer a 73 car unit grain train left Lewiston for Portland and the shipping cost per ton was the same as for barging. So much for the assumed lower cost of barging. The Corps needs to redo their analysis of shipping efficiency and cost. For starters they should read the recent study by Dr. Ken Casavant from WSU done for the Washington Transportation Board. (See response to comment GI-25 in Chapter 4.)

Economics—NED—Recreation

The other thing I would like to talk about a little bit is that in the dam study they state that one of the economic benefits of breaching the dams would be 82 million dollars per year, and as a kid growing out in the area of the Snake River, I can say that, that there's an awful lot more recreational activity right now than there was 30 years ago, before the dams, or 40 years ago. There was absolutely no one out there. And I have a friend that wrote a letter to the editor of the Walla Walla Union-Bulletin ... he thought there might be about $5,000 per year additional income and it would come from Snake bite kits, bologna sandwiches. But basically how many Big Gulps are they going to sell to raise that 82 million? (See response to comment GI-32 in Chapter 4.)

Economics—Transportation

I think we're going to have to very seriously consider what the economic impacts are going to be if we take those four Snake River dams out. Cargo estimates are that if they come out we will have 700,000 more trucks annually on the road. That's going to have an impact on air, it's going to have an impact on fuel consumption, it's going to have an impact on storm water runoff. Additionally, someone's going to have to build the transportation system to support those trucks, and I would like to know where the revenue streams are going to come from. (See responseS to comments GI-7 and GI-24 in Chapter 4.)

Economics—RED

The Corps of Engineers Draft EIS grossly overvalued existing dam operations and undervalued the economic benefits of a free-flowing Snake River and restoration of our salmon stocks. For example,

salmon mortality caused by the dams isn't even calculated against the cost of maintaining these dams. In accounting that's called cooking the books. Our regional economy and the operation of these dams are destined to change due to economic forces besides salmon recovery. Even now global trading, deregulation and shifting agricultural markets are making the operation of the Snake River system less and less economical by the day. After breaching, the Port of Pasco would be the terminus of the river transportation system providing a huge stimulus to the Tri-Cities economy, yet the Draft EIS fails to assess this benefit. (See response to comment GI-36 in Chapter 4.)

Economics

Our request is that the Corps of Engineers add to their Draft EIS an analysis that calculates the costs if salmon go extinct. United States Government has treaty obligations with the government of Canada as well as the sovereign American Indian Tribes. The 19th century treaty with the American Tribes guarantee salmon fishing in perpetuity. I would like the Corps to calculate the cost of those treaties in the EIS.

I also request that the Corps' document analyze mitigation measures for removing of the four lower Snake River dams. For example, conservation of renewable resources to replace the power generated by the four Lower Snake River dams. Likewise, an investment of approximately $315 million would result in better roads and rail service for southwest Washington wheat. Presently as a Federal taxpayer I help to subsidize annually for operation and maintenance of the Federal waterway. I would like to see all of those costs on the table as the Corps is documenting their options.

I would also like to see the Corps precisely document the measures and costs they are intending to pursue as a part of keeping the dams in place. Specifically, which technologies are they intending to use for reduction of water temperatures and reduction of resolved gases in the reservoirs? In other words, how much irrigation water is the Corps intending to take from Idaho farmers to continue barging fish from the locks of the lower Snake? (See responses to comments GI-10, GI-23, GI-34, GI-35 and GI-36 in Chapter 4.)

Economics

Your report does not compare apples to apples. It is deficient in that. It leaves out the very big cost that the salmon go extinct. It does not include the subsidies that the barge operators receive because they do not have to pay for the operation, maintenance or construction of the dams. It does not include the cost of the below market electricity that we all receive because loan subsidies for the construction of the dams have not been totally included. It does not include the cost that will occur when payments will be paid to the Tribes when we abrogate the treaty rights that we have signed with them. (See responses to comments GI-23, GI-34, and GI-36 in Chapter 4.)

6.7.2 Issues

Many of the people that spoke at the Pasco Public Meeting did not specifically address the findings presented in the FR/EIS. Rather, they presented statements for or against dam breaching. The following sections summarize the main themes from these presentations.

Scope

- The scope of the FR/EIS is too narrowly focused. (See response to comment LSR-1 in Section 5.6.1.)
- The continued focus on the contentious issue of breaching has prevented meaningful progress in salmon recovery efforts. (See response to comment FS-5 in Section 5.4.1.)
- There are other more important factors that need to be addressed or studied further before breaching is seriously considered. Frequently identified issues include ocean conditions, harvest, and natural predators. (See responses to comments GI-5, GI-12, GI-13, GI-15, GI-17, and GI-18 in Chapter 4.)

Dams

- The dams could not be the main problem because fish runs are declining throughout the region, on rivers and streams without dams, as well as those with dams. (See responses to comments GI-12 and GI-13 in Chapter 4.)

Harvest

- It should be illegal to harvest endangered salmon. The solution to declining salmon runs is to restrict or even eliminate all forms of harvest. (See response to comment GI-15 in Chapter 4.)
- Harvest levels have been significantly reduced in recent years. Further reductions would not solve the problem. In addition, reductions in harvest have had significant impacts on the livelihoods of people elsewhere in the region and as far away as southeast Alaska. (See response to comment GI-16 in Chapter 4.)

Endangered Status

- How endangered could salmon really be when it is possible to buy salmon in restaurants and stores? No distinction should be made between wild and hatchery fish. (See response to comment GI-20 in Chapter 4.)

Science

- There is insufficient scientific evidence that breaching would restore the endangered salmon runs. (See responses to comments GI-5, GI-12, and GI-13 in Chapter 4.)
- The science clearly supports dam breaching. (See responses to comments GI-4 and GI-14 in Chapter 4.)
- Existing health runs in the Hanford Reach of the Columbia River suggest that the dams are a significant problem. (See responses to comments GI-4 and GI-14 in Chapter 4.)
- The recent removal of a dam in Maine provides some support for a free-flowing lower Snake River. (See responses to comments GI-4 and GI-14 in Chapter 4.)
- While dam breaching alone may not be sufficient to recover the listed stocks, it is a necessary first step of any recovery program. (See responses to comments GI-4, GI-6 and GI-14 in Chapter 4.)
- Preventing extinction should be just the first step in the salmon recovery process. (See responses to comments GI-4, GI-6 and GI-14 in Chapter 4.)
- Salmon should be viewed in a wider ecosystem context. (See response to comment GI-6 in Chapter 4.)
- Other species that inhabit the lower Snake River are experiencing problems. (See responses to comments GI-5, GI-12, and GI-13 in Chapter 4.)

- While free-flowing river conditions are likely more beneficial to salmon runs, breaching the four lower Snake River dams would likely have significant negative impacts on the species it is trying to save. (See response to comment GI-9 in Chapter 4.)
- Breaching the four dams would have detrimental effects on the current ecosystem that has adapted to and developed in response to current river conditions. (See responses to comments GI-5, GI-12, and GI-13 in Chapter 4.)

Tribal Issues

- Salmon are important to the region's Native American Tribes. Salmon hold significant religious and cultural value, as well as nutritional and economic values.
- The Federal government has tribal trust responsibilities that must be upheld.

  (See responses to comments GI-23, GI-34, and GI-37 in Chapter 4.)

Future Generations

- Salmon are important to the Northwest region's identity and heritage.
- Extinction needs to be avoided for the benefit of future generations.

  (See response to comment GI-37 in Chapter 4.)

Costs and Subsidies

- The Corps analysis does not take into account all the costs involved in not breaching the dams. (See response to comment GI-36 in Chapter 4.)

Impacts

- Concerned with the economic and environmental effects of dam breaching.
- Breaching the dams would be "anti-progress" or a "step backward."

  (See response to comment GI-33 in Chapter 4.)
- Breaching the four lower Snake River dams would lead to other dams in the Columbia River Basin being breached. (See response to comment GI-3 in Chapter 4.)
- Breaching the four lower Snake River dams would have significant effects on the regional economy. (See response to comment GI-33 in Chapter 4.)
- The region's economy has developed based on the expectation that the dams would be in place for the foreseeable future. (See response to comment GI-33 in Chapter 4.)
- Decision makers need to take a long-term perspective and weigh extinction of a species against the short-term loss of jobs that could be mitigated. (See response to comment GI-35 in Chapter 4.)
- Predictions of job loss associated with dam breaching should be viewed in the broader context of a constantly changing global and regional economy. (See response to comment GI-33 in Chapter 4.)
- The Tri-Cities has survived other economic crises in the past and despite negative predictions continues to thrive and prosper. Change could be beneficial to the area provided that the impacts to dislocated workers and families are properly mitigated. (See response to comment GI-35 in Chapter 4.)

Transportation

- The largest economic impact to the region would result from increased transportation costs. There is insufficient available capacity in other transportation modes. (See response to comment GI-25 in Chapter 4.)
- The loss of barge transportation would result in additional trucks on the roads, which would slow down traffic, increase the risk of serious or fatal traffic accidents, and increase air emissions. The replacement of existing hydropower generation with natural gas facilities would also increase air emissions. (See response to comment GI-24 in Chapter 4.)

Power

- Concerned about the loss of hydropower, especially in light of possible shortfalls in regional capacity, as well potential air emissions associated with replacement sources. (See responses to comments GI-7 and GI-26 in Chapter 4.)
- It would be possible to replace lost generation with conservation and alternative low-impact fuel sources. (See response to comment GI-27 in Chapter 4.)

Irrigation

- A loss of irrigation from the Ice Harbor reservoir would have significant environmental and economic impacts. (See response to comment GI-28 in Chapter 4.)

Sediment

- The uncertainty and potential effects associated with the release of accumulated sediment deposits is a concern if the dams were breached. (See response to comment GI-9 in Chapter 4.)

Flood Control

- The four lower Snake River dams provide significant flood control benefits that would be lost if the dams were breached. (See response to comment GI-8 in Chapter 4.)

6.8 Boise, Idaho Statements

Approximately 1,100 people attended the afternoon and evening sessions of the Boise public meeting held on February 23, 2000 at the Center on the Grove, 850 Front Street. Of these, 68 people provided comments directly to the panel in the afternoon session, 63 people provided comments directly to the panel in the evening session, and 69 taped comments throughout the day. Table 6-8 provides a breakdown of the declared affiliations of the speakers. Most of the speakers identified themselves as residents of Idaho and many prefaced their comments with an explanation of their relationship either to fish or to the dams.

Table 6-8. Boise Meeting Breakdown by Speaker

	Afternoon Session	Evening Session	Tape Recorded	Total Number of Comments	Percent of Total
Individuals	32	39	66	137	69
Tribal Representatives	4	0	1	5	3
State/Local Government	13	13	1	27	14
Environmental Organizations	9	4	0	13	7
Other Organizations	10	7	1	18	9
Total	**68**	**63**	**69**	**200**	**102**

Note: The percent of total column does not sum to 100 due to rounding.

6.8.1 Comments on the FR/EIS

The following portions of speakers' comments specifically relate to the Draft FR/EIS or to the Summary document.

Water Quality

Page 24 (of the Summary document), Alternative 4, Dam Breaching. The only comment compared to the other alternatives: "During low flow years, slower moving, shallow water may warm up during summer days. Water temperatures would be more like they were before the dams went in." It doesn't operate that way, folks. The natural river brings the fish to the ocean in a rapid amount of time. The water does not warm up. Reservoirs warm up the water. And that is an enigma to the salmon and the steelhead. This is a mischaracterization. It's false. (See responses to comments in Section 5.11.6.1 for a discussion of temperature-related concerns.)

Anadromous Fish—CRI

In your CRI method, Rick, there are some major problems in understatement of the true extinction risk. One involves the quasi extinction threshold of one fish that I don't believe is nearly conservative enough. And the second issue is ignoring the population trend in favor of some average population growth rates over time, which also tends to ignore the accelerated rate of decline that we are currently experiencing. And we have also for some unknown reason ignored the post-1990 brood year population data after a very recent revision. All these tend to understate the true extinction risk in your document. I think that needs to be fixed. Another notable problem, I think the CRI is using the wrong SAR's, the wrong smolt adult survival rates. They are using four times, rates four times higher in fact than the actual SAR's measured for many years. These critical parameters must be brought into line with observed data. When you use the exact -- the observed survival data, the CRI conclusions change. In fact the changes are dramatic. They are different than what you briefed today. The most important is no longer first year mortality. It's now post-Bonneville mortality. Last, the CRI and E-Fish appendices both use improper sensitivity analyses. The resulting conclusions point erroneously to improved habitat as the number one management tool for recovering Idaho spring and summer Chinook in pristine wilderness watersheds. That's an indefensible position. With these errors corrected, CRI points clearly to dam removal as a key step in salmon recovery, and to delay as a major risk. (See responses to comments on the CRI analysis in Section 5.12.7.2.)

Economics—DREW

Some errors in DREW. The 82 million dollar increased recreation is too low. The gains in Idaho alone are that large. And I will conclude here. Drew also ignores Clean Water Act compliance cost, 125 million bucks per year item, and flow augmentation cost, which is 430 million. (See responses to comments GI-10, GI-11, GI-23, and GI-32 in Chapter 4.)

Economics—Passive Use

Salmon are a symbol of the Northwest to many Americans. Just knowing that 40-inch long summer Chinook still swim the equivalent of a quarter away across our continent and lift themselves more than a mile in the air in that process only to spawn in a pristine area in the mountains of Idaho has a value to many Americans. Economists have a term for the type of benefit that comes from just knowing that something still exists. They call them passive use values. The current draft of your EIS does not quantify passive use values for the four alternatives. And by not including passive use values in the economic analysis, you biased against alternatives, like Alternative 4, which have a higher probability of maintaining the continuing existence of summer Chinook runs. By not including evaluation for passive use I find the current analysis biased and fundamentally flawed. (See responses to comments GI-37 in Chapter 4 and ECO-32 through ECO-43 in Section 5.25.9.)

Economics—NED—Power

The second area where I perceive a substantial flaw in the draft EIS, economic analysis, is related to the price of electricity. Those who have been in the Northwest for a few decades will remember the debacle of the Washington Public Power Supply System, WPPSS. They got into by trying to build nuclear generating facilities at Hanford and Satsop. I am not suggesting that your analysis should be associated with nuclear power plants, but your analysis does make the same mistakes that WPPSS made, those being improperly estimating the incremental cost of electricity supply and failure to reduce estimated future demand caused by increasing costs. The single largest cost element in your analysis of Alternative 4 is the cost of replacing the electricity no longer available when the four dams are breached. You have in my estimation overstated this cost substantially by estimating the nets cost to be at five mills when market values of wholesale power supports a price differential of three mills or lower. The bias is further overstated by failing to adjust substitution effect of reducing demand for electricity in the face of higher prices. The effect of selecting a too high of replacement price and too little product substitution, is to overstate the estimated cost of Alternative 4 by more than a hundred million dollars a year. (See response to comment POW-24 in Section 5.19.)

