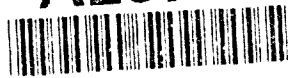


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FINAL
ENVIRONMENTAL IMPACT STATEMENT

F-15E BEDDOWN AT SEYMOUR JOHNSON AFB,
NORTH CAROLINA

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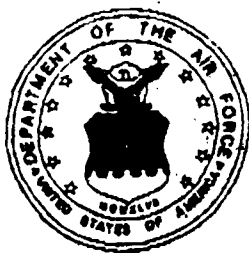
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**Air Force
Environmental Planning Division
(HQ USAF/CEVP)**

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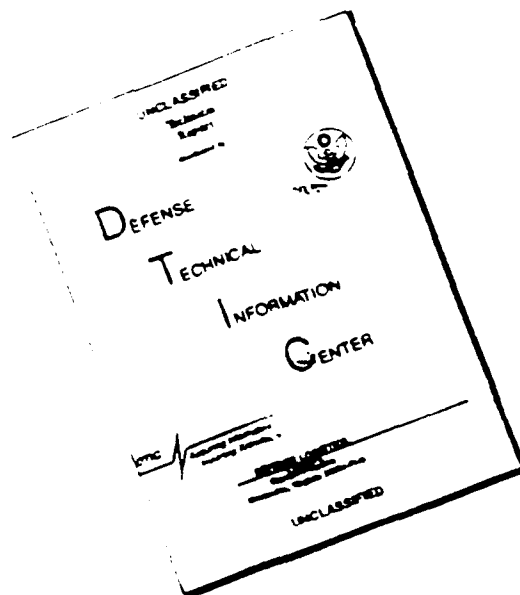
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Jack Bush, Gm-14

**Mr. Jack Bush
Special Projects and Plans
703-697-2928
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FINAL
ENVIRONMENTAL IMPACT STATEMENT

F-15E BEDDOWN AT SEYMOUR JOHNSON AFB,
NORTH CAROLINA

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November 18, 1988

- (a) Responsible Agency: United States Air Force
- (b) Proposed Action: Conversion of F-4 to F-15E aircraft that will be equipped with the new Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) system at Seymour Johnson AFB, Wayne County, North Carolina.
- (c) Responsible Individual: Alton Chavis, HQ TAC/DEEV, Langley AFB, VA 23665-5542; Telephone (804) 764-7844.
- (d) Designation: Final Environmental Impact Statement (FEIS).
- (e) Abstract: The Air Force proposes to convert the 72 F-4 aircraft at Seymour Johnson AFB with 72 LANTIRN equipped F-15E aircraft. The replacement would begin in January 1989 and be completed by 1991. The action would not result in an increase in overall sorties at the base, but would increase the number of operations currently flown between sunset and 10:30 P.M. from five up to eighteen per day. There would also be an increase in the number of sorties flown on selected military training routes and in the percentage utilization of total available hours at the Dare County Range.

Alternatives considered included taking no action, delaying the action, constructing a new base, and using an existing base. (Cannon AFB, NM, Holloman AFB, NM, Mountain Home AFB, ID, Nellis AFB, NV, and Seymour Johnson AFB, NC were evaluated.) The preferred alternative is to make the conversion at Seymour Johnson AFB.

The primary environmental concern associated with the proposed action is the effect of noise around Seymour Johnson AFB. The acreage impacted by Day-Night Noise levels (DNL) of 65 decibels and above would increase by thirty-seven percent, thus returning the area to a noise environment similar to the 1985 time period when 96 F-4 aircraft were assigned at the base. Noise levels on the military training routes are expected to be reduced since the F-15E is quieter than the F-4 in cruise power. The noise environment at the Dare County Range is not expected to materially change. A small reduction in air pollutant emissions around the base and on the military training routes is expected.

Date Made Available to the Public: November 18, 1988.

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1.0 SUMMARY

The Air Force is proposing to convert 72 F-4s to 72 F-15E aircraft that will be equipped with the new Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) system at Seymour Johnson Air Force Base (AFB). These aircraft would be phased in by 1991 with the replacement of a like number of F-4Es. The proposed action would not result in an increase in overall sorties at the Base, but would shift some daylight operations into the period between sunset and 2230 hours. There also would be an increase in the number of low level flights on selected Military Training Routes (MTRs), and in the percentage of utilization of the total available hours at the Dare County Range (DCR). There would not be any need for additional MTRs or special use airspace designation. This Final Environmental Impact Statement addresses the potential impacts of this proposed action.

The potential direct impacts of the proposed action are assessed by comparison with 1986 baseline conditions. The 1986 characteristics reflect reductions in operations and personnel brought about by the 1985 deactivation of a squadron of F-4s with an associated loss of 700 military authorizations. The proposed action would increase the 1986 military authorizations by 220 people and thus help to offset the loss resulting from the F-4 squadron deactivation. Although the 1985 F-4 squadron deactivation occurred previous to the established baseline conditions, the effects of that action are considered in this assessment in order to evaluate the cumulative effects of past, current and proposed actions.

The noise generated at Seymour Johnson AFB and vicinity would be affected by two factors associated with the proposed F-15E beddown. The F-15E is a quieter aircraft and would require less use of afterburners during takeoffs than the F-4 aircraft it would replace. These factors would reduce the amount of area affected by high noise levels of 80 decibels (dB) and above, but would increase the amount of area around the Base that would be affected by lower noise levels. On a short term basis, acreage impacted by noise would increase about 37% (approximately a 1.4 dB increase in overall noise). On a long term basis (cumulatively), the proposed action would result in a noise environment (acreage-wise) similar to the 1985 time period when 96 F-4 aircraft were assigned to Seymour Johnson AFB.

There may be a reduction in the utilization of Echo Military Operations Area for air-to-air missions as a direct effect of the beddown. However, this effect could be offset by possible rescheduling actions by other Bases utilizing this airspace.

The utilization of MTRs would increase by 14 percent and would be dispersed primarily over 10 existing MTRs extending through mountain, piedmont and coastal counties. Due to this dispersion and the fact that the F-15Es would replace a more noisy aircraft, the proposed action would result in a 6 to 12 DNL reduction in the expected noise levels along the MTRs.

The proposed action could increase DCR utilization from a 78 percent current rate to a 94 percent rate, depending upon the availability of alternative ranges. A shift in the operational emphasis to more nighttime sorties could result in longer operation of the range and would extend the time that the range and surrounding environments would be affected. The range would continue to be a high noise level environment.

Analysis of the socioeconomic impacts focused on changes in local economic conditions and the impact of changes in noise levels on residential property values. The results suggest a net positive impact on the local economy and essentially no net impact on residential property values. The increase from the baseline economic conditions in manpower, equipment, and construction activity would generate a significant increase in wages, salaries, production, and employment for Goldsboro, Wayne County, and the State of North Carolina. Specifically, production in Wayne County would be higher by \$13.3 million dollars over baseline conditions, focused primarily in the construction, wholesale and retail trade, real estate and utility industries. Total employment in Wayne County would increase by 300 persons by 1991, split between the Air Force base and Goldsboro community. With respect to the impact of noise on residential property values, the effects would be minimal.

No impact on aircraft accident potential in the local area of Seymour Johnson AFB is expected from the proposed action. The total number of sorties would not materially change, but a larger percentage of them would occur at night, i.e. after sunset. Night flying operations inherently involve a higher accident risk potential. Well established nighttime procedures and prior training at Seymour Johnson AFB in night flying operations would minimize the risks of local night operations. However, the proposed action would result in an unavoidable increase in the potential for aircraft accidents during the night low-level and night surface attack elements of the new F-15E mission. Because the proposed action involves a new role, no existing F-15E accident history is available to quantify the predicted increase in accident potential. Based upon the accident history of the F-4, however, only a slight increase over the current potential is anticipated on the range and along the most affected MTRs. A carefully formulated training syllabus, effective simulator training, the two-man F-15E crew, and the already established night surface attack range procedures should minimize the accident potential for night low-level navigation and night gunnery range operations. A reduction in daytime air traffic congestion as a consequence of the F-15E LANTIRN mission would offset the inherent risks at the Base itself. This reduction in daytime air traffic congestion is even more significant when viewed in the context of Base operations prior to the 1985 deactivation of the additional F-4 squadron.

The operational mode of the LANTIRN presents potential safety and health hazards. Use of the operational mode of the LANTIRN laser would be restricted to approved targets on the DCR. Range procedures developed for similar type lasers are adequate to protect range personnel. There would be no laser impacts outside the boundary of the DCR. Procedures have been developed to protect range personnel from direct and reflected laser rays, and aircrews from rays reflected back to the aircraft from specular targets. Compliance with these procedures will prevent adverse impacts to the health and safety of either range personnel or aircrews. Ground reflection in the vicinity of the DCR is not considered to be a significant factor.

A small reduction in air pollutant concentrations attributable to aircraft flight operations at Seymour Johnson AFB would occur as a direct effect of the F-15E beddown and the departure of a like number of F-4 aircraft. Since the region is an area in which air quality is considered better than required by the National Ambient Air Quality Standards, there will be no change in that status.

At the DCR and for those MTRs currently utilized for F-4 operations, the proposed action would result in small reductions in air pollutant concentrations. For those areas not currently utilized by F-4s, air quality impacts would not be significant due to the

dispersion of LANTIRN operations over an increased number of MTRs and airspaces. Any incremental increase in pollutants would be slight in any one area.

The proposed action should have no significant impact on either the physical or the biological environment of Seymour Johnson AFB. The indigenous vegetation and wildlife have been previously disturbed as a result of urban and agricultural development near the Base. Because there will be a small reduction in air pollutants at the Base and DCR, and the incremental increase that could occur in some MTR areas would be slight, there will be no significant impact on either indigenous or cultivated vegetation or archaeological sites in the vicinity of the Base, range, or MTRs. In addition, the turbulence from increased low-level flights should not affect standing archaeological structures.

Despite the studies on the effects of noise on domestic and natural animal behavior, there is no consensus regarding impacts. However, the preponderance of literature suggests that animal populations in general should not be impacted as a result of the proposed action. Studies also have shown that noise from low-level subsonic and high altitude supersonic flights are not likely to jeopardize the existence of raptors, such as the Peregrine Falcon in the vicinity of the range and MTRs. In consideration of these results, and the fact that no supersonic flights would be scheduled over land areas as a result of the proposed action, no significant biological impact due to noise is anticipated.

The only other possible impact at DCR would be the unlikely occurrence of an uncontrolled fire. Although no flash-producing ordnance would be used during the high fire potential season, fire could be a consequence of a direct hit of the infrared targets by a practice bomb and the ignition of fuel spilled onto the ground. Since a peaty ground cover exists in these areas, a fire caused by the destruction of an infrared target could spread rapidly, burn extensively beneath the surface, and be difficult to extinguish.

There would be no adverse impact on water resources as a result of the proposed action. The projected addition of approximately 876 individuals (military, dependents, and secondary employment) represents a net decrease of 1,910 individuals as compared to the Base population before the 1985 F-4 squadron deactivation. The demand for water use at the Base would remain well below potential withdrawal rates and below past usage. Wastewater discharge rates for the Base would remain within the design capacity of the Goldsboro wastewater treatment plant.

Because of the industrial nature of the operations at Seymour Johnson AFB, the aesthetic values of the Base are unlikely to be adversely impacted by the proposed action. The aesthetic quality of areas in the vicinity of DCR and the proposed MTRs could be affected by the proposed action. The principal effect would be increased noise in the evening hours resulting from a greater number of early evening and nighttime sorties. However, the public frequently utilizing areas near DCR have been exposed to aircraft noise for a number of years. LANTIRN sorties would utilize existing MTRs at currently approved altitudes. These routes are selected to avoid populated areas and MTR operating instructions specify noise sensitive locations. Therefore, strict adherence to route widths and operating instructions should serve to minimize any aesthetic impacts from noise.

Cumulative Impacts

Many of the comments on the draft EIS stated the Air Force must consider the cumulative impacts associated with this action. The comments noted that DOD conducts extensive training in the airspace over North Carolina, and stated that the Air Force could not restrict the environmental analysis to just the direct effects of the proposal. The requests for cumulative analysis were typically raised in connection with potential impacts from low-level aircraft on wildlife and recreation. Similarly, the Council on Environmental Quality (CEQ) has also indicated that there has been an inadequate assessment of the cumulative impacts from military use of special use airspace over North Carolina. The CEQ findings and recommendations in connection with the Cherry 1 and Corps MOA proposals by the Marine Corps announced that the FAA must consider the cumulative impacts associated with special use airspace designations it approves.

This EIS contains an analysis of cumulative impacts. The discussion is commensurate with the perceived impacts, which are negligible. With respect to use of MTRs, the noise analysis considers the use of such routes by other military aircraft as well as by those from Seymour Johnson AFB. Even so, the aircraft conversion would result in a slight decrease in expected noise levels along the routes. Further, there is not any reason to expect noise levels on other MTRs to and from the Dare County range to change.

At the Dare County range itself, the direct effect of the conversion would be to shift some of the sorties from daytime to evening. However, a possible consequence would be that other military aircraft could fill the daytime training slots thus vacated. If that were to happen, overall DCR usage could increase by up to 16%. Because the Range is already a high noise environment, the increase in overall noise from this possible increase in use would probably not be noticeable.

There would be a reduction in the utilization of the Echo MOA (air-to-air missions) as a direct result of the aircraft conversion. Again, however, this reduction could be offset by increased training sorties by other units using that airspace, resulting ultimately in no change from existing conditions. With respect to the Cherry 1 and Corps MOAs proposed by the Marine Corps, the Corps' EIS analysis indicated an overall sound environment of 72 and 67 DNL at the MOAs, respectively. There is no reason to expect Air Force use of MTRs through that airspace to increase those predictions.

There are no ascertainable regional or statewide cumulative impacts from this proposal. It is acknowledged that low-level transiting of homes, seashores, and parks by military aircraft can conflict with the land uses below. Low-level flights can disturb quiet enjoyment of homes and recreational areas. Evening flights also may potentially disturb waterfowl and other wildlife more than would similar flights during the day. Military overflights occur in a number of places in North Carolina, and there is growing local sensitivity to the overall amount of activity.

The aircraft conversion, however, does not involve additional training routes or special use airspace, nor would it increase the sorties from the base. The F-15Es would fly about the same number of sorties on the same MTRs going to and from the same training areas now used by the F-4s at Seymour Johnson AFB. The increased emphasis on evening sorties (about 8) amounts to an average increase of less than 1 sortie per evening per MTR. Those flights will be dispersed along flight tracks varying in width from 2 to 10 miles. There is no reason to expect this to harm people or noticeably

affect wildlife populations. There is certainly no basis for hypothesizing regional or statewide impact, even when other military flights in the state are taken into account.

2.0 PUBLIC COMMENTS

The following letters were received during the public comment period following release of the Draft Environmental Impact Statement on March 10, 1988. The letters are presented in order of receipt and have been reviewed to identify specific comments for response by the U.S. Air Force. These identified comments are numbered sequentially for reference purposes. U.S. Air Force responses for these numbered comments are presented in Section 4.0.



United States
Department of
Agriculture

Soil
Conservation
Service

310 New Bern Avenue
Room 535, Federal Bldg.
Raleigh, NC 27601

March 22, 1988

Mr. Alton Chavis
HW TAC/DEEV
Bldg. 681, Room 320 B
Langley AFB, VA 23665-5001

Dear Mr. Chavis:

Because of the extremely heavy workload in implementing the Conservation Provisions of the Food Security Act of 1985, we are unable to provide specific comments on your proposed project, the F-15E Beddown at Seymour Johnson AFB, North Carolina. Some general comments and recommendations regarding the project are:

- 1 | 1. Work with local units of government to minimize impacts on prime and locally important farmlands.
- 2 | 2. Utilize soil erosion control measures during project construction activities to prevent off-site sedimentation damages.
- 3 | 3. Use locally adapted plants and erosion conservation practices to prevent erosion following project installation.

We regret that we are unable to provide specific comments on your proposed projects relating to soil and water resources in North Carolina. When the conservation provisions of the Food Security Act are implemented, we will again be able to review and provide detailed comments on projects.

Sincerely,


Bobby J. Jones
State Conservationist

cc: Peter F. Smith, SCS, Washington, DC
Phil Edwards, SCS, Raleigh, NC





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30365

APR 28 1988

4PM-EA/GJM

Mr. Alton Chavis
HQ TAC/DEEV
Bldg. 681, Room 320B
Langley AFB, Virginia 23665-5001

SUBJECT: Draft Environmental Impact Statement on the Proposed F-15E
Beddown at Seymour Johnson AFB (Wayne County), North Carolina
EPA Log No.: D-UAF-E11020-NC

Dear Mr. Chavis:

Under the authority of Section 309 of the Clean Air Act and Section 102(C) of the National Environmental Policy Act, EPA, Region IV has reviewed the subject document. While there will be any number of consequences resulting from this proposal, the majority lie outside EPA's authorized mandates and/or areas of expertise. However, we have been assured by interested, knowledgeable parties who have contacted us that these societal/economic issues will be raised in their comment letters. There are, nonetheless, a number of questions regarding the noise impacts of this decision to locate the F-15E squadrons at Seymour Johnson about which we would like some clarification. These questions are in our attached detailed comments.

On the basis of our review of the document a rating of EC-2 has been assigned. That is, we have a number of environmental concerns/questions about the noise which will be generated by these new aircraft in their enhanced air to ground mission and some additional information is requested.

If we can be of further assistance, please do not hesitate to contact Dr. Gerald Miller of my staff at 404/347-3776 or FTS 257-3776.

Sincerely yours,

Sheppard N. Moore
Sheppard N. Moore, Chief
NEPA Review Staff
Environmental Assessment Branch

Attachment

DETAILED COMMENTS

- 4 ° While the Air Installation Compatible Use Zone (AICUZ) developed in 1983 may still be used for current planning, the conditions (aircraft-wise) which existed then are no longer the same. That is, currently there are 72 F-4 aircraft at the base not the 96 which were present in 1983. Hence, the relatively large acreage increase of 37% noted on p. 4.2-1 for areas affected by lower noise levels (<80 dB) is, in fact, a valid comparison for the proposed action. We suggest that the 1986 levels of aircraft noise versus anticipated F-15E levels be the standard of comparison throughout the document.
- 5 ° Table 4.2-1 shows a comparison of noise affected areas in acres between the "no action" and proposed action in 5 DNL increments. This table would be materially improved if the number of receptors within this acreage had been indicated as follows:
- 1) by building type (commercial, institutional, residential),
 - 2) number of units in each type classification, and,
 - 3) number of people residing in each category of building. A day/night comparison would also be instructive for element 1-3.
- 6 ° Table 4.7-3 notes that the "worst case" impact represents a potential increase of 20 dB in DNL for about 537 dwelling units. This involves an exposed population of 1603 people "outside AICUZ." These homes were identified as being in the Brogden and Walnut Creek geographic areas. The significance of the "worst case" 20 dB increase would be easier to determine if the table gave the ambient noise level to which the 20 dB increase would be added. With this information a practical "worst case" evaluation could be made.
- 7 ° It is also difficult to tell where the impacts occur, since noise contour maps (Figures 3.2-2 and 3.2-3 on pages 3.2-4 and 3.2-5, respectively) are drawn to different scales and the community names are illegible. We recommend:
- 1) improvement of Figures 3.2-2 and 3.2-3, so they are to the same scale;
 - 2) identification (on the maps) of the "worst case" affected communities;
 - 3) presentation in Table 4.7-3 of the "worst case" noise levels, after the 20 dB changes have been added to the ambient; and
 - 4) that mitigation be examined if the "worst case" elevations are in excess of standards adopted by the Air Force.

- ° Table 4.2-2 shows a comparison of noise levels for the Seymour Johnson military training routes with and without the proposed action. On initial examination the DNL values would not appear to be significant.
- 8 However, given the startle effect of low flying aircraft, it would be instructive if some information had been provided regarding single-event noise episodes, especially if the background L_{dn} without military overflights had been available for comparison.



United States Department of the Interior

OFFICE OF ENVIRONMENTAL PROJECT REVIEW
RICHARD B. RUSSELL FEDERAL BUILDING, SUITE 1034
75 SPRING STREET, S.W.
ATLANTA, GEORGIA 30303



April 29, 1988

In Reply Refer To:
ER 88/159

Mr. Alton Chaves
Department of the Air Force
HQ TAC/DEEV
Langley Air Force Base, Virginia 23665-5001

Dear Mr. Chaves:

This is in response to the request for the Department of the Interior's comments on the draft environmental statement for the F-15E Beddown at Seymour Johnson Air Force Base, Wayne County, North Carolina.

9 | We do not believe that the statement adequately evaluates proposed training which could impact Cape Lookout and Cape Hatteras National Seashores or evaluates alternatives which could avoid or minimize any adverse impacts to these areas. The statement also fails to evaluate the cumulative impact of this proposal with other military proposals in eastern North Carolina.

10 | The statement indicates the replacement of 72 F-4 aircraft at Seymour Johnson Air Force Base with 72 LANTIRN (Low Altitude Navigation and Targeting Infrared for Night System) equipped F-15E aircraft, and states that there will be an increase in the percentage of use in the total available hours at the Dare County Range. Military Training Route (MTR) VR-1043 (Figures 3.02) crosses Cape Lookout National Seashore over the former Cape Lookout Coast Guard Station, the Cape Lookout Light Station, the concession ferry terminal, and an unimproved campground near the Cape Lookout lighthouse. Flights are allowed to a minimum altitude of 200 feet above ground level (AGL) in VR-1043. MTR Training Route VR-073 crosses Cape Hatteras National Seashore near Rodanthe, North Carolina, parallels the seashore for approximately 20 miles and recrosses the park near Avon. Flights to 100 feet AGL are allowed within VR-073.

The statement also indicates that Warning Areas W-122 A/B/C, which are offshore of Cape Lookout National Seashore, and bombing targets BT-9 and BT-11, which are within restricted area 5306A immediately west and northwest of the park, will be used. We note

11 | that the only ingress from W-122 to either BT-9 or BT-11 is across Cape Lookout National Seashore.

12 | The statement mentions (page 2.2-7) that "There is an instrumented air combat tactics range available," but it does not identify the range. One of the key impacts with the exchange of F-15E for F-4 aircraft at Seymour Johnson Air Force Base will be the shift from daytime operation into the period between sunset and 10:30 p.m., because of the LANTIRN system employed with the F-15E. Both Cape Lookout and Cape Hatteras could experience an increase in nighttime overflights because of the aircraft conversion.

Specifically, we believe the following issues relating to the National Seashores should be addressed in the final environmental statement:

13 | 1. The nature of use of the Military Training Routes over park lands including hours of operation, aircraft speeds, flight altitudes, and noise levels that will be experienced in the parks.

14 | 2. An evaluation of the Air Force use of BT-9 and BT-11 in R5306A and impacts on the national seashores. The statement should explain the need to ingress the targets from W-122 and whether the establishment of this Military Operating Area (MOA) is critical to the training mission and alternative MOA's which could be utilized. Also, the statement should evaluate the impact in Cape Lookout National Seashore for training over the seashore including the impacts of nighttime overflights on the Seashore.

16 | 3. MTR VR-073 crosses Cape Hatteras National Seashore twice and parallels the National Seashore for approximately 20 miles. With the prospect of increased use of the MTR, including nighttime use, the statement should evaluate the impacts of this action on the National Seashore.

17 | 4. The statement should evaluate alternative air space users which will not impact national park areas.

18 | 5. The statement should evaluate the cumulative impacts of this proposal with all other existing and proposed military users of air space in the vicinity of Cape Lookout and Cape Hatteras National Seashores, especially those of the Marine Corps at Cherry Point.

19 | Ten Military Training Routes (MTR's) have been identified by the Air Force as the routes most likely to have increased use by the F-15E's, primarily at altitudes below 500 feet AGL. Of these 10 MTR's four are expected to have increased F-15/LANTIRN operations. The DEIS inadequately addresses the impacts to fish and wildlife resources, particularly to waterfowl and endangered and threatened species inhabiting the areas under these 10 MTR's. In addition, impacts on

20 | wildlife resources resulting specifically from night-time (LANTIRN) flights were not addressed.

21 | In addition, our concerns primarily address fish and wildlife resources and include potential adverse impacts to waterfowl and other migratory birds, endangered and threatened species, and National Wildlife Refuges, inadequate assessment of cumulative impacts and inadequate mitigation of impacts. Impacts to these resources should be addressed throughout the entire affected area.

Military Training Routes. The F-15E squadron proposed for Installation at the Seymour Johnson Air Force Base will be equipped with a Low Altitude Navigation and Targeting Infrared for Night (LANTIRN) system. The LANTIRN training missions will be flown between sunset and 10 p.m., at a preferred flight altitude of 100 feet above ground level (AGL) on existing MTR's. Approximately 50 percent of the LANTIRN training sorties will be flown between 100 to 500 feet AGL, with the remainder flown at altitudes greater than 500 feet AGL. The ten MTR's, which have been identified by the Air Force as the routes most likely to have increased use by the F-15E's, traverse six different states: Virginia, North Carolina, South Carolina, Georgia, Alabama, and Tennessee.

22 | According to the Statement text, the use of these 10 MTR's by the Air Force is estimated to increase by 34 percent. Table 2.1-3 in the DEIS indicates that the number of sorties/day on the MTR's will increase 61 percent from the baseline of 31 sorties/day to 50 sorties/day. Table 2.1-2 indicates that the total number of Route sorties/day will increase 14 percent from 42 sorties/day to 48 sorties/day. We request that the Air Force resolve the discrepancies between Tables 2.1-2 and 2.1-3, clarify the derivation of the 34 percent increase in MTR utilization and identify the year of the baseline data. For trend analysis of MTR utilization, the Air Force
23 | is requested to provide data from 1980 until present.

To minimize noise impacts on the human population, the Air Force will confine the lowest altitude flights on the MTR's to the least populated areas (Statement: page 4.2-6). Conversely, these areas support the largest populations of wildlife and will receive the greatest impacts from the low level, high speed jet flights. Thus, the impacts to fish and wildlife resources due to the LANTIRN training missions will be concentrated along these MTR's.

To determine the extent of impacts to fish and wildlife resources, we request that the Air Force provide the following mapped information on the MTR's which will be used by the F-15E squadron:

24 | 1) identification of each Route in terms of the county traversed at a scale appropriate to determine local drainages, National Wildlife Refuges and towns;

25 | 2) identification of each Route width, as the Routes vary in width from 2 to 10 miles;

26 | 3) identification of those Route segments prioritized for flights below 500 feet AGL.

27 | According to section 4.2.1, p. 4.2-1, local air operations, which define the Base Noise environment, will remain basically the same. However, on p. 4.4-2, the DEIS states that the overall noise environment at the Base will be increased as a result of the proposed action. Further, on p. 4.4-5 the DEIS concludes that F-15 E's are less noisy than F-4's and there should be an overall decrease in noise from the F-15E operations. Please clarify these conflicts.

28 | National Wildlife Refuges. The U.S. Fish and Wildlife Service has eight National Wildlife Refuges (NWR) in North Carolina and South Carolina which are affected by this proposed project. These refuges include: Alligator River NWR, Pea Island NWR, Mattamuskeet NWR, Swanquarter NWR, Cedar Island NWR, Pungo NWR, Pee Dee NWR and Carolina Sandhills NWR. Of these refuges, Carolina Sandhills NWR, Pee Dee NWR, Pea Island NWR and Swanquarter NWR are located under or adjacent to the ten MTR's and are directly affected. The other four refuges are located either adjacent to or included under existing restricted airspace or military operating airspaces. Additionally, the proposed Roanoke National Wildlife Refuge is located under and/or adjacent to two MTR's.

29 | The shift in Air Force operations to night hours will vacate daytime slots on the Dare County Range (Statement: page 4.2-8) and consequently on the other ranges used by Air Force, including BT-11. A subsequent increase in range activity by other military bases can be expected. This increase in range use can be expected to result in increased flights, both authorized and unauthorized, over the National Wildlife Refuges. The cumulative impacts of this activity have not been adequately analyzed in the Statement. We request the Air Force assess these cumulative impacts to fish and wildlife resources.

30 | Three refuges, including Pee Dee NWR, Carolina Sandhills NWR and Pea Island NWR, appear from Figure 3.0-2 to be traversed by MTR's. The minimum altitude on Route VR73, which crosses Pea Island NWR, is 100 feet AGL. Pea Island NWR is the southernmost nesting area for black ducks and gadwalls and is a major wintering area in North Carolina for the greater snow goose. The major fall migration route of the threatened Arctic peregrine falcon follows the Outer Banks through the refuge. The major resource management objectives at Pea Island NWR includes provision of wintering habitat for the greater snow goose and other migratory waterfowl, habitat and protection for threatened and endangered species, and habitat for migratory birds on the Atlantic Flyway.

31 | The minimum altitude on Route IR721, which bisects Pee Dee NWR and Carolina Sandhills NWR, is 300 feet AGL. The primary management objective at Pee Dee NWR is the provision of habitat and protection for wintering waterfowl. Twelve to fifteen thousand ducks from both the Mississippi and Atlantic Flyways and approximately fifteen hundred geese from the Mississippi Flyway overwinter at the refuge. The black duck, a primary overwintering species in this area has been identified in the current North American Waterfowl Management Plan as a species for special consideration due to declining populations. The Carolina Sandhills NWR is managed to provide endangered species habitat for the red-cockaded woodpecker and wintering habitat for waterfowl.

32 | Because overflights of National Wildlife Refuges by low altitude, high speed military jets and the attendant visual and accoustical impacts on waterfowl and other wildlife is in conflict with the management objectives of the refuges, we request the Air Force to relocate those segments of the MTR's which traverse National Wildlife Refuges to other areas. Specifically we request that Route V73 be relocated south of Pea Island National Wildlife Refuge and Route IR721 be shifted east of Pee Dee National Wildlife Refuge and be terminated north of Carolina Sandhills National Wildlife Refuge.

| In the event that the Air Force can not relocate these MTR segments which traverse National Wildlife Refuges, we request that the Air Force implement the following mitigative measure:

33 | All military flights on VR73 and IR721 will maintain a minimum vertical separation of 2,000 feet AGL over the National Wildlife Refuges. In addition, the crossings of the Pamlico River and Sound and the Pungo River by VR 1074 and VR 1046 should be restricted to 2,000 AGL from November 15 to March 31. All flights on VR73 will be restricted to altitudes greater than 2,000 feet AGL from November 15 to March 31, which is the waterfowl overwintering period.

| The 2,000-foot AGL elevation is the minimum vertical separation recommended by the Federal Aviation Administration for refuge overflights.

34 | Migratory Waterfowl and Other Birds. Low altitude aircraft operations affect fish and wildlife populations and habitat utilization. Waterfowl populations throughout the Atlantic Flyway, including North Carolina, have experienced serious declines in the past twenty years. Major overwintering grounds for migratory waterfowl, particularly canvasbacks, exist on the Pungo River and the Pamlico River and Sound. The proposed mitigation of impacts to wildlife, as set forth on page 4.4-6 of the Statement, is inadequate to protect migratory birds, which are trust resources of the

35 | Department of the Interior. We request adoption of the mitigative measure previously discussed above, if the MTR's cannot be shifted as requested.

Section 4.4.2, which concerns existing research on the impacts of low altitude, high speed military jets on wildlife, is insufficient to adequately ascertain the impacts of this project on wildlife resources in North Carolina, particularly waterfowl impacts. As jets produce high frequency noise, we request the Air Force to provide the frequency spectrum of the F-15E and an assessment of the noise produced in relation to bird sensitivities in the FEIS.

The conclusion reached by the Air Force on page 4.4-4 of the DEIS that military activities on the Dare County Range, BT-11, the MTR's and the Echo Military Operating Airspace have not resulted in adverse impacts on the quantity and diversity of wildlife in those areas is unsubstantiated. The Air Force is requested to provide documentation of those studies supporting this claim.

In view of the lack of information, we recommend that the Air Force design and conduct studies in North Carolina to determine the impacts of low altitude, subsonic flights on wildlife, particularly on wintering waterfowl. An assessment of the impacts to wildlife is incomplete without data which address the question of night operations. We request that the Air Force undertake efforts to obtain these data.

Endangered Species. The endangered and threatened species list on page 3.4-5 of the DEIS, was provided to the U.S. Air Force in response to their December 1, 1987 request for scoping comments on this project. Based on the project description provided in the request, only those species inhabiting Wayne County, the site of the Seymour Johnson Air Force Base, and Dare County, the site of the Dare County Range were provided in the list. The information provided in the DEIS indicates that significant impacts may occur to those species which inhabit areas under the MTR's.

The Fish and Wildlife Service does not concur with the Air Force's conclusion on page 4.4-5 that significant impacts to endangered and threatened species will not occur, as the evaluation of impacts for the list of species provided for Dare and Wayne counties is inadequate and also does not include those species affected by the MTR's, BT-11, or airspace W-122.

The Fish and Wildlife Service requests the Air Force to re-evaluate the impacts to endangered and threatened species from the low altitude, subsonic military jet flights on the ten MTR's identified for increased use and the for other ranges. A complete list of threatened and endangered species will be provided by the U.S. Fish and Wildlife Service upon receipt of information identifying all counties traversed by the MTR's or affected by activities at the various target ranges. The re-evaluation should include the specific study information from Eglin Air Force Reservation which supports the conclusion that red-cockaded woodpeckers are unaffected by low

39

altitude, subsonic jet flights. Future revisions should include a complete discussion of potential impacts and appropriate mitigative measures to avoid or minimize potential adverse impacts to nesting sea turtles and bald eagles, piping plovers, roseate terns and any other species identified as occurring within the impact areas. The roseate tern (*Sterna dougallii*), an endangered species, was added to the Dare County species list in December, 1987. Enclosed is a copy of the "Habitat Management Guidelines for the Bald Eagle in the Southeast Region," for your use. You are advised that this project has not been reviewed or cleared, pursuant to the requirements of the Endangered Species Act and that coordination with the U.S. Fish and Wildlife Service is necessary.