Economics—RED

And the second point that I would like to address, I would like you very much to reconsider and perhaps develop an addendum, is the value of recreational real estate, a resurgence in the value of these properties as little ghost towns, tiny cabins here and there, along all the rivers in Idaho, not just the larger cities, you know, the Claytons. I'm talking about everywhere you see a little cabin that is dilapidated, it is vacant, falling down, has been vandalized. I have been talking to some of my associate brokers that have dealt in real estate, what do you think the value is, if we had a good strong fishery that would return to Idaho, what do you think the value would be per year? Very conservatively, 100 million dollars in real estate sales. That has not been addressed in any of the

plans, and I think it should be included as part of whatever, maybe a separate category, or at least part of the recreation features. (See response to comment S/R-38 in Section 5.23.2.)

Economics—RED

My second question -- concern is that the studies have not addressed the value of recreational real estate along these streams and rivers. Now, if that fishery is restored, I want to tell you as a 30-year person that's practiced selling real estate for 30 years, that those properties will become worth billions of dollars. Right now, they stand vacant. Many of them have been abandoned. And there's a tremendous economic value of recreational real estate. (See response to comment S/R-38 in Section 5.23.2.)

Economics—RED

With the removal of the dams, a once thriving fishing industry will return with fish. It means 170 million a year to the hard-pressed river communities of Orofino, Stanley, Riggins and Salmon. With return of the fish, we will see the return of a fishing culture in Idaho, which is now only a memory. (See responses to comments GI-36 in Chapter 4 and REC-1 in Section 5.22.1.)

Economics—RED

I think that the recreation industry impact has been underestimated. There's examples like Riggins where the growth and the -- of the restaurants and the hotels and other industry has turned a community around, and I suspect that breaching of the dams would expose other recreational opportunities. As an example, the white water rafting industry is one of the most rapidly growing industries of outdoor recreation across the country. And I feel that that probably was not taken into consideration; that people have looked at sports fishery, which I'm sure is going to be a benefit. But as those rapids come up -- and it doesn't take very many rapids to encourage people to white water raft. Part of the unrepresented -- part of the white water industry, which is one of the most rapidly growing industries, is the elderly and the young who often are left out of studies. Back east, there are people who take white water trips just to look at the turning of the leaves, to look at -- out here, they would be looking at historical sites and topography. So I'd like to see those taken into consideration. And just to cite one example, the Arkansas River has over 245,000 guided white water dates per person per year, and probably another conservative 250,000 people that are non-guided. So I feel that these numbers could also happen in the area that is currently under water. (See responses to comments GI-36 in Chapter 4 and REC-1 in Section 5.22.1.)

Economics

The third cause for concern in your analysis stems from what I see as comparing apples and oranges. The EIS is being developed because there are endangered anadromous fish populations. The four alternatives presented vary in how effective they would be in protecting these endangered runs. But no adjustment is made for the cost of Alternatives 2, 3, and 4 to reflect the variation and the effectiveness of those alternatives in meeting the intended purpose of protecting salmon and steelhead populations. If you wanted to directly compare the cost of the four alternatives, you need to first make an adjustment for those costs to take into account the differences in the effectiveness of the four alternatives. (See response to comment GI-36 in Chapter 4.)

Economics

Page number 26 (Executive Summary). There's a reference to dam breaching, Alternate Number 4. And it is mentioned that there is 14,000 acres of new land now under the reservoirs that would be drained and exposed. That sounds like a wonderful benefit to me. And I thought, gosh, what would that be worth to expose that land again? It must be tremendously valuable land. I turned to page number 36, and I look for the benefits for that land. And I don't see a dollar represented here for the 14,000 acres that would automatically be the result of bringing back the land that was drowned as a result of these boondoggle dams. I will ask you to take a look at this representative sample of the Alternatives of 1, 2, or 3, the economic flow, and it just doesn't match at all. There are too many discrepancies, and it just seems to me just not to be a genuine representation of the economic comparisons. (See responses to comments in Section 5.21.)

6.8.2 Issues

Many of those commenting at the Boise Public Meeting did not specifically question the findings presented in the FR/EIS. Rather, they presented statements for or against dam breaching or flow augmentation. The following sections summarize the main themes from these presentations.

The Dams Are Not the Cause of Fish Declines

- Information provided to date is not sufficient to conclude that the four dams were the cause of the declines in fish runs. Predation, foreign harvest, tribal harvest, ocean conditions, Federal habitat management, logging, or other elements are more probable causes of declining fish runs. Further study should be done before breaching dams. (See responses to comments in Sections 5.12.16 and 5.12.17.)

Flow Augmentation

Flow augmentation was a major topic of concern. The practice of releasing water from Idaho dams and letting it flow down to the lower Snake River dams at intervals timed to facilitate spills that might move juvenile fish in-river is a part of existing operations and would continue to be part of Alternative 1 if that alternative were adopted. Confusion about flow augmentation's relationship to dam breaching was evident in the testimony.

- Flow augmentation deprives Idaho farmers of needed irrigation water.
- Flow augmentation would help in the recovery of the salmon.
- Breaching the dams would eliminate the practice of flow augmentation.
- Oppose both flow augmentation and dam breaching.

(See response to comment GI-10 in Chapter 4.)

Importance of Salmon to Native Americans

- Salmon are important in Native American culture.
- If salmon runs are not restored, runs would negatively affect both to Native Americans and our ability to fulfill treaty requirements.

(See responses to comments GI-23 and GI-37 in Chapter 4.)

The Threat of Extinction Calls for Immediate Action

- Salmon extinction becomes more real the longer we wait to enact measures to counteract it.
- Decisions should be made based on evidence at hand.
- Further studies should not delay action to save the salmon.

(See response to comment GI-4 in Chapter 4.)

Economic Losses Should Be Compensated

- Those who would lose their business or livelihood because of dam breaching should be compensated for their losses. (See response to comment GI-35 in Chapter 4.)

Sedimentation

- If the dams are breached the silt and sediment that has built up behind them would muddy the waters of the river for years, causing more harm to fish as well as other elements of the environment. (See response to comment GI-9 in Chapter 4.)

Loss of Clean, Inexpensive Electricity

- The power generated by the four dams, if lost, would have to be replaced. Further, since the dams produce environmentally clean and inexpensive energy, the options for replacing the lost power would be more expensive, produce air pollution, and deplete resources. (See responses to comments GI-7 and GI-26 in Chapter 4.)

Effects of Dam Breaching on Transportation

- If the dams are breached, grain would have to be transported by the more expensive mode of trucking and highways would be negatively affected by increased truck travel. Both congestion and costs of transporting grain were of concern. (See responses to comments GI-24 and GI-25 in Chapter 4.)

Recreation Economics

- Idaho sports fishing and recreation opportunities would have developed more readily if the dams had never been built. The potential for further development after dam breaching should be more highly valued in the economic analysis. (See response to comment GI-32 in Chapter 4.)

Bonneville Power Exchange Program

- One person expressed the following concern: "But I want to speak mainly about the Bonneville Power exchange program that could be dramatically affected by the breaching of the dams. As you are probably familiar, the exchange program was authorized by the Northwest Power Act of 1980. Citizens in the Northwest and in our case in Eastern Idaho, who have high power rates, received exchange credits from BPA in the form of dollars that reduced our high power rates so Eastern Idaho would benefit in the lower BPA rates. Those amounts of benefits during the current five-year period that we are in that ends June 30th, 2001, are $47,693,863. That's a great benefit to our area. In the next five-year period, from 2001 to 2006, BPA has proposed a new program called the BPA subscription program. We are supposed to get a hundred megawatts of power in this five-year period in Idaho, and then in the next

5-year period 240 megawatts. This is part of a thousand megawatts of firm power from BPA and another 800 megawatts of purchased power. If those dams are removed, which we understand have a capacity of somewhere around 1,200 megawatts, the four dams, we would likely lose that credit, because we are on the short end. The preference customers get the BPA credit first, and we would be without. And so it would be a great loss to Eastern Idaho. And I urge you to consider that." (See response to comment POW-1 in Section 5.19.1.)

Other Alternatives

- The Corps should consider other alternatives than those studied (alternate fish passage technology). (See response to comment GI-21 in Chapter 4.)

Extinction Not an Option

- Anadromous fish are essential in our culture and ecology. It is important to preserve them. Many people hoped that their grandchildren would be able to experience fishing for or observing salmon in the wild. (See responses to comments GI-4, GI-14, and GI-37 in Chapter 4.)

6.9 Seattle, Washington Statements

A total of 550 people attended the afternoon and evening sessions of the Seattle public meeting held February 29, 2000 at the Seattle Center, 200 Thomas Street, Seattle Washington. Of these, 64 people provided comments directly to the panel in the afternoon session, 54 people provided comments directly to the panel in the evening session, and 47 taped comments throughout the day. Table 6-9 provides a breakdown of the declared affiliations of the speakers.

Table 6-9. Seattle Meeting Breakdown by Speaker

	Afternoon Session	Evening Session	Tape Recorded	Total Number of Comments	Percent of Total
Individuals	23	44	42	109	66
Tribal Representatives	4	0	0	4	2
State/Local Government	17	2	0	19	12
Environmental Organizations	7	7	3	17	10
Other Organizations	13	1	2	16	10
Business	0	0	0	0	0
Total	**64**	**54**	**47**	**165**	**100**

6.9.1 Comments on the FR/EIS.

The following portion of a speakers' comment specifically addressed the document and its findings.

Economics—Passive Use

And what I wanted to comment on was the economic analyses that I've seen so far of breaching the dams. I believe that they fail to take into account the intrinsic value of salmon as a species. Although it doesn't fit well into a classical, economic model, there is a lot of precedent for assigning monetary to value to intangibles. Trial lawyers and insurance agents know that in a liability lawsuit, intangibles such as the use of an arm or the accompaniment of a spouse are regularly assigned

monetary value. So why is there no monetary value assigned to salmon extinction as an intangible concept? How do you set that value? Take the State of Washington, poll citizens, and ask how much the salmon are worth to them. Let's say the average turns out to be a dollar a year. Multiply that times the population of the State and credit that towards your cost-per-year column. In other words, please internalize your externalities. (See responses to comments in Section 5.25.9)

6.9.2 Issues

People commenting at the Seattle Public Meeting did not directly question the findings presented in the FR/EIS. Rather they presented statements for or against dam breaching often based on their own experience and/or perspective. The following sections summarize the main themes from these presentations.

Breaching the Dams May Not Save the Salmon

- The scientific evidence on dam breaching is inconclusive.
- Breaching is not guaranteed to prevent extinction.

(See responses to comments GI-5, GI-12, and GI-13 in Chapter 5.)

Not Enough Evidence to Conclude that Dams Are the Cause of Declining Fish Runs

- The information provided to date is insufficient to conclude that the four dams were the cause of the declines in fish runs. Predation, foreign harvest, tribal harvest, ocean conditions, Federal habitat management, logging, or other elements as more probable causes of declining fish runs. Pursue further study before breaching dams. (See responses to comments GI-12, GI-13, and GI-51 in Chapter 5.)

Breaching the Dams Would Cause Environmental Damage

- Dam breaching would produce more polluting replacement energy sources, more pollution from truck traffic, sediment movement, flooding, and even more danger to juveniles because they would not be transported around the Columbia dams. (See responses to comments GI-5, GI-7, GI-8, GI-9, GI-12, and GI-13 in Chapter 4.)

Breaching the Dams Would Be Economically Damaging

- Residents of eastern Washington are economically dependent on the benefits to agriculture provided by the dams.
- Electric rates would rise.

(See responses to comments GI-26 and GI-33 in Chapter 4.)

Economic Losses Due to Breaching Should Be Compensated

- Provide compensation for those whose livelihood was dependent on the dams. (See response to comment GI-35 in Chapter 4.)

Effects of Dam Breaching on Transportation

- If the dams are breached, highways would be negatively affected by increased truck travel.

- Congestion and costs of transporting grain are of concern.

  (See responses to comments GI-24 and GI-25 in Chapter 4.)

Flow Augmentation is Ineffective

- Object to the use of flow augmentation as a practice that assists in moving juvenile fish. (See response to comment GI-10 in Chapter 4.)

Delaying Action Could Mean Extinction

- Act promptly to do everything possible to prevent extinction of any anadromous species. (See response to comment GI-4 in Chapter 4.)

Economic Benefits of Breaching the Dams Are Not Fully Documented

- The economic benefits of breaching the dam are not fully explored and documented. (See response to comment GI-36 in Chapter 4.)

Importance of the Salmon to Native Americans

- Salmon are an integral element of Native American culture. By treaty and by heritage, continued salmon runs are important. (See responses to comments GI-23 and GI-37 in Chapter 4.)

Salmon Are an Indicator Species

- Salmon are important to all humanity because they are an indicator species and the health of salmon reflects how well humans are caring for earth's ecology. If a salmon species becomes extinct, other species, including humans, have less likelihood of surviving.
- Assuring the continued existence of these species is a matter of morality or spirituality.

  (See response to comment GI-37 in Chapter 4.)

6.10 Kalispell, Montana Statements

A total of 40 people provided public comments to the panel at the Kalispell Public Meeting held on March 1, 2000 at the Outlaw Inn, 1701 Highway 93 South, Winchester Room & Colt 44 Room. Two people tape recorded comments. Table 6-10 provides a breakdown of the declared affiliations of the speakers.

Table 6-10. Kalispell Meeting Breakdown by Speaker

	Evening Session	Tape Recorded	Total Number of Comments	Percent of Total
Individuals	18	2	20	48
Tribal Representatives	0	0	0	0
State/Local Government	3	0	3	7
Environmental Organizations	6	0	6	14
Other Organizations	8	0	8	19
Business	5	0	5	12
Total	**40**	**2**	**42**	**100**

6.10.1 Comments on the FR/EIS

The following section presents the portions of speakers' comments that specifically addressed the document and its findings.

Hydrology—Sedimentation

If sediment erosion from logging is considered detrimental, what will 150 million cubic yards of sediment behind the breached dams do for recovery? (See response to comment GI-9 in Chapter 4.)

Social Resources—Low Income/Minority Populations

When the Drawdown Regional Economic Workgroup composed of economic advisors tells me that increasing my electric rates and increasing my cost to ship my ag products to market, and I want to quote, "...this increase would be expected to have little social or economic affect..." this is a blatant disregard of reality for those who are on the bottom or lower end of the income scale. This is not a win-win situation; this is one culture against another. (See response to comment GI-26 in Chapter 4.)

Economics—NED—Transportation

Breaching the dams will cost Montana producers 50 million dollars in increased freight rates. The DREW Transportation Work Group's work analysis is deeply flawed. Railroads always charge what the market will bear. One only has to look at Montana's history to see this. Probable market rates must be used in the absence of competition, not opportunity costs. The maximum freight rate charged by railroads is the total of truck and barges to Portland.

When either truck rates or barge rates increase, the railroad will move to capture increased profits in this new less-competitive market. There are 220 million bushels of wheat and barley shipped out of Montana yearly at a cost of well over 200 million dollars. A 25-percent increase in freight cost in Montana is a probable outcome of the breaching of the dams. (See response to comment GI-25 in Chapter 4.)

Economics—RED

In general, I find the claim that half a billion dollars a year in increased tourism will result from the dam breaching, that's kind of fallacious that would mean that you got 500,000 fish a year, spending a thousand bucks a day just to stand someplace along the river with a fishing pole. (See responses to comments GI-31 and GI-32 in Chapter 4.)

Economics

Does impacting the power system, by breaching, decrease the amount of dollars spent on recovery? Will we continue to make debt payments on a system that is breached? (See response to comment POW-1 in Section 5.19.1.)

6.10.2 Issues

The majority of people commenting at the Kalispell Public Meeting did not directly address the findings of the FR/EIS. Rather, they presented statements for or against dam breaching from their own perspectives. The following summarizes some of the main themes from these presentations.

Power

- Breaching the lower Snake River dams would cause regional power shortages, as well as increased electricity rates. (See responses to comments GI-26 in Chapter 4 and POW-2 in Section 5.19.1.)
- Negative environmental impacts would result from possible replacement power sources. (See responses to comments GI-7 and GI-27 in Chapter 4.)

Transportation

- Increased transportation rates would have significant negative effects on farms in Montana. (See response to comment GI-33 in Chapter 4.)
- Dam breaching would benefit Montana grain farmers by increasing costs to transport grain from Lewiston and therefore, "leveling the playing field for the growers here." (See responses to comments GI-25 and GI-33 in Chapter 4.)

Negative Effects on Environment

- The potential loss of large-tract agriculture would negatively affect wildlife habitat.
- Breaching the dams would have other negative environmental effects (mostly due to sediment). (See response to comment GI-9 in Chapter 4.)

Local Effects

- Breaching the dams would negatively affect local economics and communities. (See response to comment GI-33 in Chapter 4.)
- Potential effects on local economies should be addressed with some form of economic transition or investment plan funded by the Federal government. (See response to comment GI-35 in Chapter 4.)

Timing

- Time is running out. (See response to comment GI-4 in Chapter 4.)
- It is not possible to go back in time and re-create pre-dam conditions. Progress has been made. (See response to comment GI-33 in Chapter 4.)

6.11 Missoula, Montana Statements

An estimated 225 people attended the Missoula public meeting held on March 2, 2000 at the Doubletree Hotel, 100 Madison, Blackfoot Room & Bitterroot Room. Of these, 52 people provided comments directly to the panel, and 11 taped comments. Table 6-11 provides a breakdown of the declared affiliations of the speakers.

Table 6-11. Missoula Meeting Breakdown by Speaker

	Evening Session	Tape Recorded	Total Number of Comments	Percent of Total
Individuals	28	11	39	62
Tribal Representatives	2	0	2	3
State/Local Government	0	0	0	0
Environmental Organizations	8	0	8	13
Other Organizations	14	0	14	22
Total	**52**	**11**	**63**	**100**

6.11.1 Comments on the FR/EIS

There were no comments that specifically addressed the FR/EIS or its findings.

6.11.2 Issues

While people commenting at the Missoula public meeting did not directly address the FR/EIS or its findings, the majority of people presented statements for or against dam breaching. The following sections summarize the main themes from these presentations.

Importance of Fish to the Tribes

- Several Native Americans spoke about the importance of fish to their way of life. Salmon extinction might precipitate legal battles over treaty rights, but more importantly, an entire culture would be devastated. (See responses to comments GI-23 and GI-37 in Chapter 4.)

Not Enough Evidence to Conclude that Dams Are the Cause of Declining Fish Runs

- The information provided to date is not sufficient to conclude that breaching the dams would restore salmon runs. Predation, harvest, ocean conditions, Federal habitat management, or other elements are more probable causes of declining fish runs. (See responses to comments GI-13, GI-15, GI-17, and GI-18 in Chapter 4, and Section 5.12.16 and 5.12.17.)

Nothing But Dam Removal Will Save the Fish

- The dams caused the current decline in fish populations and only dam removal would restore the fish. (See responses to comments GI-4 and GI-14 in Chapter 4.)

Further Study and Delay is Not Acceptable

- Time is of the essence, sufficient studies have been conducted, data are sufficient on which to act, and a decision should be made quickly. The primary concern was that any delay might result in extinction. (See responses to comments GI-4 and GI-14 in Chapter 4.)

Fiscal Accountability

- Funds expended to date to save the fish have been wasted. (See response to comment FS-9 in Section 5.4.1.)

Economic Effects of Dam Breaching

- Effects of dam breaching on local populations would be significant. Areas of concern included power costs and the importance of power generation, river navigation, irrigation, and recreation. (See responses to comments GI-26, GI-28, GI-31, GI-32, and GI-33, in Chapter 4.)
- Economic effects caused by displaced workers could be handled through retraining, and increased transportation costs for farmers could be offset, perhaps with Federal money that was used to subsidize barging and transport juvenile salmon. (See response to comment GI-25 in Chapter 4.)

Soil Effects on Fish Health

- The effects of the area's soil on fish habitat have been neglected in the study. (See response to comment GI-9 in Chapter 4.)

6.12 Idaho Falls, Idaho Statements

A total of 520 people attended the Idaho Falls public meeting on March 7, 2000 at the Shilo Conference Hotel, Yellowstone Room, 780 Lindsay Avenue. Of these, 88 people provided comments directly to the panel, and 53 taped comments. Table 6-12 provides a breakdown of the declared affiliations of the speakers.

Table 6-12. Idaho Falls Meeting Breakdown by Speaker

	Evening Session	Tape Recorded	Total Number of Comments	Percent of Total
Individuals	62	49	111	79
Tribal Representatives	7	0	7	5
State/Local Government	3	0	3	2
Environmental Organizations	6	3	9	6
Other Organizations	10	1	11	8
Total	**88**	**53**	**141**	**100**

6.12.1 Comments on the FR/EIS

The following portions of speakers' comments were specific to the Draft FR/EIS.

Anadromous Fish—PATH

In the program that is used, the PATH Program, I think we need to look at that program a little more. It's a model. It's something that is supposed to work, but who knows if it does. And yet, we're standing on that model as something that's actually happening and things that are going to happen in 10, 20, 30, 40 years. So I would think that we should look at that program really close. (See responses to comments in Section 5.12.6 regarding PATH.)

Anadromous Fish—CRI

The CRI modeling used in -- used throughout the paper uses the assumption that there is zero indirect mortality associated with dam passage and transportation. In other words, they are assuming that a smolt collected at Lower Granite Dam, placed on a barge or a truck and released below Bonneville dam is not going to suffer an adverse effect as a result of this experience. This is not a realistic assumption. Throughout the evening, several people have commented that the ocean is responsible for the significant portion of mortality for the Snake River fish. I would argue that a significant part of this mortality is indirect mortality associated with dam passage and transportation. If it's not, we have an awful selective killer ocean out there that is working on actively weeding out Upper Snake River fish. If the CRI assumption that no direct mortality due to dams and transportation is invalid, then the model and its predictions throughout the rest of the paper should also be called into question. Time is critical for the recovery for Snake River fish. Many upper bays and stocks are on the threshold of extinction as we speak tonight. The All-H paper uses the quasi-extinction level of one fish or less returned in a given year for modeling extinction risk. This threshold is to low. The population will be functionally extinct well before this one fish level is reached. By using this conservative level for modeling, the paper does not bring to the forefront that time is of the essence for salmon recovery. Many stocks in upper Salmon basin today are already extinct based on this criteria, including Herd Creek (phonetic), the East Fork Salmon River, Yanky Fork Salmon River, Marsh Creek and Sulfur Creek. The extinction probabilities as well as the time extinction for salmon and steelhead populations would be vastly different if a more reasonable level of fifty spawning pairs were used for modeling, which is an accepted for conservation biology theory. (See responses to comments in Section 5.12.7 regarding CRI.)

Native Americans

The Corps of Engineers completed a Draft FR/EIS, but it did not include a valuable document. It was called the "Tribal Impacts Report." This was completed in the DREW process. The report was written by Phil Meyer, an economist under contract to the Columbia River and Tribal Fish Commission supported by the Corps of Engineers funding. Their report was too devastating to publish... (See responses to comments in Section 5.17.1 regarding this report.)

Economics

You say it will cost a lot. I agree it might cost some, but I think your economic analysis is overstated. And the slides up here today, I did not see any economic benefits for the permanent jobs in the new power plants and in the rail and trucking industry that would be created in place of barging. I did not see any cost relieving the dams that are related to the devastation to Idaho economy. If you don't breach the dams, you will take Idaho water. It will be hard on the farmers around here, and that's going to be devastating to this part of the world. I think that costs should be included in any economic analysis. (See response to comment GI-36 in Chapter 4.)

6.12.2 Issues

Many of those commenting at the Idaho Falls meeting did not specifically address the FR/EIS or its findings but presented statements for or against dam breaching. The following sections highlight the main themes from these presentations.

Flow Augmentation

- The one topic of discussion that was of equal or perhaps greater interest to the question of breaching the dams was flow augmentation. All of the speakers who opposed flow augmentation did so because they believed that flow augmentation deprives Idaho farmers of needed irrigation water. Many also stated that they did not believe flow augmentation would help in the recovery of the salmon.
- Confusion about flow augmentation's relationship to dam breaching was evident in the testimony. Most of the speakers supported breaching of the dams, because they believe that breaching the dams would eliminate the practice of flow augmentation.
- Other speakers opposed both flow augmentation and dam breaching.

  (See response to comment GI-10 in Chapter 4.)

Importance of the Salmon to Native Americans

- Salmon is an integral element of Native American culture. By treaty and by heritage, continued salmon runs are important. (See responses to comments GI-23 and GI-37 in Chapter 4.)

Not Enough Evidence to Conclude that Dams Are the Cause of Declining Fish Runs

- The information provided to date is insufficient to conclude that breaching the dams would restore salmon runs. Predation, harvest, ocean conditions, Federal habitat management, or other elements are more probable causes of declining fish runs. Undertake further study before breaching dams. (See responses to comments GI-13, GI-15, GI-17, and GI-18 in Chapter 4, and Sections 5.12.16 and 5.12.17.)

Economic Impacts of Dam Removal on Local Economy

- Dam breaching would have serious economic consequences.
- Dam breaching would be economically harmful to farmers.
- Losses in farming should be weighed against the ongoing losses in salmon-dependent industries.
- The dams benefit only a few people in a very local region while the salmon benefit many strata of Americans throughout a much broader geographic area.

  (See responses to comments GI-33, GI-35, GI-36, and GI-37 in Chapter 4.)

Effects of Sedimentation if the Dams Are Breached

- The amount of sediment that would be released if the dams were breached would be significant. What effects would that sedimentation have on the Idaho area? (See response to comment GI-9 in Chapter 4.)

Miscellaneous Areas of Concern

- Other issues raised during the meeting included continued health of native, non-anadromous fish; lost power and higher power rates if the dams are breached; replacing barge transportation with additional truck or railroad traffic; the benefits of removing other dams that have adversely affected salmon runs, including Hell's Canyon Dam; and negative effects on habitat of logging, mining, and grazing. (See responses to comments in Chapter 4.)

6.13 Twin Falls, Idaho Statements

An estimated 600 people attended the Twin Falls public meeting held on March 8, 2000 at the Western Plaza, 1350 Blue Lakes Boulevard, Twin Falls, Idaho. Comments presented to the agency panel started at 7:00 p.m. and continued until 11:30 p.m. A total of 178 people provided comments, 86 people provided comments directly to the panel, and 92 taped their comments. Table 6-13 provides a breakdown of the declared affiliations of the speakers.

Speakers typically identified their occupation and place of residence, often emphasizing how long they had resided in the area. Many identified themselves as farmers.

Table 6-13. Twin Falls Meeting Breakdown by Speaker

	Evening Session	Tape Recorded	Total Number of Comments	Percent of Total
Individuals	60	81	141	79
Tribal Representatives	4		4	2
State/Local Government	6		6	3
Environmental Organizations	7	3	10	6
Other Organizations	5	3	8	4
Business	4	5	9	5
Total	**86**	**92**	**178**	**99**

Note: The percent of total column does not sum to 100 due to rounding.

6.13.1 Comments on the FR/EIS

The following portions of speakers' comments specifically addressed the Draft FR/EIS and its findings.

LSR Scope—Flow Augmentation

I hear a lot of people wanting to support alternative number four, but alternative number four has a flow augmentation component in it.. And that is a real troubling thing for us. Few people, I think, realize that it does have a flow component alternative in it.

We cannot support the breaching of the dams as long as there is a flow component, because it takes that flow to grow our crops in the valley. (See response to comment GI-10 in Chapter 4.)

Alternatives—Alternatives Eliminated

However, if you think the dams are the problems, I think there is a solution to the Snake dams that will benefit everyone. Build a new river or a canal from Lewiston to Pasco to bypass the four Snake dams. The approximately 130-mile stream could be built parallel to the existing river above the current canyon, or it could go on a direct route from Lewiston to Pasco. The new stream could carry smolts past the four dams in a stream that would be similar to the Snake River prior to dam construction. Existing water from the Clearwater and the Salmon and Snake Rivers would be sufficient to carry the smolts. A system to divert the smolts into the new river would have to be developed. This river could be constructed in a much shorter time than what it will take to breach the existing dams, and fish results would be immediate, as compared to alternatives. I hope you will seriously look into this alternative plan.