40

Radar. The LANTIRN system includes a terrain following radar of unspecified operational capacity. We request the Air Force to provide the following information and an assessment of the possible impacts of this radar on wildlife resources:

- 1) wavelength and footprint of the radar;
- 2) exposure duration and frequency of radar use during LANTIRN training sorties;
- 3) impacts of radar on migrating and resident birds, bats and wildlife, including disorientation effects (i.e., night flights over resting waterfowl with resultant fleeing; foraging bats).

41

Lasers. The LANTIRN system includes an infrared laser for target training use on the Dare County Range. The information provided on the Pave Spike and Pave Track lasers indicates that the footprint width can be as narrow as 75 feet. A maximum width is not provided. The length can vary from 100 feet to 5 miles.

The skin and eyes are most susceptible tissues to damage from laser radiation. A common reaction of wildlife to foreign or novel noise is to orient towards the sound. This raises the probability of injury, particularly to the eyes. According to the Statement, the LANTIRN laser appears to be "eye safe" for humans. We request the Air Force to provide information on the hazards of lasers to wildlife and an assessment of the associated risk of the LANTIRN laser operations at the Dare County Range. The assessment should include information on the frequency of laser use, exposure duration and footprint.

42

Cumulative Impacts. The assessment of the cumulative impacts to the biological environment presented in Section 4.4.6 of the Statement is inadequate, primarily due to the failure of the Air Force to consider the regional and military-wide implications. As stated by the Air

42 Force on page 4.2-8, usage of the Dare County Range and associated Routes and Military Operating Airspaces by other military bases can be expected to increase as the Air Force shifts its operating times to the evening hours. The impacts of this increased use of Military Operating Airspaces, Routes and target ranges must be evaluated as part of the cumulative impact assessment.

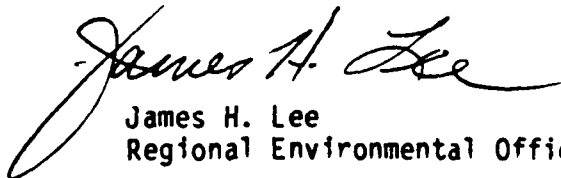
43 A single flight by the Air Force may not result in an adverse impact to a given flock of waterfowl. But if that flight is the tenth or seventy-fifth flight over that flock, exceeding a threshold level of that flock for disturbance, the flock may vacate that habitat entirely. The cumulative impact analysis must attempt to answer the question of what level of airspace utilization of Routes, Military Operating Airspaces and restricted areas exceeds the threshold tolerance of wildlife and results in an adverse impact to the population.

Summary. Major issues that need resolution include: 1) adverse impacts to waterfowl and other migratory birds and wildlife; 2) conflict of Air Force training objectives with National Wildlife Refuges management objectives; 3) impacts to endangered and threatened species; 4) evaluation of cumulative impacts; 5) mitigation of impacts; and 6) evaluation of impacts on the Cape Lookout and Cape Hatteras National Seashores; and (7) analyses of cumulative impacts of this proposal combined with other defense activities.

We request that you meet with Ms. Mike Gantt, Field Supervisor, Raleigh Fish and Wildlife Service Field Office and Ms. Kate Benkert of that office to resolve these issues before a final EIS is published. Ms. Gantt may be reached at (919) 856-4520. The NEPA process provides an avenue for referral of unresolved issues to the Council on Environmental Quality under Section 1504 of the CEQ regulations. It is our desire to exhaust every possible method of negotiation to resolve these issues in lieu of using the referral process. Therefore, I urge you to meet with the U.S. Fish and Wildlife Service as soon as possible. Please contact me at (404) 331-4524 if I can be of further assistance.

We appreciate the opportunity to comment on the Draft EIS.

Sincerely,


James H. Lee
Regional Environmental Officer



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

P.O. BOX 25201
RALEIGH 27611-5201

JAMES G. MARTIN
GOVERNOR

JAMES E. HARRINGTON
SECRETARY

DIVISION OF AVIATION
AVIATION PARKWAY
RALEIGH-DURHAM AIRPORT
(919) 787-9618

May 2, 1988

Mr. Alton Chavis
HQ TAC/DEEV
Bldg. 681, Room 320B
Langley AFB, Virginia 23665-5001

Dear Mr. Chavis:

The North Carolina Department of Transportation would like to offer the following comments concerning the Draft Environmental Impact Statement for the F-15E Beddown at Seymour Johnson AFB, North Carolina.

44 | A better method to accomodate citizen input relative to noise complaints generated by aircraft using low level routes in N.C. needs to be established. With the increased activity along these routes, especially in the evening, there will be an increase in noise complaints. Commercial telephone numbers available for this input would be a logical first step.

45 | Since the aircraft will be using Dare Range some changes are needed there. The Navy has established a discrete frequency remoted to their operations at Oceana. This is an advisory service for general aviation pilots to obtain range status. However, a pilot may enter R-5314 after checking with the Navy, thinking that the entire range is inactive. R-5314 needs to be split in order to indicate the separate Air Force and Navy operations being conducted there. Since the range is an Air Force area and the Navy is a tenant, this action should be initiated by the Air Force.

46 | Lastly, the increase in operations have a detrimental cumulative impact upon a area of Special Use Airspace that has severe ATC problems without radar and communications. As this office has indicated many times in the past, this is a "piecemeal" addition to a already serious problem.

We appreciate the opportunity to comment on this matter.

Sincerely,

Marshall Sanderson

Marshall Sanderson
Airspace Coordinator

W. PAUL HERRING
GENERAL CONTRACTOR

ROUTE 3, BOX 157

GOLDSBORO, NORTH CAROLINA, 27530

TELEPHONE 778-4810

May 2, 1988

Lt. Col. Ken Allen
4700-CVJ-15
Seymour Johnson Air Force Base
North Carolina 27531

Dear Lt. Co. Allen:

We want to protest the increase in noise of any planes at Seymour Johnson Air Force Base. The Citizens Against Zoning have fought this and any infringement for years. We were not successful in keeping the City officials from zoning our area around the Base. We do not vote for these officials, and they haven't given us anything. They have zoned us for the benefit of SJAAB, which is unfair.

I was out of town at the time of the hearing concerning this and my wife did not read it until the night of the hearing about nine p.m. I have lived in this area all my life and my wife about 33 years. We are concerned with any additional night noise for the many residents in this area (the east side of the runway, on Old Highway 111).

We have tried to be good friends of the Base all of these years, but after awhile, we decide to register a complaint, although the Goldsboro News Argus states that the F-15E jets will be arriving in 47 | October. Does a hearing do any good at all? It didn't do any good with the City Officials.

Yours truly,
W. Paul Herring
W. Paul Herring

WPH:jh



State of North Carolina
Department of Natural Resources and Community Development
512 North Salisbury Street • Raleigh, North Carolina 27611

James G. Martin, Governor
S. Thomas Rhodes, Secretary

Dr. Lynn R. Muchmore
Assistant Secretary
Administration and Intergovernmental Relations

May 2, 1988

MEMORANDUM

TO: Chrys Baggett
FROM: Lynn Muchmore 
RE: Draft Environmental Impact Statement, F-15 E Beddown at
Seymour Johnson AFB (SCH#88-0767)

The Department of Natural Resources and Community Development has reviewed the Draft Environmental Impact Statement (DEIS) for the proposed beddown of F-15E aircraft at Seymour Johnson AFB. There is no conceptual objection to the proposed change in the aircraft, although weaknesses in the DEIS prohibit endorsement of the proposed action at this time.

48 Structural and substantive deficiencies in the DEIS render the document difficult to comprehend and raises questions about some of the conclusions reached. It appears that substantial information needs to be added to the DEIS to allow it perform the purposes envisioned by NEPA. For that reason, this Department recommends that a Supplemental DEIS be prepared for this project, thereby providing an opportunity for all pertinent data to be incorporated into a single consistent perspective. To improve the format of the Supplemental DEIS it is recommended that the sections on the Affected Environment and Environmental Consequences be separated into three parts (Base, Ranges, MTR) so there will be no confusion as to what physical area the environmental discussion applies.

This Department's review also identified numerous questions about the conduct of activities upon ranges, restricted airspace, and MTR; as well as the compatibility of these areas with other state concerns. Given the statement on page 4.2-6: "The Air Force is sensitive to noise issues and continually reviews operations to minimize community impacts. Should the Air Force find that some adjustments are needed to minimize impacts...,

49 appropriate steps (commensurate with mission requirements) will be taken"; it is recommended that such an investigation be undertaken, and that the results be incorporated into the Supplemental DEIS and pursued with the FAA. This Department is prepared to work with the Air Force, and other state and local agencies in such a cooperative effort.

The Department of Natural Resources and Community Development appreciates the opportunity to review the DEIS, With improved documentation, and appropriate adjustments for local and cumulative conditions, we feel assured that the proposed action will progress.

LRM/BF/dlr



State of North Carolina
Department of Natural Resources and Community Development
512 North Salisbury Street • Raleigh, North Carolina 27611

James G. Martin, Governor
S. Thomas Rhodes, Secretary

Edythe McKinney
Director
Planning and Assessment

May 2, 1988

MEMORANDUM

TO: Lynn Muchmore
FROM: Bill Flournoy *B7.*
RE: F-15E Beddown at Seymour Johnson AFB (SCH#88-0767)

The following and attached comments are from divisions of this department. They are in response to the draft Environmental Impact Statement (EIS) prepared by the U.S. Air Force for the proposed beddown of F-15E aircraft at Seymour Johnson AFB.

This has been a particularly perplexing NEPA review because the most significant potential impacts relate to proposed training areas previously approved by the FAA. To adequately respond to the concerns of this department the FAA regulations over the effected Military Training Routes, special use airspaces, and ranges would have to be amended, but these are not decisions directly controlled by the Air Force's NEPA review. Nevertheless, the draft environmental document is weak on the topic of cumulative impacts and its technical presentation can be improved in many areas. The following comments address these concerns in an effort to assist the Air Force in proceeding toward the development of a sufficient final EIS.

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Page xiii. The summary includes a statement about takeoff noise and afterburner use for the F-15E. Related statements in the text on pages 2.1-1 and 4.2-1 are in conflict and the discrepancies among these three should be resolved.

Page xiv. The summary includes the following: "The results suggest a net positive impact on the local economy and

51 essentially no net impact on residential property values", which is representative of a problem found throughout the draft environmental document. The impacts of the proposed action may be found over a large region including not only the Goldsboro area, but also the area beneath the Military Training Routes (MTR) and the effected ranges and their associated Restricted Special Use Airspaces. Many decisions appear to be based upon status quo data, inappropriate data, or no data at all. On this and other environmental topics, the means of measurement must relate to the nature of the impacts, and be sufficient in its breadth and depth of discussion. A special effort should be made to deal with all significant impacts in the EIS, address the various affected areas specifically, and use the most appropriate data for decision-making.

52 Page xv. The summary includes a statement about the effects of turbulence from low-level flights. The topic was introduced and discussed in neither Section 3 on Affected Environmental, or Section 4 on Environmental Consequences. This appears to be a potential impact of significance for the areas effected by MTR, training range, and Restricted Airspace use that should have been discussed in the draft EIS. Its technical characteristics should be presented in adequate detail and its effects integrated into the discussion of environmental consequences so as to allow an understanding and analysis of the issue.

53 Page xvi. The summary justifies increased noise impacts at the Dare County Range (DCR) with the statement: "However, the public frequently utilizing areas near DCR have been exposed to aircraft noise for a number of years". While this may be true, it must be pointed out that the DCR predates NEPA and a total environmental analysis of the activities that may be conducted there under current authorizations has never been conducted. It is inappropriate and perhaps inaccurate to conclude here or elsewhere in the draft or final EIS that any given level or use or impact is acceptable because it falls within existing FAA authorizations for MTR or SUA.

54 Page xvi. This summary and later more detailed discussions of the MTR place heavy reliance upon operating instructions to pilots to minimize potential environmental impacts. Since such instructions were not appended to the draft EIS it was difficult to analyze the level of protection that might be afforded. A copy of DOD Flight Information Publication AP/IB was finally secured and will be discussed later in this memo.

55 Page xvi. The summary should include the topics of solid and hazardous waste management as discussed in more detail later in the draft EIS.

- 56 | Page 2.1-2. The first paragraph under Proposed Action shows no difference between the two missions being contrasted. Is this correct?
- 57 | Page 2.1-1, 2.1-2 and 2.1-6. There are several references to Table 2.0 which should read 2.1.
- 58 | Page 2.1-2. It is noted that 30 + low-level routes are available to Seymour Johnson aircraft, but only ten are identified. If the Air force intends to use any of the twenty unidentified MTR then the draft EIS is incomplete in its presentation and analysis. Reviewers of the draft EIS cannot comment on the environmental acceptability of potential actions that are not presented.
- 59 | Page 2.1-2. Vision Restricting Devices (VRD) are mentioned as an alternative to night training, but little is said about them. Does the Air Force favor VRD training or are there significant disadvantages to actual night training? Under what circumstances would VRD training be utilized under the proposed action?
- 60 | Page 2.1-4. Table 2.1-2 could be greatly improved through reorganization and additional information to make it more easily evaluated by reviewers. Columns showing the numerical and percentage increase in the proposed sorties would be advantageous. This would clearly show that the most significant increases (20%) would occur on IR-012 between Seymour Johnson and the DCR, and on VR-1046 between Seymour Johnson and R-5306-C. The other eight MTR would have increased utilization in the 12-14% range. In the draft EIS it is noted that four MTR have the heaviest utilization, but from this table it is not obvious why VR-1046 was not included among the heaviest utilized MTR. Under the proposed action it is clearly indistinguishable from the next highest utilization MTR.
- 61 | Page 2.1-5. Table 2.1-3 deserves much more detail, in light of the text on page 2.1-3 and 2.1-6. The table should include all airspaces and ranges to be used under the proposed action. It is difficult to determine the distribution of use from the information in the draft EIS. For instance, are the increased sorties on VR-1046 destined for BT-9 or 11 or are they passing through to offshore Warning Areas. Such information is critical to an understanding of the cumulative impacts of the proposed action. This table would also be improved by columns showing the number and percentage increase in the proposed sorties.
- Page 2.1-6. Two statements are unclear as to their intent or purpose in the draft EIS: (1) "This increase could be accommodated by expanding the operating hours at Air Force DCR, and through additional utilization of Navy Dare and BT-11", and (2) "In addition, operating hours of Air Force DCR would likely

b2 be expanded to accommodate F-15E night training requirements". Does this mean that the Air Force intends to ask the FAA to amend its time of use designation of R-5314? With the exception of these two statements, no specific discussion has been presented for such a change. It is critical to an understanding of the proposed action for any such amendment to be clearly documented in the draft EIS to address indirect effects and illuminate uncertainty from the final proposed action.

b3 Pages 2.2-3 and 2.2-7. There needs to be closer coordination between item "c" of the Seymour Johnson discussion with its counterpart in the criteria. For instance, is W-122 the supersonic operations area referred to in the criteria, or are others envisioned? What is the instrumented air combat tactics range available to Seymour Johnson; failure to name the site raises skepticism about the draft EIS. It would be more accurate to say that there is discussion of enlarging the Echo MOA but that the process has not progressed beyond the NEPA scoping phase; FAA approval of expansion is not assured at this time.

b4 Page 3.0-3. Figure 3.0-2 only qualifies as a general representation of the MTR proposed for use and is not sufficient

to show their relationship with other facilities. For instance, neither R-5301 and 5302 nor R-5313, or Pamlico MOA are on the map. It is impossible to identify the location of any site in the interior of the state if it is not on the map.

b5 Page 3.2-1. While acknowledging that two different types of noise measures are needed to assess airport and aircraft noise, the Air Force placed a disproportionate burden upon day night average noise levels (DNL) to define the impact of the proposed action. The use of DNL data is acceptable for evaluating noise impact in Goldsboro, but is less acceptable for use at the ranges, and least acceptable on the MTR where activity is more intermittent. The draft EIS should have relied more on sound exposure level (SEL) data, alone and in combination with DNL data, to more accurately describe the impacts of these single noise event exposures.

b6 Page 3.2-1. The noise assessment standard endorsed by the Federal Interagency Committee on Urban Noise is referenced. It was not noted as to how these standards were applied in assessing noise impacts for the proposed action. These standards could be applied in Wayne County, but are inappropriate for use on either the MTR or ranges because of the significant difference in the character of surrounding land and single event nature of noise exposures. Therefore, any data in the draft EIS which relies upon these standards for assessing noise impacts outside Wayne County are also inappropriate.

66 | Page 3.2-7. It is mentioned that a program has begun to build "hush" houses at Seymour Johnson AFB, but no details are provided in the draft EIS. It is impossible to determine when the program might be completed or how effective it might be in reducing test stand noise.

67 | Page 3.2-7. The practice weapons to be used are referred to as "inert ordinance". While this may describe their explosive capacity, it may not be environmentally accurate. The detonators, smoke charges, and rocket propellant use and proposed for use on the ranges are made with chemicals, the impact of which have not been presented in the draft EIS. Any chemicals on EPA's Priority Pollutants and Hazardous Materials List that are associated with existing or proposed ordinances should be reported since it may be released to the environment. The impact of potential releases should also be analyzed.

68 | Page 3.2-8 and 3.2-9.; The twin statements that : "Since DCR is a restricted area, the noise impact on humans is not a major environmental consideration" and "Public use of the DCR is restricted" are not entirely accurate and are misleading because public use is not prohibited. In fact, Air Force Dare is managed by agreement with the N.C. Wildlife Resources Commission for hunter safety, so public use of the range is allowed. Noise impacts on humans must be a consideration in the EIS. Further, DCR cannot be used without impacting the humans and land uses beneath R-5314, but this area has not been addressed in the draft EIS.

69 | Page 3.2-9. The discussion of areas sensitive to noise impact should include population trends as an indicator of the suitability of the proposed action. For instance, Dare had the greatest percentage increase in population (28.9%) of the top five counties in North Carolina between 1980 and 1985. Four of the five fastest growing counties (Dare, Brunswick, Carteret and Currituck) are in the coastal zone.

70 | Page 3.2-9. Farmers are not alone in their concern about the effects of aircraft noise on animals. Wildlife is an integral part of the resources and economy of eastern North Carolina. They should be mentioned in the section on the areas sensitivities to noise impacts, along with a reference to more detailed discussion later in the draft EIS.

71 | Page 3.2-14. The information presented in Table 3.2-2 is much to limited to provide the breadth of data needed to understand the full range of operational conditions. As discussed on page 3.2-7, ground level noise exposure is determined by aircraft power setting, altitude, and duration of exposure. Therefore, the table should include the following information in addition to

71 that already shown. The observer to aircraft distance column should include a 50 foot measures since this is the lowest anticipated flight and closest exposure. There should also be groupings of noise level data arranged by power setting (minimum approach, cruise, afterburner). This will provide the draft EIS with sufficient data to allow understanding and analysis of the proposal.

72 Page 3.3-3. It is noted that the Neuse River and Stoney Creek in the vicinity of Seymour Johnson AFB are designated as Class C waters. The Neuse River has recently been designated as Nutrient Sensitive as well, and this designation and its ramifications should also be discussed in the draft EIS.

73 Page 3.3-4. The existence of flow controls on the principal surface water transport canal leaving the DCR was mentioned. No discussion was offered in the draft EIS to explain how the controls are used to protect the sensitive resources of the coastal area. Is fresh water diverted away from primary nursery areas, or are water levels raised during dry seasons for added fire protection, for instance? Such information is necessary to determine whether or not the environment is being protected and whether the draft EIS is complete.

74 Page 3.3-6. Special Use Areas associated with the proposed activity are presented, but since this term is not defined it is impossible to ascertain if all appropriate areas were included. There is a reference to Section 3.4-4, and if this is the extent of the special use areas discussion then it can be assumed that the draft EIS presentation is grossly deficient. For instance, Cliffs of the Neuse State Park is mentioned to be in the vicinity of Seymour Johnson AFB, but Waynesborough is not. Numerous State Parks and gamelands exist in proximity to MTR, but they are not identified here. This section simply does not provide sufficient information to allow analysis and decision-making.

75 Page 3.4-7. Sensitive Areas associated with the proposed activity are presented, but this term is also undefined and it is impossible to know if all appropriate areas are included. It might be assumed that this discussion is incomplete, since no State Parks or gamelands are included, but these areas might have been excluded by definition. Nevertheless, state owned and managed sensitive areas are comparable to and of equal significance with federally designated areas, and they should have been presented in the draft EIS.

76 Page 3.4-12. There appears to be a conflict between the statement: "[Cliffs of the] Neuse State Park, approximately 8 miles southeast of Seymour Johnson AFB, provides unique geological features" and the statement on page 3.3-7 that reads:

- 76 "No unique physical features occur on or around Seymour Johnson AFB".
- 77 Page 3.4-12. The reference to Figure 3.01 appears to be inconsistent with the text. Further, there is no map in the draft EIS that identifies the MTR and all adjacent/underlying: "wildlife management and recreation areas such as State parks and National forests". This is a major deficiency in the environmental documentation.
- 78 Page 3.7-30. The two sentence socioeconomic discussion for the DCR is totally inadequate and shows a disregard for the regional impacts of the proposed action. This section of the draft EIS should lay the foundation for analysis, conclusions, and possible mitigation of impacts. Regrettably, no foundation is provided, so the remainder of the environmental documentation is equally insufficient. The draft EIS presents a more thorough picture of Goldsboro/Wayne County on page 3.7-22 through 3.7-29 and the discussion of the DCR should have been comparable. The DCR discussion should acknowledge that the range is inexorably connected to the remainder of R-5314, rather than the narrow perspective presented on the draft EIS. Contrary to statements in the draft EIS, both the DCR and areas beneath R-5314 are economically productive. The areas economics relate in part to the commercial and sport, hunting and fishing industries; and their livestock is nature's fish and game. Finally, it should be noted that the socioeconomic discussion is inconsistent with the breadth of information presented in subsection 3.2.5. on noise sensitive areas, which is important because of the possible socioeconomic losses that might occur as a result of the proposed action, but which remain unaddressed in the draft EIS.
- 79 Page 3.7-30. The one quarter page socioeconomic discussion for the MTR is also inadequate for much the same reason as the prior comments about DCR. A more thorough foundation is necessary to support analysis and decision-making. There is significant concern as to whether the MTR are sufficiently restricted to avoid socioeconomic impacts, and this will be discussed in more detail later in this memo. Further, the Air Force's statement about the positive secondary and diffuse socioeconomic impact of MTR is unfounded and cannot be claimed for areas removed from Seymour Johnson AFB.
- 80 Page 3.9-1. The presentation on aesthetics fails to recognize that all of the senses are involved in the determination of aesthetic value, not just visual input. The omission of discussion about the relationship of hearing (noise), touch (turbulence and pressure changes), and smell (air emissions) weakens the draft EIS. As mentioned earlier in this review, numerous sensitive areas are known or presumed to be affected by

80 the proposed action that have not been identified in the draft environmental document. The inadequacies of this early documentation is carried throughout the draft EIS.

81 Page 4.1-1. The air quality dispersion analysis is said to be based upon worst-case analysis. On page 3.5-1 there is a discussion of "surge" operations for the F-4 which involves up to 189 sorties per day for the duration of the operation. If similar surge operations are anticipated for the F-15E, then would this constitute the worst-case to be used for draft EIS analysis?

82 Page 4.1-2. Table 4.1-1 is either difficult to interpret or it is inconsistent. If the "Maximum Number of Aircraft" column is accurate, then shouldn't the data for 1-hour through 24-hours reflect surge operations? If seasonal and annual data assume at most 1440 sorties per month, then why should the maximum number of aircraft monthly be 612?

83 Page 4.2-1. The discussion of impacts of the proposed action is too narrow in that it addresses the DCR without including the surrounding operations area R-5314. These broader noise impacts have not been evaluated in the draft EIS, so the true effects of increased utilization of DCR are undocumented and unknown.

84 Page 4.2-5. The data found within Table 4.2-2 is not representative of the possible noise impact because it reduces intermittent frequency data to an average. As mentioned earlier, SEL date and repetitions per given period are more representative of the type of impact anticipated along the MTR. The absence of this data jeopardizes the sufficiency of the draft EIS.

85 Page 4.2-6. The text reports that: "only ten to twenty percent of the sorties would be flown at the 100 foot level, and these operations would be restricted to defined segments of the MTRs". The draft EIS does not identify either the exact MTR segments approved for 100 foot AGL training (part of VR-1752 is approved to the surface) or the sensitive areas that may be found beneath. This renders the analysis of impacts incomplete and significantly weakens the draft EIS.

86 Page 4.2-8 and 4.2-9. As noted earlier, the DCR is restricted, but public use is not prohibited. Therefore, the statements that noise: "should not pose a threat to human health" cannot be substantiated. Further, since: "The noise environment of the DCR has not been quantitatively define" and humans are present in the area, the draft EIS conclusions are unfounded and most likely inaccurate on this issue.

Page 4.2-8. The contention that: "weekends ... should be free

87 from aircraft noise interruption" cannot be assured on the DCR. Weekend use is not prohibited under FAA designation and the Air Force has offered no other assurances through the draft EIS. In fact, the weekday/weekend distribution of historical use was not presented to support or conflict with such a contention. Recreational use also has holiday and seasonal fluctuation, but there was no effort in the draft EIS to identify and correlate such trends to military training schedules as a mitigative measure.

88 Page 4.3-1. In the discussion of hazardous waste generation, an increase from 13 to 17 gallons per aircraft per month was projected as a result of the proposed action. While this may be quite accurate, the discussion would have been more clearly presented if the draft EIS had also reported that this was a 30% increase that amounted to an additional 288 gallons per month or 3456 gallons per year for Seymour Johnson AFB.

89 Page 4.4-2. The presentation on the impacts of fire is too limited because it introduces only one potential source. A more complete identification of fire sources is needed in the draft EIS to support a more complete and effective mitigation proposal.

90 Page 4.4-4. The statement that: "Wildlife coexisted with the military uses of the Echo MOA, DCR, Range BT-11, and the MTRs for many years without any evidence of adverse affects on the quantity and diversity of wildlife" should not be made without specific supporting data. The draft EIS did not present excerpts from or reference to long-term monitoring or research that would substantiate this Air Force site specific claim.

91 Page 4.4-5. Because of the previously noted generalizations of noise data, incomplete inventories, and weaknesses in the research presented on noise impacts on wildlife, the conclusions reached in the sensitive areas presentation of the draft EIS are questionable. Better base data could easily lead to different or more complex conclusions.

92 Page 4.4-6. The discussion of cumulative impacts on the biological environment includes the statements: "The frequency of night operations will increase; however, wildlife on or near the various military operations areas already are accustomed to night operations. The range has been used intensively by the military for over 20 years and no cumulative adverse impacts have been observed". This unsubstantiated conclusion suffers from the same need for supporting data as noted in the previous comment.

Page 4.4-6. The discussion of mitigation measures for biological environmental impacts places dependence upon the design of MTR and observance of special operating instructions to minimize

93 impacts. As noted earlier, a copy of DOD Flight Information Publication AP/1B was secured and reviewed to confirm the Air Force's use of this approach. The review found no State Parks or State Gamelands (Refuges) identified in the special operating instructions nor were areas where state resource management aircraft could be expected to operate. The review also found the special operating instructions identification of towns, noise-sensitive areas, bird activity, crop dusting, and fish spotting to be sporadic and insufficient to provide the

mitigation benefits presumed in the draft EIS.

94 Page 4.5-2. The discussion of mitigative measures for accident potential relies heavily upon the "see and avoid" rule, while the conclusion about cumulative impacts is that: "increased night range utilization will result in higher probability of an aircraft accident on the range complex". The absence of a proposal for more formalized protective/management measures in the draft EIS gives not assurance that state resource management and emergency aircraft operations will be able to continue.

95 Page 4.9-1. The conclusion that: "Aesthetic quality of areas in the vicinity of the MTRs affected by the proposed action could also be affected by the increased number of evening and nighttime sorties" is not supported by the Air Force finding that DNL levels will be constant or reduced. This confirms the need for greater reliance upon and better organized information on SEL data in the draft EIS. Further, the conclusion that noise: "might affect recreational activity, for example, in Cape Lookout and Cape Hatteras National Seashores" is not evident in the data and conclusions presented in Subsection 4.7 on Socioeconomic Impacts. The draft EIS should be more consistent in cross-referencing its findings throughout the document. Again, reliance upon MTR operating instructions is believed to be an ineffective mitigative measure, as they are currently written.

Finally, general comments about the complete draft EIS are in order.

96 (1) The structure of the environmental document presents cumulative impact discussions by impact topic. This conveniently allows the issue of cumulative impacts among the several concurrent military operation expansions (Navy, Marine Corps, and Air Force) proposed in North Carolina to be discounted and avoided. The draft EIS should have made a greater commitment to identifying the cumulative impacts associated with these multiple proposals. This is clearly a situation defined under 40 CFR 1508.7 of CEQ's regulations.

97 (2) The draft EIS is inconsistent in the way it addresses unavoidable adverse impacts. In some cases, such as the

97 | discussion of physical environment, laser operations,
| socioeconomic, and aesthetic impacts, the issue is not addressed
| at all. In other cases, such as noise and biological
| environmental the conclusions are founded upon questionable data
| bases. This provides little confidence in the results
| conclusions, or proposals contained in the environmental
| documentation.

98 | (3) Throughout the draft EIS the DCR is treated as an isolated
| unit. In reality it cannot be utilized as proposed without
| R-5314. The 16% increase in utilization of the DCR was noted,
| but this never carried over into a specific evaluation of the
| impacts on the larger area covered by R-5314. This raises the
| question of whether the impact analysis for the DCR is adequate.

In conclusion, when this review and the attached comments from divisions within this department are take as a whole, the draft EIS appears to be insufficient to successfully meet the purpose and requirements of NEPA.

DIVISION OF PARKS AND RECREATION

INTER-DIVISIONAL MEMORANDUM

TO: Melba McGee
FROM: Carol Tingley *C Tingley*
DATE: April 13, 1988
SUBJECT: 88-0767 F-15E Beddown at Seymour-Johnson AFB

The Division of Parks and Recreation has reviewed the Draft Environmental Impact Statement for the proposed conversion of 72 F-4 aircraft to 72 LANTIRN equipped F-15E aircraft at Seymour-Johnson AFB in Wayne County. The effects of the proposed conversion will extend to the Dare County Range and to the various Military Training Routes (MTRs) utilized by these aircraft.

98a We manage and operate Pettigrew State Park in Washington and Tyrrell Counties. The 16,600 acre park includes Lake Phelps, and is very popular for fishing, boating and other recreational activities. The park is located within R-5314, near the Dare County Range, and is presently subject to frequent low-level military overflights. The noise from these overflights adversely affects the quality of the park visitor's recreational experience.

99 Several of the MTRs which would be affected by the proposed aircraft conversion cross over or near the park: VR-073, VR-1753, IR-012, and VR-1074. The DEIS shows that the proposed DNL along each of these MTRs would be equal to or less than the current DNL. The EIS concludes that as a result of the unchanging DNL, there would be no impacts to recreational activities in areas underlying the MTRs. This conclusion is unfounded. Because of the sudden and startling nature of the noise events resulting from aircraft overflights, the total number of flights and the timing of flights, rather than just the average sound level, are significant contributors to the overall level of impact. The total number of flights along each of the MTRs near the park will be substantially increased, and the flights will occur later in the evening hours. These factors will significantly increase the overall impact of military overflights on the park.

100 Other state parks in addition to Pettigrew are located under or near MTRs, and therefore would be impacted by increasing numbers of overflights. Hammocks Beach State Park in Onslow County is within R-5306C, and under VR-1043. Park visitors frequently complain of the intrusive and annoying low-level military

Melba McGee
April 13, 1988
Page Two

100 | aircraft. The proposed increase in use of VR-1043 will exacerbate this problem. MTRs VR-1046 and VR-1074 will affect Goose Creek State Park in Beaufort County. Other state parks may be impacted by increased use of MTRs, but DEIS Figure 3.0-2 is insufficient to compare the location of the MTRs with the locations of the parks.

101 | Although Pettigrew State Park is mentioned in the DEIS as a tourist attraction, it is not included in the discussion of sensitive areas or mitigative measures. The relationship of this and other state parks to the MTRs is not discussed at all. The EIS should include a more specific and thorough discussion of impacts to state parks under the MTRs, and should propose mitigative measures to offset the proposed increases in overflights. We would like an opportunity to review this additional information prior to the issuance of a Final EIS for this project.

cc: Philip McKnelly

5075



State of North Carolina
Department of Natural Resources and Community Development
Division of Marine Fisheries
P.O. Box 769 • Morehead City, North Carolina 28557-0769

James G. Martin, Governor
S. Thomas Rhodes, Secretary

April 11, 1988

William T. Hogarth, Director
(919) 726-7021

MEMORANDUM

TO: Bill Flournoy
FROM: Ed McCoy and Wayne Maxwell
SUBJECT: Seymour Johnson F-15E Beddown, Draft EIS

At the meeting on 6 April 1988, it was clear that replacing existing aircraft with the F-15E at Seymour Johnson presents no problem to the Division of Marine Fisheries. What surfaced at the meeting was that the mode of training with the F-15E would change from air to air as used with the F4 to an air to ground training situation. Training requirements would establish low level flight corridors and utilize existing targets in the immediate coastal area such as BT-9 (Brant Island), BT-11 (Piney Island), and the ranges located in Dare County and Albemarle Sound. It is these low level flight paths with a floor of only 100 feet, that further impacts aircraft enforcement and surveillance operations of the Division of Marine Fisheries.

Over the past several months, we have been "bombarded" with proposals by various military branches to extend military restricted/controlled airspace with what appears to be absolutely no coordination between the military groups. The cumulative impact is one problem while the continually expanding use, or proposals to use, flight corridors with floors of 100 feet could eventually render Division aircraft useless. We could eventually be forced to seriously consider a number of additional water surface enforcement and surveillance units with personnel to offset the loss of the use of Division aircraft in part if not all of the coastal waters.

Should we have to use water surface units to replace what is now being accomplished with Division aircraft, the cost, as projected in my comments of 26 August 1987, would be in the

Mr. Bill Flourney
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neighborhood of \$450,000 per unit initial costs. Initial costs plus operating and fixed costs over the expected life of such patrol boats would be about \$225,000 per year for each unit. The number of such water surface units needed to replace existing aircraft patrol would, of course, depend on the success of the military in obtaining proposed airspace areas. There is a point in the establishment of military air space in the coastal area at which the feasibility of maintaining Division aircraft would have to be questioned. In other words, continued designation of military airspace, especially low level activities, could eventually put the Division out of the aerial enforcement/surveillance business.

EGM/rm

cc: Dr. Bill Hogarth
Fentress Munden
Jim Tew



State of North Carolina
Department of Natural Resources and Community Development

Division of Forest Resources
512 North Salisbury Street • Raleigh, North Carolina 27611

James G. Martin, Governor
S. Thomas Rhodes, Secretary

Harry F. Layman
Director

April 13, 1988

MEMORANDUM

TO: Melba McGee
Environmental Assessment Unit

THROUGH: Harry Layman
Director

FROM: Don H. Robbins
Staff Forester

SUBJECT: DEIS for the Conversion of the 72-F-4
Aircraft at Seymour-Johnson AFB with 72 (lantern)
Equipped F-15E Aircraft

We have reviewed the above document that was prepared by the U.S. Air Force and have the following comments--

1. The proposed action would:
 - A. Increase the number of sorties that would be flown between sunset and 1030 PM at the Dare Bomb Range.
 - B. Be a shift in mission emphasis from the air-to-air emphasis to more of an air-to-ground situation.
 - C. Cause more low altitude flying.
 - D. Result in a higher probability of an aircraft accident at the Dare Bomb Range.
2. Our current agreement with the Air Force is that on Readiness Plan #6 or higher, when relative humidity is forecasted to

105 | remain below 60% during the night, flight operations will be canceled. If the increased night time flying is going to cause them to extend beyond this, then they will need to provide more people for night time fire protection purposes.

3. We would also hope that the other increased items mentioned above would not cause us increased fire problems or accidents.

4. The DEIS indicates that the proposed action will not require any modifications to the existing restricted air space, or MOAs. We, of course, would hope that the proposed action would not require any future changes in airspace requirements, because this could interfere with our aircraft operations.

106 | 5. The table on page 2.4-2 should be expanded to include Fire Problems and Air Space under Impact Area for summary of effects.

6. We would hope that the mitigating measures indicated in Section 4.4.7 to put the generator for the infrared target in a container that would prevent fuel from spilling onto the ground, would be adequate to prevent a fire in the peat soils.

7. We would like to re-emphasize some of the below concerns that we brought out in the scoping meeting on December 19, 1987--

107 | A. When there is a woods fire, regardless of where it is in relation to any MOAs, that we will be there with several aircraft including large air and heli-tankers and they need to take this into account.

108 | B. Some of their pilots are young, inquisitive, and are in a training status and at times, they will leave the centerline of the MOA to come over to take a look at the woods fire and this has caused us some concerns in the past.

109 | C. We understand that the USAF has a job to do as well as we and we would hope that both parties could have an effective and safe air operation.

8. NRCD Air Space Meeting with Bill Flournoy on April 6, 1988:

At the above meeting, several questions were brought up and Bill Flournoy requested the below information from Forest Resources.

Memorandum
Melba McGee
April 13, 1988
Page 3

- A. The fire reports indicate that the majority of the fires on the Bomb Range under cause are listed as machine use only and are not really broken down any further. However, personal observations by our people in the area since 1980 reveal the following causes:
- (1) The majority of the fires are caused by their practice bombs.
 - (2) Approximately 4 have been caused by airplane crashes.
 - (3) Approximately 6 have been caused by Smoky Devils (relatively new device).
- B. Their flight restrictions and range use are tied to our Readiness Plans and Relative Humidity and the Air Force has been very cooperative in helping to prevent fires. Since 1980, District Forester Dan Smith can only recall approximately five nights the Air Force could not do any flying due to relative humidity. Even though this was not many nights, it prevented a lot of potential bad fires from getting started. Our nearest weather station is at Stumpy Point Tower which is only manned 6 months per year during the spring fire season.
- C. We have a fire plan for the area and have restrictions by Readiness Plans. The Air Force provides us all the money for men and equipment for fire protection and prevention, both on and off of the range. We have good cooperation and relationships with the Air Force and they have been very receptive to our needs and suggestions.

DHR/11

CC: Dane Roten
Fred White
Bill Flournoy



☐ North Carolina Wildlife Resources Commission ☐

512 N. Salisbury Street, Raleigh, North Carolina 27611, 919-733-3391
Charles R. Fullwood, Executive Director

April 27, 1988

MEMORANDUM TO: Melba McGee, Planning and Assessment
Dept. of Natural Resources & Comm. Dev.

FROM: Richard B. Hamilton *Richard B. Hamilton*
Assistant Director

SUBJECT: STATE CLEARINGHOUSE IGC/EIS PROJECT NUMBER 88-
0767: Draft Environmental Impact Statement F-15E
Beddown at Seymour Johnson AFB, Wayne County,
North Carolina

The Wildlife Resources Commission has reviewed the subject Draft Environmental Impact Statement (DEIS) and professional biologists on our staff are familiar with habitat values of the project area which includes a significant portion of eastern North Carolina. Our comments are provided in accordance with provisions of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et seq.) and the North Carolina Environmental Policy Act (G.S. 113A-1 et seq., as amended; 1 NCAC 25).

Although the DEIS is generally well written, the document focuses almost entirely on adverse impacts at the Seymour Johnson Air Force Base and the Dare County Bombing Range. Due to the nature of flight training activities, impacts from the proposed beddown of the F-15E squadron will extend far beyond the base and range. We believe the following comments to be appropriate:

1. Military Training Routes (MTR's)---The DEIS identifies 10 MTR's most likely to be utilized by F-15E aircraft with night flights at altitudes of generally less than 500 feet above ground level (AGL). Adequate environmental descriptions, including wildlife resources along these MTR's are lacking. Noise footprint analyses, environmental descriptions, and impact analyses on wildlife and outdoor recreation should be should be presented in a revised DEIS for each of the MTR's. We are especially concerned over impacts from night-time flights on wildlife resources.

Another area of concern regarding MTR's involves selection based upon low human population density. In general areas with low human activity provide the highest quality remaining wildlife habitat. Examples include VR1752 and VR73 which follow all or portions of the Roanoke River Basin. Bottomland and swamp forests along the Roanoke River provide some of the highest quality habitat remaining for numerous game and nongame species in the entire State. Because of the quality of habitat underneath these MTR's for wildlife resources, utilization by outdoor recreationists, potential impacts from a 34% increase in flight activities (primarily at night), and ownership by the Wildlife Resources Commission of nearly 14,000 acres we strongly encourage treatment of these MTR's as environmentally sensitive areas and believe they should receive special attention. There other publicly owned areas by State or Federal agencies which should receive additional attention regarding environmental impacts.

2. Impacts on Wildlife---The DEIS provides a cursory analysis of impacts from low altitude flights on domestic animals and , to a lesser extent, wild species. The document further concludes that wildlife has existed in areas with high noise levels associated with aircraft and therefore, there must not be any impact. There are many problems with such an analysis which is based upon faulty logic. First, one cannot conclude that there have been no impacts on wildlife populations from aircraft noise without baseline population estimates or indices. Even though wildlife may be present (ex post facto), conclusions presented do not consider previous population densities and compare with present numbers or density potential.

Secondly, data selectively presented is based primarily on impacts from daytime activities. While some species are active primarily during the day and rest at night, many are crepuscular or nocturnal. As data are generally lacking on low level flight impacts at night, an assessment of these impacts will be difficult but concerns must be addressed. Such an assessment must include an impact analysis for those species which are active primarily at night as well as species which may be resting.

We are especially concerned over impacts on migratory waterfowl, colonial birds, and threatened or endangered species. Most of these species are roosting at night and may be subject to significant disturbances from jet aircraft flying at altitudes of 100 feet AGL. Professional

112 biologists have observed significant disturbances on flocks of waterfowl from low flying aircraft during daylight hours. There is little reason to doubt that similar disturbances would not be possible during the night. Frequent disturbances may result in insufficient time for feeding and resting, thereby resulting in birds returning to breeding grounds in poor condition for reproduction. Another species, the wild turkey (Meleagris gallopavo) roosts in high trees in most of the Roanoke River Basin. Biologists and turkey hunters know that excessive noise during night hours will flush birds from the roost. Since the species is not adapted to nocturnal activities, individual birds become more susceptible to predation once flushed from it's roosting site.

- 113 5. Laser Safety---The analysis of laser safety is oriented to humans only. Although we have assumed that laser's are active only when near targets, the area affected by the beam could be as small as 75 feet wide (maximum width not provided) by 100 feet to 5 miles long. Many nocturnal wildlife species such as the white-tailed deer (Odocoileus virginianus) have a tendency to direct attention to noise and light. This is evident from the relative ease with which firelighters illegally kill deer at night. We believe that a potential for laser safety regarding wildlife, especially those species which may be affected by night flights and target practice, does exist and must be analyzed.

- 114 6. Conflicting Airspace Utilization---Wildlife enforcement officers and biologists utilize aircraft for detection of game law and fisheries violations and censusing, respectively. While most activities are conducted during daylight hours, aerial observation of deer firelighters at night is one of the most efficient techniques for detection and apprehension. Such flights are made at night and may cover large areas of the State, especially eastern North Carolina. The DEIS does not address procedures for resolving problems arising from conflicting needs for airspace utilization. We acknowledge the mission of the Department of the Air Force, but must also point out the fact that our mission involves conservation and protection of wildlife resources. Denial of an important enforcement technique will affect our ability to accomplish our mission. The DEIS should address impacts on enforcement flights for detection and apprehension of firelighters as well as flights during the day.

- 115 8. Cumulative Impacts---North Carolina has realized a substantial increase in Department of Defense activities throughout the state, but especially in the eastern portions. The combined effect of individual agencies may result in cumulative impacts far more significant than stated in individual documents. We continue to maintain that impacts from all military activities should be examined, especially when considering statements indicating decreased use of bombing ranges during the day by the Air Force will result in increased use by other branches of the military. Failure to adequately address cumulative impacts will continue to propagate the piecemeal approach to environmental impact assessment and could result in significant degradation in the quality of our environment.
- 116 9. Mitigation---We disagree with the DEIS analysis of the need for mitigation. Basically, the document lacks sufficient information for fully addressing adverse impacts on wildlife resources making a determination that mitigation is unnecessary premature. In determining the need for mitigation, direct, indirect, and cumulative impacts must be fully considered.
- 117 10. Research Needs---While the DEIS attempts to assess project impacts on wildlife resources, it falls short of doing so. It does clearly show a significant data gap regarding noise impacts on wild animal populations. In order to resolve some concerns, objective research is needed. Research may be as simple as placing noise sensors along MTR's or other high activity areas or as complex as quantifying impacts on certain wildlife species such as the deer, turkey, or bald eagle. We are especially interested in effects of low altitude, subsonic flights on waterfowl. Quantification of impacts through carefully designed research projects should not fall solely on the Air Force as other military agencies are utilizing the same air space. We believe that data needs will require a joint effort by all branches of military agencies utilizing the project area to provide information necessary for future decisions. However, commitments to study the problems should be made now.

In summary, we believe the DEIS to be inadequate for fully evaluating adverse individual and cumulative impacts on wildlife resources. We further believe that a revised draft is necessary to address expressed concerns. We look

~~Memo To: Melba McGee~~
~~Date: April 27, 1988~~
~~Page: Five~~

forward to working with the Department of the Air Force and other Federal and State agencies to resolve concerns and move forward with the project, including research projects.

Thank you for the opportunity to review and comment on this application. If we can provide further assistance, please call on us.

RBH/lp

cc: Mr. Hal Atkinson, NCWRC
Mr. Grady Barnes, NCWRC
Mrs. L. K. (Mike) Gantt, USFWS
Mr. Dennis Stewart

ALBEMARLE COMMISSION

LEAD REGIONAL ORGANIZATION FOR REGION R

POST OFFICE BOX 646
512 SOUTH CHURCH STREET
RTPFORD, NORTH CAROLINA 27944

TELEPHONE
(919) 426-5753

MEMORANDUM

TO: NORTH CAROLINA STATE CLEARINGHOUSE

FROM: DON C. FLOWERS, JR., EXECUTIVE DIRECTOR *D.C.F./p.*

DATE: APRIL 25, 1988

SUBJECT: COMMENT ON U.S.A.F. D.E.I.S. - STATE REVIEW #84-E0000-0749

The following are comments from the Albemarle Commission. The Albemarle Commission represents the ten (10) counties of Region R in Northeastern North Carolina. The entire Air Force Dare County Range falls within this region as does Navy Dare, Palmetto, Stumpy Point, large sections of Pamlico A and B MOA and many of the proposed MTR routes.

The D.E.I.S. as submitted fails to follow N.E.P.A. guidelines in the following areas:

1. Lack of public participation in affected area. The D.E.I.S. states increased usage of the ranges with new flying tactics - as such, public hearing should have been held in this region for public comment and review as required by the N.E.P.A. process.

2. Only one public hearing was held at Goldsboro, N.C. - over two to three hours away from most of our region and the D.E.I.S. was not obtained in time for an adequate review by local public officials.

3. The D.E.I.S. does not address the effects on ranges other than the Dare County range even though the Air Force spelled out in the D.E.I.S. it's plans to use other ranges. For example, the Palmetto range (R5302) was not mentioned in the D.E.I.S. but a phone call to Mr. Alton Chavis, HQTAC/DEEV, Langley AFB, Virginia confirmed the Air Force's intention to continue to use the Palmetto Range. (ref. Mr. Stan Busteed of Holiday Island). The N.E.P.A. process clearly states all affected areas must be reviewed. Effects on all ranges used,

MEMBER GOVERNMENTS

Cumden • Chowan • Currituck • Dare • Gates • Hyde • Pasquotank • Perquimans • Tyrrell • Washington
Columbia • Creswell • Edenon • Elizubeth City • Gatesville • Hertford • Kill Devil Hills • Kitty Hawk • Manteo
Nags Head • Plymouth • Roper • Southern Shores • Winfull

regardless of agency control, must be included as part of the NEPA process.

121 | 4. In addition, cumulative impact on all ranges is not being addressed by the Air Force in the D.E.I.S., or by the Navy or U.S.M.C.- which all use the same ranges! The N.E.P.A. guidelines clearly state all cumulative impacts must be addressed. Any D.E.I.S. concerning joint use airspace should be prepared for the Department of Defense (as the head federal agency) by a disinterested third party. Separate proposals by individual services neglect to assess the cumulative impacts of joint usage.

5. The D.E.I.S. as submitted does not satisfactorily or fully assess the impact of aircraft noise on waterfowl and wildlife.

122 | (a) The U.S. Department of the Interior Fish and Wildlife study #87-115 dated February, 1988 clearly reveals the harmful magnitude of aircraft noise on wildlife. All references in the D.E.I.S. concerning waterfowl are greatly understated in view of the D.O.I. study by trained wildlife professionals. The U.S. Department of Interior study was funded in part by the U.S. Air Force and all of its data should be included in any D.E.I.S.

(b) The Naval Air Station, Fallon, Nevada, E.I.S. study, Section 5, Wildlife, also emphasizes the harmful effect on wildlife and waterfowl in particular. Both of these studies are recent and were performed by third parties. They should be included in any draft. The statement "Most literature suggests that animals are little affected by jet aircraft noise; they appear to be more aware of moving objects than of sound" is completely and totally inaccurate. The Department of Interior's study and the Naval Air Station E.I.S clearly refute this.

123 | 6. The D.E.I.S. understates the potential damage to people and property from sound and air pressure due to low level flights. Low level flights of military jets at high speeds may cause severe physiological damage. Noise damage is not assessed, but rather an average noise level (LDN) is listed. The D.E.I.S. should concentrate on single event noise for damage and impacts. Cumulative studies should be undertaken before low-level flights are permitted. The "high annoyance" the D.E.I.S. states simply overlooks physical harm, and a resolution to that harm.

124 | 7. The D.E.I.S. does not address the harmful effects of ionized radiation on people, plants or wildlife that would cumulate due to radar emissions from low flying aircraft. As a "night fighter", the F15E is greatly reliant on radar navigation. A study should be included by independent experts in this field.

125 | 8. The D.E.I.S. glosses over the potential dangers of laser

125 radiation. Specific knowledge should be made available in order to ascertain the potential damage in hazard zones, footprints and lasing areas. Expert opinion on laser hazards should be included.

126 9. The D.E.I.S. states procedures for the use of VRD (Visual Restriction Devices) during daytime hours. This use would be an extremely dangerous practice at low level high speed flight operations for crop dusters and any general aviation pilot within the MTR routes. The general aviation and agricultural aviation communities should be given specific public hearings and allowed to comment. Does the Air Force desire public comment on their proposed MTRs?

127 10. (a) The additional creation of MTRs via existing VRs is inevitably dangerous and would have devastating effects on people, homes, property and wildlife by sound and air pressure damage. There are already too many VR and MTRs in this area. The creation of any low level high speed MTRs should have a separate Environmental Impact Statement.

128 (b) The proposed MTRs' low level flight paths converge on the west side of the Dare County restricted air space where the floor is 1000 feet. Obviously, this is incompatible. Is the Air Force proposing to drop the air space floor of the range? If so, that is a major confiscation of airspace rights and would require significant public input and review, not to mention F.A.A. guidelines. Will the Air Force have its pilots immediately "climb" to 1000 feet to be in compliance with the western end of the range air floor? All MTRs should confirm to the air space floor when entering into a range - otherwise this is a de facto way of creating additional air space. The MTRs' eight mile width constitute a range within themselves and should not be permitted unless they go through the same F.A.A. process as needed for special use airspace.

129 11. Will the Air Force give avigation easements for property that they plan to fly over at less than 500 feet? The Supreme Court has held that property owners own the property rights up to 500 feet of airspace over their properties. Will all property owners be advised of these overflights and will they have an opportunity to concur, settle, or be heard in a public hearing?

130 12. The statement on page 2.2-3, first paragraph "Areas should permit supersonic operations" is totally incorrect. In 1974 the Navy had a study performed that concluded this area was not suited for any supersonic operations due to its relatively dense population for that type of operation. This area has seen a vast increase in population in the past fourteen (14) years. We are totally opposed to any supersonic operations or supersonic approaches to land targets from the sea. The latter would destroy the intent of the Federal Park systems and make use of this area as a residential and living area

totally unsuitable. Why did the Air Force include supersonic in the E.I.S., and what are they proposing?

131 | 13. The D.E.I.S. states the D.C.R. will be used for tactical air exercises. Will that include the Navy Dare County Range or most of restricted airspace R-5314? If so, the impacts should be stated. What are tactical air exercises?

14. The D.E.I.S. incorrectly estimates the economic benefits of the addition of new Air Force personnel. Factors that should be included in any study are:

132 | (a) Estimated lower property values along MTRs.

(b) Estimated economic loss to counties from potential destruction of waterfowl habitat and the potential of abandonment of habitats due to low level flights.

(c) The property tax exempt status of military personnel living on base versus the cost of services given to personnel. Examples: schools, recreation, increased human services, etc. It is a known fact that federal impact funds do not begin to cover the costs of tax supported services.

In summary, the Air Force D.E.I.S. is inadequate in that it does not address all the issues, does not use the most current ecological data, does not address cumulative impacts in all areas of use and the procedures have not been followed to allow for proper public hearings and comments by all affected parties in all the affected areas. This document vividly points out the need for any D.O.D. air space usage to be prepared by a neutral third party.

Research



Information bulletin

U.S. DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE

NO. 87-115
DATE Sept.

Survey Reveals the Magnitude of Aircraft Effects on Fish and Wildlife

There is evidence that low-altitude aircraft operations affect fish and wildlife populations and habitat utilization under Fish and Wildlife Service jurisdiction. As part of a cooperative research effort with the U.S. Air Force, the National Ecology Research Center initiated a survey in January 1987 of all Service regional offices, research centers, and field stations. The purpose of the survey was to determine the nature and extent of actual or potential adverse effects of low-altitude aircraft operations on fish and wildlife. Information was requested on observations of animal reactions to aircraft operations, instances of areas where aircraft noise is known or believed to be responsible for reduced populations, descriptions of areas where adequate background data on wildlife populations are available to compare impacted and nonimpacted sites, and other data that might be relevant or helpful in determining the direction and design of aircraft impact studies.

The Problem is Widespread

The problem of aircraft disturbance to fish and wildlife occurs over a wide geographic area. The regional responses received through July 1987 included: Region 1, 34; 2, 23; 3, 12; 4, 26; 5, 12; 6, 10; 7, 3; and 8, 13 (133 total). The survey revealed aircraft-induced impacts on fish and wildlife such as startle behavior in raptors, panic and running behavior in ungulates, and the mortality of hatchery striped bass (*Morone saxatilis*) due to high-intensity sonic booms. Various types of military, commercial, and private aircraft have been responsible for disturbing wildlife on and near Service installations. Sixty refuges in 30 States and all Service regions reported moderate to severe underutilization of habitat by waterfowl and other wildlife due to the frequency of low-altitude aircraft overflights. Several reports stated that helicopters appear to cause a greater fright/flight response than fixed-wing aircraft. Waterfowl were by far the most frequently reported group disturbed by aircraft activity. Texas Point

National Wildlife Refuge, for example, receives almost no winter use by snow geese (*Chen hyperborea*) due to low-altitude overflights. Several installations reported extreme aircraft disturbance to colonial nesting species. For example, the only United States colony of magnificent frigatebirds (*Fregata magnificens*) may be declining because of frequent low-altitude overflights by tour planes at Key West National Wildlife Refuge. In Hawaii, low-altitude military overflights are believed to be responsible for the palila (*Psittirostra bailleue*), an endangered species, underutilizing a sizable portion of its critical habitat.

Technical Assistance Is Available

Fish and Wildlife Service refuges and field offices do not have an adequate knowledge base to predict the effects of low-altitude aircraft on fish and wildlife, yet they must make assessments of the potential effects in proposed flight areas. Virtually all responding field installations expressed support for additional information on the effects of aircraft noise and sonic booms on fish and wildlife. Center staff have research experience on this subject and can provide technical assistance. The National Ecology Research Center has assembled all known published information on the effects of aircraft and other noise on domestic animals and wildlife into a keyword-searchable, bibliographic data base. Copies of this data base (or portions thereof) are available at no cost to Service field installations.

Additional Information Is Requested

As part of an ongoing research effort to acquire unpublished information on the effects of low-altitude aircraft operations on fish and wildlife, the National Ecology Research Center requests any information on the subject. The information will be added to the data base and made available to Service personnel.

EFFECTS OF AIRCRAFT NOISE AND SONIC BOOMS
ON FISH AND WILDLIFE

RESULTS OF A SURVEY OF
U.S. FISH AND WILDLIFE SERVICE
ENDANGERED SPECIES AND ECOLOGICAL SERVICES
FIELD OFFICES, REFUGES, HATCHERIES,
AND RESEARCH CENTERS

Douglas N. Gladwin
Duane A. Asherin
U.S. Fish and Wildlife Service
National Ecology Research Center
2627 Redwing Road
Fort Collins, CO 80526

and

Karen M. Mancif
TGS Technology, Inc.
2627 Redwing Road
Fort Collins, CO 80526.

February 1988

PREFACE

This report was produced as the result of a cooperative research project between the National Ecology Research Center, Ft. Collins, Colorado and the Air Force Engineering and Services Center, Tyndall Air Force Base, Florida, on the effects of aircraft noise and sonic boom on animals. The effort was funded by the Air Force's Noise and Sonic Boom Impact Technology program, Wright-Patterson Air Force Base, Ohio.

Suggested citation:

Gladwin, D.N., D.A. Asherin, and K.M. Mancí. 1987. Effects of aircraft noise and sonic booms on fish and wildlife: results of a survey of U.S. Fish and Wildlife Service Endangered Species and Ecological Services Field Offices, Refuges, Hatcheries, and Research Centers. U.S. Fish Wildl. Serv., National Ecology Research Center, Fort Collins, CO. 24 pp.

INTRODUCTION

The National Ecology Research Center (Center), as part of an ongoing research study on the effects of low-altitude aircraft operations on fish and wildlife, conducted a survey in January 1987 of all U.S. Fish and Wildlife Service (Service) regional directors, research center directors, Ecological Services and Endangered Species field offices supervisors, refuge managers, and hatchery managers. The objective of the survey was to determine the nature and extent of aircraft-induced impacts on fish and wildlife species, populations, and habitat utilization under Service jurisdiction.

Because many Service field installations are located near military and civilian airports and flight training areas, the results of the survey could be useful to Service personnel who must comment on proposed flight operations and for evaluating habitat in such areas. The field installation managers and biologists were asked to provide background information or data on fish and wildlife reactions to low-altitude aircraft disturbances, including physiological, behavioral, and reproductive/population effects. The survey stressed that because of the current lack of information on the effects of aircraft on fish and wildlife, any type of information the respondent could supply would be of interest.

Specifically, the survey asked for information such as:

- (1) observations of animal reaction(s) to aircraft operations, e.g., desert bighorn sheep scare behavior in response to aircraft overflights or hatchery fish seizures and death following intense sonic booms;
- (2) instances of areas where aircraft noise is known or believed to be responsible for reduced population size, e.g., areas along heavily used aircraft flight corridors where breeding waterfowl densities are lower than in similar habitat away from the noise area;
- (3) descriptions of areas or sites where adequate background data on wildlife habitat and populations are available to compare impacted and nonimpacted sites;
- (4) any other data or information that might be relevant or helpful in determining the direction and design of future aircraft impact studies; and
- (5) expression of the importance of aircraft/wildlife impact information to the Service.

The 132 responses varied from no known adverse aircraft-induced effects on a given refuge or hatchery, to waterfowl leaving an area due to the presence of low-altitude aircraft overflights, to the death of fish at a hatchery due to intense sonic booms.

—Survey responses—that contained information on the effects of aircraft on fish and wildlife were entered into a data base (Table 1 and Appendix 1), using the QUICKTEXT data base management system (Osborn and Strong 1984). QUICKTEXT is a user-friendly data management system that permits easy selection of keywords in fields to sort, list, and summarize responses by region, State, year, agency, location, type of aircraft, animal group, and problem/issue descriptors.

DATA BASE SUMMARY

Multiple responses from separate personnel came from Aransas National Wildlife Refuge (NWR) (6 responses), Bombay Hook NWR (2), Sacramento NWR (2), and Wichita Mountains NWR (2). Approximately 24% of the responding installations were in Region 1, 23% in Region 2, 20% in Region 4, and less than 10% each in the other Service regions. The data base contains information received from installations in 30 States. The States with the highest number of installations reporting aircraft disturbance were Texas (11 installations), California (6), Nevada (5), Alaska (4), and North Carolina (4).

Table 1. Aircraft/wildlife impacts data base fields.

Field no.	Fieldname	Description
1	ITEM#	Assigned by QUICKTEXT.
2	REGION	Service region of installation.
3	STATE	State of installation.
4	YEAR	Year of response.
5	AGENCY	Government agency responding to survey (at present, data base only contains Service code).
6	LOCATION	Name of installation.
7	AIRCRAFT	Type of aircraft causing disturbance (e.g., MILITARY, COMMERCIAL, HELICOPTER, SMALL JET).
8	ANIMAL	Animal group(s) being disturbed (e.g., BIRDS, WATERFOWL, UNGULATES).
9	ISSUE	Short description of problem(s)/issue(s).

Aircraft causing disturbances at the installations were classified as military (60% of the installations), private (44%), and commercial (37%). Helicopters caused disturbance at 70% of the installations, small jets at 59%, small propeller aircraft at 50%, and large jets at 31%.

Installations reported a variety of birds, mammals, and fish disturbed by aircraft operations (Table 2).

Table 2. Animal groups reported by installations as being potentially affected by low-altitude aircraft operations.

Animal group	Installations reporting	
	Number	Percent
<u>Birds</u>	63	90
Waterfowl	44	63
Raptors	12	17
Shorebirds	8	11
Colonial nesting	7	10
Upland game	6	9
Waterbirds (e.g., cranes)	3	4
Seabirds	3	4
Cavity-nesting	1	1
Passerines	1	1
Other (unspecified)	7	10
<u>Mammals</u>	14	20
Ungulates	12	17
Marine mammals	1	1
Bats	1	1
<u>Fish</u>	5	7

DISCUSSION

The problem of aircraft disturbance to fish and wildlife exists over a wide geographic area. Various types of military, commercial, and private aircraft have been responsible for disturbing wildlife on and near Service installations. Several reports stated that helicopters appear to cause a greater flight/fright response in wildlife than fixed-wing aircraft. Waterfowl were by far the most frequently reported animal group disturbed by aircraft. Several installations reported that some species of waterfowl were completely driven off refuges by frequent aircraft activity (e.g., Texas Point NWR). Waterfowl are an extremely visible group of birds, and the incidence of reports of disturbance may be a reflection of this as well as the apparent greater sensitivity of the group to aircraft disturbance. Clearly, additional research is needed to determine if more secretive, less conspicuous bird species also are being adversely affected by aircraft.

The reported impacts on wildlife range from minor behavioral responses to severe changes in the use of an area (e.g., Texas Point NWR). Information on the relationship of the observed reactions to physiologic, population, and reproductive effects for most species and situations is currently unknown.

Several installations reported extreme aircraft disturbance to colonial nesting species. For example, the only United States colony of magnificent frigatebirds (Fregata magnificens) may be declining due to frequent low-altitude overflights by tour planes at Key West NWR. In addition, low-altitude military overflights are believed to be causing the endangered palila bird (Psittirostra bailleui) of Hawaii to underutilize a sizable portion of its critical habitat.

While aircraft disturbance to mammals was not reported as frequently as for birds, several installations reported that low-altitude aircraft have caused ungulates to stampede [e.g., desert bighorn sheep (Ovis canadensis nelsoni) at Desert NWR and pronghorn antelope (Antilocapra americana) at Hart Mountain NWR and Sheldon NWR]. Concern was expressed particularly for potential adverse effects of low-altitude aircraft over fawning/calving grounds [e.g., endangered Sonoran pronghorn antelope (Antilocapra americana sonoriensis) at Cabeza Prieta NWR and barren ground caribou (Rangifer arcticus) at Selawik NWR].

Service refuges and Ecological Services and Endangered Species field offices currently lack an adequate knowledge base on the effects of low-altitude aircraft on fish and wildlife, and are consequently making assessments of the potential effects of proposed flight areas based on inadequate information. Field installation managers expressed a high level of frustration at their helplessness to stop or modify proposed projects that would increase the level of aircraft disturbance at or near their installations. Virtually all field installations responding to the survey expressed support for further research on the effects of aircraft noise and sonic booms on fish and wildlife. At this point, the number of other Service field installations that have aircraft problems, but failed to respond to the survey, is unknown.

RECOMMENDATIONS

The following recommendations are made based on the survey results.

1. A formal mechanism should be established for refuges by which the majority of airspace intrusions and resultant animal responses can be documented. Violations of the Federal Aviation Administration's (FAA) recommended 2,000 ft minimum flight altitude above ground level needs to be reported to the FAA for private and commercial aircraft, and to the military base of origin for military aircraft. Photographing the intruding aircraft may be necessary to document approximate height above ground level and to identify the aircraft for reporting purposes. Ideally, the sound level should be recorded using sound level meters, and animal responses should be quantified to the extent possible. For example, a report should contain information similar to the following: "A single pass over a refuge by a military aircraft bearing the letter designation HL (Hill Air Force Base, Utah) at approximately 200 ft above ground level at 1 p.m. on 2 July 1987 created a peak noise level of 105 decibels and caused virtually all refuge waterfowl to leave the area for approximately 2 hours." The documented complaint should be reported to the Commanding Officer at Hill Air Force Base. Some Service refuges are currently employing such a reporting system.
2. Because many of the Service field installations responding to the survey reported a lack of sufficient information on aircraft impacts when called upon to comment on proposed flight operations, all Service refuges and Ecological Services and Endangered Species field offices should be provided with a copy of the joint Center/Air Force publication entitled "Effects of Aircraft Noise and Sonic Booms on Domestic Animals and Wildlife."
3. A central clearinghouse for aircraft/wildlife impacts information should be established.
4. A follow-up study to this preliminary survey should be conducted to gather additional information from Service field installations. The results should be analyzed and summarized in a report similar to, but more detailed than, this one.
5. Service field installations should develop better working relations with airport operators, the FAA, and military bases regarding the effects of aircraft operations, both ongoing and proposed, on fish and wildlife.

6. Region 8 (Research and Development) should conduct formal field research studies on the effects of low-altitude aircraft operations on fish and wildlife, with emphasis on waterfowl, colonial nesting birds, and threatened and endangered species. These field studies should be base funded and conducted under the direction of the Center as an aircraft impact research project. Research should be conducted to translate observed behavioral responses to low-altitude aircraft overflights to potential adverse reproductive/population effects. Studies should be conducted that compare the wildlife use and productivity of infrequently overflown refuges to those frequently overflown by low-altitude aircraft, but otherwise similar in location and resource availability.
7. An aircraft impact prediction capability should be defined and developed, and access to the capability should be made available to all Service field installations.

LITERATURE CITED

Osborn, R.G., and P. Strong. 1984. SAGIS QUICKTEXT user manual. U.S. Fish Wildl. Serv., National Ecology Research Center, Fort Collins, CO. 80 pp.

Appendix 1. Survey results by FWS region.