If you really want to help the salmon, there are ways to do so. Continue barging. The Army Corps of Engineers has done a good job. If you really want to increase the survival of salmon, there is a plan. Columbia River bypass channel presented in August 1991 by Dr. E. Brannon, University of Idaho, M. Satterwhite, Trout Unlimited, and C. Keller, Bureau of Reclamation. I will quote their final recommendations. "We believe the best resolution to the salmon crisis and to the competing water needs in the system is to remove the smolt from the system and provide a safe, biological, compatible migration route to the sea that more specifies their historical experience. We believe a migratory bypass channel will provide for, one, natural migratory behavior and rate of transit consistent with historic patterns. Two, elimination of the passage mortality. Three, elimination of major losses from predation. Four, avoidance of gas super-saturation problems. Five, elimination of high flow requirements for migration and conservation of water to meet other water resource needs." (See responses to comments GI-5, GI-10, GI-12, GI-13, GI-17, and GI-21 in Chapter 4.)

Hydrology—Sedimentation

I am also concerned about some reports that estimate that approximately 75 million cubic yards of sediment have built up behind these four dams that we're talking about, some of which, perhaps, could contain heavy metal buildups. If they are released downstream, that could create environmental chaos, even worse than some of the problems we face now. I'm very concerned about that. Have any engineering reports addressed those? (See response to comment GI-9 in Chapter 4.)

Transportation

(The Casavant and Jessup study) shows that the combined cost of trucking grain to Snake River ports and then barging it to Portland is actually greater than taking it to a railhead and shipping it by train. The study shows that with some minor regional variance, rail rates with 25 to 26 rail car loadings are considerably cheaper than truck barge rates for all regions. It goes on to question with this cheaper rate, one may speculate why a larger volume of wheat is not transported via rail. It also states that rail car shortages are known to exist during certain time periods, which may direct wheat to barge truck that would otherwise move via rail.

The port of Lewiston moves, on average, approximately 750,000 tons of what they describe as wheat and barley shipments annually, which equates to 7 percent of the total grain moved through Portland. Idaho agricultural statistics state that Idaho alone grows over three million tons of wheat annually, and approximately 4.5 million tons are produced in Washington per year. Of the roughly 7.5 million tons of wheat produced annually between the two, not to mention wheat from the surrounding States, these numbers indicate that just a small percentage of this region's commodities are actually moved through the port of Lewiston. These figures seem to suggest that the American taxpayer is being asked to pay millions of dollars per year for an inefficient barge transportation system. (See response to comment GI-25 in Chapter 4.)

Electric Power

I want to talk to you today about a major flaw in your studies about electricity and the cost of electricity to irrigators. This is today's Wall Street Journal, and it daily quotes the rates of power, wholesale power costs across the country. For your information, the most expensive cost of electricity, as of today, if you buy it off-peak, is the mid-Columbia. You could buy electric power

through the Oregon-Nevada grid right now 30 percent cheaper than you can in mid-Columbia. Now let's talk about on-peak, during the day. You can consistently buy power cheaper in Chicago, New Jersey, and Pennsylvania. Today in Chicago, it is cheaper to buy power, 30 percent cheaper to buy power there than the mid-Columbia. In Pennsylvania, New Jersey, 12 percent cheaper. This is consistent day after day.

Now, some folks in southern and eastern Idaho know about this. There's a group of rural farming communities with rural electric companies, which include Raft River Rural Electric, Lost River Rural Electric, Salmon River Rural Electric, Clearwater Rural Electric, and eight others in central Oregon, one in Montana, who are buying their power at wholesale rates from a company called Pacific Northwest Generating Cooperative in Portland, Oregon. They are paying -- I called them, and their website, for anybody's interest, is pngc.com. I called up and talked to them. I said, "Can you guys beat BPA's power?" They said, "Consistently. We don't buy from them. We beat them by 10 to 15 percent at the very worst." So these guys are doing something else.

The other thing I would like you to consider in your study and re-address this is fuel cells. That time is here. It is here. And especially, if we're talking about taking out the dams, and take ten years to do this, ten years from now fuel cells are going to be a lot cheaper. Bonneville Power Administration spent $3.5 million buying 110 fuel cells from Idaho Corps' subsidiary, Northwest Power Systems, just in the last month or two. One hundred of them were for residents, the other ten were for commercial use. Instant Power in Washington is doing the same things. So we've got some other choices out there. You know, I sure would like you guys to address that as well. (See response to comment GI-27 in Chapter 4.)

Electric Power

We also believe that you should look at alternative power. We have 1,000 megawatts of geothermal power. We have power in the States of Oregon and Idaho that are unused. Natural, clean steam that would cost less than 1-20th of one cent to 1-30th of one cent per kilowatt hour to replace those dams, the four dams on the Snake. (See response to comment GI-27 in Chapter 4.)

Water Supply

We suggest keeping the irrigated farmland at Ice Harbor, 37,000 acres of irrigated ground. We'd like you to look into a canal to bring the water down by gravity so that the costs are much reduced, both as to capital costs initially and operating costs of getting that water to the farms. (See response to comment GI-28 in Chapter 4.)

Social Resources

The final EIS should put forward a plan to invest in the people and infrastructure affected by natural river restoration. (See response to comment GI-35 in Chapter 4.)

Economics—NED

The actual economic value of wild anadromous fish in Idaho is difficult to determine, but it is very high, and I believe that the Corps needs to reexamine its figures. They're grossly underestimated. (See response to comment GI-36 in Chapter 4.)

We are for saving people in rural communities, saving Idaho water, and saving our majestic fish. The economics of a restored fishery are clear, but they absolutely must be more fully explored in the Draft EIS. (See responses to comments GI-10 and GI-36 in Chapter 4.)

Economics—RED

In the Wood River Valley we are seeing the strongest economic boom ever, and it isn't because of the cheap electricity or strong industrial base. It's recreation that drives our economy. I'm not suggesting that Idaho needs to be dotted with a lot of little Ketchums, but people don't need much of an excuse to buy a piece of property and put a cabin on it. I'm sure that the lure of catching ocean run salmon and large numbers of steelhead would appeal to many people a whole lot more than skiing for $50 a day.

If you look at the money being made in the stock market, it's easy to see why our recreation economy is thriving. And what these people are looking for is what money can't buy them in the cities where they live and make that money. What's most prized is wilderness and some diversion while they're enjoying it, such as cross-country skiing, snowmobiling, hunting, mountain biking or dirt bikes.

But there is something special about living on or close to some great fishing water that people love. Land on Silver Creek sells for five times as much as on adjacent land not on Silver Creek. The same is true for land on the Big Wood River and the Big Lost River. There is no other explanation for the development on the Madison River below Quake Lake, other than the fishing. The part of Idaho's economy that needs the most help is the rural areas that have always depended on extractive industries for their money. These are the very same areas that would benefit most from sport fishing-related building booms. Towns like Clayton, Challis, and Salmon, and we're not talking about jobs flipping burgers or selling bait. We're talking about the heart of the community. The carpenters and apprentices, plumbers and electricians, heavy equipment operators, lumber yards, hardware stores. I find it unbelievable that no economic benefit in the construction sector was tallied on the side of breaching. (See responses to comments GI-32 and GI-36 in Chapter 4.)

Economics—NED—Recreation/Avoided Costs

The EIS projections of both potential recreation dollars and of cost avoidance seem significantly underestimated to me, particularly the latter, because of the potential for extremely costly reparations. (See response to comment GI-32 in Chapter 4.)

Economics—RED—Recreation

Let me touch briefly on tourism as a benefit of breaching. I always chuckle when I hear this reasoning. Tourism is mainly a product of the local chamber of commerce. Their figures are always suspect, because of their purposeful promotional efforts, and many times are tied to obtaining additional money from some other force for some other promotion. The fishers of salmon that I know are pretty well self-sustaining, even down to their beer. They bring their supplies from home. (See response to comment GI-32 in Chapter 4.)

6.13.2 Issues

Many of the people that spoke at the Twin Falls Public Meeting did not specifically address the findings presented in the FR/EIS. Rather they presented statements for or against dam breaching. The following sections summarize the main themes from these presentations.

Flow Augmentation

- Concerned about flow augmentation proposals that would require Idaho water for downstream salmon recovery measures. (See response to comment GI-10 in Chapter 4.)
- Concerned about the relationship between the FR/EIS alternatives and flow augmentation requirements. (See response to comment GI-10 in Chapter 4.)
- Concerned that all four alternatives under consideration involve flow augmentation. (See response to comment GI-10 in Chapter 4.)
- Breaching the four lower Snake River dams would eliminate the need for additional water from southern Idaho. (See response to comment GI-10 in Chapter 4.)

Breaching Would Reduce Restrictions in Other Areas

- Breaching would lead to less severe restrictions in other areas/industries that are important to Idaho (harvest, logging, mining, grazing, etc.). (See response to comment GI-33 in Chapter 4.)

Time

- Efforts to date have proved ineffective and time is running short for the salmon.
- It is important to recognize the difference between avoiding extinction and restoring the endangered stocks to healthy population levels. (See responses to comments GI-4 and GI-14 in Chapter 4.)

Ecosystem Approach

- Salmon should be viewed in a wider ecosystem context. (See response to comment GI-6 in Chapter 4.)

One of Many Factors

- Dams are just one of many factors. Federal agencies should examine other factors more thoroughly before deciding to breach the four lower Snake River dams. Frequently identified factors include ocean conditions, harvest, and natural predators. (See responses to comments GI-5, GI-12, GI-13, GI-15, GI-17, and GI-18 in Chapter 4.)
- How endangered are salmon when it is possible to buy them in stores and restaurants? (See response to comment GI-20 in Chapter 4.)
- Salmon runs are declining throughout the region, on rivers and streams without dams, as well as those with dams. (See responses to comments GI-5, GI-12, and GI-13 in Chapter 4.)

Dams Are a Big Part of the Problem

- Existing healthy runs in similar habitat below the dams indicate that the dams are the problem. (See responses to comments GI-4 and GI-14 in Chapter 4.)

- The recent removal of a dam on a Sacramento River tributary provides some support for a free-flowing lower Snake River. (See responses to comments GI-4 and GI-14 in Chapter 4.)

Tribal Issues

- Salmon have cultural and religious significance to Native Americans. (See responses to comments GI-23 and GI-37 in Chapter 4.)
- The Federal government has tribal trust responsibilities that it needs to uphold. (See responses to comments GI-23 and GI-37 in Chapter 4.)
- If the endangered Snake River stocks were to go extinct, the Federal government could be required by the courts to pay reparations for violating Native American treaty rights. The costs of litigation would be significant if the Federal government were sued for failing to uphold its tribal trust responsibilities. (See responses to comments GI-23 and GI-37 in Chapter 4.)

Identity and Heritage

- Salmon are significant to the Northwest region's identity and heritage. (See response to comment GI-37 in Chapter 4.)
- Breach the dams to avoid extinction for the benefit of future generations. (See responses to comments GI-4 and GI-37 in Chapter 4.)

Subsidies

- Existing costs and subsidies should be taken into account when considering the costs of breaching the four lower Snake River dams. (See response to comment GI-36 in Chapter 4.)

Economic Benefits of Breaching

- Salmon-associated recreation and tourism would generate significant economic benefits for southern Idaho if the four lower Snake River dams were breached. (See response to comments GI-36 in Chapter 4.)
- Increased salmon runs would result in increased property values and associated tax revenues. (See response to comment GI-36 in Chapter 4.)

Power

- There could be significant potential impacts associated with the loss of power presently generated at the dams. Potential impacts identified include possible power shortages, air pollution associated with possible replacement power sources, and increased generation costs. (See response to comments GI-26 in Chapter 4.)

Transportation

- The loss of barge transportation services on the lower Snake River would result in increased transportation costs for local agricultural producers and increase the number of trucks on the road. Truck traffic is less fuel efficient than barge transportation and would result in increased air emissions. (See responses to comments GI-7 and GI-25 in Chapter 4.)

Mitigation

- The potential effects of dam breaching upon local communities and individuals could be mitigated. (See response to comments GI-35 in Chapter 4.)

6.14 Ketchikan, Alaska Statements

An estimated 72 people attended the Ketchikan public meeting held on March 6, 2000 at the Ted Ferry Civic Center, 888 Venita Avenue, Ketchikan, Alaska. Sixteen people provided public comments to the panel. Table 6-14 provides a breakdown of the declared affiliations of the speakers. Speakers typically identified themselves by profession and in terms of years of local residency.

Table 6-14. Ketchikan Meeting Breakdown by Speaker

	Evening Session	Percent of Total
Individuals	12	75
Tribal Representatives	0	0
State/Local Government	1	6
Environmental Organizations	2	13
Other Organizations	1	6
Total	**16**	**100**

6.14.1 Comments on the FR/EIS

There were no specific comments addressing the FR/EIS or its findings.

6.14.2 Issues

Only 8 speakers addressed the issue of breaching the four lower Snake River dams. All of these supported breaching of the dams. (See responses to comments GI-4 and GI-14 in Chapter 4.)

Economic Impacts of Federal Decisions on the Ketchikan Region

- Worried that further restrictions would be made on fishing and that any additional restrictions on Alaska fish harvests would have an overwhelmingly negative effect on Ketchikan's economy. (See response to comment GI-16 in Chapter 4.)
- Concerned about sustainable fish populations. The area needs harvest at sufficient levels to sustain the economy. (See responses to comments GI-4, GI-14, GI-16, and GI-33 in Chapter 4.)
- The Federal government should compensate individuals involved in commercial fishing for loss of income due to additional harvest reductions. (See response to comments GI-16 in Chapter 4.)

Harvests Is Not the Problem

- Fish harvests are not the cause of the serious threats of extinction. (See response to comment GI-16 in Chapter 4.)

Anadromous Fish Habitat

- Habitat rather than harvest is the crucial factor in restoring fish runs. Restoration of habitat goes beyond merely taking out the dams. (See responses to comments GI-6 and GI-18 in Chapter 4.)

Anadromous Fish Hatcheries

- Alaska has more successful hatchery programs than those on the Columbia River and that Washington and Oregon could benefit from the lessons learned by hatcheries in Alaska.

Federal versus Alaska Interests

- As a State, Alaska has done a much better job of managing its fish resources than has the Federal government. The Federal government interferes in Alaska affairs inappropriately and expects Alaska to pay for mistakes made in the other States.

6.15 Sitka, Alaska Statements

An estimated 130 people attended the Sitka public meeting on March 7, 2000 at the Westmark Shee Atika, 330 Steward Street, Sitka, Alaska. Forty-three people provided public comments to the panel. Table 6-15 provides a breakdown of the declared affiliations of the speakers. Speakers typically identified themselves by profession and in terms of years of local residency. Many were personally involved with commercial or sport fishing.

Table 6-15. Sitka Meeting Breakdown by Speaker

	Evening Session	Percent of Total
Individuals	31	72
Tribal Representatives	2	5
State/Local Government	3	7
Environmental Organizations	2	5
Other Organizations	5	12
Business	0	0
Total	**43**	**101**

Note: The percent of total column does not sum to 100 due to rounding.

6.15.1 Comments on the FR/EIS

There were no specific comments addressing the FR/EIS or its findings.

6.15.2 Issues

While none of the comments presented at the Sitka Public Meeting specifically addressed the FR/EIS or its findings, many people presented statements for or against dam breaching. The following sections summarize the main themes from these presentations.

Economic Impacts of More Restrictions on Harvest

- The Sitka region depends on the fishing industry. Request no further restrictions be made to fish harvests in Alaska. (See response to comment GI-16 in Chapter 4.)

- The economy of the region is directly or indirectly dependent on the fishing industry, commercial fishing, sports fishing, fish processing and canning, and support services for the fishing industry. (See response to comment GI-16 in Chapter 4.)
- Recent losses in the timber industry have had the effect of concentrating the area's economic dependence on fishing. (See response to comment GI-16 in Chapter 4.)
- In addition, significant reductions over historic harvest levels have already been implemented in recent years. (See response to comment GI-16 in Chapter 4.)
- A very low percentage of the fish harvested in Alaska are from the Snake River. Further harvest reductions could not yield significant improvements for listed stocks. (See response to comments GI-16 in Chapter 4.)

The Pacific Salmon Treaty

- The Pacific Salmon Treaty covers harvest limits. Hundreds of hours of consideration and negotiations over a 6-year period went into achieving this agreement. The general sentiment was that the Pacific Salmon Treaty was having a positive effect on the status of listed species and that harvest quotas beyond those already in place under the treaty were unnecessary. (See response to comment GI-16 in Chapter 4.)

Other Hazards to Fish

- Low-level voltage in the water could be used to guide fish away from turbines into "an area that they would just swim down the river, away from the turbines." Predators are also a concern. (See responses to comments GI-17 and GI-21 in Chapter 4.)
- Sea lions more than tripled in numbers between 1975 and 1995, and Orca whales also may be a major predator on anadromous fish. (See response to comment GI-17 in Chapter 4.)
- Ocean conditions, declines in the herring population, and weather patterns are complicating factors in fish survival. (See response to comment GI-18 in Chapter 4.)

Spiritual Importance of Salmon

Salmon are both economically and spiritually important. (See response to comment GI-37 in Chapter 4.)

6.16 Juneau, Alaska Statements

An estimated 151 people attended the Juneau public meeting held on March 8, 2000 at the Goldbelt Hotel Juneau, 51 Egan Drive, Juneau, Alaska. Of these, 43 people provided public comments to the panel. Table 6-16 provides a breakdown of the declared affiliations of the speakers. Speakers typically identified themselves by profession and in terms of years of local residency. Many were personally involved with commercial or sport fishing.

Table 6-16. Juneau Meeting Breakdown by Speaker

	Evening Session	Percent of Total
Individuals	31	72
Tribal Members	0	0
Tribal Representatives	0	0
State/Local Government	6	14
Environmental Organizations	3	7
Other Organizations	3	7
Business	0	0
Total	**43**	**100**

6.16.1 Comments on the FR/EIS

There were no specific comments referencing the FR/EIS. There was, however, one comment disputing the accuracy of figures presented at the meeting:

> I have heard a couple items tonight that do bother me, that the Colonel suggested for example that 60 percent of the downstream migrants going through the Snake River dams survive. That's patently untrue. It cannot be. There is undoubtedly some way in which that statistic can be put together in which that is the conclusion. But that is obviously not in the context of the way that kind of analysis ordinarily occurs by fisheries biologists. Were there that kind of survival rate, we would not need to be here.

Thirty-six speakers addressed their comments to the issue of breaching the four lower Snake River dams. Of these, 30 supported breaching of the dams rather than the alternative of imposing further restrictions on harvesting fish in Alaskan waters. There were no directly stated requests to not breach the dams. (See responses to comments GI-2 through GI-5, and GI-16 in Chapter 4.)

6.16.2 Issues

While speakers at the Juneau public meeting did not specifically address the FR/EIS or its findings, many people presented statements for or against dam breaching. The following sections summarize the main themes from these presentations.

Economic Impacts of More Restrictions on Harvest

- Further restrictions on harvesting fish would negatively affect the area and no further restrictions should be made to fish harvests in Alaska. (See response to comments GI-16 in Chapter 4.)
- Much of the economy of the region is directly or indirectly dependent on the fishing industry, commercial fishing, sports fishing, fish processing and canning, and support services for the fishing industry. (See response to comment GI-16 in Chapter 4.)
- Significant reductions over historic harvest levels have already been implemented in recent years. (See response to comment GI-16 in Chapter 4.)
- A very low percentage of the fish harvested in Alaska are from the Snake River. Further harvest reductions would not yield significant improvements for listed stocks. (See response to comment GI-16 in Chapter 4.)

Mitigating the Costs of Breaching the Dams

- Dam breaching should include mitigating efforts to compensate the local economy around the dams. (See response to comment GI-35 in Chapter 4.)

6.17 Petersburg, Alaska Statements

A total of 28 people provided public comments to the panel at the Petersburg Public Meeting held on March 9, 2000 at City Hall. Table 6-17 provides a breakdown of the declared affiliations of the speakers. Individual speakers generally identified themselves as being affiliated with commercial and recreational fishing.

Table 6-17. Petersburg Meeting Breakdown by Speaker

	Evening Session	Percent of Total
Individuals	19	68
Tribal Representatives	0	0
State/Local Government	5	18
Environmental Organizations	1	4
Other Organizations	1	4
Business	2	7
Total	**28**	**101**

Note: The percent of total column does not sum to 100 due to rounding.

6.17.1 Comments on the FR/EIS

None of these comments specifically addressed information presented in the FR/EIS.

6.17.2 Issues

- The majority of people commenting were concerned with the Federal Caucus alternatives, specifically those that involve possible reductions in Alaskan salmon harvests. (See response to comment GI-16 in Chapter 4.)
- Alaskan fishermen should not be held responsible for actions in the lower 48 States. (See response to comment GI-16 in Chapter 4.)
- The Pacific Salmon Treaty already addresses harvest. (See response to comment GI-16 in Chapter 4.)
- The southeast Alaskan fishery has already contributed enough toward salmon recovery efforts. (See response to comment GI-16 in Chapter 4.)
- Curtailing Alaskan salmon harvests would be detrimental to local livelihoods and communities in general. (See response to comment GI-16 in Chapter 4.)

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Annex A

Announcements of the Public Comment Period and Public Meeting

- **Inside Back Page of the Draft Summary Document (1999)**
- **News Releases**
- **Information Paper**
- **Newsletter No. 8**
- **Corps Web Page**

What Are the Next Steps?

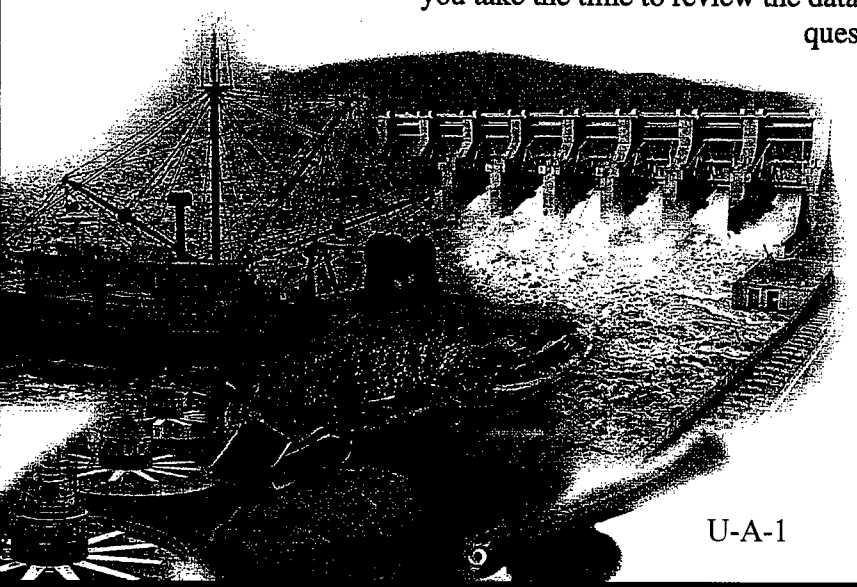
This summary report is a snapshot of the contents of the Draft Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement published in December 1999. Comments will be accepted starting in December 1999 until March 31, 2000. Everyone is invited to submit comments to the U.S. Army Corps of Engineers. From February through March 2000, public meetings will be held at various locations throughout the Northwest. These meetings will offer a forum for questions and an opportunity for the public to express concerns and recommendations. Comments will be addressed in the Final Feasibility Report/Environmental Impact Statement (FR/EIS).

Your Opportunity to Contribute

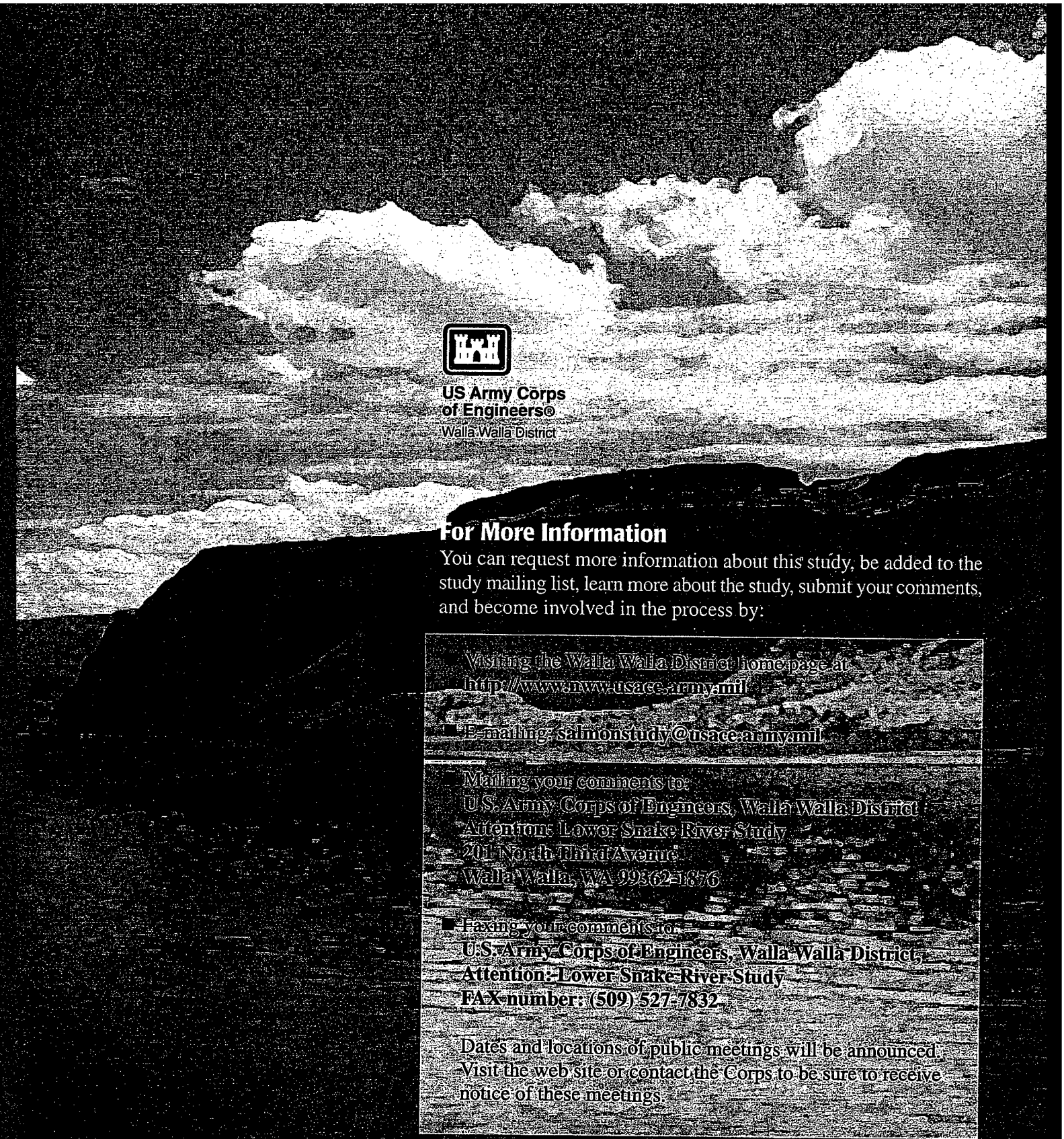
The future of anadromous fish in relation to the four dams on the lower Snake River is important to us all. The public has been involved in the process from the beginning of this study in 1995. From the scoping meetings in July 1995 through the comment period, we have solicited and incorporated public comments into the study and the decision process.

Choosing a preferred alternative is a difficult task. Comparison of the alternatives by all of the factors assessed in the study has not offered a clear-cut recommendation. It is the Corps' intent to recommend a preferred plan of action in the final FR/EIS.

Please provide your comments on the issues presented in this summary and in the Draft Feasibility Report/Environmental Impact Statement. We hope you take the time to review the data we have accumulated and bring us your questions, concerns, and recommendations.



You can submit your comments until March 31, 2000 through one of the methods noted on the next page.



US Army Corps
of Engineers®
Walla Walla District

For More Information

You can request more information about this study, be added to the study mailing list, learn more about the study, submit your comments, and become involved in the process by:

- Visiting the Walla Walla District home page at http://www.nww.usace.army.mil
- E-mailing: salmonstudy@usace.army.mil
- Mailing your comments to:
  U.S. Army Corps of Engineers, Walla Walla District
  Attention: Lower Snake River Study
  201 North Third Avenue
  Walla Walla, WA 99362-1876
- Faxing your comments to:
  U.S. Army Corps of Engineers, Walla Walla District
  Attention: Lower Snake River Study
  FAX number: (509) 527-7832

Dates and locations of public meetings will be announced. Visit the web site or contact the Corps to be sure to receive notice of these meetings.

U.S. Army Corps of Engineers
Walla Walla District
Public Affairs Office

Media Advisory

News Release No. 99-69

Date:
December 9, 1999

Contact: Nola Conway or
Dutch Meier

Phone: (509) 527-7020

Corps will release Lower Snake River Study Draft EIS in Portland Dec. 17 at federal multi-agency media conference

Walla Walla, Wash., – Officials from the U.S. Army Corps of Engineers will release the Draft Environmental Impact Statement on the Lower Snake River Juvenile Salmon Migration Feasibility Study at a multi-agency media conference Dec. 17 in Portland, Ore. The study addresses passage of juvenile endangered species past four federal dams in Washington.

Top officials from other member agencies in the Federal Caucus process will also be on hand to address the "All-H's Paper" which also concerns regional salmon recovery efforts and issues.