Region	State	Year	Agency/Location	Aircraft	Animal	Issue
1	CA	1987	USFWS/Ridgortold NWR	Private/small propeller/helicopter	Birds/waterfowl	Frequent overflights cause flushing of waterfowl, especially snow geese. The 2,000 ft above ground level minimum altitude for refuges is frequently violated.
2	CA	1987	USFWS/Sacramento ES Office	Military/commercial/private/small propeller/small jet/helicopter	Birds/waterfowl/shorebirds/other	Cited the FWS need for an impact prediction capability for proposed low-altitude aircraft operations.
3	CA	1986	USFWS/Sacramento NWR (2)	Military/private/small propeller/small jet/helicopter	Birds/waterfowl	Frequent overflights are causing serious disturbance to Refuge waterfowl, especially geese. Helicopters are more disruptive than wing aircraft. Aircraft-induced stress is believed to be making waterfowl more susceptible to disease.
4	CA	1987	USFWS/Sacramento SE Office	Military/commercial/private/small propeller/small jet/helicopter	Birds/waterfowl/shorebirds/other	Cited the FWS need for an impact prediction capability for proposed low-altitude aircraft operations.
5	CA	1987	USFWS/San Luis NWR Complex	Commercial	Birds/waterfowl	Numerous agricultural spray plane operations near the Refuge Complex are flushing waterfowl, especially geese, and are sometimes driving the animals off the Refuge. Aircraft-induced stress is believed to be making waterfowl more susceptible to disease, especially during winter.
6	HI	1987	USFWS/Pacific Islands SE Area Office	Military/small jet/helicopter	Birds/waterfowl/raptors/passerines/mammals/bats	The Area Office initiated a formal Section 7 consultation for a proposed USAF low-altitude route in Hawaii. It is believed the route could have an adverse effect on endangered species, including the Hawaiian hawk, Hawaiian goose, and Hawaiian monk seal, as well as several species of passerine forest birds.

Case #	Region	State	Year	Agency/Location	Aircraft	Animal	Issue
7	1	NV	1987	USFWS/Anaho Island NWR	Military/small jet/large jet/helicopter	Birds/colonial nesting	Infrequent low altitude aircraft operations are flushing pelicans.
8	1	NV	1987	USFWS/Desert NWR	Military/small jet/large jet/helicopter	Mammals/ungulates	A severe impact to desert bighorn sheep is suspected due to a declining population and extensive and intensive aircraft operations.
9	1	NV	1987	USFWS/Fallon NWR	Military/small jet/large jet/helicopter	Birds/waterfowl/shorebirds/other	Frequent low-altitude aircraft operations are constantly disturbing (flushing) waterfowl, shorebirds, and other refuge birds.
10	1	NV	1987	USFWS/Lahontan RFR	Military/small propeller	Fish	An experiment done in cooperation with the U.S. Air Force showed that a mild sonic boom had no effect on fish eggs.
11	1	NV	1987	USFWS/Stillwater NWR	Military/small jet/large jet/helicopter	Birds/waterfowl/shorebirds/other	Frequent low-altitude aircraft operations are constantly flushing waterfowl, shorebirds, and other refuge birds.
12	1	OR	1987	USFWS/Hart Mountain NWR	Military/small jet/helicopter	Mammals/ungulates	Antelope are exhibiting panic running behavior as the result of low-altitude jet fighter aircraft.
13	1	OR	1987	USFWS/Mattheur NWR	Military/small jet/large jet/helicopter	Mammals/ungulates/birds/waterfowl	Mattheur NWR is now on the fringe of a new Military Operations Area and it is feared that low-altitude aircraft operations may displace Refuge wildlife.
14	1	OR	1987	USFWS/Sheldon NWR	Military/small jet/helicopter	Mammals/ungulates	Antelope are exhibiting panic running behavior as a result of overpasses by low-altitude jet fighter aircraft.

Region	State	Year	Agency/Location	Aircraft	Animal	Issue
5	IA	1987	USFWS/Conboy Lake NMH	Military/helicopter	Birds/waterfowl	Virtually all refuge ducks, geese, and swans will take flight at the sound of approaching helicopters and remain airborne until the aircraft can no longer be heard. A formal written complaint has been made to the Military.
6	WA	1987	USFWS/Washington Islands NMH	Military/private/ small propeller/ small jet/ helicopter	Birds/waterfowl/ shorebirds/ raptors/ seabirds/ mammals/marine mammals	Frequent overflights are causing flushing of birds and stampeding of marine mammals. Identifiable aircraft numbers were turned over to law enforcement with no results.
7	WA	1987	USFWS/Villapa NMH	Military/private/ small propeller/ small jet/ helicopter	Birds/waterfowl	Frequent overflights, even as high as 3,000-4,000 ft above ground level cause birds to panic flush and leave the area for hours, sometimes missing the next low-tide feeding opportunity.
8	AZ	1987	USFWS/Caboza Prieta NMH	Military/small jet	Mammals/ ungulates/birds/ upland game	Reactions to intense sonic booms vary from alert and startle in bighorn sheep, jumping and running in the endangered Sonoran pronghorn, and frequent flushing by birds (including Gambel's quail, mourning doves, and white-winged doves). Most wildlife of the Refuge appear to have habituated to the repetitive sights and sounds of low-altitude aircraft flights that have taken place in the area over the past 40 years. The Refuge is concerned about intense aircraft operations over lambing grounds of the Sonoran pronghorn. The effect of flights on population sizes and altered behavior of refuge wildlife should be investigated.

Item #	Region	State	Year	Agency/Location	Aircraft	Animal	Issue
19	2	AZ	1987	USFWS/Phoenix ES Office	Private/small propeller	Birds/raptors	Overflights by small propeller aircraft and helicopters had no adverse effect on breeding bald eagles in a 4-year study.
20	2	AZ	1987	USFWS/Willow Beach NMII	Military/commercial/private/small propeller/small jet/helicopter	Mammals/ungulates/fish	Aircraft noise and sonic booms are having no effect on fish at the hatchery. It is suspected that aircraft are having an adverse effect on desert bighorn sheep, especially at calving time.
21	2	NH	1987	USFWS/Dosque del Apache NWR	Private/small propeller	Birds/waterfowl/waterbirds	Infrequent overflights are creating "scare" behavior in waterfowl, sandhill cranes, and whooping cranes.
22	2	OK	1987	USFWS/Wichita NWR	Military/private/small propeller/small jet/helicopter	Birds/waterfowl	Waterfowl will flush and remain airborne for varying lengths of time when low-altitude aircraft are over the Refuge.
23	2	OK	1987	USFWS/Wichita Mountains NWR (2)	Military/private/small propeller/small jet/helicopter	Mammals/ungulates/birds/waterfowl	Refuge animals are being startled by aircraft and are exhibiting alert behavior. Waterfowl will flush and remain airborne for varying lengths of time when low-altitude aircraft are in the vicinity. Buffalo, longhorn cattle, deer, and elk have apparently habituated to the aircraft. It was stated that the most serious impact is on the people visiting the refuge whose experiences are damaged by frequent overflights.
24	2	TX	1987	USFWS/Anahuac NWR	Commercial/helicopter	Birds/waterfowl	Frequent low-altitude overflights by commercial helicopters involved in oil and gas activities are causing waterfowl to flush and leave the refuge until the noise level returns to ambient.

Appendix 1. (Continued)

2-59

um 4	Region	State	Year	Agency/Location	Aircraft	Animal	Issue
25	2	TX	1907	USFWS/Arkansas NWR (6)	Commercial/ private/small propeller/ helicopter	Birds/waterbirds/ waterfowl/ raptors/colonial nesting/mammals/ ungulates	It is believed that whooping cranes have habituated to low-altitude light aircraft overflights during the last 30 years. Sandhill cranes will flush at the approach of light aircraft and have apparently not habituated. Whooping cranes are flushing at the approach of low-altitude helicopters and remaining away from the refuge until the noise level returns to ambient. A response threshold has been determined to be 500 ft minimum above ground level but the threshold is frequently violated by aircraft. Sandhill cranes, crows, herons, raptors, and other refuge birds, and deer are also exhibiting flight/fright behavior at the approach of helicopters. Frequent low-altitude overflights by commercial helicopters involved in oil and gas activities are causing waterfowl to flush and leave the refuge until the noise level returns to ambient.
26	2	TX	1907	USFWS/Attwater's Prairie Chicken NWR	Military/ commercial/ private/small propeller/small jet/large jet/ helicopter	Birds/upland game	A study on the effects of low-altitude aircraft on Attwater's prairie chickens showed no adverse impact.
27	2	TX	1907	USFWS/Draozoria NWR	Commercial/ helicopter	Birds/waterfowl	Frequent low-altitude overflights by commercial helicopters involved in oil and gas activities are causing waterfowl to flush and leave the refuge until the noise level returns to ambient.

Case #	Region	State	Year	Agency/Location	Aircraft	Animal	Issue
28	2	TX	1987	USFWS/Corpus Christi ES Field Office	Military/private/ small propeller/ small jet/ helicopter	Birds/colonial nesting	Low-altitude overflights flush breeding birds (part- icularly brown pelicans) and can cause panic reactions that result in lost eggs and young. Repeated flushing can cause abandonment of the rookery. Private aircraft over the rookery has been a considerable management problem because ownership of the planes cannot easily be identified. The military have been cooperative when contacted about flights disturbing rookeries.
29	2	TX	1987	USFWS/Laguna Atascosa NWR	Commercial/ helicopter	Birds/waterfowl	Frequent low-altitude overflights by commercial helicopters involved in oil and gas activities are causing waterfowl to flush and leave the Refuge until the noise level returns to ambient.
30	2	TX	1987	USFWS/Hcfadden NWR	Commercial/ helicopter	Birds/waterfowl	Frequent low-altitude overflights by commercial helicopters involved in oil and gas activities are causing waterfowl to flush and leave the Refuge until the noise level returns to ambient.
31	2	TX	1987	USFWS/San Bernard NWR	Commercial/ helicopter	Birds/waterfowl	Frequent low-altitude over- flights by commercial helicopters involved in oil and gas activities are causing waterfowl to flush and leave the Refuge until the noise level returns to ambient.
32	2	TX	1987	USFWS/Texas Point NWR	Commercial/ helicopter	Birds/waterfowl	The high frequency of low- altitude helicopters are causing severe impacts on waterfowl. The Refuge is virtually unused by water- fowl, particularly snow- geese.

Appendix 1. (Continued)

Region	State	Year	Agency/Location	Aircraft	Animal	Issue
3	IL	1987	USFWS/Hark Inain HWB	Commercial/private/ small propeller/ small jet/large jet	Birds/waterfowl/ raptors/upland game	Geese on landing sites "spook" at merely hearing a small plane in the distance. Geese seem to raise their heads before a person can hear the noise. Red-tailed hawks, American kestrels, prairie chickens, and resident giant Canada geese near commercial air- ports appear to readily adjust to airport noise.
3	IN	1987	USFWS/Bloomington ES Office	Military/helicopter	Birds/colonial nesting	The Field Office commented on a proposed Air National Guard operation that would involve helicopters flying in close proximity to great blue heron rookeries. The Office stated that they lacked information on which to base their recommenda- tions.
3	MI	1987	USFWS/East Lansing ES Field Office	Military/small jet	Birds/raptors	In conjunction with a review of proposed military flights in the area, the East Lansing Office is in the process of reviewing bald eagle productivity data from a current jet flight path and comparing the data to State records for all of Michigan.

Region	State	Year	Agency/location	Aircraft	Animal	Issue
3	OH	1987	USFWS/Ottawa NM	Commercial/private/ small propeller/ helicopter	Birds/waterfowl	Fixed-wing planes flying less than 2,000 ft above ground level over the refuge several times a year have caused waterfowl and geese to flush. After a straight line flight of a plane, the birds usually settle back to resting and feeding within 5 to 10 minutes. Repeated passes drive birds off the area for hours. Birds are more likely to leave the area completely when disturbed by helicopters; they appear to be more sensitive to the chopping sound from a much greater distance than the sound of a fixed-wing aircraft.
4	AL	1987	USFWS/Annis NM	Military/private/ small propeller/ small jet/ helicopter	Birds/waterfowl	Frequent low-altitude aircraft overflights are causing waterfowl to leave the refuge until the noise level returns to ambient.
4	AR	1987	USFWS/Hot Springs NM	Private/small propeller/ helicopter	Birds/waterfowl	Various species of waterfowl, particularly geese, are flushing and leaving the refuge in response to low-altitude aircraft overflights and do not return until the noise level returns to ambient.
4	AR	1987	USFWS/Vanover NM	Private/small propeller/ helicopter	Birds/waterfowl	Various species of waterfowl, particularly geese, are flushing and leaving the refuge in response to low-altitude aircraft overflights and do not return until the noise level returns to ambient.
4	FL	1987	USFWS/Jacksonville SC Field Office	Military/small jet	Birds/colonial nesting	A study of wading bird colonies in Florida indicated that low-altitude overflights by military subsonic fighter jets had little or no adverse effects on reproductive success.

MONITORING THE EFFECTS OF MILITARY AIR OPERATIONS

AT NAS FALLON ON THE BIOTA OF NEVADA

JOB PROGRESS REPORT FOR THE YEAR 1986-87

Prepared By

Rory E. Lamp
Nevada Department of Wildlife

June, 1987

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INTRODUCTION

This is the second annual report on monitoring the effects of supersonic and low level military aircraft operations on wildlife. As part of the Memorandum of Agreement with the U.S. Navy and the State of Nevada, the Nevada Department of Wildlife (NDOW) will provide data addressing impacts to wildlife and associated habitat by air operations of the U.S. Navy at NAS Fallon. Funding for this project is provided by the U.S. Navy at NAS Fallon and administered by the Nevada Office of Community Services.

The effects of supersonic and low level military air operations on wildlife in Nevada are unknown. Scientific literature on the effects of noise disturbance on wildlife mostly address short-term impacts. No long-term monitoring studies have been found by this project. It is the Department's intent to monitor the operations both within the SOA, the five surrounding Military Operation Areas (MOA's), and the wetlands of the Lahontan Valley to observe impacts on wildlife behavior, populations and their habitats.

The area being monitored is shown on Map A1. The lands within the Supersonic Operations Area (SOA) are within the Great Basin desert type. They include parts of three counties in central and western Nevada - Churchill, Pershing and Lander Counties. The five MOA's that have air operations cover parts of four additional counties - Mineral, Nye, Eureka and Lyon. The wetlands within the Lahontan Valley are located in Churchill County.

LITERATURE REVIEW

Literature on the effects of supersonic and subsonic aircraft disturbance on wildlife has been received from various sources. The U.S. Navy, Woodward and Clyde, Hubbs Institute, the Washington Department of Game, the Sierra Club, the Nevada State Library, and the U.S. Fish and Wildlife Service (USFWS) have provided copies of work associated with the effects of sound on animals. Numerous bibliographies and reports have been reviewed, with the USFWS bibliography from Fort Collins providing the most complete and up-to-date annotated listing of the research on this subject. The following information was compiled from these literature sources.

BIG GAME

Little research has been done on the effects of supersonic overflights on big game species. Reindeer were shown to be moderately sensitive to sonic booms, regardless of their intensity which ranged from .35-7.02 mb. (Espmark, 1972)

Caribou and antelope were shown to respond to low flying aircraft. Overflights caused 65 to 75 percent of caribou herds to panic. (Kleine, 1973 and Calef, 1976) Antelope had a strong reaction to overflights that measured 77 dbA but did not react to overflights measured at 60 dbA. (Luz, 1976)

No long-term monitoring research on the effects of supersonic or subsonic low level aircraft noise on big game species has been conducted.

UPLAND GAME

Wild turkeys were tested for reactions to sonic booms during nesting and brooding. Four hens on nests reacted to sonic booms by assuming alert posture. No production losses were associated with sonic booms (.4 to 1.0 psi). Brooding hens and poults were not separated from each other following sonic booms. (Lynch, 1978) Simulated sonic booms of 50-860 nm² had no effect on nesting pheasants. (Ruddleson, 1971) Chicken egg hatching success was unaffected by simulated sonic booms. Chickens hatched from eggs exposed to simulated sonic booms had no differences from controls in; weight gain, onset of egg laying, or egg production. (Heineman, 1969)

No long-term monitoring research on the effects of supersonic or subsonic low level aircraft noise on upland game species found in Nevada has been conducted.

NONGAME

Raptors in New Mexico were observed for their reactions to supersonic and low level overflight. Observed reactions to nearby jet traffic were minimal and were never associated with reproductive failure. Measured noise levels of 82-114 dbA caused alarm reactions of short duration. (Ellis, 1981) Endangered kites in Florida were unaffected by airport

operations. (Dade County Airport Authority, 1977) Hunting behavior in a northern harrier was not interrupted by low level jet passes and bomb explosions measuring 80-87 db. (Jackson, 1977) Harriers demonstrated the ability to locate their prey by hearing vocalizations of the prey without having to use visual or olfactory signals. (Rice, 1982) Raptor populations at French airports from 1973 to 1977 appeared to increase with a corresponding increase in birdstrikes. (Busnel, 1980)

Ravens became very agitated in response to a sonic boom forming a flock of up to 72 individuals which took over 10 minutes to disperse. (Davis, 1967)

Circumstantial evidence linked very intense low level sonic booms with a mass hatching failure of the Dry Tortugas sooty tern in 1969. (Robertson, 1970)

Simulated sonic booms caused bleeding in the inner ear of field mice. The traces of bleeding increased with the amount of sonic booms and took eight weeks to disappear. (Renis, 1976) Field mice collected below low level aircraft routes had larger adrenal glands when compared to mice from unaffected areas. Noise levels of 80-120 db were recorded under the aircraft. Mice from the unaffected area would develop larger adrenal glands when exposed to recorded aircraft noise at 105 db in the laboratory. (Chesser, 1975)

Seabirds reacted to sonic booms but the stimuli are not production limiting. (Jehl, 1980) Seabird and wading bird colonies during nesting and brooding were not adversely affected by low level overflights. (Dunnet, 1977, Black, 1984) Gull production was lower in crowded colonies than in less crowded colonies under airport runways. (Burger, 1981,) Quieter jets at airports were expected to encounter more airstrikes with flying birds due to less warning noise from the aircraft. Increased bird populations also increased birdstrike probabilities. Birds were attracted to airports due to an absence of predators and presence of roosting, bathing, feeding, drinking, and nesting areas. (Burger, 1983)

WATERFOWL

Snow geese on the north slope were very sensitive to aircraft, reacting to overflights as high as 10,000 feet. Aircraft were capable of driving snow geese away from a 50 square mile area in 15 minutes. Waterfowl populations on a small lake were reduced by 60 percent due to aircraft disturbance over a three day period. Larger lake (1-.62 mi²) populations were reduced slightly by the same disturbance. Helicopters were more disturbing than fixed-wing aircraft. (Gunn, 1974)

NOISE

Sounds were observed to travel upwards in the air, farther and more predictably than along the surface. Birds were thought to be able to navigate using familiar sounds even though visual cues are unavailable. Altitude was thought to be estimated by identifying the reduction of the higher frequencies in familiar sounds that are absorbed by the air. (Griffin, 1974)

There were 13 additional literature reviews included in the abstracts provided by Doug Gladwin.

CONCLUSIONS AND RECOMMENDATIONS

The literature review is incomplete at this point. Long-term studies were unavailable to substantiate conclusions of no impacts to wildlife by supersonic or low level aircraft disturbances. Lab studies show that animals' ears were damaged by high amplitude sounds and especially by impulse sounds. Physiological changes were identified in mice residing under low level aircraft routes. Changes in one segment of an ecological community have been observed to cause a ripple effect in other populations that are associated with that segment.

Observations and conclusions of recent literature suggest that wildlife behavior and disturbances are indications of adverse impacts, but are not conclusive to significant levels. Physical (i.e. visual) intrusion into an animals space by low flying aircraft has been identified in the literature as an area of concern for increasing environmental stress on individuals and populations.

Additional articles identified in the USFWS annotated bibliography are being requested for closer review. Noise levels noted to affect domestic and wildlife behavior will be investigated in forthcoming work of this project. Auditory abilities of effected wildlife species will need to be quantified.

BIG GAME

DESERT BIGHORN SHEEP

FINDINGS

Twenty days spent observing bighorn sheep lambing areas in the SOA yielded 25 hours of observations of aircraft disturbances on bighorn sheep during the lambing period. Reactions of bighorn sheep to supersonic overflight are shown in Table 1. Reactions of bighorn sheep to low and high level overflights are shown in Table 2. Reactions for the purposes of this report are defined as:

- NO = No visible change in behavior
- MINOR = Perceptible but not significant change in behavior
- MAJOR = Significant change in behavior

TABLE 1
REACTIONS OF DESERT BIGHORN SHEEP TO
SUPER SONIC AIRCRAFT DISTURBANCE

MONTH/ YEAR	DAYS	HOURS	SIGHTINGS	REACTION		
				NO	MINOR	MAJOR
12/86	3	6.25	42	-	1	-
1/87	3	.50	3	-	-	-
2/87	9	12.00	34	-	1	-
3/87	5	6.25	67	-	-	-
TOTAL	20	25.00	146	-	2	-

TABLE 2
REACTIONS OF DESERT BIGHORN SHEEP TO LOW LEVEL
AND HIGH LEVEL AIRCRAFT DISTURBANCE

MONTH/ YEAR	DAYS	HOURS	SIGHTINGS	REACTION					
				NO		MINOR		MAJOR	
				LL	HL	LL	HL	LL	HL
12/86	3	6.25	42	6	-	-	-	1	-
1/87	3	.50	3	-	-	-	-	-	-
2/87	9	12.00	34	-	4	-	-	-	-
3/87	5	6.25	67	1	2	-	-	-	-
TOTAL	20	25.00	146	7	6	-	-	1	-

LL = LOW LEVEL less than 3000'
HL = HIGH LEVEL greater than 3000'

One hundred and forty-six bighorn sheep sightings occurred in 25 hours of observation. Sixteen aircraft disturbances occurred while bighorn sheep were under observation, two sonic booms and 14 low and high level overflights. Two sonic booms caused a minor reaction in feeding and resting sheep, i.e. sheep raising their heads from feeding and a lamb raising up from sleep posture.

One low level overflight, three S3 aircraft at 100 feet altitude, caused resting sheep to rouse and flee from their bedding area. Seven low level and six high level overflights caused no observable reaction in feeding and resting sheep.

Tests to provide aircraft disturbances over bighorn sheep during the lambing period were not conducted.

None of the aircraft disturbance sound levels were quantified due to the unavailability of a sound level meter.

As part of the MOU between the U.S. Navy and the State of Nevada, the Navy agreed to install sonic boom monitors to document and quantify the supersonic aircraft disturbance within the SOA. One year of data, from January, 1986 to December, 1986 have been received. The monitors at Cold Springs and the school at Dixie Valley were selected for examination because of their close proximity to bighorn sheep lambing areas. Summaries of these data are shown in Tables 3 and 4.

TABLE 3
SUMMARY FROM SONIC BOOM MONITOR NUMBER SIX,
DIXIE VALLEY SCHOOL FOR 1986

MONTH	EVNT/MO	--OVERPRESSURE (PSF)--			AVERAGE DURATION	AVERAGE LINEAR db
		AVE.	MIN.	MAX.		
Jan	20	0.6	0.5	0.6	0.2	123.0
Feb	33	0.6	0.5	0.8	0.2	122.8
Mar	61	0.6	0.5	1.1	0.2	126.9
Apr	176	0.6	0.5	1.4	0.2	126.2
May	101	0.6	0.5	0.8	0.2	124.7
Jun	124	0.6	0.5	1.3	0.2	127.3
Jul	71	0.6	0.5	1.0	0.2	124.1
Aug	35	0.6	0.5	0.9	0.2	124.8
Sep	87	0.6	0.5	1.0	0.2	124.4
Oct	0	N/A	0.0	0.0	N/A	N/A
Nov	3	0.7	0.6	0.8	0.3	125.1
Dec	0	N/A	0.0	0.0	N/A	N/A

TABLE 4
SUMMARY FROM SONIC BOOM MONITOR NUMBER SEVEN,
COLD SPRINGS FOR 1986

MONTH	EVNT/MO	--OVERPRESSURE (PSF)--			AVERAGE DURATION	AVERAGE LINEAR db
		AVE.	MIN.	MAX.		
Jan	11	0.6	0.5	0.6	0.2	122.3
Feb	175	0.6	0.5	1.3	0.2	123.3
Mar	1	0.7	0.7	0.7	0.2	129.1
Apr	17	0.7	0.6	1.0	0.4	121.7
May	19	0.7	0.5	1.0	0.3	122.0
Jun	1	0.7	0.7	0.7	0.3	122.3
Jul	20	0.6	0.5	0.7	0.2	122.9
Aug	21	0.6	0.5	0.7	0.2	122.9
Sep	62	0.7	0.5	1.3	0.3	121.2
Oct	34	0.7	0.5	1.1	0.3	122.2
Nov	15	0.7	0.5	0.8	0.3	124.8
Dec	2	0.6	0.5	0.6	0.2	123.9

Recent discussions with Navy personnel indicate that the data storage system in the supersonic sound monitors cease storing information when the wind speed reaches a 10 mph threshold. Daily wind speeds at or above this threshold occur frequently in central Nevada.

CONCLUSIONS AND RECOMMENDATIONS

A number of questions arise from viewing the Navy sonic boom monitor data. The fact that the Navy sonic boom monitors will not record information during periods when the wind is greater than 10 mph greatly compromises the validity of any assumptions made concerning the quantity and quality of the monitor data to date. Documentation of the wind speed records for weather stations closest to the SOA is being requested to quantify the amount of time the wind exceeds 10 mph during the year.

The data from monitor #6 in Dixie Valley show frequent booms occurring from April through September of 1986. This is a period when the Navy had agreed to restrict supersonic flights over Dixie Valley due to the impact on residents still living there. It is unusual that there are that many booms in an area where supersonic flight activity is supposedly not occurring. It is questionable whether these data accurate.

On the 10th of February, 1986 a series of demonstration sonic booms were performed by a Navy F-14 over Cold Springs to show a number of dignitaries the sonic boom monitor just installed by the Navy. Subsequent discussion of the events of that day, recorded in field notes, indicate two of the sonic booms were greater than 2 psf, two were greater than 3.5 psf and one was greater than 7 psf. The data from monitor #7 at Cold Springs in the annual summary from the the Navy sonic boom monitors show a maximum boom of 1.3 psf being recorded in February of 1986. These two facts do not correlate with each other.

Supersonic activities were initially to be monitored by the Navy's nine stations distributed throughout the SOA. The practical application and reliability of these devices are now questionable due to the factors discussed above. The supersonic monitoring data were to be gathered by the Navy to aid this project in identifying supersonic operation concentration areas. It was the objective of our investigations to correlate sonic boom data with field observations of potentially impacted wildlife. It would appear that the failure to collect reliable sonic boom data would make wildlife disturbance data impossible to correlate. }

Sonic boom and overflight data were collected in the vicinity of bighorn sheep herds during the winter months of February through April 1987. This year's field work resulted in an expenditure of 20 days to obtain 25 hours of bighorn sheep observations. During these observations, only 16 aircraft disturbances occurred in which to base any conclusions as to the degree of their impact to bighorn sheep. It is felt that the present data base is too limited to draw any conclusions. We offer the following recommendations to the project:

1. Sonic boom data and monitoring should be developed to provide meaningful data for the project to utilize in determining supersonic overflight concentrations in respect to critical wildlife habitats.
2. Bighorn sheep observations should be conducted during the critical lambing period to increase the data base on the effects of aircraft disturbances. We would like observations of five sonic booms and 20 low level overflights over bighorn sheep. We will plan on expending 25 mandays in 1987-88, to attempt to achieve these numbers. Corroboration of the first year of data would potentially occur with one more field season. The observation period will be shifted to later in the year from February through May. Aircraft operations information would be closely coordinated with NAS Fallon to identify flight activity over critical habitat areas.
3. Sound measurements would be incorporated into the studies to quantify the aircraft disturbances impacts.
4. Threshold tests could be conducted to determine aircraft disturbance intensities to provide the Navy with information guidelines for critical bighorn sheep habitat.

MULE DEER

FINDINGS

Ten days yielded 20.25 hours of observations of mule deer on traditional winter ranges. Reactions of mule deer to super sonic overflight are shown in Table 5. Reactions of mule deer to low and high level overflights are shown in Table 6.

TABLE 5
REACTIONS OF MULE DEER TO SUPERSONIC
AIRCRAFT DISTURBANCE

MONTH/ YEAR	DAYS	HOURS	SIGHTINGS	REACTION		
				NO	MINOR	MAJOR
2/87	3	4.25	22	-	1	-
3/87	7	16.00	141	-	-	-
TOTAL	10	20.25	163	-	1	-

TABLE 6
REACTIONS OF MULE DEER TO LOW LEVEL AND
HIGH LEVEL AIRCRAFT DISTURBANCE

MONTH/ YEAR	DAYS	HOURS	SIGHTINGS	REACTION					
				NO		MINOR		MAJOR	
				LL	HL	LL	HL	LL	HL
2/87	3	4.25	22	1	2	-	-	-	-
3/87	7	16.00	141	2	12	-	4	-	-
TOTAL	10	20.25	163	3	14	-	4	-	-

LL = Low Level less than 3000'

HL = High Level greater than 3000'

One hundred and sixty-three deer sightings were recorded in 20.25 hours of observations on wintering mule deer. Twenty-two incidents of aircraft disturbance occurred while deer were under observation, one sonic

boom and 21 low and high level overflights. The one sonic boom recorded while mule deer were under observation caused the feeding deer to raise their heads and discontinue feeding for a short period of time.

Four high level overflights caused feeding deer to cease feeding and observe the flight of the aircraft. The deer resumed feeding after the aircraft were out of sight. Three low level and 14 high level overflights caused no observable reaction in wintering mule deer.

None of the aircraft disturbance sound levels were quantified due to the unavailability of a sound level meter.

Mule deer are the most heavily utilized big game resource within the SOA. Table 7 shows a comparison of the data collected on the numbers of hunters and hunter effort on the two big game species hunted within the SOA for the last five years.

TABLE 7
HUNTER NUMBERS AND EFFORT WITHIN THE SOA
1982-1987

<u>Year</u>	<u>Mule Deer</u>		<u>Antelope</u>	
	<u>Hunters</u>	<u>Days</u>	<u>Hunters</u>	<u>Days</u>
1982	592	2,456	No Hunt	
1983	490	1,848	No Hunt	
1984	795	2,924	3	7
1985	788	2,887	3	4
1986	986	4,071	No Hunt	

The economic value of mule deer hunting in Nevada has been calculated from information received from hunters. A questionnaire was provided with every deer tag issued to a hunter during the 1986 deer season. A Summary of the expenditures by hunters for those portions of Lander and Churchill counties within the SOA are shown in Table 8.

TABLE 8
ECONOMIC VALUES FOR DEER HUNTING
FOR THE SOA

<u>YEAR</u>	<u>HUNTERS</u>	<u>DAYS</u>	<u>DOLLARS SPENT</u>	<u>AVERAGE DAYS</u>	<u>AVERAGE \$/DAY</u>
1986	986	4,071	\$ 300,730.00	4	\$ 74.00

Deer hunters expended 4,071 days pursuing a hunting experience in the SOA. Using expanded economic questionnaire data it is calculated that hunters spent \$300,730.00 in an effort to obtain a mule deer. Residents spent an average of \$31.00, nonresidents, \$87.00, per day on their hunts for a combined total of \$74.00 per day average. The average hunt lasted four days in the field

The impacts of Navy aircraft operations upon recreational activities within the SOA were assessed by conducting field interviews during the 1986 deer season. Results of the recreationist questionnaire for deer hunters is shown in Table 9.

TABLE 9
DEER HUNTERS QUESTIONNAIRE SUMMARY

ACTIVITY	-----REACTIONS-----				SUB TOTAL	NO OVERFLIGHTS	TOTAL
	NO IMPACT	NOT NEGATIVE	ANNOYED	EXTREME ANNOYED			
Hunters	24	3	12	3	42	21	63
Percent	57	7	29	7	100		

Sixty-three individuals were contacted in the field with 42 observing an aircraft disturbance. Thirty-six percent of those who experienced an aircraft disturbance, were annoyed or extremely annoyed by the disturbance. Seven percent felt the aircraft disturbance was noticeable but not negative. Fifty-seven percent felt the aircraft disturbance had no impact on their recreational experience.

Due to the lack of reliable information from the Navy sonic boom monitors, there is no conclusive data on the number or location of super-sonic aircraft disturbances in the vicinity of wintering mule deer. During the 101 hour period that big game species were under observation in the SOA, five sonic booms were recorded. Data for that period from the super-sonic monitors has not been provided by the Navy as of this writing. Data from the Cold Springs monitor #7, seen in Table 4, for the corresponding months in 1986 show an average of 62 booms per month.

CONCLUSIONS AND RECOMMENDATIONS

Unusually warm weather in December, 1986 and January, 1987 did not necessitate deer herds to move onto winter ranges until late February, 1987. Sonic boom and overflight data were collected in the vicinity of wintering mule deer herds during the late winter months from March through April, 1986. Insufficient numbers of overflights did not allow for significant numbers of observations on the effects of aircraft disturbance on mule deer on winter ranges.

Comparisons of results from the field observations with data from the U.S. Navy sonic boom monitors have not been made due to the unavailability of the data for the corresponding months for the field observations. To add to this situation is the issue of the accuracy of the sonic boom data. Emphasis needs to be placed on the need for accurate knowledge of the location and amplitude of sonic booms within the SOA. It is essential that this information be available to this project to assess what the effects of U.S. Navy air operations are having on Nevada's wildlife.

Impacts of Navy activities upon recreational activities will continue to be assessed by conducting field interviews of hunters during the 1987 hunting seasons. The surveys will assess sportsman response to overflights and sonic booms and obtain data on observations, by sportsmen, of wildlife responses to air activities.

Status and trend data for mule deer populations in the SOA show the various herds to be increasing in population levels. Preliminary observations from 1986 do not identify any major behavioral reactions to aircraft disturbances by mule deer on winter ranges. The data are not complete due to the abbreviated winter of 1986-87. One complete winter of observational data on wintering mule deer coupled with the trend data on these herds would allow the project to make a determination on the question of the effects of aircraft operations on wintering mule deer in the SOA. This determination will be valid for present operational training levels.

Due to the fact that mule deer did not fully utilize the winter range during the winter of 1986-87 and the complications of collecting sonic boom data, we find that the observations of aircraft disturbance impacts on mule deer are too limited to draw strong conclusions. It is recommended that the following objectives be pursued this year:

1. Sonic boom data and monitoring should be developed to provide meaningful data for the project to utilize in determining supersonic overflight concentrations in respect to critical wildlife habitats.
2. Mule deer observations should be conducted on key winter ranges in the Desatoya and Clan Alpine ranges from December to March. Aircraft operations information will be closely coordinated with NAS Fallon to identify flight activity over critical habitat. We would like to observe five sonic booms and 20 low level overflights over wintering mule deer. It is our intent to observe mule deer for one additional wintering season to corroborate the data taken during the abbreviated winter of 1986-87.
3. Sound measurements would be taken to quantify aircraft disturbance with wildlife behavior data.
4. Hunter questionnaire and social/economic impacts would be further assessed.
5. Threshold tests could be conducted to determine overflight or sonic boom tolerance limits.

PRONGHORN ANTELOPE

FINDINGS

The major antelope resource is located in the northeastern portion of the SOA. One antelope sighting was reported in Smith Creek Valley. Due to the limited numbers of antelope and the distance involved in travel, antelope were not observed this year.

CONCLUSIONS AND RECOMMENDATIONS

The literature suggests that antelope are an overflight sensitive species. At this time antelope are currently limited to the eastern edge of the SOA. They are considered a limited resource within the SOA and not a high priority for monitoring.

UPLAND GAME

SAGE GROUSE

FINDINGS

One sage grouse lek was surveyed on two mornings in early April. Strutting activity was observed on both days over a five hour period. Three cocks and two hens were recorded on the first survey, four cocks and one hen were observed on the second day. No aircraft disturbances were recorded during the field surveys.

Two aerial surveys to locate leks were conducted in April to locate additional strutting grounds. No sage grouse strutting activity was identified in Cherry Creek, War Canyon in the Clan Alpine Range, Edwards Creek, New Pass west, and Cedar Creek of the Desatoya Range on the first flight. The second flight failed to locate any sage grouse activity in Campbell Creek, Smith Creek, or New Pass east in the Desatoya Range.

CONCLUSIONS AND RECOMMENDATIONS

Sage grouse strutting activity occurs during the early hours of the morning. Observations made during the strutting seasons in 1987 indicated no aircraft activity during this time of the day. Flight schedule information provided by NAS Fallon indicated little flight activity planned for the early hours when peak sage grouse strutting activity is occurring.

The U.S. Navy flight training operations, as presently scheduled, do not appear to create conflicts with sage grouse strutting activities. Should flight training be scheduled for earlier hours in the morning during the strutting season, from February through April, sage grouse should be reexamined for potential impacts from aircraft disturbance.

Sage grouse inhabit much of the SOA. Population densities are lowest in Churchill County and are higher in Lander County. Few data are available on the distribution and number of strutting grounds within the SOA. Low population densities within the SOA make further monitoring of sage grouse too costly in terms of time and effort.

CHUKAR PARTRIDGE

FINDINGS

Chukar are widely distributed throughout the SOA. In the Churchill County portion of the SOA, they are second to waterfowl as the most popular consumptive game bird resource. Table 10 shows the harvest data for Churchill County since 1982.

TABLE 10
CHUKAR PARTRIDGE HARVEST
CHURCHILL COUNTY (NDOW 10% QUESTIONNAIRE)

<u>Year</u>	<u>Harvest</u>	<u>Hunters</u>	<u>Days</u>	<u>Birds/Hunter</u>	<u>Birds/Hunter Day</u>
1982	59	131	255	0.4	0.2
1983	1,453	383	850	3.7	1.7
1984	1,622	452	983	3.5	1.6
1985	265	196	283	1.4	0.9
1986	1,721	395	985	4.4	1.7

Natural population fluctuations are common for chukar and efforts will continue to identify population trends for this species within the SOA. More intensive brood counts need to be conducted in order to increase the data base for population trend and distribution.

Several days were expended to explore the feasibility of using remote sensing to monitor aircraft disturbances to chukar broods. The time lapse camera does have some application, but the recording of noise events to correlate to filmed responses does not appear feasible.

Hunter questionnaires failed to identify chukar hunting conflicts, due to insufficient numbers of hunters contacted.

CONCLUSIONS AND RECOMMENDATIONS

Field surveys to date did not result in specific observations of chukar being exposed to aircraft disturbances. Additional surveys to obtain aircraft disturbance observations are being completed. It is our intent to obtain observations of sonic booms and low level overflights on chukar at guzzlers this summer. These observations coupled with the excellent production seen in chukar in 1986 will allow the project to establish what chukar reactions to aircraft disturbances are. Chukar observations will then be deemphasized in the scope of the overall project.

Hunter questionnaire data is lacking to correlate to the number of hunters and recreational days seen in the SOA.

It is recommended that a small portion of man time be expended to observe chukar broods during periods of aircraft activity. Additional effort will be made to expand upon the hunter questionnaire data and possible social/economical impacts.

WATERFOWL

WATERFOWL

FINDINGS

Observations of migrating snow geese staging at Carson Lake occurred over eight days from November, 1986 to February, 1987. A total of 12,180 sightings of snow geese were recorded in flocks ranging from 80 geese to 4,000 geese. Snow geese were observed feeding and resting in three open water areas of Carson Lake. (the Sprig Ponds, the Big Water, and the Sump) Eight days in the field yielded 26 hours of observations of aircraft disturbance over snow geese at Carson Lake. Reactions of snow geese to low and high level overflights are shown in Table 11.

TABLE 11
REACTIONS OF SNOW GEESE TO LOW LEVEL AND
HIGH LEVEL AIRCRAFT DISTURBANCE

MONTH/ YEAR	DAYS	HOURS	SIGHTINGS	REACTION					
				NO		MINOR		MAJOR	
				LL	HL	LL	HL	LL	HL
11/86	2	7.0	1,700	12	-	-	1	2	-
12/86	3	9.5	2,080	10	1	2	-	8	-
2/87	3	9.5	8,400	5	2	12*	3	13*	-
TOTAL	8	26.0	0 12,180	27	3	14	4	23	-

LL = Low Level less than 3000'

HL = High Level greater than 3000'

* Three minor and two major reactions occurred to unknown stimuli and are not included in these totals .

Seventy-six incidents of aircraft disturbance were recorded over snow geese in the 26 hours of observations, 64 low level overflights and seven high level overflights. Twenty-three major reactions and 14 minor reactions were recorded in response to 37 low level overflights. Four minor reactions occurred in response to four high level overflights. No observable reactions occurred in response to 27 low level and three high level overflights. Major reactions observed were flushing the entire flock which would circle and then land, or leave. Minor reactions included change or increase in calling in the flock and change in posture to an alert position. Five reactions to unknown stimuli were recorded, two major and three minor. One appeared to be in response to increased jet noise from NAS Fallon, four had no apparent visible or audible cause.

No sound measurements were made during snow geese observations due to the unavailability of a sound meter.

Canada geese observations occurred over six days from February, 1986 to April, 1987. Observations were recorded at Sheckler and S-Line Reservoirs with five days spent at Sheckler and one day at S-Line. Canada geese were feeding and resting when observed. Six days in the field yielded 17.25 hours of observations of potential aircraft disturbance on Canada geese. Reactions of Canada geese to low and high level overflights are shown in Table 12.

TABLE 12
REACTIONS OF CANADA GEESE TO LOW LEVEL
AND HIGH LEVEL AIRCRAFT DISTURBANCE

MONTH/ YEAR	DAYS	HOURS	SIGHTINGS	-----REACTION-----					
				NO		MINOR		MAJOR	
				LL	HL	LL	HL	LL	HL
2/86	2	5.0	18+	27	-	15	-	-	-
7/86	1	2.0	20	11	-	-	-	-	-
8/86	1	1.0	30	15	-	2	-	-	-
3/87	1	4.0	12	13	-	7	-	-	-
4/87	1	4.25	2	-	-	1	-	-	-
TOTAL	6	17.25	82+	66	-	25	-	-	-

LL = LOW LEVEL less than 3000'

HL = HIGH LEVEL greater than 3000'

Ninety-one incidents of low level overflights were recorded over Canada geese during the 17.25 hours of observation. No major reactions to aircraft disturbances were observed. Twenty-five overflights caused minor reactions in Canada geese. This included rousing from sleep posture, assuming an alert position, alert calling, swimming away from the resting area and ceasing feeding activity. There were no observable reactions to 66 incidents of low level aircraft disturbance. One sonic boom was experienced while Canada geese were under observation with no observable change in the feeding activity of the geese. All observations were on feeding or resting Canada geese. No observations of aircraft disturbance over nesting Canada geese were obtained.

One day of observations were made with the new B&K sound meter. Twenty-two overflights were measured with the peak noise level recorded for each overflight. The average overflight had a peak db reading of 92.7 db on the linear scale. The range was from 81 db to 105 db. Ambient noise

was also recorded at 15 minute intervals. The average ambient noise was 63 db with a range from 52 to 70 db.

Goose nesting success for Sheckler and S-Line Reservoirs is shown in Table 13.

TABLE 13
GOOSE NESTING SUCCESS ON
SHECKLER AND S-LINE RESERVOIRS

Year	SHECKLER RESERVOIR			S-LINE RESERVOIR		
	Incubating	Successful	% Success	Incubating	Successful	% Success
1986	25 (4.74)*	19	76	25 (5.14)*	25	100
1987	27 (4.28)*	18	67	28 (5.33)*	25	89

* Clutch size

Nesting success in Canada geese was examined on Sheckler and S-Line Reservoirs for the second year. Twenty-nine nests were located on Sheckler and 28 were located on S-Line. Nesting success on Sheckler was 67 percent as compared to 89 percent on S-Line, a 22 percent difference. The previous year, 1986, showed a 24 percent difference. Average clutch sizes were 4.3 eggs per nest on Sheckler and 5.3 eggs per nest at S-Line Reservoir. The clutch size for Sheckler was a 10 percent decrease from 1986, and for S-Line the clutch size was an increase of four percent.

Four days in the field yielded seven hours of observations of aircraft disturbance on ducks. Reactions of ducks to low and high level overflights are shown in Table 14.

TABLE 14
REACTIONS OF DUCKS TO LOW LEVEL AND
HIGH LEVEL AIRCRAFT DISTURBANCE

MONTH/ YEAR	DAYS	HOURS	SIGHTINGS	REACTION					
				NO		MINOR		MAJOR	
				LL	HL	LL	HL	LL	HL
2/86	1	2.75	300	3	-	-	-	-	-
3/86	1	3.00	500	7	-	1	-	-	-
7/86	1	1.00	500	-	-	1	-	1	-
10/86	1	.25	500	-	-	-	-	1	-
TOTAL	4	7.00	1,800	10	-	2	-	2	-

LL - LOW LEVEL less than 3000'

HL - HIGH LEVEL greater than 3000'

Fourteen incidents of aircraft disturbance were recorded in seven hours of observations on ducks. Two major reactions were recorded in response to helicopters flying in the vicinity of feeding ducks. Feeding ducks flushed in response to one CH 53 helicopter, when it was estimated to be one-half of a mile south of the ducks. The other incident was a direct overflight of a CH 53. Two incidents of minor reactions were recorded. Small numbers of feeding cinnamon teal, mixed in with larger numbers of pintails, reacted by flushing to low level bomb runs at Sheckler. There was no observable reaction to 10 overflights.

No sound measurements were recorded during duck observations due to the unavailability of a sound meter.

Waterfowl hunters were questioned for their response to aircraft disturbance during their hunting experience. The results are displayed in Table 15.

TABLE 15
WATERFOWL HUNTER QUESTIONNAIRE RESULTS

<u>ACTIVITY</u>	<u>-----REACTIONS-----</u>				<u>SUB TOTAL</u>	<u>NO</u>	
	<u>NO IMPACT</u>	<u>NOT NEGATIVE</u>	<u>ANNOYED</u>	<u>EXTREMELY ANNOYED</u>		<u>OVERFLIGHTS</u>	<u>TOTAL</u>
HUNTING							
Waterfowl	10	26	11	4	51	5	56
Percent	19	51	21	9	100		

Fifty-six waterfowl hunters in the Lahontan Valley were queried for their reactions to aircraft disturbance during their hunting experience. Fifty-one had experienced aircraft overflights while in the field. Thirty percent were annoyed or extremely annoyed by the aircraft disturbance. Fifty-one percent had noticed the aircraft disturbance but felt that it was not a negative factor to their hunting experience. Nineteen percent felt the aircraft had no impact on their hunting experience.

Data from waterfowl check stations indicate that hunters expended an estimated 8,006 days pursuing migratory waterfowl in the Lahontan Valley during the 1986-87 migratory season. Over 14,000 ducks, 400 geese and 60 tundra swans were harvested by hunters during that period.

Spectral analysis of low level aircraft noise is being provided gratis by Frank Cherne of the University of Nevada, Reno (UNR) Electrical Engineering Department. Recordings of various aircraft at low altitudes were made and later analyzed by Professor Cherne at UNR. Preliminary indications show low level aircraft have a large component of low frequency noise with peak energy levels between 200 and 500 hz.

CONCLUSION AND RECOMMENDATIONS

Military overflights occur throughout the Lahontan Valley. Table 16 lists each wetland, its potential for impact and the period of waterfowl use.

TABLE 16
POTENTIAL FOR IMPACT AND PERIOD OF USE
LAHONTAN VALLEY WETLANDS

<u>Wetland</u>	<u>Potential For Impact</u>	<u>Nesting</u>	<u>Feeding</u>	<u>Wintering</u>
Stillwater	Low-Medium	x	x	x
Carson Lake	Medium-High	x	x	x
Sheckler Reservoir	High	x	x	
S-Line Reservoir	Low	x	x	
Harmon Reservoir	Low	x	x	
Old River Reservoir	Low	x	x	

Carson Lake is an important wintering ground for snow geese. A review of the literature indicates that snow geese are extremely sensitive to overflight activity. Observations made at Carson Lake indicate that snow geese responded to 54 percent of the aircraft disturbances observed. The geese responded irrespective of aircraft altitude or type. These data support the conclusions found in the literature. Snow geese are sound sensitive and are being adversely impacted by the operations of NAS Fallon. Efforts by the project biologist would be made to assess the compliance to the 3000 foot elevation ceiling agreed upon in the Airspace MOU.

Completion of the land withdrawal and site renovations for R4813 (Bravo 20 bombing range) will increase sorties into the Carson Sink area north of the Stillwater WMA and NWR. As R4813 becomes active, aircraft disturbances will be monitored.

Intensive surveys on reproductive activities of Canadian geese can generally conclude that air activities do not significantly impact this species. It would appear that these birds can acclimatize to man's activities and coexist. Additional surveys and efforts will not be pursued on this species.

Due to other priority projects, migratory ducks were not intensely surveyed this year. It is proposed to conduct additional surveys at Carson Lake, Stillwater and other wetlands to assess the numbers, behavior and composition of wintering species subject to varying degrees of aircraft disturbances.

Utilization of the sound monitoring device will be emphasized in the waterfowl surveys. We wish to correlate the observed aircraft events with actual levels of noise. Threshold levels could be determined for snow geese to provide additional information on the potential impacts of aircraft disturbances for NAS Fallon to use in future air operations planning.

Migratory waterfowl provided for over 8,000 days of consumptive recreation on the wetlands located within the Lahontan Valley. Thirty percent of the waterfowl hunters questioned for their response to overflights were annoyed by aircraft disturbance during their outdoor experience. This would indicate that 2,400 days of recreational effort in the Lahontan Valley were potentially affected in a negative manner by military aircraft activities.

Impacts of overflights upon recreational use of waterfowl will continue to be addressed by questionnaire and field interviews. Expansion of this data is extremely important to assess the social/economical impacts of aircraft operations upon recreationists.

The Fish and Wildlife Service has initiated a study to monitor "Migratory Bird Populations and Habitat Relationships in Lahontan Valley, Nevada (1986-1990)". The study is designed to give an accurate assessment of the relationships between waterfowl and water, including the association of waterfowl to species competition, habitat conditions, and changes in habitat caused by other factors than water. The study will also identify public consumptive and nonconsumptive use of the wetlands in the Lahontan Valley. Data from this study will be assimilated into this report on an annual basis. Cooperation with the FWS and NDOW to review production and population status will continue in 1987-88.

As part of the USF&WS study, wetland habitat will be examined for vegetative diversity. Waterfowl use associated with each wetland will be evaluated to determine if each wetland's potential for use is being utilized by migratory waterfowl. Modeling techniques will be employed to assist in these evaluations.

Additional aircraft low level noise data is being gathered and analyzed by Frank Cherne from the University of Nevada at Reno, and will be available to the project. Professor Cherne has been volunteering his time, effort, and equipment to the SOA project up to now. Additional recordings of aircraft noise from Frenchmans and Sheckler Reservoir are planned to quantify aircraft disturbance during training operations.

FURBEARERS

FURBEARERS

FINDINGS

No monitoring of aircraft disturbance to furbearers has occurred to date.

CONCLUSIONS AND RECOMMENDATIONS

The Department has conducted a study at Grimes Point to determine the life history and environmental factors influencing kit fox. Information from this study identified soil types as an important factor in kit fox distribution. Four soil types were identified, with the Biddleman type selected most frequently. Sites with adequate drainage were also identified as important for den selection by kit foxes.

The U.S. Geological Survey and Soil Conservation Service soil maps will be employed to identify potential distribution parameters for kit fox within the SOA. Ground surveys will follow to determine if kit fox use is occurring within these soil types found in the SOA will follow. Den densities under areas of intensive aircraft disturbances and areas of little aircraft disturbance will be identified if possible. Den frequencies will be used to identify relative abundance and population status for kit foxes.

Harvest information will be used as an additional source for distribution and trend data for kit foxes.

Since the kit fox relies solely on its hearing to hunt and avoid predation, its status could be threatened by extensive disturbance, especially by sound intensities that could damage their hearing.

Distribution information on the other furbearers will be acquired when possible.

NONGAME

RAPTORS

FINDINGS

One day was expended in the SOA and six days in the Lahontan Valley observing various raptors for their responses to aircraft disturbances.

Prairie falcons on historical nesting areas in the SOA were observed in the Desatoyas. One nest was identified and monitored for three hours. One active and one inactive golden eagle nest were identified in the SOA. One additional golden eagle nest was reported by a local resident.

Wintering bald and golden eagles were observed at the traditional roost in the Lahontan Valley. Up to 70 eagles were observed during one census flight. Prairie falcon and Swainson's hawk nests were observed for sensitivity to aircraft disturbance in the Lahontan Valley. Observations of raptors' response to aircraft disturbance are shown in Table 16 for the SOA and Table 17 for the Lahontan Valley.

TABLE 16
RAPTOR RESPONSE TO AIRCRAFT DISTURBANCE
WITHIN THE SOA

MONTH/ YEAR	DAYS	HOURS	SIGHTINGS	REACTION								
				NO			MINOR			MAJOR		
				SB	LL	HL	SB	LL	HL	SB	LL	HL
5/87	1	3.0	2	-	-	-	-	-	-	-	-	-
TOTAL	1	3.0	2	-	-	-	-	-	-	-	-	-

TABLE 17
RAPTOR RESPONSE TO AIRCRAFT DISTURBANCE
WITHIN THE LAHONTAN VALLEY

MONTH/ YEAR	DAYS	HOURS	SIGHTINGS	REACTION					
				NO		MINOR		MAJOR	
				LL	HL	LL	HL	LL	HL
11/86	1	2.5	10	-	-	-	-	-	-
1/87	2	3.0	2	1	-	-	-	1	-
4/87	1	4.0	2	-	-	-	-	-	-
5/87	2	5.5	2	15	-	-	-	1	-
TOTAL	6	15.0	16	15	-	-	-	2	-

No incidents of aircraft disturbance were recorded in the three hours of observations of raptors in the SOA.

Eighteen incidents of low level aircraft disturbance were recorded over raptors in 15 hours of observations in the Lahontan Valley. Two major reactions were observed. One pair of bald eagles, an adult and a juvenile, flushed in response to a low level pass at Lahontan Reservoir. The second response was from a Swainson's hawk, which flushed from its nest for over two hours, in response to a UH1 helicopter overflight at 500 feet. On two occasions NDOW personnel have observed incidents where constant aircraft traffic has kept an adult raptor from returning to its nest site.

Historical nest sites for Swainson's hawks in the Lahontan Valley were monitored in 1987. Ten active Swainson's hawk nests and seven red-tailed hawk nests were identified in the Lahontan Valley.

CONCLUSION AND RECOMMENDATIONS

Based upon the noted observations of nesting disturbances by aircraft activities and the intensive nesting surveys being conducted by the Department's nongame program, it is proposed to devote greater time and attention to this resource during the forthcoming year. Species such as the Swainson's hawk is considered "sensitive" by the federal government and efforts should be made to assure its welfare.

Bald eagles are a primary concern of the Fish and Wildlife Service. It is forecasted that R4813 (Bravo 20 bombing range) will become active in the coming year. Since the most significant concentration of wintering bald eagles have been located near the flight pattern for R4813, and the fact that R4813 has been inactive the past two years, we propose to have greater survey effort to assess possible impacts of aircraft disturbances to wintering bald eagles.

Observations by Department personnel have noted sensitive behavior of Swainson's hawk to overflight activity during their nesting period. Observations of Swainson's hawks on nest will occur during the nesting season in the Lahontan Valley during the summer of 1988.

SHOREBIRDS

SHOREBIRDS

FINDINGS

Seven days in the field yielded 23.75 hours of observations of aircraft disturbance over feeding and nesting white-faced ibis. The reactions of the ibis to the low and high level aircraft disturbances are shown in Table 18.

TABLE 18
REACTIONS OF WHITE-FACED IBIS TO LOW LEVEL
AND HIGH LEVEL AIRCRAFT DISTURBANCE

MONTH/ YEAR	DAYS	HOURS	SIGHTINGS	-----REACTION-----					
				NO		MINOR		MAJOR	
				LL	HL	LL	HL	LL	HL
7/86	4	16.25	20	57	-	-	-	2	-
5/87	3	7.50	1630	5	2	-	2	1	-
TOTAL	7	23.75	1650	62	2	-	2	3	-

Twenty-three and three-quarter hours of observations yielded sightings of 1,650 white-faced ibis. The ibis were feeding and nesting during the observation period, Ibis responded to five of the 69 observed aircraft disturbances. Three major reactions were recorded, two in response to low level bomb run passes at Sheckler and one in response to a UH1 pass over a field off of Union Lane. Major reactions consisted of the feeding birds flushing and leaving the immediate vicinity. Two minor reactions, increased activity over the colony during overflights, were observed.

Reports from personnel in the field have indicated that species such as the long-billed dowitcher appear to be sensitive to aircraft disturbance.

CONCLUSIONS AND RECOMMENDATIONS

Preliminary conclusions of the effects of aircraft disturbance on the white-faced ibis indicate few conflicts at this point. Feeding ibis were moderately sensitive to low level overflights particularly from helicopters. However, ibis have acclimated to mans activity in the Lahonton Valley and actually benefit from the agriculture community which has increased ibis feeding areas with each irrigated field.

Little information is available on distribution or status of the rest of the shorebirds on the wetlands in the Lahonton Valley. Large numbers of shorebirds nest or move through the valley on annual migrations. Species

such as the dowitcher appear to be sensitive to aircraft disturbance. It is our recommendation that migratory shorebirds be examined in greater depth to identify overflight sensitive species. Observations for aircraft disturbances will occur at Carson Lake, Stillwater and other major wetlands utilized by shorebirds in the Lahontan Valley.

The Fish and Wildlife Service has initiated a study to monitor "Migratory Bird Populations and Habitat Relationships in Lahontan Valley, Nevada (1986-1990)". The study is designed to give an accurate assessment of the relationships between shorebirds and water, including the association of shorebirds to species competition, habitat conditions, and changes in habitat caused by other factors than water. The study will also identify public nonconsumptive use of the wetlands in respect to shorebirds, in the Lahontan Valley. Data from this study will be assimilated into this report on an annual basis. Cooperation with the FWS and NDOW to review production and population status will continue in 1987-88.

Monitoring of the white pelicans will continue to determine if conflicts in the Carson Sink area arise with air training operations. Nesting white pelicans documented on the Carson Sink in the spring of 1986 have not been observed as of June, 1987. The affects of the proposed changes to R4813 (Bravo 20 bombing range) will be monitored to identify potential conflicts with the white pelican's feeding and nesting activities in the Carson Sink/Stillwater NWR area.

Efforts to identify other overflight sensitive species through the literature search will continue in 1986-87.

Data from the FWS study on the migratory bird populations identified in the waterfowl section of this report will be assimilated into this report on an annual basis.

NEVADA DEPARTMENT OF WILDLIFE
NAVY ACTIVITY MONITORING WORK PROGRAM

PURPOSE/OBJECTIVES

At this time the Department has completed one field year of investigations concerning the impacts to wildlife by the Navy Air Station at Fallon. Our primary job objectives are to assess all impacts from supersonic and subsonic low level overflights activities, within the Lahontan Valley, the SOA, and the NOAs used by the U.S. Navy at NAS Fallon. Job activities described in this narrative are based upon the Record of Decision of June, 1985, and the Memorandum of Agreement between the State and U.S. Navy from 1986.

LITERATURE SEARCH AND REVIEW

The purpose of the literature review is to establish useful methodology to properly address impacts of Navy air operations. Abstracts or full copies of 200 citations have been reviewed to date. Literature on the effects of supersonic and subsonic aircraft disturbance on wildlife has been received from the U.S. Navy, Woodward and Clyde, Hubbs Institute, the Washington Department of Game, the Sierra Club, the Nevada State Library, and the U.S. Fish and Wildlife Service (USFWS). We feel that there are gaps in the body of knowledge concerning the effects of aircraft disturbance on wildlife, particularly in the long term effects of aircraft noise on wildlife.

The literature review and search for current information will continue with the assistance of the Navy, the state library, and other sources at our disposal. Our key interests will be in identifying auditory capabilities of wildlife associated with the Great Basin ecological community. We will continue to obtain information on research on the effects of supersonic and subsonic low level overflights on wildlife species of concern in Nevada.

FIELD INVESTIGATIONS

Big Game

Navy overflight and sonic boom data will continue to be assessed with big game distribution and density data to determine the emphasis of wildlife behavioral monitoring. Monitoring aircraft disturbances over mule deer winter ranges in the Clan Alpine and Desatoya Ranges will occur during the winter of 1987-1988. Aircraft disturbance sound measurements will be collected during field investigations, using the B&K sound meter.

Bighorn sheep data indicate a high dependency on precipitous terrain at Freeman Canyon and Box Canyon in the Stillwater Range. Recent introductions of sheep into the Clan Alpine and Desatoya Ranges have increased the distribution of desert bighorn sheep under the SOA. Monitoring these populations during the lambing season will occur this year from February through May. Aircraft disturbance sound measurements will be collected during field investigations, using the B&K sound meter.

Sonic boom monitor data, if available, will be analyzed to identify supersonic training activity concentration areas for comparison to big game distribution data to identify potential conflicts.

MAN DAYS

35

Upland Game

Navy overflight data will be assessed with waterfowl distribution and density data to determine the effects of aircraft disturbance on migratory waterfowl. Surveys will be conducted at Carson Lake, Stillwater NWR/WMA, and other wetlands within the Lahonton Valley. Potential impacts caused by improvements to R4813 (Bravo 20 bombing range) and the increased air traffic expected when the range becomes active will be addressed. Quantifying overflight numbers and intensity will be completed for these wetlands. Aircraft disturbance sound measurements will be collected during field investigations, using the B&K sound meter.

Chukar partridge will be observed for reactions to aircraft disturbance from June to August, 1988 in the Sand Springs range. Aircraft disturbance sound measurements will be collected during field investigations, using the B&K sound meter.

MAN DAYS

25

Nongame

Navy overflight and sonic boom data will continue to be assessed with nongame species distribution and density to determine the emphasis of wildlife behavioral monitoring. Wintering bald eagles will be monitored in the Lahontan Valley in February, 1988. Nesting Swainson's hawks will be monitored in the Lahontan Valley from May through July, 1988. Nesting goshawks and prairie falcons will be monitored for reactions to aircraft disturbance in the SOA, from May through July, 1988.

Migratory colonial shorebirds will be monitored for overflight impact responses at Carson Lake, Stillwater NWR/WMA, and Sheckler, S-Line from March through August, 1988.

MAN DAYS

30

Socioeconomic Response to Military Air Operations

The military air operations from NAS Fallon provides an excellent opportunity to document public awareness, acceptance and compatibility with other land uses. This facet of the program will continue to poll through the use of a questionnaire, the hunting, fishing, and non-consumptive recreating public to determine the possible effects of military aircraft training activities upon citizens using the SOA, MCA's, and the wetlands of the Lahonton Valley.

MAN DAYS

6

Administrative

Monthly and pay period reports will be completed as required. Binders will be updated as necessary. The final report draft will be completed and due on the 1st of November, 1988. The completed final report will be due to the Navy on 31 December, 1988

MAN DAYS

127

BUDGET
Fiscal Year 1986-87 and 1987-88

	<u>FY 1986-87</u>	<u>FY 1987-88</u>
Salary	\$35,053.00	\$37,637.00*
Travel	\$1,000.00	\$700.00
Equipment	\$750.00	\$300.00**
Fixed costs	\$2,172.00	\$1,810.00
Utilities	\$360.00	\$300.00
Mileage	\$3,060.00	\$1,530.00
Air operations	\$2,300.00	\$0.00
TOTAL	\$44,695.00	\$42,277.00

* Salary increase reflects a major reclassification change in the Department of Wildlife's biologist series classification.

** Equipment costs include purchasing of miscellaneous supplies needed to complete the final report.

*** SAVE OUR SKIES ***

Part 5

WARNING: MILITARY USE OF AIRSPACE MAY BE HAZARDOUS TO YOUR HEALTH

Military use of the sky for supersonic and low-level testing and flights can subject rural citizens to health hazards from noise, radiation, accidents, and air pollution. As the militarization of the sky increases, these risks increase, too.

There's no agreement within the scientific community on the specific current level of health hazards or on the general thresholds of risk associated with the military's use of the skies. But there's sufficient evidence to indicate that the military's traditional position -- "There's no risk, or, if there is, we lack adequate data to prove it" -- should no longer be acceptable, not that it ever should have been.

We can't rely on military scientists or researchers under contract to the Pentagon to carry out the research needed to get a better fix on health hazards. We need independent research. Ironically, however, budget cuts have already eliminated the Office of Noise Abatement and Control at the Environmental Protection Agency, and EPA's Office of Air and Radiation, which also faces cuts, has no regulatory authority and can only advise other agencies.

● NOISE

Everyone knows that a jet aircraft traveling at low altitude or at supersonic speeds makes noise -- noise that is disruptive to human beings and animals. Clearly this kind of noise can be a nuisance. Clearly it can cause property damage: shaking and sometimes breaking windows, cracking plaster and drywall. But there's more to it than that.

For people and animals alike, noise can create physical and mental stress, and may, if sufficiently intense, trigger hearing loss. Stress affects almost every bodily system, especially those weakened by illness or age.

Noise is an inescapable part of modern life. We put up with it. A farm tractor produces noise, but it doesn't necessarily cause stress, because it's not unexpected and because it's doing useful work. Noise becomes a health hazard when it comes as a surprise, when it's at high levels, when it's sustained, or when we can't do anything about it -- or all of the above. So measuring the effect of noise is partly a subjective exercise.

Noise is also measured objectively in "decibels" (dBA), the usual unit for expressing the relative intensity of sounds and the pressure a sound produces

on the human ear. Measurement of noise can be precise, but it still involves some complex concepts. In a brief summary such as this, it's difficult to spell out exactly how much noise an ordinary person or animal can handle without stress or damage, because the subject doesn't lend itself to simplification. But it's worth noting that a key factor is "total noise," which, for the purposes of this discussion, is the combined effect of indigenous noise, background noise, and aviation noise.

Indigenous noise consists of the noises generated by routine neighborhood or community activities. Background noise is the noise from major highways, trains, and industries. Obviously, the relative importance of aviation noise can be very great if indigenous and background noise levels are low. And that's a good working definition of noise characteristics in rural America.

Other things being equal, the human ear can handle a decibel range from near zero to about 130 dBA. Anything higher than about 120 dBA is potentially harmful to hearing. Risk varies with duration of exposure, of course. Current workplace noise standards require, for instance, that the average noise exposure over an 8-hour shift can't exceed 90 dBA; the maximum for any 15-minute period is 115 dBA; the maximum "impact or impulse" noise allowable at any moment is 140 dBA.

The following chart helps to put these kinds of noise levels in perspective. Keep in mind that "harm" levels involve exposure both over time and, at higher levels, the damage that can be caused by momentary "impact or impulse" noise. And keep in mind, too, that decibel measurement is logarithmic, which means you can't estimate effects with simple arithmetic. If one jet flying overhead at moderately low altitude produces 90 dBA, do two jets produce 180 dBA? No, they produce 93 dBA. But, conversely, a noise at 93 dBA has twice the intensity of a sound at 90 dBA, although it might not sound twice as loud.

Noise Levels & Effects

No harm:	dBA
Normal breathing	10
Leaves rustling in the breeze	20
Voice, soft whisper	30
Voice, normal conversation	60
Vacuum cleaner	70
Some risk of harm:	
Truck	90
Subway train	100
Jackhammer	110
Rock music (live)	110
Considerable risk of harm:	
Low-intensity sonic boom (1 PSF)	120
Propeller aircraft	120
Air raid siren	130
Machine gun fire, close range	130
Jet aircraft takeoff at 300'	130
Medium-intensity sonic boom (2.4 PSF)	135
~~High-intensity sonic boom (13 PSF)~~	~~140~~
High-intensity sonic boom (13 PSF)	150
Saturn rocket takeoff	170

You will note from the above that noise is also measured in "pounds per square foot" (PSF), a measure of the pressure created by a sound wave on an exposed surface. This measure is used to express noise levels caused by sonic booms and low-level flights.