The event will be held in Portland, Ore., at the Lloyd Center Doubletree Inn (located at 1000 NE Multnomah St.) in the Oregon Room on the lower level. The hour-long session will kick off at 10 a.m. and will be hosted by Brig. Gen. Carl Strock, commander of the Corps' Northwestern Division. Other key federal officials participating include:

* Judi Johansen, Administrator, Bonneville Power Administration
* William Stelle, Regional Administrator, National Marine Fisheries Service
*Anne Badgley, Regional Director of U.S. Fish & Wildlife Service (Pacific Region)

A toll-free call-in line will be available for reporters unable to attend the session in person. Reporters can call (800) 252-4455 (Participant Code #324-282) five minutes before the start of the news conference. Call-in participants are asked to mute their phones during the agency presentations until the floor is opened for questions from the media. On-line media kits, including the summary document, will be available after 7 a.m. Pacific Standard Time on the morning of the media conference from the Corps' Walla Walla District web site at www.nww.usace.army.mil.

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BPA Public Affairs POC - Crystal Ball (503) 230-5133

Public Affairs Office, Walla Walla District Headquarters, U.S. Army Corps of Engineers, 201 N. Third Ave, Walla Walla, WA 99362-1876
Phone (509) 527-7020 FAX (509) 527-7824 CELL (509) 520-1468
Website: www.nww.usace.army.mil E-mail:cenww-pa@usace.army.mil

Federal Agencies Release Columbia River Fish and Wildlife Documents
Issue Call for Regional Debate

Contact: Brian Gorman, NMFS
(206) 526-6613
Crystal Ball, BPA
(503) 230-5133
Nola Conway, Corps of Engineers
(509) 527-7020

FOR IMMEDIATE RELEASE
12/17/99

PORTLAND, Ore.—Federal agencies called for a regional dialogue on Columbia Basin salmon and steelhead recovery policies today, while releasing two major documents re-affirming the poor health of the fish and the tough choices facing the region for recovering them.

The agencies released two major documents concerning at-risk salmon and steelhead in the Columbia River Basin: a study of options for improving conditions for salmon and steelhead in the lower Snake River and a Basin-wide recovery analysis revealing serious extinction risks for Upper Columbia fish.

The lower Snake River study is a draft environmental impact statement by the U.S. Army Corps of Engineers on improving conditions for salmon and steelhead in the lower Snake River. It studies four alternatives for configuring and operating the lower Snake River dams to benefit fish: status quo operations, increased barging of young salmon downstream, improvements at dams to increase survival of young fish migrating in-river, and breaching the earthen portions of the dams to restore natural river conditions. The study suggests no preferred alternative at this time.

"There is no simple answer to this complex problem", said Brig. Gen. Carl Strock, Commander of the Corps' Northwestern Division. "I know that many would like our decision now, one way or another. But the fact is that the science doesn't point clearly to any one solution, while the biological, economic and social implications are huge. We want the benefit of additional regional dialogue and scientific information before we arrive at a preferred alternative."

The Basin-wide salmon and steelhead recovery report, entitled "Conservation of Columbia Basin Fish," contains sweeping biological analyses of at-risk species and potential actions for recovering them. New analyses in the report show that fish populations upper Columbia rivers are facing extinction risks equal to or greater than similar species in the Snake River. Analyses of extinction risks for Snake River fish were released last month.

The report is sometimes referred to as the "All-H Paper," because its scope includes the so-called four Hs affecting salmon survival: hatchery operations, harvest policies, hydro operations, and habitat conditions. Federal officials said the report reveals strong measures will be needed to reverse the decline of fish populations throughout the Basin. It concludes a range of actions within each phase of the salmon life cycle is needed to recover the fish, and it calls for a regional dialogue on which options should be pursued.

"Salmon stocks in the Snake River and above the Hanford Reach are both in very bad shape," said Will Stelle, regional administrator of the National Marine Fisheries Service. "There is no silver bullet, no quick fix. Saving these fish will demand a comprehensive effort throughout the Columbia River Basin."

"The scientists all agree these fish are in dire straits, and strong action is needed now," added Anne Badgely, Regional Director of the Fish and Wildlife Service, which has responsibility for resident fish, wildlife, and plant species. "It is urgent that we make these tough choices quickly."

"The news may be sober today, but these reports get us closer to a long-term fish plan," said Judith Johansen, Administrator of BPA, the region's federal electric power marketer.

The Federal agencies indicated they would pursue more analyses of potential economic effects of a plan that covers the Columbia River Basin. Currently available analysis does not cover the scope of actions across the salmon life cycle or the breadth of endangered stocks across the Columbia River Basin. Developing such information would provide a better understanding of social and economic implications prior to any final decisions, officials said.

Agency officials issued a call to regional and local decision-makers to respond to the latest science and options. A decision on operation and configuration of the whole Columbia River power system is due by May 2000.

"Now is the time for people who care about these issues to engage," said Stelle. "We need to hear what the people want to do about this problem."

The agencies will hold a round of public meetings throughout the region for people to review and comment on the documents, as well as any final decisions. Meetings will begin in February, and are currently planned for Seattle, Portland, Spokane, Boise, Missoula, Pasco, Lewiston, Astoria, Juneau, and Kalispel. Other locations may be added. For more information visit http://www.bpa.gov/Power/PL/FederalCaucus/fcspl.shtml.

Over the same time period, the agencies will conduct government-to-government consultation with the Columbia River tribes. The agencies will also provide the documents to the Columbia River Basin Forum. This group could provide a venue for federal agencies, tribes, and state governments to come together to discuss recovery policies in the region.

The nine federal agencies -- known collectively as the Federal Caucus -- are the Bureau of Indian Affairs, Bureau of Land Management, Bureau of Reclamation, Bonneville Power Administration, Environmental Protection Agency, National Marine Fisheries Service, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service and U.S. Forest Service.

U.S. Army Corps of Engineers
Walla Walla District
Public Affairs Office

News Release

News Release No. 00-14

Date:
March 17, 2000

Contact:
Nola Conway

Phone: (509) 527-7020

Lower Snake River study comment period ends March 31

Walla Walla, Wash. -- U.S. Army Corps of Engineers study officials want to remind the public that the comment period for the draft of the Lower Snake River Juvenile Salmon Migration Feasibility Report and Environmental Impact Statement ends on March 31.

The Corps' draft feasibility report and environmental impact statement was released in December 1999 and focuses on ways to modify the four lower Snake River dams to improve migration conditions for juvenile salmon and steelhead listed under the Endangered Species Act.

Public meetings for the Corps' Draft Feasibility Report/ Environmental Impact Statement were held throughout the region in February and March. More than 8,700 people attended the meetings. To date, the Corps has received more than 30,000 written comments.

"Written and oral comments have the same weight," said Greg Graham, study project manager. "We are particularly interested in comments that focuses on the information that is published in our draft report."

Comments may be sent by email to salmonstudy@usace.army.mil; by mail to Department of the Army, Walla Walla District Corps of Engineers, Attn: Lower Snake River Study; 201 North Third Avenue, Walla Walla, WA 99362, or by fax to (509) 527-7832.

For more information on the Corps' Lower Snake River FR/EIS visit www.nww.usace.army.mil.

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Public Affairs Office, Walla Walla District Headquarters, U.S. Army Corps of Engineers, 201 N. Third Ave, Walla Walla, WA 99362-1876
Phone (509) 527-7020 FAX (509) 527-7824 CELL (509) 520-1468
Web site: www.nww.usace.army.mil E-mail:cenww-pa@usace.army.mil

U.S. Army Corps
of Engineers
Walla Walla District
Public Affairs Office

News Release

News Release No. 00-17

Date:
March 30, 2000

Contact:
Nola Conway

Phone: (509) 527-7020

Corps extends Snake River study comment period until April 30

Walla Walla, Wash. -- The public comment period on the draft of the Lower Snake River Juvenile Salmon Migration Feasibility Report and Environmental Impact Statement has been extended to April 30, an official from the U.S. Army Corps of Engineers said today.

The Corps extended the comment period -- originally scheduled to end March 31 -- after receiving several requests from regional agencies and groups. The Oregon Department of Fish and Wildlife sent in a formal request that was approved today by Lt. Col. William E. Bulen, Jr., Walla Walla District commander.

The Corps' draft FR/EIS was released in December 1999. It focuses on ways to modify the four lower Snake River dams to improve migration conditions for endangered or threatened juvenile salmon and steelhead stocks listed under the Endangered Species Act.

According to Brig. Gen. Carl A. Strock, commander of the Corps' Northwestern Division, the next step is to analyze and respond to the comments and identify concerns.

"We intend to have a preferred alternative identified and documented later this year, following with a record of decision in 2001," said Strock.

The Corps selection of a preferred alternative will not be based on a head count or show of hands, Strock emphasized.

"The Corps' EIS is a public process in which we carefully consider a range of alternatives in light of the engineering requirements, biological/environmental effects, economic effects, the cultural and social effects. Included in this analysis are treaty obligations, the Endangered Species Act, the Clean Water Act, the Clean Air Act and the Fish and Wildlife Coordination Act," said Strock.

-MORE-

Public Affairs Office, Walla Walla District Headquarters, U.S. Army Corps of Engineers, 201 N. Third Ave, Walla Walla, WA 99362-1876
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Web site: www.nww.usace.army.mil E-mail:cenww-pa@usace.army.mil

COMMENT PERIOD EXTENDED\2-2-2

Public meetings for the Corps' draft FR/EIS were held throughout the region in February and March. More than 8,700 people attended the meetings. To date, the Corps has received more than 50,000 written comments and expects that number to double by the end of the extended comment period.

The Corps requests that comments be sent to the Department of the Army, Walla Walla District Corps of Engineers, Attn: Lower Snake River Study; 201 North Third Avenue, Walla Walla, WA 99362, or by faxing comments to (509) 527-7832.

For more information on the Corps' Lower Snake River FR/EIS visit www.nww.usace.army.mil.

-30-

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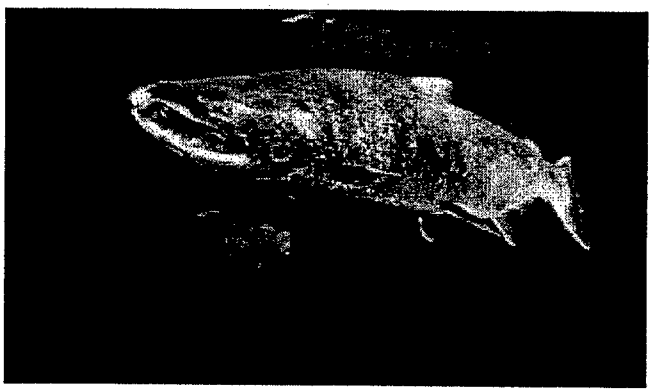
US Army Corps of Engineers
Walla Walla District

Information Paper

Date: December 1999

http://www.nww.usace.army.mil/

Draft Lower Snake River Juvenile Salmon Migration Feasibility Report/Environmental Impact Statement



The decline of salmon and steelhead in the Pacific Northwest is a complex problem. Historically, the runs have been impacted by overfishing, dams, and general habitat degradation. Many of these conditions continue today. The four lower Snake River dams were built in the 1960s to 1970s. The dams were designed with features to aid fish passage and a number of improvements have been made to the dams. The problem is that Columbia Basin salmon and steelhead populations continue to decline. Under the Endangered Species Act, the National Marine Fisheries Service listed the Snake River sockeye salmon as endangered in November 1991. In April 1992, Snake River spring/summer chinook and Snake River fall chinook salmon were listed as threatened. In 1997, Snake River steelhead were also listed as threatened. The Lower Snake River Juvenile Salmon Migration Feasibility Study evolved from the National Marine Fisheries Service's 1995 Biological Opinion for the Reinitiation of Consultation on 1994-1998 Operation of the Federal Columbia River Opinion for the Reinitiation of Consultation on 1994-1998 Operation of the Federal Columbia River Power System and Juvenile Transportation Program in 1995 and Future Years.

Objective and Scope

The primary objective of this study is to develop a plan to effectively and efficiently improve migration conditions for salmon and steelhead in the lower Snake River and contribute to the recovery of these stocks. This study will only addresses questions and make recommendations related to the four lower Snake River dams. It does not address specific actions on dams and reservoirs on the Columbia River, or other factors in salmon decline outside operation of these projects.

The geographical scope is the lower Snake River, which starts at its confluence with the Columbia River and extends upstream approximately 140 miles to the city of Lewiston, Idaho. Within this reach of the river there are four dams and reservoirs designed, constructed and operated by the Corps of Engineers: Ice Harbor, Lower Monumental, Little Goose, and Lower Granite. These are multiple use projects, authorized by Congress and operated for power production, inland navigation, irrigation, recreation, and fish and wildlife.

The Corps' Walla Walla District is preparing an Environmental Impact Statement (EIS) for the Lower Snake River Juvenile Salmon Migration Feasibility Study in compliance with the National Environmental Policy Act (NEPA). The Draft Feasibility Report/Environmental Impact Statement includes a comprehensive description of the existing condition and the various alternative actions being investigated. It also includes a qualitative and quantitative assessment of the effects of the alternative actions on all system uses and resources (cultural resources, water and air quality, power, navigation, water supply, recreation, commercial fishing, resident and anadromous fish, wildlife, real estate, etc.). The final FR/EIS will include documentation of compliance with all applicable Federal and state laws and treaties, a trade-off analysis or comparison of the proposed alternatives, and a complete description of the recommended preferred alternative (including the implementation plan for this recommended action).

There are two technical workgroups that were heavily involved in the development of information critical in this and other salmon studies and decisions. These are the Plan for Analyzing and Testing Hypothesis (PATH) and Drawdown Regional Economic Workgroup (DREW). Both groups include representatives from Federal agencies, state agencies, tribes, consultants, and other regional interests. The PATH group of scientists was formed to provide modeling information to regional decision-makers on salmon and other fish and wildlife solutions, using historical scientific information in combination with new data. The DREW is a group of economists, social scientists, and other professionals who have been tasked to analyze and describe social and economic effects associated with alternative recovery measures. The word "drawdown" is used in the DREW title because the drawdown or dam breaching options have by far the most significant socio-economic effects, so most of their analysis is devoted to this option. These groups have engaged independent technical review groups for their efforts.

Alternatives Evaluated
Four alternatives for the four lower Snake River dams have been identified and thoroughly explored within the study: existing condition; maximum transport of juvenile salmon; major system improvements; and breaching.

Existing Conditions: Continue to operate the four dams according to their current configuration, including all the fish passage programs now in operation. More than 50 percent of the fish would be transported by truck or barge. Improvements of fish facilities would continue. No major impacts to power, navigation or irrigation. No major economic impacts. There would be a slight reduction in extinction risks for listed salmon and steelhead.

Maximum Transport of Juvenile Salmon: The Corps would continue to operate the dams in their current configuration, but transportation of juvenile salmon would be maximized. Improvements of fish facilities would continue, voluntary spill would be minimized, resulting in more power production and less gas. No major impacts to navigation or irrigation. Net economic benefits would be approximately $4 billion per year from increased power generation and increased numbers of juvenile fish. There would be a slight reduction in extinction risks for listed salmon and steelhead.

Major System Improvements: Under this alternative the Corps would maximize juvenile fish transportation program and construct a full-length surface bypass collector at Lower Granite Dam. The bypass collector in combination with existing bypass screens, could increase the collection capability at Lower Granite, the first dam out-migrating fish reach on the journey to the sea, by 90 percent or more. Screens that divert the fish from turbine passage would also be replaced at Lower Monumental and Ice Harbor. Though there wouldn't be major economic impacts, the net economic cost would be approximately $6 million per year. Hydropower production, navigation and irrigation would continue. There would be a slight reduction in extinction risks for listed salmon and steelhead.

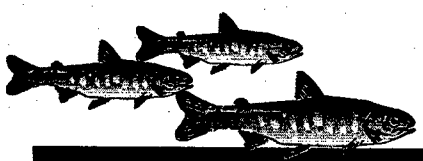
Dam Breaching: This alternative consists of breaching the four dams and creating a free-flowing 140-mile stretch of river. This would involve removing the earthen embankment section of each dam and eliminating the reservoirs behind the dams. Power production and commercial navigation would cease, and recreation would be changed. The net economic cost would be $246 million annually. Loss of navigation, irrigation, hydropower, together with the cost of implementing drawdown would result in annual costs of $359 million annually. The benefits from drawdown (avoided costs, increased recreation and salmon) would offset the cost by $113 million per year. Under drawdown, the study predicts there would be a moderate reduction in extinction risks for all chinook and steelhead. There would be a slight reduction in extinction risks for spring/summer chinook.

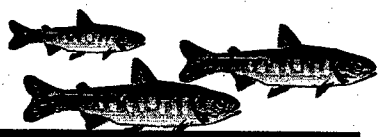
Schedule
The Lower Snake River Juvenile Salmon Migration Feasibility Study EIS is expected to be completed next year. A draft EIS will be distributed for a 90-day public review in December 1999. Public information meetings are scheduled for February and March.

More Information
The Draft Feasibility Report/Environmental Statement includes 17 appendices, a main report and a summary. The entire document is approximately 4,000 pages. The Corps is encouraging the region to read the information and provide their comments. The document is available on the web and by request. Comments need to be received by March 31, 2000. For more information visit the Walla Walla District on line at www.nww.usace.army.mil

US Army Corps of Engineers®
Walla Walla District

Lower Snake River JUVENILE SALMON MIGRATION Feasibility Study





JANUARY 2000 NEWSLETTER NO. 8

The U.S. Army Corps of Engineers (Corps) is conducting a feasibility study of ways to improve juvenile salmon migration through the hydropower system on the lower Snake River. The study focuses on how the lower Snake River dams can be changed to improve migration prospects for Snake River salmon stocks listed under the Endangered Species Act.



STUDY UPDATE

By Greg Graham, Corps Project Manager for the Study

Draft FR/EIS Released

The Draft Feasibility Report/Environmental Impact Statement (FR/EIS) was released for public review on December 17, 1999. This is a major milestone in the process. I would like to express my appreciation to the many people who have contributed to this report.

The Draft FR/EIS is a large document—with appendices it is well over 4,000 pages long. Even the summary report is 40 pages. A huge amount of information is included within this report. It incorporates the best available results of biological, engineering, and environmental analyses associated with the alternatives investigated. The Corps had broad regional input in developing this information. Some of the material in this report you may have already seen or heard before, since we have been trying to share information as it becomes available as part of our "no surprises" study policy.

There is no preferred alternative identified in this report. We decided to hold off on issuing a preferred alternative at this time for three reasons: 1) to allow the public and agencies to review and understand the information and provide much needed input before a preferred alternative is selected; 2) to allow regional scientists, agencies, and the public to further discuss and examine the uncertainties associated with the science; and 3) to allow us to continue working closely with the Federal Caucus to understand how the "All-H" process, aimed at salmon recovery throughout the entire Columbia-Snake River Basin, will influence decisions on the lower Snake River dams.

What Happens Next?

There is still much work to be done. The next step in the process is to get input from the public on this report. The comment period began with the release of the Draft FR/EIS, and we will continue to accept written or oral comments until March 31, 2000. To facilitate the oral comments, there will be a series of 13 public meetings around the region (see page 3). These meetings will be designed to accept comments on the Corps' Draft FR/EIS, as well as the Federal Caucus All-H Paper that was also released on December 17, 1999.

Following the public comment period, the Walla Walla District intends to review the comments and select a preferred alternative. Because of the regional importance of this decision, our current plan is to issue a Revised Draft FR/EIS to document this preferred alternative. That report would then be distributed to the public for comment on the "proposed Federal action." This would then be followed by a Final FR/EIS that reflects public input. The schedule for release of the Revised Draft FR/EIS is contingent on the number and complexity of the comments received on the current Draft FR/EIS. Our current plan is to issue the Revised Draft FR/EIS later this year.

Although the Corps is not ready today to make a recommendation, we do realize the urgency and importance of improving migration of salmon and steelhead. Because our next move could be so critical to this effort, we want to be sure the entire region is involved in understanding what each action entails, evaluating the possible degree of success of each action, and weighing the balance of what we may have to give up in other areas. I hope that you take the time to read the report (at least the summary report), attend one of the public meetings, and provide us with your feedback.

Inside This Issue

- Public meeting dates
- Draft FR/EIS at glance
- Available documents

Regional Coordination Update

Corps and Federal Caucus to Host Series of Public Meetings

In association with the nine agencies of the Federal Caucus, the Corps is hosting a series of public information meetings throughout the Columbia-Snake River Basin. Participants will be able to make written and oral comments on the U.S. Army Corps of Engineers Juvenile Salmon Migration Draft FR/EIS and the Federal Caucus Conservation of Columbia Basin Fish All-H Paper. These meetings will also provide citizens the opportunity to learn more about the options being considered for salmon and steelhead recovery through an open house, presentation, and Q&A session.

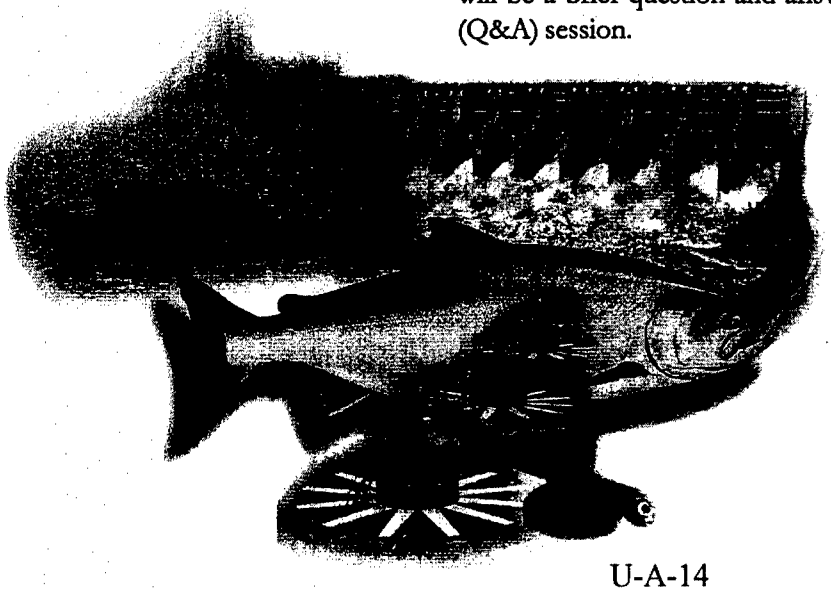
The future of anadromous fish in relation to the four dams on the lower Snake River and in the Columbia-Snake River Basin as a whole is important to us all. Potential actions affect us all. Attending one of these public meetings will enable you to bring us your questions, concerns, and recommendations before critical decisions are made regarding which path to choose towards salmon and steelhead recovery in the lower Snake River and in the broader region.

At each public meeting, an open house will run concurrently with the presentation and public comment session. The open house will provide the opportunity to tour information booths on fish recovery topics, talk with agency representatives, provide written comments, and obtain information on viewing or receiving copies of reports. In addition to the Corps FR/EIS and the Federal Caucus All-H Paper, you will be able to talk to representatives regarding the Interior Columbia Basin Ecosystem Management Project and the John Day Project.

The presentation will provide specific information on the four alternatives evaluated in the Corps Lower Snake River Juvenile Salmon Migration Draft FR/EIS, which addresses improving salmon and steelhead migration throughout the four lower Snake River dams. The presentation will also provide an overview of Columbia River Basin fish recovery efforts and options related to habitat, hatcheries, harvest, and the hydropower system, as identified in the Federal Caucus All-H Paper. The nine agencies cooperating in the Federal Caucus are: The Corps, National Marine Fisheries Service, U.S. Fish and Wildlife, Bureau of Reclamation, Bonneville Power Administration, Environmental Protection Agency, Bureau of Indian Affairs, Forest Service, and Bureau of Land Management. Following the presentation, there will be a brief question-and-answer (Q&A) session.

After the Q&A session, members of the public will be invited to offer their oral comments on the Draft FR/EIS and the Federal Caucus All-H Paper. Speakers should sign up at the front table at the beginning of the meeting (one person per sign-up) and will be limited to 3 minutes each to ensure that as many people as possible have the opportunity to be heard.

Written and oral comments on the Corps' Draft FR/EIS that are provided at the public meetings or received before the end of the comment period on March 31, 2000, will be reviewed and reflected in the Revised Draft FR/EIS that will likely be produced later this year.



Public Involvement Opportunities

To submit comments, learn more about the study or the public meetings, request more information about the study, or be added to the study mailing list, you can:

- Visit the Walla Walla District home page at http://www.nww.usace.army.mil
- E-mail salmonstudy@usace.army.mil
- Mail your comments to: U.S. Army Corps of Engineers, Walla Walla District, Attention: Lower Snake River Study, 201 North Third Avenue, Walla Walla, WA 99362-1876
- Fax your comments to: Attention Lower Snake River Study, (509) 527-7832.

For more information on the Federal Caucus decision tools and documents, or meeting dates and locations, visit www.bpa.gov/federalcaucus, or e-mail federalcaucus@bpa.gov.

Public Meeting Schedule

U.S. Army Corps of Engineers Lower Snake River Juvenile Salmon Migration Draft FR/EIS with Federal Caucus Conservation of Columbia Basin Fish All-H Paper.

Thurs., February 3
Portland, Ore.
Holiday Inn at the Airport
8439 NE Columbia Blvd.
Columbia Conference Center
1 p.m. and 6:30 p.m. (two sessions)
Open house begins at noon and runs concurrently with sessions.

Tues., February 8
Spokane, Wash.
DoubleTree Hotel
322 N. Spokane Falls Court
Grand Ballroom
1 p.m. and 6:30 p.m. (two sessions)
Open house begins at noon and runs concurrently with sessions.

Thurs., February 10
Lewiston, Idaho
Williams Conference Center
Lewis Clark State College
8th Avenue and 6th Street
Selway River Room and Snake River Room
1 p.m. and 6:30 p.m. (two sessions)
Open house begins at noon and runs concurrently with sessions.

Tues., February 15
Astoria, Ore.
Clatsop County Fairgrounds
92937 Walluski Loop
Multi-purpose Arena/Exhibit Hall
5 p.m.
Open house runs concurrently with session.

Thurs., February 17
Tri-Cities (Pasco), Wash.
DoubleTree Hotel
2525 North 20th Avenue
Medallion 1 & 2
1 p.m. and 6:30 p.m. (two sessions)
Open house begins at noon and runs concurrently with sessions.

Wed., February 23
Boise, Idaho
Centre on the Grove
850 West Front Street
The Summit and Flying Hawk Eyrie
1 p.m. and 6:30 p.m. (two sessions)
Open house begins at noon and runs concurrently with sessions.

Tues., February 29
Seattle, Wash.
Seattle Center
200 Thomas Street
Seattle Center Pavilion
1 p.m. and 6:30 p.m. (two sessions)
Open house begins at noon and runs concurrently with sessions.

Wed., March 1
Kalispell, Mont.
Outlaw Inn
1701 Highway 93 South
Winchester Room and Colt 44 Room
6 p.m.
Open house runs concurrently with session.

Thurs., March 2
Missoula, Mont.
DoubleTree Hotel
100 Madison
Blackfoot Room and Bitterroot Room
6 p.m.
Open house runs concurrently with session.

Tues., March 7
Idaho Falls, Idaho
Shilo Inn
780 Lindsay Boulevard
Yellowstone Room and Grand Teton Room
5 p.m.
Open house runs concurrently with session.

Tues., March 7
Sitka, Alaska
Westmark Hotel
330 Seward Street
Conference Room 1 and Lobby
5 p.m.
Open house runs concurrently with session.

Wed., March 8
Twin Falls, Idaho
Weston Plaza
1350 Blue Lakes Boulevard N.
Blue Lakes, Shoshone, Pomerelle, Teton, and Sawtooth Rooms
5 p.m.
Open house runs concurrently with session.

Wed., March 8
Juneau, Alaska
Centennial Hall Convention Center
101 Egan Drive
Sheffield Ballroom 1, 2
5 p.m.
Open house runs concurrently with session.



For More Information

The FR/EIS documents listed below can be viewed from your computer or downloaded in whole or by sections by accessing the Walla Walla District's home page at http://www.nww.usace.army.mil (Draft Feasibility Report/Environmental Impact Statement link). Interested parties can also request a copy of the Draft FR/EIS CD, which also contains the following documents. The CDs are also available for viewing at libraries throughout the region.

- Summary Document (40-page synopsis of FR/EIS)
- FR/EIS (complete text of the main document)
- Appendix A—Anadromous Fish
- Appendix B—Resident Fish
- Appendix C—Water Quality
- Appendix D—Natural River Drawdown Engineering
- Appendix E—Existing Systems and Major System Improvements Engineering
- Appendix F—Hydrology/Hydraulics and Sedimentation
- Appendix G—Hydroregulations
- Appendix H—Fluvial Geomorphology
- Appendix I—Economics
- Appendix K—Real Estate
- Appendix L—Lower Snake River Mitigation History and Status
- Appendix M—Fish and Wildlife Coordination Act Report
- Appendix N—Cultural Resources
- Appendix O—Public Outreach Program
- Appendix P—Air Quality
- Appendix Q—Tribal Consultation and Coordination
- Appendix R—Historical Perspectives
- Appendix S—Snake River Maps

Additional support documents, fact sheets, and feasibility study information can also be accessed through the Walla Walla District home page.