A level of 1 PSF is potentially harmful to hearing. But sonic booms and low-level flights can produce many times this level. For example, the Navy in its Environmental Impact Statement for the proposed Supersonic Operations Area at Fallon, Nevada, calculates that PSF levels will range from 3.9 to 10.6. But actual readings taken in the area have reportedly ranged as high as 23.4 PSF, causing the Nevada State Medical Association to warn of "several possible areas of adverse influence on human health and psychology by noise exposure in general and sonic booms in particular."

An EPA publication, "Noise: A Health Problem," summarizes the findings of many current studies on the effects of noise on various bodily systems. In addition to hearing loss, documented problems include:

- High blood pressure among workers exposed to high noise levels;
- Low-weight babies born to mothers working in noisy areas;
- Possible links between noise, stress, and birth defects;
- Chronic insomnia triggered by repeated sudden disruption of sleep;
- Stress-related disease including ulcers, colitis, asthma, and headaches;
- Increased risk of disease from general lowering of resistance related to the fatigue effects of noise exposure.

EPA's reports also reinforce two other important points:

(1) The idea that "people get used to noise" is largely a myth. People do adapt to some kinds of noise and to some levels of noise — but there's a trade-off. Adaptation may involve living at higher levels of stress (recognized or otherwise) that can take their toll over time.

(2) The "startle effect" of sudden noise can cause temporary impairment of one's ability to function and reason. Depending on when and where this happens, the risk of accidents can increase dramatically.

Sonic booms: the Pamlico Sound case

In a precedent-setting case, the Navy acknowledged in 1974 that noise created by training flights can create unacceptable conditions for people and animals. A proposal for the Oceana Supersonic Operations Area involved withdrawing airspace for an Air Combat Maneuvering Range over Pamlico Sound, North Carolina. The Navy's Final Environmental Impact Statement resulted in rejection of the proposal. Instead, a training area was created over the ocean, off the North Carolina coast.

This is how the Navy summarized its findings:

"The reasons that [the proposal] could not satisfy requirements are:

- Aircraft noise and sonic booms are not acceptable to local populace;
- Restrictions to civilian aircraft operations are unacceptable;
- Possible disturbance of wildlife refuges is unacceptable.

Sonic booms can be somewhat startling to humans and animals and under certain extreme conditions can cause property damage. For these reasons they will not be able to impact any land areas.

It [the open-ocean plan] will cost considerably more, is farther from bases and poses greater technical problems. However, it will insure that the civilian populace and wildlife refuges are not disturbed by training."

The Famlico Sound case concerned an area of relatively dense population (by rural standards) and important regional wildlife refuges and flyways. Sportsmen, conservationists and local political leaders joined with many grassroots groups to organize powerful opposition to the Navy's original plan.

What's different about the Pentagon's current plans for the skies over rural America? The risks and hazards are comparable; the main difference is that the military's primary focus now is on areas of generally lower population density.

But the disturbances acknowledged by the Navy in 1974 have not diminished. Nor have they been adequately researched. It's no comfort to someone risking stress or hearing impairment to know that relatively few other people are being subjected to similar risks. It's comforting to the military, though, because people scattered thinly across the countryside are at a disadvantage when they try to organize against the concentrated power of the Pentagon.

• RADIATION

The military places "threat emitters" and scoring systems on along terrain beneath air routes used for combat flight training. These devices are currently being placed throughout the rural countryside, mainly in the West (see Part 6), with no protective shielding to control radiation, sometimes without fencing to keep people and animals from coming within close range -- and without sufficient research to assure that the emitters are safe.

These emitters send out a beam of non-ionizing radiation that simulates the radar guidance systems of anti-aircraft guns and surface-to-air missiles, and can be used to record whether a maneuvering plane successfully evades ground defenses. For the military, they provide a state-of-the-art training system that realistically simulates combat conditions without crippling or killing pilots. The obvious question is whether their radiation is crippling or killing civilians.

Most of us are aware of the potentially damaging effects of ionizing radiation, such as the gamma rays produced by a nuclear blast. Gamma rays, like X-rays, fall into the category of ionizing radiation, having sufficient energy to damage living tissue by smashing its atomic structure and, through ionization, dislodging cellular electrons. Given that man's capacity to

produce radiation is fairly recent, we've been learning --not quickly enough-- that some early assumptions about "safe" levels of exposure were wrong.

In the 1940s and early 1950s, scientists told soldiers not to worry about direct exposure to radiation produced by atomic tests. The scientists were wrong. The scientists are still learning -- but some of those guinea-pig soldiers are dead, victims of cancer caused by the tests.

The more the scientists learn, the more they revise their earlier reassurances. As recently as December, 1985, for example, the Nuclear Regulatory Commission recommended reducing the level of acceptable exposure within nuclear power plants. The more we learn, in short, the lower the acceptable levels of exposure.

Non-ionizing radiation lacks the energy to cause the kind of on-contact damage caused by ionizing radiation, unless tissue and cells are directly exposed to heat produced at high frequency -- as in a microwave oven. For that reason, sources of non-ionizing radiation are thought to be comparatively "safe."

And such sources are sprouting up throughout rural America, particularly in areas of military operations. Sources of non-ionizing radiation include the threat emitters and scoring systems for combat training, earth-to-satellite transmitters, radar installations, ground-based long-distance telephone relay systems, CB transmitters, and video display terminals.

What health risks are these radiation sources creating? Nobody's sure. Scientists don't fully understand the potential impact of non-ionizing radiation on people and animals. Studies of the health effects of non-ionizing radiation separate impacts into two categories:

(1) the effects of electrification of low-frequency non-ionizing radiation, as in power lines and video display terminals;

(2) the effects of heating of high-frequency non-ionizing radiation, as in microwaves and radar.

The slowly evolving state of our knowledge is disturbingly reminiscent of the early days of understanding (and misunderstanding) the effects of ionizing radiation. Here, for example, are some of the questions cropping up currently in scientific literature and news stories:

"Brain damage and unusual changes in spinal fluid have been detected in more than two dozen Swedish radar-maintenance workers exposed to microwave radiation for ten years or more . . ."

--Washington Post (1986)

"For the first time, biophysicists have demonstrated that DNA -- the molecular code of life -- resonantly absorbs microwaves. This finding . . . has prompted researchers to suggest that non-thermal genetic effects from low-level microwaves are possible . . ."

--Science News (1984)

"According to New Jersey officials, since the antennas [earth-to-satellite transmitters and ground-based relay systems] came to Vernon township, the percentage of children born there with Down's Syndrome, a

chromosome abnormality sometimes called 'mongolism' that seriously impairs a child's development, has soared to almost four times that for the general population . . ."

--Barron's (1935)

"Human data are limited . . . however, two recent studies of physiotherapists suggest two potentially significant health effects associated with work with radiofrequency equipment. The first is heart disease in males, the second is [abnormal] pregnancy outcomes in female physiotherapists . . ."

--EPA (1984)

The state of our knowledge being what it is (and isn't), common sense suggests we should proceed with extreme caution before exposing people or animals to additional sources of non-ionizing radiation. All the research returns aren't in yet. The returns so far, however, suggest that we're in for some nasty surprises -- and that military installations will provide many of them.

• ACCIDENTS

- Simple logic permits us to assert that people and animals living under the supersonic and low-level training-and-testing air corridors are at a higher risk of injury from aircraft accidents.

At the Rural Coalition we're still in the early stages of attempting to obtain useful data on military aviation accidents involving civilian populations. Until that data is available, we must limit ourselves to an observation based on fundamental common sense:

Obviously, risk increases when an area that has had zero supersonic flights suddenly experiences as many as 135 a week, as is the case in some areas. And it's equally obvious that a rural area newly designated for low-level flights faces a special kind of risk. A pilot whose engine flames out at 20,000 feet has a little time to deal with his problem, maybe even to bring his airplane down without killing anything in the process. A pilot encountering that problem at 200 feet has no time for anything, not even a quick prayer.

Sighted fisherman, same same

Another kind of accident can be caused by the tendency of some military pilots to do a bit of hotrodding when they get the chance. Sometimes the results are harmless, sometimes not. Two recent examples:

- In June, 1935, Navy pilots bombed the town of Fairview, Nevada. Fortunately, Fairview is a ghost town, but there's a silver mine nearby, and campers sometimes use the abandoned buildings in the town. Luckily, no one was camping in Fairview or working at the mine on the day the "accidental" bombing took place.

• In May, 1985, Marine pilots bombed three fishermen in a boat on Pamlico Sound in North Carolina. The fishermen reported that several jets first skimmed past them at low altitude, then reappeared and dropped bombs that hit within 50 feet of their boat. They were engulfed in smoke and, as they raced toward shore, they were buzzed repeatedly. One fishermen suffered severe burns and another, who breathed fumes from the explosions, developed pneumonia and was ill for two months, according to news reports.

Boys will be boys. And pilots will be pilots. Unless we're willing to tolerate more news reports like these -- and more deaths and injuries -- it makes sense to limit the airspace that we turn over to the Pentagon.



RURAL COALITION
Rural Military Issues Project
2001 S Street NW, Washington DC 20009

RC-RMIP / SOS-5 / 1.0 / 3-86

24 April 1988

Stan Busteed
Holiday Island Box 228
Hertford, N.C. 27944

Director A-95 Review
Department of Administration
116 W. Jones Street
Raleigh, N.C. 27603-8003



Dear Director:

Comments herein are directed primarily at the USAF Draft Environmental Impact Statement(DEIS) for the F-15 Beddown at Seymour Johnson AFB.

Conspicuous by its absence is any mention of USAF use of the Palmetto Target, Restricted Airspace R-5302, in the Albemarle Sound. This points out the continued lack of coordination between the military branches as to the cumulative impacts on the environment of joint use airspace. Other regional joint use airspaces sharing hazardous impacts are R-5313, R-5306, R-5311, plus hundreds of miles of low level military training routes.

This beddown proposal is just one of a series of environmental documents originated by agents of the Department of Defense (DOD) and aimed at impacting eastern North Carolina in the last six months. The Council on Environmental Quality Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act, 40CFR Parts 1500-1508, state clearly in § 1508.7 the requirement of agencies to consider cumulative impacts. § 1508.25 points out the requirement to consider cumulative actions and when related to similar proposals, to treat them in a single impact statement.

The U.S. Navy proposal 85-ASO-16, the USMC FEIS on the CherryI and Core MOAs, the USAF DEIS on the beddowm of F-15 aircraft, and some agency's forthcoming documents on the Mid-Atlantic Electronic warfare Range are all interrelated actions using common military airsoace and developing cumulative impacts significantly affecting the human environment. As all these military organizations are acting as agents of the Department of Defense, DOD should become the lead agency as detailed under § 1501.5 of the above cited regulation.

This business of the residents of eastern North Carolina trying to keep abreast of one proposal after another being tossed at them by all branches of the military is absurd. Are they expected to interrelate these themselves? Is this an example of military tactics to divide and conquer?

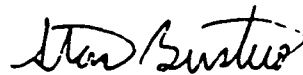
I ask that your office work to demand that the DOD present its long range proposal for all actions which may impact the human environment in eastern North Carolina, and then perhaps all residents may review, understand, and comment on the environmental impacts they will be asked to withstand.

Until such time as it takes DOD to prepare a DEIS on all perceived military requirements which may impact the human environment in eastern North Carolina, I respectfully ask your office to take the initiative and deny any military proposal or final action that would further degrade or deteriorate the quality of life in eastern North Carolina.

Aside from NEPA conflicts, this beddown DEIS as well as the other military proposals do not appear in consonance with the Federal Coastal Zone Management Act. These proposals exceed the initial exemptions granted federal military facilities thus inconsistent with the N.C. Coastal Management Act.

Thank you for your attention on this issue and continued interest in the environmental well-being of North Carolina.

Respectfully,



cc:SecDef
CEQ
EPA
Att.Gen. N.C.
Cong. Walter B. Jones
Sen. Jesse Helms



TOWN OF KILL DEVIL HILLS

Post Office Box 719
1634 N. Croatan Highway
Kill Devil Hills, N.C. 27948
(919) 441-2531

April 26, 1988

LOWELL M. PERRY

Mayor

COMMISSIONERS

C. E. BROUGHTON, JR.

JOSEPH DENEKE

LACY McNEILL

LURANA J. COWAN

LLOYD BALLANCE

Manager

WALLACE H. McCOWN

Attorney

MARY E. OUDLEY

Clerk

REBECCA E. WESCOTT, CPA

Director of Tax and Finance

DEBORA P. DIAZ

Administrative Assistant

WILLIAM G. LOY

Director of Planning
and Development

DARRELL A. MERRELL

Director of Water
and Wastewater Services

C. A. SMITH

Director of Public Works

WILLIAM E. GARD

Fire Chief

JAMES H. GRADELESS

Chief of Police

N.C. State Clearinghouse
Department of Administration
116 W. Jones Street
Raleigh, North Carolina 27611

Dear Sir:

The Board of Commissioners of Kill Devil Hills would like to go on record as opposing the new airspace requirements proposed by Seymour Johnson Air Force Base.

We do not think that night-flying should be allowed in our area as it causes a great deal of noise and is generally disruptive, especially in the proposed evening hours.

The Town is also greatly concerned with the fact that the Air Force has not met the National Environmental Protection Agency (N.E.P.A.) Act in two important areas. The first is that no public hearings have been held in this region concerning the proposed night flights by the Air Force. The second point centers on the fact that Environmental Impact Statements submitted are grossly inadequate for our area. Both of these are required by the N.E.P.A. Act.

Thank you very much for your consideration.

Sincerely,

Lowell M. Perry
Mayor

dc

cc: Board of Commissioners
Don Flowers, Albemarle Commission
Debora Diaz, Interim Town Manager
File

3.0 PUBLIC HEARING TRANSCRIPT

The Draft Environmental Impact Statement was released to the public March 10, 1988. A public hearing on the proposed action was held in Goldsboro, North Carolina on April 14, 1988. The following is the transcript from this hearing.

ENVIRONMENTAL IMPACT MEETING

F-15E BEDDOWN SEYMOUR JOHNSON AFB

OPENING REMARKS

BY: Colonel J. Jeremiah Mahoney

Good evening Ladies and Gentlemen. The National Environmental Policy Act and the implementing regulations require federal agencies to carefully analyze potential environmental impact proposed actions and to use those analyses in arriving at decisions or recommendations on whether or how to proceed with the proposed actions.

The Air Force has prepared and distributed in accordance with applicable regulations, a draft Environmental Impact Statement. In fact, Mr. Chavis has a copy of it here. This addresses a proposal to station F-15E aircraft at Seymour Johnson Air Force Base in Wayne County, North Carolina.

I am Colonel J. Jeremiah Mahoney. I have been designated by the Office of the Judge Advocate General of the United States Air Force in Washington, DC, as presiding officer for tonight's public hearing on this draft Environmental Impact Statement. I am stationed at Maxwell Air Force Base in Montgomery, Alabama. I am a full-time trial judge for courts-martial in the Air Force.

I'd like at this time to introduce the head of the Air Force team of experts, Colonel James T. Ferrell, the base commander at Seymour Johnson Air Force Base.

INTRODUCTION OF PERSONS PRESENT

BY: Colonel James T. Ferrell

Thank you, sir. What I'd like to do first, I'd just like to introduce the team we have representing the base and I'd like to start with Mr. Al Chavis, he's to my left over here. He's from Headquarters TAC Environmental Engineering. Mr. Charles Gruby, also from Headquarters TAC, Airspace Management. Mr. Bob Dobbins, to my right over here. He is the Base Civil Engineer representative. Lt Col Ken Allen, who is the F-15 project officer for the base, and of course, Lt Col Paul Henry, who is the Assistant Deputy Commander for Operations. And of course, Major Mark Ordess, Headquarters TAC/XP--from Plans.

Colonel Mahoney

I'd like to recognize everybody who has taken the time out of their personal schedules to come here tonight. Your presence is commendable in that it reflects interest in your community and the things that are important to us. I'm here to assure you that your interest is the sole purpose of our being here.

Now, as hearing officer, I am not an expert in this proposal, and I haven't had any connection with its development. Likewise, I'm not here to act as legal

advisor to the Air Force team of experts who will address the proposal. My purpose is simply to insure that we have a fair and orderly hearing and that all who wish to be heard have a fair chance to speak.

Let me take a moment to explain how the hearing will be conducted. This isn't going to be a debate or referendum on the proposals themselves. There'll be no demonstrations or referendum on it. The purpose of the hearing is to provide a public forum for two-way communication with a view to improving the overall decision making process. And you'll notice I said two-way communication. Part I of that calls for you to listen carefully to what the Air Force experts have to say as they brief you on the proposals on the anticipated environmental consequences. After the hearing there will be a period for you to ask questions to clarify in your mind any points made during the briefing concerning the draft environmental impact statement.

Part II of the process is for any statements or comments for you to tell the Air Force experts what you think and give the decision makers the benefit of your knowledge of the local area affected by the proposals and any environmental hazards that you may perceive.

So the purpose of the hearing is to identify and assess the pertinent impact between your personal perspective as to those impacts. You can take notes, if you wish, during the hearing and during the briefings, and fill out the comment sheets that have been provided as you came in the door. You can indicate on that comment sheet if you wish to ask a question or make a statement, and the subject matter involved. After the briefing I'll recognize members of the public for the purpose of questioning the Air Force experts. And then after that question period we'll receive any statements or comments from public officials or representatives of private organizations or from members of the public speaking as individuals. After any statements are received, then I'll devote any remaining time to taking any questions which may have been generated by the various statements, and then of course the hearing will close. Please don't be hesitant to ask a question or make a statement. This is an informal hearing and there are no dumb questions. I want to help insure that all who wish to speak are heard, so please help me by following these simple guidelines. First, please speak only after I recognize you and please address your remarks to me. Please speak clearly and slowly starting out with your name, address, and capacity in which you appear, that is, as a public official or as a representative of a private association or as an individual. Speak up so that our court reporter, Mrs. Elaine Morris, can get all this down accurately. She has the duty of making a verbatim transcript of these proceedings which will be considered in the decision making process.

Also, I'd ask you to only ask one question at a time. I'll permit a reasonable number of questions, but shot-gun questions tend to be confusing. Please limit your oral statements or comments to a reasonable period, five minutes is most likely a reasonable period. And finally, please honor any request from me to cease speaking, and don't speak while anyone else is speaking.

Now, it's possible that there will be questions that the Air Force representatives are not able to answer. This could occur, first, because even though they have

a great deal of expertise they will not attempt to answer a question tonight unless they are confident that they can do so accurately. And second, there may be questions that have a security implication and might require further review before the answers are provided. If this should occur, and the question is relevant, I can assure you that it will be addressed in the final document which you can request a copy of as indicated on the comment sheet you have been provided.

You will note that on that comment sheet, statements can be submitted at any time prior to 2 May 1988, mailing it to Lt Col Allen at Seymour Johnson Air Force Base. Whether you make your statement on the record tonight or whether you mail it in later, it will be carefully considered and made a part of the record of these proceedings and it will have equal weight and receive the same careful consideration whether it's made tonight orally or made in writing afterwards.

Now, at this time, Major Mark Ordess from TAC Headquarters will give an overview of the proposed action and then Colonel Ferrell the base commander at Seymour Johnson will give an overview of the Environmental Impact analysis process, and the anticipated environmental impact of this proposed action. Major Ordess.

BRIEFING ON PROPOSED ACTION

BY: Major Mark Ordess
(Accompanied by Slide Presentation)

Good evening Ladies and Gentlemen. I work in the office of Director of Programs, at Headquarters Tactical Air Command. Just to let you know what we do, we are in effect rather like the business managers of TAC. We manage the iron assets, that is the aircraft assets, of the Tactical Air Command.

The purpose of this briefing is, as he said, give you an overview of exactly what we are proposing here at Seymour Johnson Air Force Base. Now, I'll tell you a little bit about the purpose and the need, a little about the airplane; I'll go into some reasonable detail in describing the proposed action, and a brief review of the alternatives to the proposed action.

Simply put, Seymour Johnson is proposed to be the first F-15E combat coded wing in the United States Air Force. We plan to convert 72 F-4Es to 72 F-15Es. And the reason that we want to do that is threefold. Our long range strike capability is diminishing. The F-111 is both getting old and getting smaller in numbers, and so is the F-4. So, the time has come to replace these 1960's vintage weapons systems with a new airplane, and that is the F-15E. Second, the other guys are increasing the quality and the quantity of their capability, therefore, in order to keep pace we need to bring new weapon systems aboard. One of these is the F-15E. Now, the third reason is, the F-15E is cost effective. The airplane can perform the same air-to-air mission that the F-15A's and C's can, and it can also--the reason it's really built, it can do the long range night interdiction mission. So what you get is, you get two for the price of one. You get a more flexible weapon system and a more economically efficient weapon system.

Just a general description of the airplane. It's essentially a highly modified two-seat version of the F-15A and C. The aircraft is powered by two 24,000 pound class Pratt and Whitney engines. It is capable of speeds in excess of twice the speed of sound and in excess of 60,000 feet. The aircraft is also capable of intercontinental deployment without air refueling. It also has a combat radius of about 1,000 miles, depending upon the weapons load. The weapons load for this aircraft is in excess of 12 tons of munitions.

Now, one of the things that makes this airplane special is the Low Altitude Navigation Targeting Infra Red System for night which we could've said a lot, so we shortened it to LANTIRN. What this really consists of are two pods bolted onto the bottom of the airplane, and it gives the airplane three capabilities. It gives it a Terrain Following Capability, that is, we can fly this airplane at night, in the weather, close to the ground without hitting the ground. It has a Forward Looking Infra Red Capability which means the crew gets a black and white TV picture of what's in front of them. That's useful for two main things, it helps us to find the target that we are after, and two, it helps us with terrain avoidance. And finally, a Laser Designator. This is not a Star Wars laser. The primary purpose of this laser designator is to put a pinpoint beam of light on a target so that a bomb can follow the reflected light from the laser energy. The laser itself doesn't kill people, the laser only guides the weapons to the target.

Now, the F-15 has been the safest fighter aircraft in the history of the United States Air Force and we expect the F-15E to be even safer because we've improved the dependability of the avionics and of the engines. Now, how does that compare with the F-4? Hopefully this airplane will be safer than the F-4. As far as Air Traffic Control procedures and noise and emissions around Seymour Johnson, it will be pretty close. I don't have the numbers here, it's in the document. Essentially, the average fellow on the street won't be able to tell any difference.

The specifics of the action. I'm going to talk a little bit about the conversion schedule; what it means in terms of additional people here in the community, a little bit about military construction, and a few operational considerations.

This is a bit of a busy slide, so let me talk you through it. What the slide describes, it shows a schedule of the conversion from 72 F-4Es to 72 F-15Es, and it begins in the 4th quarter of 1988, which is, October-November of 1988, and that's the starting point with no F-15Es and a full wing of F-4s. Then we begin in January of 1989 and it flows through basically on a one-for-one basis.

We complete the action in 1991, and the main thing to note here is that we essentially keep about 72 airplanes at Seymour all the time. We are not going to have 72 F-15s and 72 F-4s. We are going to roll them out as the F-15Es become available. By June of 1991 we will add 220 people to Seymour Johnson Air Force Base, and they come in roughly at about 70 or so a year. The reason for this is, the aircraft, because it's more capable, because it carries more

munitions, requires a few more bodies--a few more people to work on and take care of that stuff.

This is a slide of the military construction required to support this new mission. Essentially \$12 million dollars in the initial build, and then in FY90 we have an additional \$3 million dollars that we are asking for that is unfunded at this point. The bottom line is a total of about \$15 million dollars in military construction at Seymour Johnson Air Force Base to support this new aircraft.

Now, this is a very busy slide, and all it is, it is a comparison of what the F-4s do today and what the F-15Es will do in the future. They are going to fly essentially the same sortie rates, but the only difference is they are going to fly at a little bit different time of day. This aircraft's claim to fame is the ability to fly at night so we are going to fly a few more night sorties, but I want you to notice those sorties will still happen between sunset and 10:00 o'clock at night. We are not going to be flying airplanes around the clock and we are not going to change--we don't plan to change the standing quiet hours which is there are no takeoffs after 10:00 o'clock and everybody lands pretty close after 10:00 o'clock. Military Training Routes are similarly effected. We are going to fly a little bit more at night on military training routes, and we are going to fly a little bit more on military training routes because of the little bit heavier emphasis on the air-to-ground mission. Finally, at the bottom, Dare County Range. That percentage there is the percentage of total capability at Dare County. Right now the Air Force uses about 78% of the capability of the range. We will probably up that to 94%, which is about the same level that the 4th Wing used Dare County when we had 4 squadrons here back in 1985.

So how did we come to pick Seymour Johnson as the base. Well, any basing action we have essentially there are four things we can do. You can do nothing. Well, that didn't seem to be a prudent thing to do because I explained to you how there is a requirement here to modernize our airplanes and to keep up with the Soviets in terms of quality and quantity of military hardware. So no action didn't seem to be a prudent thing to do. To delay the action, again, delays our capability to keep up, plus it ends up costing more money to delay. To build a new base; estimates are today that it would cost in excess of \$1 billion dollars to even begin building a new base with a new runway and all of that. So, that was monetarily out; it just didn't make sense. So, we started looking at other TAC bases. Seymour has the last active combat coded F-4 unit. So, when we looked at the range, and the airspace, and all of the things that the 4th Wing has here, Seymour Johnson came out to be the best choice. We believe Seymour Johnson is the preferred alternative for the F-15E beddown.

So in summary, we are swapping out 72 F-4Es for 72 F-15s over a two and a half year period. We'll complete the action in the summer of 1991.

BRIEFING ON ENVIRONMENTAL IMPACT PROCESS

BY: Colonel James T. Ferrell

What I'll do is talk to you about the Environmental Impact Process and the

Environmental Impact Statement. An Environmental Impact Statement is required to support the programmed F-4 to F-15E aircraft conversion at Seymour Johnson Air Force Base. From now on I'll refer to this as the EIS. I'll shorten it a little bit.

This EIS is part of federal agency's responsibility under NEPA, which is the National Environmental Policy Act, it's a charter for protection of the environment. NEPA is divided into two parts. The first provides declaration of National Environmental Policy, and the intent is to create and maintain conditions under which man and nature can exist in productive harmony. NEPA's second part establishes the council on environmental quality to advise the President on environmental trends and publish guidance for federal agencies to meet NEPA requirements. Federal agencies are required to implement procedures to make the NEPA process more useful to the decision makers and the public, to reduce paperwork and to emphasize real environmental issues and alternatives. To integrate the requirements of NEPA with other planning and environmental procedures, to encourage public involvement in decisions which effect the quality of the environment, and to enhance the quality of the environment by adopting litigation measures which would minimize the impacts. The Air Force policy and NEPA implementation procedures are contained in Air Force Regulation 19-2, titled, the Environmental Impact Analysis Process. Therefore, as NEPA and our own Air Force Regulations encourage, we invite involvement of the public and government officials throughout the environmental impact analysis process.

Our public participation program for the EIS includes the following actions to solicit public involvement. First, a notice of intent to prepare an EIS was published in the Federal Register on Friday, November 13th, 1987. Press releases were issued and announcement letters sent to Federal, State and local government and civic leaders. Next was the Scoping meeting to determine the significant issues. The issues raised in the 17 December 1987 Scoping meeting have been analyzed in the draft EIS. The draft EIS was made available to the public on 10 March 1988 and filed with the EPA on the 11th. The public comment period opened on the 18th of March and will close on the 2nd of May. This provides the public 45 days to review the draft EIS, and the public hearing is being held tonight to collect verbal comments and written statements. The Air Force will then consider all relevant issues raised, and provide a response in the final EIS. News releases and announcements will be made throughout the process to advise on the process.

These are the approximate milestone dates for the completion of the environmental impact analysis process as it relates to the aircraft conversion at Seymour Johnson Air Force Base. We have met all the milestones from the 13 November 1987 date to tonight, the public hearing. And of course, the public comment period will close on the 2nd of May 1988. After evaluation of public comments, the draft will be revised into a final EIS which will be filed with the Environmental Protection Agency and public notice given. We anticipate a record of decision on the EIS for the programmed aircraft conversion in July of 1988, and notice to proceed with the conversion in September.

Again, this is a busy chart, and I would like to review with you the findings of the potential environmental effects should the Air Force decide to implement

the aircraft conversion at Seymour Johnson Air Force Base. The quality of air pollutant emissions at the base, range, and on the MTR's which are the training routes, will be slightly reduced from that emitted by the F-4s. If the Air Force chose not to implement the action, there would be no change in the quality of emissions. Noise levels around the base would return to the 1985 conditions when we had 96 F-4s assigned to the base. Specifically, the action would increase the overall noise levels by about $1\frac{1}{2}$ decibels. This level of increase is generally not considered to be significant by either the FAA or the Air Force. Projections of noise level on the Military Training Routes and on the range indicate a 1 to 2 decibel reduction on the MTR's and about 1 decibel increase for the range. Again, these changes are not considered to be significant. The noise level on the Military Training Routes are well below the criteria of HUD for acceptable residential living. The physical environment, the non-biotic or non-living part of our environment would not materially change if either the proposed action or the no action alternative were selected. Impacts from the construction of facilities at the base, or construction and maintenance of targets on the range are temporary activities, where effects can be controlled to acceptable levels. We have considered the potential effect of an increase in generation of hazardous waste of the base as a result of implementing the proposed action. The F-15E will generate about 4 more gallons of hazardous waste per aircraft than the F-4s. This level of increase is minor and well within the capability of the base manage. It is anticipated our waste minimization program will continue to reduce the quantities of hazardous waste generated at the base, and with this program in effect, we feel that in the long run there would be little if any real increase. Potential effects on the biotic environment are minimal. The indigenous vegetation and wild life have been previously disturbed as a result of urban and agricultural development near the base. It is not believed that the minor changes and noise levels would be a limiting factor for the wildlife or animal's continued use of their existing habitats. In respect to the no action alternative, the proposed action would not materially change the biotic environment.

We believe night operations pose more of a risk than day operations. This is true for any type of aircraft. However, when one considers the enhanced night vision capability of the F-15E over that of other aircraft in the inventory, the relative difference is well within acceptable safety thresholds. Lasers similar to the LANTIRN's laser have been used on the Dare County Range for a number of years. Safety procedures have been developed to protect the aircrews as well as range personnel on the ground. Some of these procedures such as removing reflective surfaces and location of targets also provide protection for wildlife. In respect to potential environmental impact of the proposed action as compared to the no action alternative, there would be no real change to the environment if either alternative were chosen.

Analysis of socioeconomic impact focused on changes in local economic conditions, and the impact of changes and noise levels could have on residential property values. The results suggest a net positive impact on the local economy due to the projected increase in manpower and construction activities associated with

the proposed action. With respect to the impact of noise on residential property values, the effects would be minimal. Most of the development now effected by aircraft noise has been constructed with full knowledge of the existence of Seymour Johnson Air Force Base. Property values in these areas therefore already reflect to a great degree valuation based on aircraft overflights, noise, and aircraft crash potential. In a continuum of time there would be no real difference between the future and the recent past when we had 96 F-4s assigned to the base.

Consultation with the State Historic Preservation Officer has indicated no knowledge of any cultural resources on the base or the range. Many of the archeological sites under the Military Training Routes are prehistoric with no above ground remains. These buried artifacts would not be impacted by the proposed action. Because of the industrial nature of the operations at Seymour Johnson Air Force Base, the aesthetic values of the base are unlikely to be adversely impacted by the proposed action. The aesthetic quality of areas in the vicinity of the range could be effected by the increase in noise level; however, the projected 1 decibel increase is not considered to be significant and should not be noticed by the local residents. It is not believed the proposed action will significantly impact the recreational value of the Cape Hatteras National Seashores or Cape Lookout. Noise levels on the Military Training Routes will either remain the same or slightly reduce.

As Colonel Mahoney has already said, you have the option of either making comments tonight, as he will recognize you later, or if you would like, this is the address and the date of where you mail your comments and statements to us, attention: Lt Col Allen at the base, and as we have said, every issue or comment will be addressed.

Colonel Mahoney.

Thank you, Colonel Ferrell. And that address is on the comment sheets that you have also.

We will now turn to the question and answer period of the public hearing. This is the time set aside to allow you to ask questions about the content of the briefing and the draft Environmental Impact Statement. It's not intended to be a period for comments or statements which will come later, but merely to provide you with more detailed information in response to any questions you may have. So, please limit any questions at this time to the briefing or the draft environmental impact statement.

Is there anyone that has a question, if so, please step forward?

(There is no response from the audience.)

Apparently, everything has been made very clear. If there are no questions, then we'll proceed to the part of the hearing for oral comments or statements by anyone who wishes to make those at this time instead of submitting them in writing to be considered at a later time. Is there anybody that wishes to

make a statement or make comments?

(There is no response from the audience.)

Apparently not. I don't want to solicit them unnecessarily, but this is your chance if you have anything you want to say for the record. If not, as we have indicated, the comment sheets have the address. Any comments or statements can be sent to the base in care of Lt Col Allen, and they certainly will be considered as part of the report.

Okay, apparently there are no further comments, questions or statements. Any written statements submitted will be fully considered and addressed in the final impact statement.

Once again, we as the Air Force, appreciate your effort to come out tonight and contribute your views to this public hearing. On behalf of myself and the members of the Air Force team we thank you for your attention during this hearing, and assure you that the Air Force decision makers will carefully consider the viewpoints of any statements received on this Environmental Impact Statement in deciding the ultimate course of action on the proposal to beddown the F-15E's at Seymour Johnson Air Force Base.

Since we have nothing further at this time, the hearing is adjourned. Thank you.