FOCUS ISSUE

DRAFT FR/EIS CONCLUSIONS AT A GLANCE

The Corps' Juvenile Salmon Migration Draft FR/EIS includes the best available information on the biological effectiveness, engineering approaches, economic effects, and other environmental effects associated with the four alternatives for improving salmon and steelhead passage through the four lower Snake River dams to recovery criteria recommended by the National Marine Fisheries Service. The alternatives, the actions involved under each alternative, and the major potential effects of each alternative are summarized from the Draft FR/EIS in the following table.

Alternative 1 — Existing Conditions

Every FR/EIS has a starting point from which all other alternatives are measured. Alternative 1 is the baseline or no action alternative under which the Corps would continue operating the four lower Snake River dams according to their current configuration, including all fish passage programs now in operation. More than 50 percent of the fish would be transported via truck and barge, while the remainder would migrate in-river. This alternative does not mean that no further improvements would be made. The Corps, as part of its ongoing development plans and in response to changes in agency requirements, plans to improve technology at the dams to promote fish passage. The Corps' current plan calls for turbine improvements, structural modifications to fish facilities at Lower Granite Dam, new fish barges, adult fish attraction modifications, a new trash boom at Little Goose Dam, modifications to fish separators, added cylindrical dewatering screens, and more or improved spillway flow deflectors.

Alternative 2 — Maximum Transport of Juvenile Salmon

Most of the improvements planned for Alternative 1 would also be included in Alternative 2. The emphasis in this alternative, however, is on operating the existing facilities to maximize the passage of fish through the existing collectors into trucks or barges for transport downriver. Voluntary spill to bypass fish would be minimized. Fish would be collected in the existing facilities and transported past the dams. Under this alternative, there would be no need to modify spillway flow deflectors, because voluntary spill would be minimized. Some juvenile fish would still pass through the dam turbines.

Alternative 3 — Major System Improvements

This alternative, like Alternative 2, also maximizes transport of juveniles. It differs from Alternative 2 in that it incorporates a full-length surface bypass collector at Lower Granite Dam, which is the first dam juvenile fish encounter, thus the logical point to collect the fish. This new collection technology, in combination with existing bypass screens, would increase collection capability at Lower Granite Dam to 90 percent or higher and minimize the number of dams, bypass systems, and reservoirs that juvenile fish encounter. This bypass collector would span the powerhouse and work in conjunction with the existing extended submerged bar screens to divert fish from the turbines. At Lower Monumental and Ice Harbor, the existing submerged traveling screens would be replaced with bar screens to improve the collection or bypass of juvenile fish that originate from tributaries below Little Goose Dam.

Alternative 4 — Dam Breaching

This alternative consists of breaching the four dams and creating a free-flowing 140-mile stretch of river. This would involve removing the earthen embankment section of each dam and eliminating the reservoirs behind the dams. Under this alternative, all facilities for transporting fish would cease to operate. A free-flowing river can be achieved by removing only the embankment. The powerhouses, spillways, and navigation locks would not be removed, but would no longer be functional, eliminating power production and commercial navigation.

US Army Corps
of Engineers®
Walla Walla District

Lower Snake River Juvenile Salmon Migration Feasibility Study Index

Public Information

- Draft Feasibility Report and Environmental Impact Statement (FR/EIS)
  NOTE to Internet Explorer 4.5 & 5.0 Users
  - Commander's Message
  - Preferred Alternative *Due Fall 2001*
  - Information Sheets
  - Questions/Answers
  - The Study
  - Significant Milestones
  - Public Outreach
  - Products
  - Adult Fish Counts
  - Regional Coordination
  - Links to Other Items of Interest



- Columbia Basin Salmon Recovery Strategy
- Final 2000 FCRPS Biological Opinion

Return to the Walla Walla District Home Page

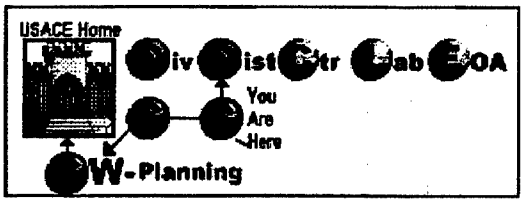
Find your information quickly on the Site Map.

Study Comments/Order Information

Privacy and Security Notice

The POC for this page:

Dave Dankel, CENWW-PD
509-527-7288
Walla Walla, WA
dave.a.dankel@usace.army.mil



Annex B

Newspaper Announcements

- **List of Regional Newspapers that Carried Meeting Announcements**
- **Sample Ad**

List of Newspaper Ads Published for Draft FR/EIS Meetings in Conjunction with the Federal Caucus

Newspaper	Dates Ad was run	Meetings Advertised
Seattle Times/Post Intelligencer Seattle, WA	2-15 2-22 2-28	Seattle, WA (2-29)
Spokesman Review Spokane, WA	1-25 2-1 2-7	Spokane, WA (2-8) Lewiston, ID (2-10) Tri-Cities, WA (2-17)
Tri-City Herald Pasco, WA	2-3 2-10 2-16	Tri-Cities, WA (2-17)
Walla Walla Union Bulletin Walla Walla, WA	1-25 2-1 2-7	Spokane, WA (2-8) Lewiston, ID (2-10) Tri-Cities, WA (2-17)
Whitman County Gazette Colfax, WA	2-3 (weekly)	Spokane, WA (2-8) Lewiston, ID (2-10) Tri-Cities, WA (2-17)
Dayton Chronicle Dayton, WA Melinda 509-382-2221	2-1 (weekly)	Lewiston, ID (2-10) Spokane, WA (2-8) Tri-Cities, WA (2-17)
East Washingtonian Pomeroy, WA	2-2 (weekly)	Lewiston, ID (2-10) Spokane, WA (2-8) Tri-Cities, WA (2-17)
Waitsburg Times Waitsburg, WA	2-3 (weekly)	Lewiston, ID (2-10) Spokane, WA (2-8) Tri-Cities, WA (2-17)
Eastern Oregonian Pendleton, OR	1-27 2-3 2-9	Lewiston, ID (2-10) Spokane, WA (2-8) Tri-Cities, WA (2-17)
Oregonian Portland, OR	1-20 1-27 2-2	Portland, OR (2-3) Astoria, OR (2-15) Seattle, WA (2-29)
Hermiston Herald Hermiston, OR	2-8 (weekly)	Lewiston, ID (2-10) Tri-Cities, WA (2-17)
Daily Astorian Astoria, OR	2-1 2-8 2-14	Astoria, OR (2-15) Seattle, WA (2-29)
Idaho Statesman Boise, ID	2-9 2-16 2-22	Boise, ID (2-23) Idaho Falls, ID (3-7) Twin Falls, ID (3-8)
Lewiston Morning Tribune Lewiston, ID	1-27 2-3 2-9	Lewiston, ID (2-10) Spokane, WA (2-8) Tri-Cities, WA (2-17)
Moscow-Pullman Daily News Moscow, ID	1-25 2-1 2-7	Spokane, WA (2-8) Lewiston, WA (2-10) Tri-Cities, WA (2-17)
Clearwater Tribune Orofino, ID	2-3 (weekly)	Spokane, WA (2-8)
Times-News Daily Twin Falls, ID	2-23 3-1	Twin Falls, ID (3-8) Idaho Falls, ID (3-7)

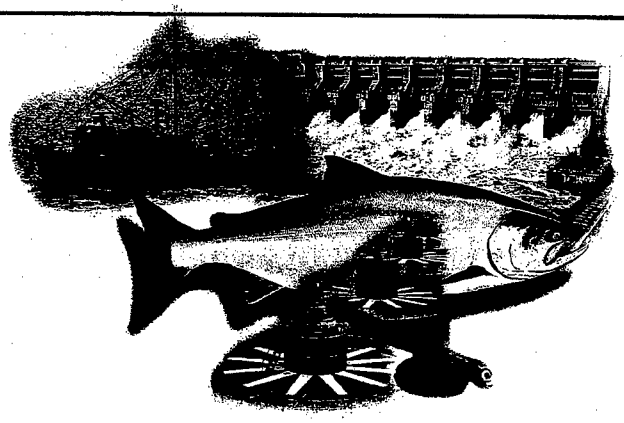
Newspaper	Dates Ad was run	Meetings Advertised
	3-7	
Post Register Idaho Falls, ID	2-22 2-29 3-6	Idaho Falls, ID (3-7) Twin Falls, ID (3-8)
Coeur d'Alene Press Coeur d'Alene, ID	1-25 2-1 2-7	Spokane, WA (2-8) Lewiston, WA (2-10) Tri-Cities, WA (2-17)
Missoulian Missoula, MT	2-17 2-24 3-1	Missoula, MT (3-2) Kallispell, MT (3-1)
Daily Interlake Kallispell, MT	2-16 2-23 2-29	Kallispell, MT (3-1) Missoula, MT (3-2)
Juneau Empire Juneau, AK	2-23 3-1 3-7	Sitka, AK (3-7) Juneau, AK (3-8)
Ketchikan Daily News Ketchikan, AK	2-28 3-5	Ketchikan, AK (3-6) Sitka, AK (3-7) Juneau, AK (3-8) Petersburg, AK (3-9)
Petersburg Pilot Petersburg, AK	3-2 3-8	Juneau, AK (3-8) Petersburg, AK (3-9)
Sitka Sentinel Sitka, AK	3-1 3-5	Ketchikan, AK (3-6) Sitka, AK (3-7) Juneau, AK (3-8) Petersburg, AK (3-9)

PUBLIC MEETINGS

U.S. Army Corps of Engineers
Lower Snake River Juvenile Salmon Migration Draft FR/EIS

Federal Caucus Conservation
of Columbia Basin Fish All-H Paper

Conservation of Columbia Basin Fish



You will be able to make written and oral comments on the U.S Army Corps of Engineers Juvenile Salmon Migration Draft Feasibility Report/Environmental Impact Statement and the Federal Caucus Conservation of Columbia Basin Fish All-H Paper.

These meetings will give you the opportunity to learn more about the options being considered for recovery through an open house, presentation, and Q&A session.

For more information on:

- U.S. Army Corps of Engineers Draft FR/EIS, visit **www.nww.usace.army.mil**, or e-mail **salmonstudy@usace.army.mil**
- Federal Caucus, Decision Tools and Documents, or additional meeting dates and locations, visit **www.bpa.gov/federalcaucus**, or e-mail **federalcaucus@bpa.gov**

Tues., February 8
Spokane, Wash.
DoubleTree Hotel
322 N. Spokane Falls Court
Grand Ballroom
1 p.m. and 6:30 p.m.
(two sessions)
Open house begins at noon and runs concurrently with sessions.

Thurs., February 10
Clarkston, Wash.
Lewis-Clark Conference Center
800 Port Drive
1 p.m. and 6:00 p.m.
(two sessions)
Open house begins at noon and runs concurrently with sessions.

Thurs., February 17
Tri-Cities (Pasco), Wash.
DoubleTree Hotel
2525 North 20th Avenue
Medallion 1 & 2
1 p.m. and 6:30 p.m.
(two sessions)
Open house begins at noon and runs concurrently with sessions.

Annex C
Comment Form from Public Meetings

US Army Corps
of Engineers®
Walla Walla District

Lower Snake River Juvenile Salmon Migration Draft Feasibility Report/ Environmental Impact Statement

The U.S. Army Corps of Engineers invites any person who has an interest in the Draft FR/EIS or represents a group of people that have an interest in the subject matter of this study, to make comments. The Corps will respond to the comments related to their Draft FR/EIS in their next NEPA document produced for the Lower Snake River Juvenile Salmon Migration Feasibility Report/EIS. Comments will be accepted through March 31, 2000.

Name:

Organization:

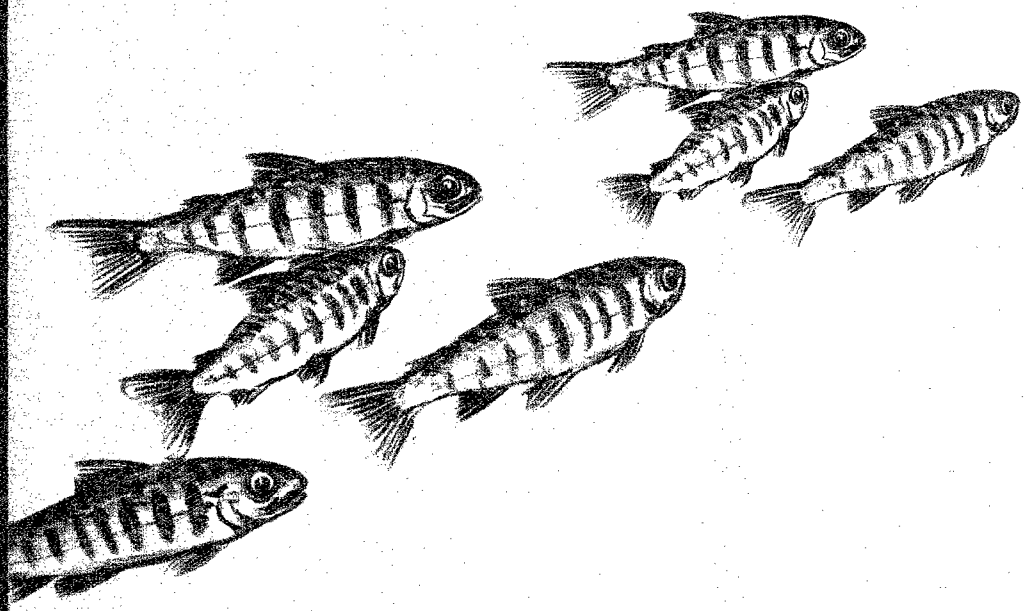
Comments:

Send comments by
E-mail: salmonstudy@usace.army.mil
Fax: (509) 527-7832
Mail: Department of the Army , Walla Walla District Corps of Engineers, Attention: Lower Snake River Study, 201 North Third Avenue, Walla Walla, Washington 99362-1876

For More Information

Visit the Walla Walla District Home Page
at http://www.nww.usace.army.mil

Department of the Army
Walla Walla District, Corps of Engineers
201 North Third Avenue
Walla Walla, WA 99362-1876



EPA

Bonneville
Power Administration