4.0 RESPONSE TO DEIS COMMENTS

1. The Air Force recognizes the importance of farmlands in eastern North Carolina and agrees that the resource must be protected. We believe the proposed action would not result in a noticeable effect to farmland because there would not be a significant increase in air pollutants or noise.
2. Construction activities to support the proposed aircraft beddown will be conducted with appropriate erosion control measures to prevent offsite sediment damage. Erosion potential at the base is slight due to the relatively level topography.
3. The Air Force appreciates the Soil Conservation Service comments and will, where possible, use locally adapted plants to help prevent soil erosion.
4. We believe reference to both time periods is important for understanding the short as well as the long term effects. The 1986 baseline has been used for evaluating short term environmental effects. Reference to the time period when 96 F-4 aircraft were assigned to the base is valid from a socioeconomic standpoint as well as giving local people a benchmark for what the ambient noise levels could be if the proposed action is adopted. Longer time periods are also used by community planning officials in evaluating long range zoning proposals.
5. During preparation of the draft Environmental Impact Statement (EIS), land use categories were evaluated and residential property was determined to be the principal area of impact. The analysis does generally provide the requested information for residential property. A building-by-building count for commercial and institutional properties would only have academic value and limited use in bettering the understanding of effects in the more pronounced area of probable impact.
6. We believe the comment refers to Figure 4.7-4; however, reference to background noise levels is done deductively by referencing Section 3.7.1.3 of the DEIS. Consequently, the Brogden and Walnut Creek areas are taken to have a 55 DNL noise level. Although we believe this is conservative, no noise surveys have been conducted.
7. In line with comment 4, Figure 3.2-2 only provides a benchmark for showing the noise contours during the 1983 time period. To gauge the short term impacts, the reader should compare Figures 3.2-3 and 4.2-1 which are comparably scaled. Brogden and Walnut Creek have been identified on the maps which are provided in the errata section of this document. Tables 4.7-3 and 4.7-4 both represent "worst case"; the change in the noise level column represents the difference between a value of 55 DNL or the comparable compatible use district (CUD) from Figure 3.2-3. (if the area in question is within the AICUZ), respectively.
8. A-weighted peak noise levels are provided in Table 3.2-2 and, although no noise surveys have been conducted, page 4.2-4 of the DEIS discusses typical DNL values for the MTRs.
9. The Air Force believes it has adequately evaluated the potential cumulative impact of the proposed action. See Section 2.1 of the DEIS.

10. The draft EIS unfortunately gave the impression that flights could and would occur on all segments of the MTRs at an altitude of 100 feet and higher. This is not the case. All military low-level training is conducted in accordance with restrictions published in the Department of Defense Flight Information Publication Area Planning Guide section 1B (DOD FLIP AP/1B). On VR-1043, overflight of the Cape Lookout area is restricted to a minimum altitude of 750 feet (1500 feet from June 1 to September 1). Overflight of the Cape Hatteras National Seashore is restricted to above 1000 feet along VR-073. See Appendix A for FLIP AP/1B listing of the MTRs discussed in the EIS.
11. Ingress to BT-9 or BT-11 from W-122 A/B/C is not and is not projected to be a normal or frequent occurrence. In those cases where overflight is required, it will be done in accordance with the restrictions contained in AP/1B.
12. W-72 contains an Air Combat Maneuvering Instrument range where supersonic operations can be conducted.
13. Hours of operations along MTRs are as published individually in AP/1B. Projected hours of operation of the 4TFW F-15Es are as published in the draft EIS, 0600-2230, unless further restricted by AP/1B. Aircraft speeds on the MTRs are by regulation 360 knots minimum to 540 knots maximum ground speed; commonly, 420 to 480 knots ground speeds are planned. Flight altitudes are in accordance with AP/1B. Specifically, along VR-073 over the Cape Hatteras National Seashore and the Outer Banks, 1000 feet minimum. The Air Force has not determined which specific segments of the various MTRs would be used for flight operations at the 100 feet level. Therefore, all calculations represent a distribution as discussed in the draft EIS (see section 4.2). Noise levels in Cape Hatteras and Cape Lookout National Seashore would change from 56 to 54 DNL and from 44 to 41 DNL, respectively. During the summer months, noise levels under VR-1043 and Cape Lookout N.S. would change from 49 to 36 DNL. In addition, we are incorporating the Marine Corps EIS for the establishment of the Cherry I and Corps MOA. That document indicates that noise levels in the Cherry I MOA would be around 72 DNL. Comparing projected noise levels for the MTRs shows that noise levels for the area would be dictated by operations in the MOA.
14. See comment response 11 above relative to ingressing BT-9/BT-11 from W-122 A/B/C. The requirement to discuss these ranges was deleted in the scoping process for the EIS. Their use is limited and level of continued use would not materially change. Additionally, their use is not airframe dependent, and consequently, their continued use is not related to the proposed aircraft beddown. The Air Force is not a party to the establishment of any MOAs in the national seashore area.
15. VR-1043 crosses the southern end of Cape Lookout National Seashore. Since there would be no change to existing airspace, including currently established overflight altitude restrictions, the effects of the proposed F-15E beddown would be limited to the increase of flights during the evening hours. From a relative standpoint, the F-15E in cruise power is quieter than the F-4 and consequently the overall noise level would be less. Visitor annoyance would be expected to be slightly less. At the present level of flyovers, flights over Cape Lookout pose no significant impact to visitor use of the seashore (Chuck Harris, Cape Lookout Chief Ranger, May 19, 1988, personal communication). Also see comment response 13 above.

16. See comment response 15 above. The minimum altitude on VR-073 over the Outer Banks, including Cape Hatteras National Seashore, is 1000 feet.
17. The action being analyzed in the environmental impact statement is for replacement of F-4 aircraft by F-15Es. Alternatives for this action must relate to how the action can be accomplished. Finding other airspace users whose operations may present less impacts is not considered relevant.
18. See comment response 9 above.
19. The analysis provides enough data to show that any effect of noise on wildlife would be minimal. No further analysis is needed. See Section 4.4.
20. The EIS did not differentiate effects for day and night operations because it is believed that the difference is negligible. With respect to nighttime operations, it is pointed out that the MTRs now have nighttime operations; the proposed action would just increase the number of flights on a given MTR from about one sortie every third night to one per night. The consequences of these increased number of flights is not well known due to the fact that the only studies on the effects of sonic or subsonic noises on animals during the nighttime have been performed on one domestic species. Information on impacts to wildlife species over the MTRs is not available.

Few studies have been made to document the effects of aircraft noise on animals during the evening or nighttime. Many studies have been performed during the daytime, primarily because it is during this time that most sonic and subsonic impacts are experienced. Evening or nighttime impacts are important, however, because it is during the evening hours that most wildlife which are active during the daytime are seeking a safe location to spend the night. It is, therefore, a sensitive period of the day for most wildlife.

The only research projects documenting the effects of sonic or subsonic noises on animals during the nighttime were performed on domestic hens. In the first study, Stadelman (1958a) subjected the fertilized eggs of domestic hens to incubation under conditions of sound (over 120 dB) or no sound (under 70 dB). Sound was present 8 out of every 20 minutes from 8 a.m. to 8 p.m. each day and from 8 p.m. to 8 a.m. every third night. The sound produced inside the incubation boxes consisted of playbacks of recorded background airfield noises and noise from propeller and jet aircraft. He observed no effects on hatchability of eggs or on the quality of chicks hatched. Stadelman (1958b) then subjected domestic chicks to aircraft flyover noise at 80 to 115 dB at 300 to 600 Hz. The chicks were exposed to the sound daily for 5 out of every 20 minutes from 8 a.m. to 8 p.m. and from 8 p.m. to 8 a.m. every third night. He observed no difference in weight gain, feeding efficiency, meat tenderness or yield, or mortality between sound exposed and non-exposed chicks.

References:

Stadelman, W.J. 1958a. The effect of sounds of varying intensity on hatchability of chicken egg. *Poultry Science* 37:166-169.

Stadelman, W.J. 1958b. Observations with growing chickens on the effects of sounds of varying intensities. *Poultry Science* 37:776-779.

Pearson, E.W., P. Skon, and G.W. Corner. 1967. Dispersal of urban roosts with records of starling distress calls. *J. of Wildlife Management* 31:502-506.

21. See comment response 9 above.
22. The percent increase in use of the MTRs is 14 vice the 34 shown on pages xiii and 2.1-2 and the 38 shown on page 4.2-4 of the draft EIS. The Air Force regrets the sortie rate discrepancy shown in Table 2.1-3. The 36 sorties shown for the proposed action during 0600-2200 hours should have been listed as 32 sorties and the 14 should have been 10 for the sunset to 2200 hour time period. The baseline was derived from data collected during a period in 1985 and 1986.
23. MTR utilization data is not archived, and we are unable to provide the requested information.
24. The Air Force has provided the Department of Interior with a list of counties under the MTRs and has initiated informal consultation for the following endangered species: wood stork, red-cockaded woodpecker, bald eagle, american peregrine falcon, roseate tern, gray bat, Indiana bat, Kemp's (atlantic) ridley sea turtle, leatherback sea turtle, and the recently proposed endangered northeastern beach tiger beetle; and the following threatened species: arctic peregrine falcon, piping plover, dismal swamp southeastern shrew, green sea turtle, and the loggerhead sea turtle. The Air Force anticipates the proposed action would not jeopardize any of the above species and is continuing discussion with the Fish and Wildlife Service's Raleigh Field Office. There would be no construction activity in the habitats of the shrew and tiger beetle and the long-term and instantaneous noise levels would be less than currently experienced. The only known potential effect on the turtles would be use of landing lights when coming across the seashore on the MTRs. Only the loggerhead turtle has been identified as being disoriented by lights. The aircraft would not be using landing lights in the area. It is believed the gray and Indiana bats would be active below the altitude of the F-15E aircraft. There is no similarity between the bat's echo-location process and aircraft radar. Previous studies on the red-cockaded woodpecker, arctic and american peregrine falcons, and roseate terns indicate overflight of the magnitude proposed should not result in jeopardizing the species. The Air Force has agreed to follow its common practice of modifying MTRs to avoid eagle nests by 500 feet AGL and/or 1000 feet horizontal and is willing to do the same for the piping plovers from March to August of each year. FWS has agreed to provide the Air Force information on nesting locations of eagles, storks, bats, red-cockaded woodpeckers, and piping plovers and will review available literature on all species as part of the Section 7 coordination process under the Endangered Species Act. The Air Force will continue to work with the FWS to develop any necessary mitigation for the various species.
25. See comment response 24 above. Also see Appendix B of this document. County level maps for each MTR are provided in Appendix B.

26. Data is not available at this time to show which segments of the MTRs would be flown below 500 feet. Flights will be conducted in accordance with altitude restrictions in AP/1B. See Appendix A.
27. The cited text are correct. The F-15 aircraft is generally quieter than the F-4, except when doing pattern work around the airfield. Consequently, the amount of acreage impacted by noise at the end of the runways would shrink and the acreage adjacent to the runways would increase if the proposed action is adopted. F-15E operations along the MTRs and in the MOA would generally be about 6-12 decibels less than that created by an F-4.
28. The Alligator River, Pea Island, Pee Dee, and Carolina Sandhills NWRs are under airspace that would be used for the proposed action. Pungo NWR is adjacent to R-5314, but due to its location probably would not be affected because the local range regulation requires the pilots to avoid the NWR by 5NM. Per AP/1B, Swanquarter NWR is to be avoided by 5 NM or 8000 feet MSL. Mattamuskeet and Cedar Island NWRs are not close enough to any of the MTRs to be affected by the action. The Air Force requests an opportunity to consult on the proposed Roanoke NWR to assure any management objective developed takes into consideration on-going military flight activity in the area. See Appendix B.
29. The comment on potential increased use of the range is speculation; increased use of the range is not planned at this time. The draft EIS does provide a brief review of the magnitude of noise increase should the forecast come true. Any additional use of the MTRs as a result of this shift of operation would represent less than one-half a decibel increase in noise since the activity would be spread over several MTRs. A half decibel increase in noise level would not be noticed.
30. The standard operating procedure published in AP/1B shows VR-073 to have a minimum altitude of 1000 feet AGL over the outer banks where Pea Island NWR is located. The noise levels are expected to change from the current 56 to 44 DNL.
31. AP/1B shows IR-721 to have a minimum altitude of 2000 feet AGL over the Pee Dee NWR and 2500 feet AGL over the Carolina Sandhill NWR. The noise level in the Pee Dee and Carolina Sandhill NWR are calculated to be 44 and 42 DNL, respectively. It is expected the noise levels would be 32 DNL in the Pee Dee NWR and about 30 DNL in the Carolina Sandhill NWR if the proposed action is adopted.
32. In general, the Air Force does not believe low level overflight of wildlife refuges represents a significant conflict with the management objectives of the refuges. There are a number of refuges where the Service has indicated their management objectives are not affected and in some cases are enhanced by the Air Force's presence. We have been working with FWS in their effort to establish new waterfowl areas adjacent to the Dare County range. While there may be some compromising, overall we believe the two programs can coexist without major impacts. Also see comment responses 28, 30, and 31 above.
33. See comment response 28, 30, 31, and 32 above. In regard to the Pamlico and Pungo rivers and the Sound, the Air Force does not believe mission objectives could be met if the area was avoided. We are willing to work with the FWS to find mutually acceptable ways to minimize potential impacts to resource lands.

34. While this is a common feeling shared by many people doing wildlife conservation work, we have not found or been shown persuasive data supporting the position that low level operations have caused a decline in species populations.
35. See comment responses to comments 32, 33, and 34 above.
36. Frequency spectrums of the F-15E are provided in Appendix C of this document. It is pointed out that it is not only the amount of energy at a particular frequency, but time of duration must be evaluated to determine relative impacts. High noise levels may be disruptive for a short duration, causing flushing and cowering type responses in some individuals of a given species, but the noise levels should not be sustained for enough time to cause hearing damage.
37. The commenter is correct that there is no data to support the conclusion that there has not been at least some limited animal effects. However, the Air Force has not found or been shown data to support the view that there has been an effect resulting in noticeable wildlife losses. We have been operating jets for a number of years at bases and ranges near waterfowl habitat, and we continue to develop new land management techniques to minimize bird strikes. While no surveys have been conducted to determine carrying capacity for these areas, they contain a variety of waterfowl.
38. The Air Force is interested in protecting the waterfowl of eastern North Carolina and is willing to participate in studies with the Department of the Interior that will lead to a better understanding of the interrelationship of habitat use and anthropogenic induced stresses. This is one of the issues raised by the Air Force concerning FWS's recent proposal to create new waterfowl habitat adjacent to the Dare County range. This should also be a subject of discussion for the proposed Roanoke NWR.
39. See comment response 24 above. The Air Force does not believe any of the endangered species would be adversely affected by the proposed action. The action represents a minor increase in operations in areas that have been used for this type of flight operations for a number of years.
40. The wavelength and exposure duration of the radar is 0.7 inches and 0.06 seconds, respectively. The footprint and frequency are classified data and cannot be released; however, the latter is within the Ku band (i.e., 16GHz region). The radar power level is less than 10 milliwatts/cm-squared at a distance greater than 50 feet from the aircraft. Since wildlife cannot fly at the speed of the aircraft, they would not be able to stay within 50 feet of the plane long enough to receive a damaging exposure. Consequently, this subject was deleted during the scoping process for the EIS.
41. The commenter misread the sentence describing the laser beam width. The sentence says the beam width can vary up to a maximum of 75 feet wide. In 1984, the base Bioenvironmental Engineer designated a 2000 feet hazard zone around laser targets on the range. The hazard zone contains the direct beam plus a buffer zone around the beam. All laser targets are more than 2000 feet from the range boundary. Effects of the laser on wildlife are believed to be similar to that discussed in the draft EIS for people. Based on previous use of lasers (with similar characteristics) on the range, we believe the LANTIRN system can be deployed without any adverse effects to wildlife.

42. See comment response 9 above.
43. The Air Force believes this is a valid comment, but one without a short term answer. Useful data for addressing this issue are sparse. Most studies of impacts to wildlife from aircraft and loud noises have not been performed to evaluate the cumulative impact of a sequence of noises. In addition, specific reactions to sounds can vary according to the species involved and the environmental situation in which the impacts occur (Bell, 1972). Newman and Beattie (1985) agree with this opinion. They state that "a significant amount of research has been conducted on the reactions of animals to noise," but that it has been "difficult to draw any general conclusions on the subject because there is much variability in response both between and within species."

Several studies, however, have been made under worst case conditions which would be equal to or greater than the MTRs discussed in this EIS. These studies indicate that some wildlife species apparently live in areas where there are nearly constant loud noises without being affected by the sound. Rats live in subways, mice in milling plants, and crows, pigeons, starlings and gulls live close to airfields. Some studies also indicate that not only passerine birds and rodents but also large mammals, such as deer and a number of large birds including raptors and vultures, have healthy populations near airfields. Ellis (1981) found that responses of nesting Peregrine Falcons and other raptors to extremely frequent and nearby jet aircraft were often minimal, seldom significant, and never associated with reproductive failure. He noted that while the birds observed for this study were often noticeably alarmed by the subject stimuli, the negative responses were brief and never productivity limiting. Thiessen and Shaw (1957a,b) even attempted to repel ducks from a Canadian airport by using a very loud siren, without success.

Other studies show a definite avoidance or panic in response to aircraft and/or aircraft noise. Reports describe caribou walking or running away from both fixed- and rotating-wing aircraft, the stampeding of sheep, the fast trotting, scattering and panic of wolves in the presence of a helicopter, the flushing of snow geese, and the decrease of egg production of bald eagles (Ruth, 1976; Salter and Davis, 1972). A working group of the Acoustic Society of America (1980) reported Common Eiders, Lesser Snow Geese, and Oldsquaws were very sensitive to low flying aircraft and helicopters. The group noted that strange reactions were elicited in flightless sea ducks during low level flights. These studies seem to contradict reports which indicate that wildlife can be unaffected by this type of noise.

The fact that some species and populations can adapt to aircraft and aircraft noises is due to the fact that these groups have become habituated to the noise and visual stimuli. They have, in fact, learned to live in this highly artificial environment. On the other hand, other species and populations seek to avoid these types of stimuli. They either have an inability to tolerate the noise and visual stimuli or for some reason have not become habituated to the stimuli. This situation is complicated further by the fact that reactions in animals not only vary between and within species, and at different stages of life, but also vary considerably with the seasons, ecological niches, animal population density, social activities, the nature of the sound, and any associated visual stimuli.

The majority of studies tend to indicate that most animals will become habituated to loud noises and visual stimuli if subjected to those stimuli for a sufficient length of time with no unpleasant experiences associated with those stimuli. However, because of the already mentioned uncertainties related to the habituation of species to these stimuli, no precise prediction of the response of wildlife from flights of F-15Es on the indicated MTRs can be made at the present time. We believe the limited changes in operations do not represent a change beyond the operational fluctuations experienced in the past. If noise is a stressor for wildlife then the potential is much greater at our bases than what would be experienced on the MTR's and ranges. (It should be noted that the noise levels on the MTRs are expected to be reduced under the proposed action.) It is also pointed out that we continue to manage our airfields in a manner to discourage waterfowl, wildlife, and other animals. Similar experiences are true for our ranges. The Air Force would be pleased to discuss the possibility for assisting on any U.S. Fish and Wildlife Service (FWS) funded sensitivity type studies for the proposed waterfowl habitat near the Dare County range and the proposed Roanoke NWR.

References:

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44. Seymour Johnson AFB has adequate methods for receiving public complaints. There are numerous telephone lines to the base. Public affairs can be called through the base operator, or can be reached directly at (919) 736-5411. A news release is

issued annually which informs the public how to contact the base for inquiries or complaints.

45. Civil pilots often request clearance from the Navy's "Giant Killer" air traffic controllers at NAS Oceana for transit through R-5314; however, Giant Killer is neither the controlling agency nor the using agency for R-5314. The Charlotte sectional chart shows Giant Killer controlling other restricted areas adjacent to R-5314. It appears the public is misled by the depiction of Giant Killer's VHF frequency charted near R-5314; however, further subdividing R-5314 is inappropriate. The Air Force has requested Giant Killer to emphasize to civil pilots that R-5314 is not a Navy restricted area and that Giant Killer cannot clear traffic through.
46. Comment noted. Current and projected 4TFW aircraft operating in Dare County range ingress/egress the range under Instrument Flight Rules (IFR) with radar control or along published MTRs. Projected increases in operations reflect increased operating hours, vice more intensive operations, and should not have a negative impact on established procedures. The F-15E conversion was announced well in advance to permit an ample opportunity for planning. It is not anticipated that IFR service would be substantially changed by the F-15E.
47. Yes, a hearing provides the public an opportunity to participate in the decision process. Public input helps assure that the decisionmaker understands the full effect of the action.
48. The draft EIS is structured so that the effects at the base, range, and MTRs are discussed under a given environmental topic.
49. Comment noted. The Air Force, Navy and Marine Corps are working with local officials and individuals in eastern North Carolina to evaluate current operations. This is a part of the Air Force's on-going community relations program and is beyond the scope of this environmental analysis other than to indicate that the standing policy will continue if the proposed action is adopted.
50. The third sentence of paragraph 3 on page 2.1-1 has been modified to indicate that afterburner use would be limited and primarily used during the summer months. See the errata section of this EIS.
51. Comment noted. The draft EIS discussed effects at the base, range, and MTRs.
52. Turbulence (in terms of overpressure [pounds per square feet]) is discussed on page 4.8-1 of the draft EIS.
53. Comment noted. The Air Force's review of general literature on noise indicates there is a degree of habituation to noise.
54. Flight restriction for the MTRs were omitted from the draft but have been included in this document; see Appendix A.
55. Comment noted. The subject has been included in the summary of this document.

56. The sixth line of the first paragraph of section 2.1 should have indicated the F-15A/B/C/D mission mix is 80 percent air-to-air and 20 percent air-to-ground.
57. The Air Force appreciates assistance in finding typographic errors; we apologize if they cause difficulty in understanding the draft EIS. See the errata section of this EIS.
58. The primary routes that would be used have been included in the draft EIS. It is possible that some of the other routes may be used, but their use would be limited. If Seymour Johnson AFB desires to concentrate LANTIRN sorties on any route not assessed in this EIS, appropriate analysis will have to be conducted before the route is used.
59. The Air Force prefers to conduct night flights; however, limitations of the quiet hour at the base and reduced nighttime hours during the summer make it difficult to meet all of the training requirements. A VRD would allow about 50 percent of the nighttime sortie requirement to be flown during the day.
60. Comment noted. We do not believe that a percentage column is necessary for the understanding or evaluation of the proposed action.
61. While it would be nice to identify where each and every sortie would go and what type of operations would be conducted during the sortie, this detailed level of information is not available because the program is still in the planning stage. We have predicted flight operations to the maximum level possible for the time. The increased sorties on VR-1046 are not destined for BT-9, BT-11 or the Warning Area offshore, but this is not to say a limited number of the sorties will not go to these areas.
62. There is no anticipated requirement to change charted times of use for the MTRs or R-5314. Current airspace time designations are expected to meet 4TFW requirements. The 4TFW has determined that the airspaces are charted enough into the night to meet requirements.
63. W-122 is the primary area for 4TFW supersonic operations. They are restricted to no closer than 15 NM from land. W-72 has an Air Combat Maneuvering Instrumented range where supersonic operations can be conducted. The Air Force has completed the NEPA analysis for the Echo MOA; however, no action has occurred on restructuring the airspace due to FAA's efforts to help establish a commercial hub from the Raleigh-Durham airport.
64. The Air Force apologizes for not being able to provide graphics that contain all sites that would be of interest to all individuals. The questioned restricted airspaces are not a primary factor related to the F-15E beddown and consequently have not been included so that attention, as intended, could be placed on the low level MTRs.
65. When considering aircraft noise, a common goal is describing the noise of a single event, as well as considering the cumulative dose. As the commentor noted the Air Force has provided information to describe both factors. The A-weighted noise data describes instantaneous noise levels and the Day-Night Level (DNL) describes the averaged level from all events occurring during a 24-hour period. The Air

Force places a high level of emphasis on the DNL noise metric because it is a widely accepted and preferred "yardstick" for comparing forecasted effects to noise criteria adopted by EPA, HUD, and FAA. EPA also indicates that noise produces the same general type of effects on animals as it does on humans and, until more information exists, judgement of environmental impact must be based on existing information. The most simple approach is to assume that animals will be at least partially protected by application of maximum levels identified for human exposure (EPA, 55019-74-004, March 1974). Additional peak noise data for single overflights are provided in Table 3.2-2 of this document. In addition, see Section 3.2 of the Draft EIS.

66. While the noise metrics used in the EIS may have some drawbacks, they are the best "yardsticks" available and their use for describing effects from these types of operations has long been accepted by the scientific community. The hush house program began at Seymour Johnson AFB in 1987. It is effective in reducing local noise levels in the area of the run up operations; however, it does not significantly affect the overall noise contours since they are in principal dictated by landings, takeoffs, and overhead patterns. The hush house program is not related to the proposed aircraft beddown and, thus, was not raised as a factor for mitigating the potential noise effects.
67. There would be no change in types of ordnance used on the Dare County range as a result of the proposed action. The environmental assessment prepared for the purchase of the land in 1976 addressed types of ordnance used on the range. That document resulted in a finding of no significant impact and thus, the subject of ordnance was screened-out during the scoping process for the EIS. The Air Force is complying with federal and state environmental regulations at the Dare County range.
68. The general public cannot use the Dare County range when it is open for aircraft operations, thus the restrictive nature does help prevent public exposure to the noise generated on the range. R-5314 has been considered synonymously with the Dare County range and a 16 percent increase in use was addressed; this represents less than one half of a decibel change in the noise environment.
69. Comment noted. The Air Force does not agree that population trends should be a criteria in determining the suitability of the F-15E beddown. The existence or continued use of the Dare County range is not part of the proposed action.
70. The biological environment is covered in section 3.4 of the draft EIS. At the present time, wildlife resources are considered to be minimally impacted from this project. Therefore, no discussion of the impacts to the economics of wildlife resources is included in this section.
71. One hundred feet is the lowest altitude proposed for flight operations (except for takeoffs and landings) over private and public lands. Thus, there is no need for noise data at the 50 foot altitude. Table 3.2-2 has been modified to provide data on approach and takeoff powers for the various altitudes. See the errata section of this EIS.
72. According to the North Carolina Administrative Code, Title 15, Chapter 2, waters such as the Neuse River which have been designated "Nutrient Sensitive" require

limitations on nutrient input, particularly with respect to nitrogen and phosphorus. The proposed action will not affect nutrient discharge to the Neuse River.

73. Flow controls and water levels on the Dare County range complexes are operated and maintained by the North Carolina Forest Service in accordance with its existing fire suppression contract with the Air Force. Forest Service responsibilities include both fire prevention and suppression. They fulfill these responsibilities by controlling water levels and flow with pumps and flood water gates, and through canal construction and maintenance. We see no change to formal agreements or the informal working relationship between the Air Force and the North Carolina Forest Service resulting from F-15E operations on the Dare County range.
74. This comment apparently refers to section 3.3.6 on Page 3.3-7. Additional information on the location of "Special Use Areas" and "Sensitive Areas" is provided in Appendix B.
75. The U.S. Air Force recognizes the importance of state owned and managed lands. Additional information on the location of such lands in the project area is provided in Appendix B.
76. Comment noted. Text on page 3.3-7 has been changed to reflect that Cliffs of the Neuse State Park provides some unique geological features. See the errata section of this EIS.
77. The correct reference is to Figure 3.0-2. See errata (Chapter 5). Additional information on the location of "wildlife management and recreation areas" is provided in Appendix B.
78. The Air Force believes that the overall effects near the Dare County range will be negligible should the proposed action be adopted. Consequently, the analysis provided discussion commensurate with the perceived impacts. We believe shifting some of the operations to the evening hours would lessen the effects on most of the recreation and commercial activities in the area of the range since the bulk of them are daytime activities. We believe the analysis is adequate, and that it is of sufficient detail that a reasoned decision can be made concerning the proposed aircraft beddown.
79. See comment 78 above.
80. The other "sense" related attributes have been covered in their respective section of the draft EIS (see sections of the draft EIS that dealt with noise and air quality).
81. No. Surge operations are of an infrequent nature and projecting effects of the beddown based on those conditions would represent an overestimation of the effects.
82. See comment response 81 above.
83. We believe we have adequately addressed the effects of operations on and near the Dare County range. The R-5314 airspace is considered a part of the range for this

analysis and was not overlooked. As pointed out in the draft EIS, the noise level would not materially change as a result of the proposed aircraft beddown.

84. See comment responses 65 and 66 above.
85. See comment responses 13 and 54 above.
86. See comment responses 68 and 83 above.
87. Review of historical data shows no monthly or seasonal fluctuation in the usage of the Air Force portion of the Dare County range and minimal weekend use. During the period from July 1, 1987 to June 30, 1988, the range was used only 3 weekend days (May 14 and 15 and November 7). While introduction of the F-15E may result in an overall increase in range usage, that increase should be consistent throughout the year. We see no increased weekend usage.
88. Comment noted. The follow-on comments in the referenced paragraph put proper context to the issue by noting that the increase is minor and is well within the base's capability to manage. Additionally, the waste minimization program would be expected to reduce the quantity of hazardous waste generated at the base.
89. The Dare County range is susceptible to range fires from four major sources--aircraft and its related armament, ground support equipment (vehicles, generators, IR targets, and etc.), lighting strikes, and the human factor (arson, hunters, and etc.). Of these potential sources, the only one that would change as a result of the proposed beddown would be ground support equipment (generators for IR targets). As indicated by the comment, this subject was covered in the draft EIS.
90. See comment response 37 above.
91. Comment noted. Also see comment response 34 above.
92. See comment responses 32, 37, and 38 above.
93. See comment response 26 above. The Air Force is willing to discuss operations over State resource lands to determine if flight restrictions are needed and will, where possible and commensurate with mission requirements, add these restriction to the AP/1B document.
94. Concern appears to stem from an interpretation of the draft EIS conclusion that there will be "higher probability of an accident on the range complex" to refer to mid-air collision potential with firefighting or other emergency aircraft. In fact, the draft EIS is referring to increased potential for fighter aircraft collision with the ground. Mitigative measures for mid-air collision potential do not rely only on application of the "see and avoid" rule but also, and primarily, on separation of military and civil operations over the range. The fire suppression contract between the Air Force and the North Carolina Forest Service precludes the use of military aircraft on the range when state aircraft are required for firefighting purposes and additionally, permits the use of state aircraft to patrol restricted airspace when deemed essential for the prevention of forest fires. Emergency

aircraft may operate in the range airspace through coordination with range control and/or Washington ARTCC.

95. See comment responses 65 and 66 above. The Air Force concludes that affects on the recreational activity in the Cape Lookout and Cape Hatteras National Seashores would be of a magnitude where the economics of the area would not be noticeably affected.
96. See comment response 9 above.
97. Comment noted.
98. See comment response 83 above. Additionally, paragraph 4.2.2 on page 4.2-8 of the draft EIS discussed that the 16 percent increase represents about one half of a decibel increase in noise for the area.
- 98a. Comment noted. The predicted level of noise impact should be little different from current exposure levels (i.e., an increase of no more than one-half decibel).
99. The draft EIS provided the number and timing of the sorties for the MTRs, see Tables 2.1-2 and 2.1-3. Also see comment response 20 above.
100. AP/1B indicates a minimum altitude of 1000 feet AGL in the area of Hammocks Beach State Park. The park appears to be on the edge of the MTR. Goose Creek State Park is 3 NM outside the western boundary of the closest MTR (VR-1046) and should not be noticeably affected by the proposed action. Additional information on the location of state parks in relation to the MTRs is provided in Appendix B.
101. Additional information on the location of state parks in relationship to the MTR's is provided in Appendix B. With respect to impacts, in order to make a noticeable change in the level of effects due to the current as well as the potential impacts of the proposed action, the airspace or number of aircraft operations would have to be changed. This would significantly affect the quality of training provided in the area, which would have a direct impact on the wartime readiness of the 4TFW. We do not believe the current or projected impacts warrant making such a tradeoff.
102. Training requirements for the F-15E are forecasted to change from the current F-4E mix of approximately 60 percent air-to-ground and 40 percent air-to-air to a mix of 80 and 20 percent, respectively. Also see comment response 61 above.
103. The Air Force has proposed no additional or revised airspace to accommodate the proposed aircraft beddown.
104. See comment response 102 above.
105. The Air Force anticipates no requirement to revise the existing fire suppression contract with the North Carolina Forest Service as a result of the proposed aircraft beddown.

106. The Air Force agrees that fire potential should be included in the table (see Section 5.0, Errata). We do not believe airspace is an impacted resource and thus have not added it to the table.
107. Comment noted; paragraph 4.5.3 of the draft EIS discussed procedures relating to "see and avoid" and "notice to airmen." Additionally, the 4TFW regulations provide expanded guidance of forest fire avoidance, and when notified of firefighting operation, the fighter squadrons are immediately directed to avoid the area by specified altitudes and/or distances.
108. See comment response 107 above. If there is an infraction to the avoidance guidance, the 4TFW public affairs officer should be notified so prompt action can be taken.
109. We agree that safety is of the utmost importance and if we work together, there should be no reason that both programs cannot be conducted safely.
110. Comment noted. The Air Force believes there is adequate documentation in the draft EIS to make an informed decision on the proposed aircraft beddown. We do not believe there is adequate justification for preparing an EIS for each MTR. It must be understood that the beddown does not require any modification to the altitude structure or time of use for any of the MTRs; operations would be conducted within the existing parameters for the airspace. Therefore, the alternatives relates to the beddown and not the airspace. Also see comment response 20 above.
111. See comment response 22 above. The Air Force considers all overflowed land as special and believe military operations are compatible with most wildlife management objectives. The Air Force is willing to consult with the state on resource management objectives and, commensurate with mission requirements, will work to maintain environmental conditions that are conducive for wildlife habitat.
112. The Air Force appreciates this comment, but it must be remembered that the affected areas have had nighttime flights in the past. It is true that under the proposed action there may be minor effects and that there may be individual animals lost due to predators, but these losses are considered limited and would not change the ecological balance of the area nor result in a species permanently leaving the area.

No baseline studies on wildlife species exist for the area which has been subjected to high noise levels in the past. Therefore, it is true that no precise conclusions can be drawn as to the impact from aircraft flying over the area. However, it is noted that the Air Force has not found or been shown data indicating that a dramatic decrease in any wildlife species has occurred in this area due to the introduction of aircraft noise. For additional comments relative to aircraft impacts during the nighttime, see comment response 20.

113. We believe the effects described in the EIS are sufficient for animals as well as humans. Section 3.6 of the draft EIS discusses laser footprints for lasers similar to the LANTIRN laser and indicates the width can be up to 75 feet wide. If the operational mode of the LANTIRN laser is used on the range, then this discussion is applicable. If the training mode is used, there would be no hazard zone unless

an individual was within the beam and viewed the aircraft with an optical device with a magnification power greater than 40X. Also see comment response 41 above.

114. The commenter is directed to paragraph 4.5.3 of the draft EIS. F-15E night operations will be conducted totally under either Instrument Flight Rules (IFR), generally under radar control, within restricted or special use airspace, or along MTRs in accordance with established and published procedures. The operations would be conducted early in the evening with landings prior to 2230. Under these conditions, we foresee minimal conflict with North Carolina Wildlife Commission nighttime flight operations.
115. See comment response 9 above.
116. See comment response 19 above.
117. See comment response 38 above. The Air Force is willing to work with the state in the same relationship.
118. The National Environmental Policy Act (NEPA), paragraph 40 CFR 1506.6, requires agencies to make efforts to involve the public in their NEPA procedures, provide public notice concerning availability of EISs and meetings, and hold public hearings whenever appropriate. The Air Force believes it has met all NEPA requirements for public involvement. We announced the intent to prepare an EIS in November 1987, held a scoping meeting in December 1987, and conducted a public hearing in April 1988. News media releases were made for each of the above steps. Goldsboro, NC was selected as the location for the scoping meeting and the public hearing because this area would be the most adversely impacted by the action. There was direct contact with the Commission during the public comment period (one week prior to the hearing), and their comments on the EIS were received before the close of the public comment period (May 2, 1988). Although the Commission chose not to be represented at the public hearing, at their request, part of the Air Force's briefing addressed some of their concerns. With this level of coordination, the Air Force believes it has made adequate opportunity for the Commission to participate in the NEPA process for this EIS.
119. See comment response 118 above. A person does not have to attend a public hearing in order to participate in the NEPA process. Written comments before close of the comment period assures the concerns will be considered. We believe the 45 day public comment period allowed ample time for interested agencies and individuals to comment on the draft EIS.
120. Consideration of these ranges was deleted in the scoping process for the EIS. Their use is limited and level of continued use would not materially change. This decision is well within the guidelines of NEPA, because it directs agencies to focus on real environmental issues rather than those that are unimportant.
121. See comment response 9 above.
122. After review of the final document and discussion with the primary authors, we conclude that the cited USFWS report is consistent with the draft EIS. The report was unable to reach a conclusion regarding impacts of noise on wildlife. It shows

findings ranging from minor to severe, but concluded that there was a lack of sufficient information on the topic. Likewise, the Fallon report cites instances of negative responses but does not present the data as conclusive for the species and also stated a need for additional study.

123. In respect to use of the DNL noise metric, please see comment response 65 and 66 above.
124. See comment response 40 above.
125. The Air Force does not agree that the laser discussion glosses over the potential danger of lasers. Information provided in section 3.6 of the draft EIS is based on expert opinion and provides discussion on the size of the footprints for lasers similar to the LANTIRN operational mode laser. If the training mode is used on the range, there would be no hazard area unless an individual was within the beam and viewed the aircraft with an optical device with a magnification power greater than 40X.
126. If a VRD is developed and issued for use, it could be deployed in one of two possible ways: (1) A chase aircraft could spot for the aircraft using the VRD, or (2) the weapon systems officer (WSO) could act as the safety observer. It is emphasized that the pilot's vision is not totally restricted by the VRD. He would be able to see forward of the aircraft by looking through the heads up display (HUD); only his peripheral vision would be obstructed. Thus, we do not believe use of the VRD would significantly affect general or commercial aviation.
127. See comment response 110 above. We do not believe MTRs are dangerous or have a devastating effect on people; rather, MTRs enhance safety by charting military activity for public knowledge.
128. The EIS does not propose to change R-5314 or its associated MTRs. Currently, MTRs do transit under the 1000 foot shelf in R-5314J for high speed access. These MTRs do not restrict airspace access under the shelf and do not constitute a "range" in itself. Airspace processing is not done by "de facto means," but by specific criteria contained in FAA Handbook 7610.4 and 7400.2.
129. Compensation for aviation easements are awarded by the courts if overflights and noise are so severe as to amount to a "taking" of an interest in the property. The interest taken is usually in the form of an easement, and the flights must be frequent, directly over the affected property, and below 500 feet. The Air Force does not believe the projected overflight frequency or associated noise levels would constitute a taking.
130. Comment noted. The referenced section does not imply that supersonic operations should be conducted over land. A portion of the F-4 as well as the F-15E training program requires supersonic flight. This training is and would continue to be conducted in currently approved airspace which is offshore by more than 15 NM.
131. Tactical air exercises are periodic exercises conducted by the 4TFW or other agencies to evaluate the unit's warfighting capability under simulated wartime conditions. The Wing will commonly fly at higher than normal rates to test its ability to generate sorties and employ "high threat" tactics to test its ability to

accomplish the mission and survive. The scenario may involve multiple types of aircraft operating simultaneously in the range airspace, including Navy Dare, to accomplish coordinated attacks. The 4TFW conducts these exercises approximately quarterly for a period of 2 to 3 days in order to maintain the Wing's high level of combat readiness. However, even though these exercises are conducted under as realistic as possible conditions, normal training ordnance is employed on the standard targets and all aircraft operate in accordance with standard range procedures and restrictions. Consequently, environmental effects are not that noticeable from normal day-to-day operation. These types of operations have been considered in this EIS.

132. Economic factors have been considered for the MTRs, and it is the Air Force's opinion that the proposed action would not result in lower property values or affect the waterfowl habitat to a point where there would be an economic impact to the area. Please see section 4.7 of the draft EIS.
133. See comment responses 9 and 18 above. There will not be any increased Air Force use of the Palmetto Target in the Albemarle Sound. This is a Navy facility which the Air Force uses only infrequently, and there is nothing in the Air Force's proposal to put F-15Es at Seymour Johnson AFB which would alter our use of it. That is why the EIS does not discuss it.
134. Comment noted. See comment response 9 above.
135. The North Carolina Coastal Area Management Act requires every person before undertaking any development in any area of environmental concern to obtain (in addition to any other required state or local permit) a permit pursuant to the Act. Development is defined by the Act as:

any activity in a clearly designated area of environmental concern... involving, requiring, or consisting of the construction or enlargement of a structure; excavation; dredging, filling, dumping, removal of clay, silt, sand, gravel or minerals; bulkheading; driving of pilings; clearings or alteration of land as an adjunct of construction; alteration or removal of sand dunes; alteration of the shore, bank, or bottom of the Atlantic Ocean or any sound, bay, river, creek, stream, lake or canal.

Because the proposed action does not involve any of the above activities, the Air Force believes that its proposed action is consistent with the N.C. Coastal Area Management Act. If this is the case, then the action is also consistent with the Federal Coastal Zone Management Act, as it requires compliance (to the extent practicable) with state law.

136. The Air Force understands the concern expressed in this comment. The town of Kill Devil Hills should not be overflowed as a result of this action.
137. See comment responses 118 and 119.

5.0 ERRATA AND REVISIONS

1. p. xiii, 6th paragraph, line 1: Change 34 to 14 percent.
2. p. 2.1-1, 1st paragraph, line 6: Change "80% air-to-ground" to "80% air-to-air."
3. p. 2.2-1, 2nd paragraph, line 1: Change Table 2.0-1 to Table 2.1-1.
4. p. 2.1-1, 3rd paragraph, 3rd sentence: Change to read; "Afterburner use would normally be limited, but may be required during the summer months due to the ..."
5. p. 2.1-1, 5th paragraph, 5th and 6th lines: Change Table 2.0-3 and Table 2.0-2 to Table 2.1-2.
6. p. 2.1-1, 5th paragraph, line 7: Change schedule to scheduler.
7. p. 2.1-2, 1st paragraph, 8th line: Change 34% to 14%.
8. p. 2.1-2, 1st paragraph, 9th line: Change Table 2.0-3 to Table 2.1-3.
9. p. 2.1-2, 2nd paragraph, 3rd line: Change 14 to 10.
10. p. 2.1-2, 6th paragraph, 3rd line: Change 67 to 60.
11. p. 2.1-5, Table 2.1-3, Proposed Action Column: Change 36 to 32 and 14 to 10.
12. p. 2.1-6, 2nd paragraph, 3rd line: Change Table 2.0-3 to Table 2.1-3.
13. p. 2.4-2, Table 2.4-1, Impact Area, No Action Alternative, and Proposed Action columns: Insert "Fire Potential", 0, and 0, respectively.
14. p. 3.0-3, Figure 3.0-2, VR-096 and VR-1043. Routes were drawn beyond legs specified in AP1B extracts for MTRs. See revised maps in Appendix B.
15. p. 3.2-5, Figure 3.2-3: See revised Figure in this section.
16. p. 3.2-14, Table 3.2-2: See revised Table in this section.
17. p. 3.3-7, 1st paragraph of section 3.3.5: Delete "or around." Add following sentence: Cliffs of the Neuse State Park does provide some unique geological features.
18. p. 3.4-12, 3rd paragraph, last line: Change Figure 3.0-1 to 3.0-2.
19. p. 4.2-2, Figure 4.2-1: See revised Figure in this section.
20. p. 4.2-4, 2nd paragraph, 3rd line: Change 38 to 14.
21. p. 4.2-4, 4th paragraph, line 6: Delete the word "slight".
22. p. 4.2-4, 6th paragraph, line 2: Insert "VR-1046" after "VR-1753".

23. p. 4.2-5, Table 4.2-2. See revised Table in this section.
24. p. 4.2-8, paragraph 5, line 3: Delete the word "slight".

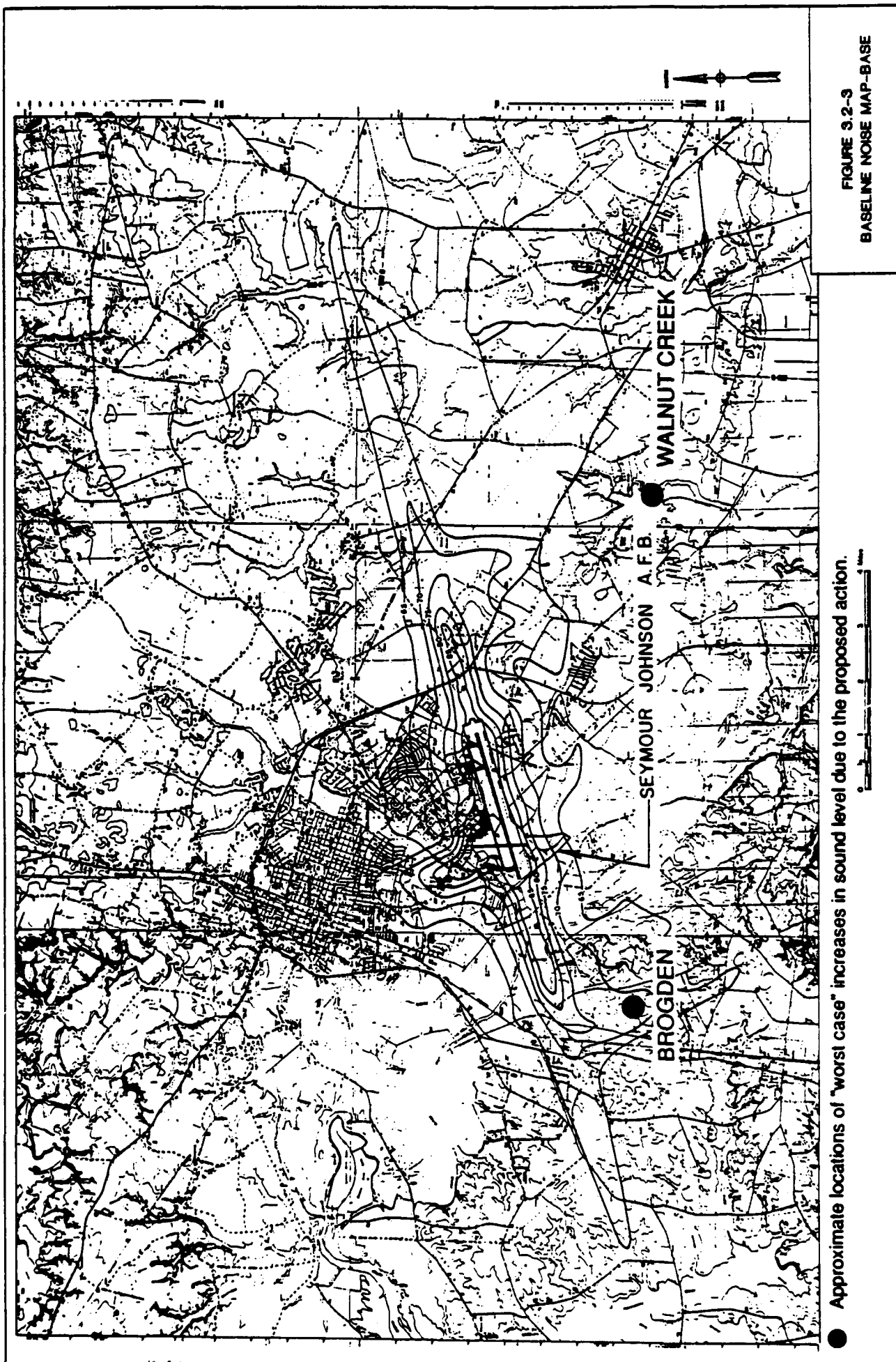
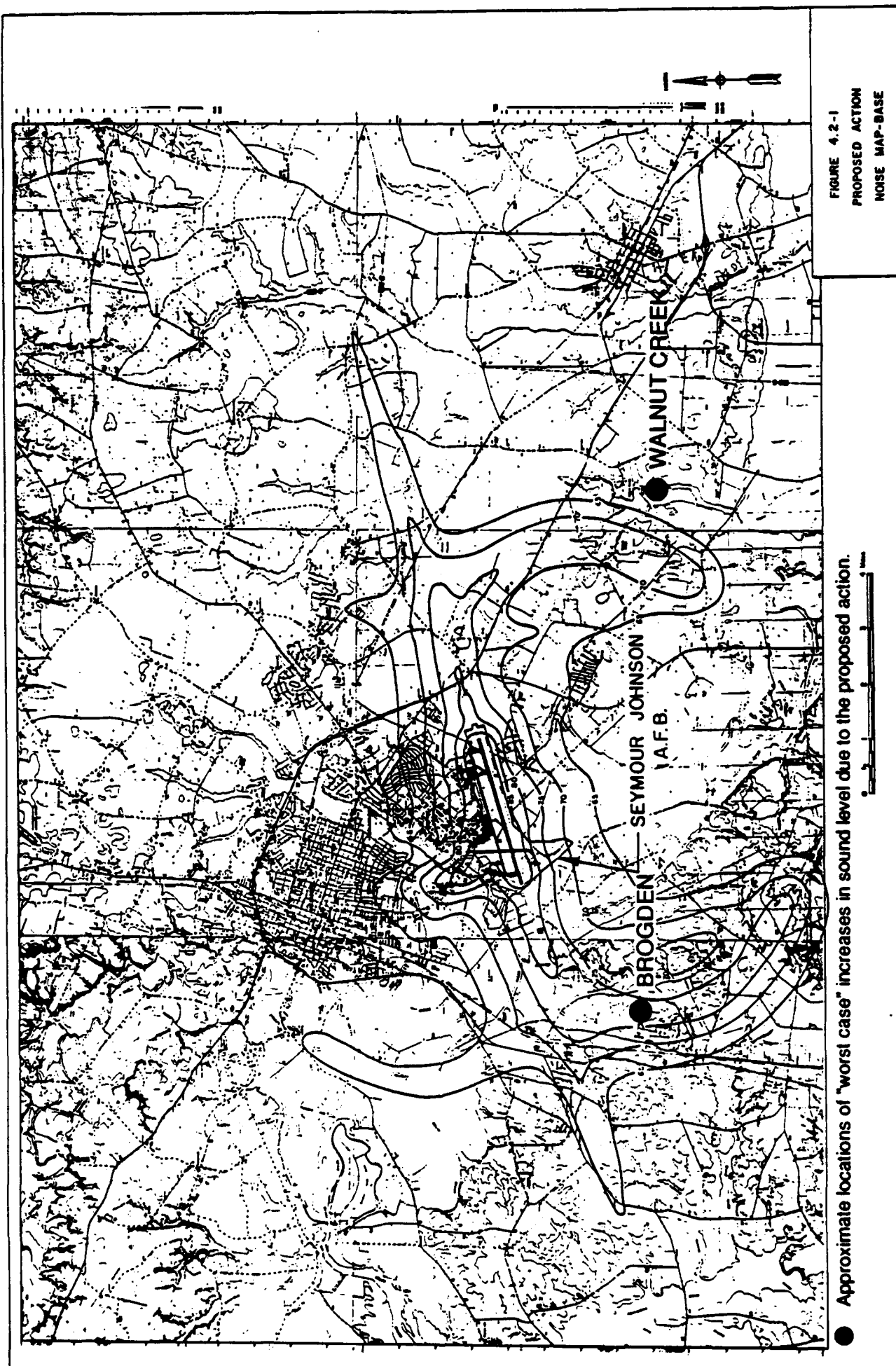


TABLE 3.2-2
A-WEIGHTED PEAK NOISE LEVEL [dB(A)]

Altitude-Ft	F-4				F-15			
	A/B	Takeoff	Cruise	Approach	A/B	Takeoff	Cruise	Approach
100	140	134	116	116	136	120	100	96
300	129	124	109	109	131	116	93	93
500	123	118	105	104	124	112	89	88
1000	114	110	98	97	114	104	82	82



● Approximate locations of "worst case" increases in sound level due to the proposed action.

TABLE 4.2-2
COMPARISON OF NOISE LEVELS FOR SEYMOUR JOHNSON MTRs¹

MTR	Minimum ³ Altitude (ft.)	Estimated Annual Sorties Base Case	Estimated Annual Sorties Proposed Action	Base Case ⁴ DNL (F-4s)	Proposed ² Action DNL (F-15s)
VR-073	100	2928	3278	62	54
VR-1074	100	4310	4890	63	56
IR-012	500	372	446	51	41
VR-058	100	276	314	51	44
IR-721	300	576	656	54	44
VR-096	500	564	639	53	43
VR-1752	SFC	1502	1682	57	51
VR-1753	500	2434	2772	61	49
VR-1043	200	868	988	56	49
VR-1046	200	1389	1667	58	50

NOTE:

¹ Based on 25% of average daily sorties flying over the exact same spot.

² Based on sorties broken down into following altitude mix:
20 percent - minimum MTR altitude
30 percent - 300 ft. AGL
50 percent - 500 ft. AGL

³ Minimum altitudes are based on the altitudes charted by the FAA.

⁴ Based on sorties broken down into the following altitude mix:
20 percent - 300 ft. AGL
70 percent - 500 ft. AGL
100 percent - 1000 ft. AGL

Except for MTRs where floor is 500 feet, in which case
90 percent - 500 ft. AGL
100 percent - 1000 ft. AGL

APPENDIX A
AP/1B EXTRACTS FOR MTRs

1. (4) Alternate Exit B, C or D.

(5) Users shall avoid overflight of chemical plant at 31°16'10"N 87°59'50"W and the Choctaw National Wildlife Refuge, 31°54'00"N 88°10'00"W.

(6) Flight beyond D is not authorized unless the Desoto MOA is scheduled for your flight.

(7) Route leg C to E is congruent with VR-179 and opposite direction C to D. Use of this leg requires coordination with the 159TH TFG, AV 363-3377.

(8) CAUTION: Between A and C route crosses conflicts with VR-1020, VR-1021, VR-1022, VR-1030, VR-1031, VR-1033 and VR-1083. Between C and E route crosses/conflicts with VR-1021, VR-1024 and VR-1083. See and avoid applies.

FSS's Within 100 NM Radius:

BHM, CEW, DHN, JAN, MCB, MEI, MGM, MOB, PNS, TCL

VR-073

ORIGINATING ACTIVITY: 4TFW/DOA, Seymour Johnson AFB, NC 27531-5004 AUTOVON 488-6351.

SCHEDULING ACTIVITY: 4TFW/DOU, Seymour Johnson AFB, NC 27531-5004 AUTOVON 488-6565/6561; after duty hrs and weekends, call 4TFW/DOC AUTOVON 488-6601/6602.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
01 AGL B 15 AGL to	A	LVL 228/20	36°34.0'N 78°10.0'W
01 AGL B 15 AGL to	B	LVL 197/16	36°33.0'N 77°57.5'W
01 AGL B 15 AGL to	C	CVI 296/29	36°31.0'N 77°27.0'W
01 AGL B 15 AGL to	D	CVI 247/23	36°10.0'N 77°17.0'W
01 AGL B 15 AGL to	E	CVI 190/21	36°01.0'N 76°53.0'W
01 AGL B 15 AGL to	F	CVI 156/42	35°47.0'N 76°24.0'W
10 AGL B 15 AGL to	G	NKT 032/32	35°23.0'N 76°35.0'W
01 AGL B 95 MSL to	H	ISO 098/64	35°18.0'N 76°16.0'W
01 AGL B 95 MSL to	I	ISO 098/84	35°17.0'N 75°51.0'W
01 AGL B 15 AGL to	J	ISO 093/105	35°24.0'N 75°25.0'W
01 AGL B 15 AGL to	K	CVI 131/84	35°38.0'N 75°25.0'W
01 AGL B 15 AGL to	L	CVI 137/68	35°40.5'N 75°46.0'W

TERRAIN FOLLOWING OPERATIONS: Authorized for entire route

ROUTE WIDTH - 5 NM either side of centerline A to G; 2 NM left and one-half NM right of centerline G to H; 5 NM either side of centerline H to L.

Special Operating Procedures:

(1) Transit R-5314J below 1000' AGL unless scheduled for Dare Co. operations and cleared by the Range Control Officer. Do not enter R-5313 unless scheduled. Do not enter R-5306A unless scheduled for BT 9/11 and cleared by Cherry Point APCH CTL (268.7).

(2) Avoid towns and populated areas by 1 NM or overfly 1000' AGL; avoid airports by 3 NM or overfly 1500' AGL. Over sparsely populated areas, aircraft may not be operated closer than 500' to any person, vessel, vehicle or structure.

(3) Avoid Mattamuskeet, Pungo and Swanquarter National Wildlife Refuges by 5 NM or overfly above 8000' MSL as permitted by route structure.

(4) Minimum altitude 1000' AGL over outer banks.

(5) (Continued) 4TFW/DOU, Seymour Johnson AFB, NC 27531-5004 AUTOVON 488-6351/6351; after duty hrs and weekends, call 4TFW/DOC AUTOVON 488-6601/6602.

sensitive areas.

(6) Terrain FSS: New Bern (265.4)

(7) Alternate Entry Points: B, C, E, F, G, I, J, K.

(8) Alternate Exit Points: F, G, I, J.

(9) CAUTION:

(a) C-D, avoid towns of Seaboard, Jackson and Rich Square. 250' Tower at 36°25.0'N 77°26.0'W.

(b) D-E, avoid towns of Lewiston and Windsor.

(c) E-F, 412' AGL Tower, charted, no lights, stripes at 36°05.0'N 76°45.9'W; 200' Tower at 36°00.0'N 76°42.0'W, avoid town of Roper. If entering R-5314, avoid town of Gumneck by 1500' or 1.5 NM, exercise caution for aircraft flying approaches into Edenton Airport.

(d) F-G, minimum altitude for this leg is 1000' AGL.

(e) H-I, do not enter Pamlico B MOA unless scheduled above 8000' MSL.

(f) K-L, 350' AGL and 210' AGL Towers located 35°41.0'N 75°29.2'W.

(g) Bird activity all legs.

(h) Numerous low levels cross and join this route.

(10) Users must make the 10 minute entry block times or reschedule.

FSS's Within 100 NM Radius:

CRE, ECG, EWN, PHF, RDU, PWT, SBY

VR-085

ORIGINATING ACTIVITY: 363 TFW/DOA, Shaw AFB, SC 29152 AUTOVON 965-3250.

SCHEDULING ACTIVITY: 363 TFW/DOO (Advance Same Day), Shaw AFB, SC 29152 AUTOVON 965-3063, after hours 965-3339.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
As assigned to	A	TYI 222/38	35°28.0'N 78°10.0'W
05 AGL B 30 MSL to	B	TYI 179/18	35°41.0'N 77°40.0'W
05 AGL B 30 MSL to	C	TYI 108/16	35°55.0'N 77°23.0'W
05 AGL B 30 MSL to	D	TYI 082/25	36°04.0'N 77°12.0'W
05 AGL B 20 MSL to	E	TYI 099/49	35°53.0'N 76°42.0'W
05 AGL B 20 MSL to	F	CVI 146/33	35°58.0'N 76°24.0'W
05 AGL B 20 MSL to	G	CVI 126/45	36°02.0'N 76°03.0'W
50 MSL to	H	CVI 115/58	36°06.0'N 75°43.0'W

Alternate Exit: E

05 AGL B 20 MSL to E: TYI 102/56 35°51.5'N 76°34.0'W

TERRAIN FOLLOWING OPERATIONS: Authorized from A to G

ROUTE WIDTH - 5 NM either side of centerline from A to E; 3 NM either side of centerline from E to H; 3 NM either side of centerline from E to E1.

Special Operating Procedures:

(1) Exit at E unless prior coordination has been made to enter R-5302 or R-5314.

(2) Alternate Entry: C.

(3) Alternate Exit: E, E1.

(4) CAUTION: VR-086 same direction from Pt A to C (deconflict with 363 TFW/DOO).

(5) CAUTION: Student flying area Hwy 117 between Wilson and Goldsboro.

(6) CAUTION: Multiple VR/IR routes cross from Pt B to E.

(7) Congressional noise sensitive area, farm at 35°41.0'N 77°47.3'W. Avoid by 1500'/1 NM.

VR-1069

ORIGINATING/SCHEDULING ACTIVITY: 169 TRG McEntire ANG, SC 29044 AUTOVON 583-8231.

HOURS OF OPERATION: Normally 0700-1900 ld daily; avbl OT.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
As assignd to	A	CRE 077/22	33°55.0'N 78°18.0'W
05 AGL B 15 AGL to	B	CRE 035/45	34°27.0'N 78°15.0'W
05 AGL B 15 AGL to	C	FLO 072/37	34°27.0'N 78°58.0'W
05 AGL B 15 AGL to	D	FLO 138/24	33°57.0'N 79°19.0'W
05 AGL B 15 AGL to	E	FLO 234/25	33°58.0'N 80°03.0'W

TERRAIN FOLLOWING OPERATIONS: Authorized entire route.

ROUTE WIDTH - 7 NM either side of centerline A-B. 2 NM either side of centerline B-E.

Special Operating Procedures:

- (1) Contact Florence FSS for route entry.
- (2) Portions of segment C to D suitable for 100' AGL navigation.
- (3) Alternate Entry: B

FSS's Within 100 NM Radius:

AND, CHS, CRE, ECG, EWN, FLO, GSP, HKY, RDU, RWI, SAV

VR-1070

ORIGINATING/SCHEDULING ACTIVITY: 187 TFG Dannelly Field (ANG), P.O. BOX 2584, Dannelly Field, Montgomery, AL 36196-0001 AUTOVON 742-9255.

HOURS OF OPERATION: 0700-2000 Local, other times by NOTAM.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
As Assigned to	A	MGM 150/12	32°03.0'N 86°13.0'W
05 AGL B 15 AGL to	B	MVC 078/33	31°32.0'N 86°43.0'W
15 AGL to	C	CEW 059/19	30°58.5'N 86°21.0'W
15 AGL to	D	VPS 046/22	30°39.0'N 86°14.0'W

TERRAIN FOLLOWING OPERATIONS: Authorized A to E

ROUTE WIDTH - 5 NM either side of centerline from A to B; 2 NM left and 5 NM right of centerline from B to D.

Special Operating Procedures:

- (1) This route will not be flown unless scheduled in to R-2914.
- (2) Hazards A-B: Lighted tower 31°58.5'N 86°09.5'W (1925' AGL), avoid by 3 NM. Tower 31°56.3'N 86°19.3'W (190' AGL est). Tower 31°52.3'N 86°22.3'W (150' AGL est). Power line construction from 31°52.0'N 86°31.0'W to 31°38.0'N 86°43.0'W. Low flying helio traffic from A-B left to centerline. Noise sensitive A-B: House 31°45.0'N 86°30.0'W, avoid by 1000' AGL by 1 NM.
- (3) Hazards B-C: Low flying helio traffic below 1500' AGL.
- (4) Alternate Entry: B or C.
- (5) Alternate Exit: C.
- (6) Contact Montgomery FSS on 255.4 prior to entry.
- (7) Contact Eglin Range Control on 262.3 prior to C for clearance into R-2914.

(8) CAUTION: This route crosses, overlaps or runs parallel with VR-1082, VR-1083, VR-1084 and VR-1085.

(9) Tie-in FSS: Montgomery, MGM.

(10) Scheduling activity hours of operation: 0700-1730 local Tues-Fri, occasional weekends. Alternate scheduling activity during non-duty hours is 186 TRG Meridian (ANG) AUTOVON 694-9217.

FSS's Within 100 NM Radius:

ANB, ATL, BHM, CEW, DHN, MCN, MEI, MGM, MOB, PNS, TCL, TLM

VR-1072

ORIGINATING/SCHEDULING ACTIVITY: 186 TRG DO, Key Field, Meridian, MS 39302-1825 AUTOVON 694-9217/9260.

HOURS OF OPERATION: Normally 0800-2100 ch-use other time not prohibited.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
As assigned to	A	JAN 17/127	31°10.0'N 91°00.0'W
15 AGL to	B	JAN 194/01	31°10.0'N 90°22.0'W
05 AGL B 15 AGL to	C	JAN 214/05	31°41.0'N 90°00.0'W
05 AGL B 15 AGL to	D	JAN 214/96	31°15.0'N 91°20.0'W
05 AGL B 15 AGL to	E	JAN 204/99	31°03.0'N 91°00.0'W
05 AGL B 15 AGL to	F	JAN 165/55	31°36.0'N 89°59.0'W
05 AGL B 15 AGL to	G	JAN 125/44	32°02.0'N 89°31.0'W
05 AGL B 15 AGL to	H	MEI 165/25	31°56.0'N 88°43.0'W

TERRAIN FOLLOWING OPERATIONS: Authorized entire route.

ROUTE WIDTH - 5 NM either side of centerline.

Special Operating Procedures:

- (1) Not flight checked below 500' AGL

FSS's Within 100 NM Radius:

BHM, CEW, DRI, ELD, GWO, JAN, MCB, MEI, MGM, MLU, MOB, PNS, SHV, TCL

VR-1074

ORIGINATING ACTIVITY: 4 TFW DOLA Seymour Johnson AFB, NC 27531-5004 AUTOVON 488-6351.

SCHEDULING ACTIVITY: 4 TFW DOLA Seymour Johnson AFB, NC 27531-5004 AUTOVON 488-6565, 6561 after duty hrs and weekends. schedule with 4 TFW DOLA-AUTOVON 488-6501, 6602

HOURS OF OPERATION: Continuous

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
01 AGL B 15 AGL at	A	ILM 194/30	33°51.0'N 77°57.0'W
01 AGL B 15 AGL to	B	ILM 118/5	34°18.0'N 77°43.0'W
01 AGL B 15 AGL to	C	ILM 011/29	34°50.0'N 77°50.0'W
01 AGL B 15 AGL to	D	GSB 141/21	35°06.0'N 77°28.0'W
01 AGL B 15 AGL to	E	NKT 311/30	35°12.0'N 77°23.0'W
01 AGL B 15 AGL to	F	NKT 002/26	35°20.0'N 76°54.5'W

10 AGL B 15 AGL to G NKT 011/37 35°31.0'N 76°48.0'W
 10 AGL B 15 AGL to H NKT 025/52 35°29.0'N 76°21.0'W
 10 AGL B 15 AGL to I NKT 040/59 35°43.0'N 76°11.5'W

Alternate Exit from F

01 AGL B 15 AGL to F1 NKT 032/32 35°23.0'N 76°35.0'W

TERRAIN FOLLOWING OPERATIONS: Authorized entire route.

ROUTE WIDTH - 2 NM left and 5 NM right of centerline A to B; 5 NM either side of centerline B to I.

Special Operating Procedures:

- (1) Do not enter R-5306A unless scheduled for BT-9/11 and cleared by Cherry Point apch ctl 268.7.
- (2) Do not enter R-5314 unless scheduled for Dare County Range and cleared by the Range Officer.
- (3) Avoid towns and populated areas by 1 NM or overfly 1000' AGL; avoid airports by 3 NM or overfly 1500 AGL.
- (4) Avoid Mattamuskeet, Pungo and Swanquarter National Wildlife Refuges by 5 NM.
- (5) Contact ATIS/DOU, AUTOVON 488-6565/6561, for scheduling and coordination of additional noise sensitive areas.
- (6) Terrain FSS (new item) (235.4).
- (7) Alternate Entry Points: B, D, and E.
- (8) Alternate Exit Points: C, F, H, and I.

(9) Light aircraft along coast. Entire beach is considered noise sensitive. Maintain 1000' minimum when flying within 1 NM of coastal area.

(3) B-C maintain 1000' minimum until 4 NM past highway U.S. 17. Congressional noise sensitive area at 34°22.0'N 77°42.9'W avoid by 1000' or 2-NM.

(C) C-D, VR-1046 crosses from right at D. Avoid Maxwell Wildlife Refuge by 1.5 NM, located at 35°02'N 77°41'W. Avoid Pink Hill Airport by 1500' or 3 NM located at 35°03'N 77°44'W.

(D) D-E, avoid sawmill at E. Avoid town of Cave City.

(E) E-F, avoid overflight of Streets Ferry Plant located at 35°12.0'N 77°07.5'W by 1500' or 1.5 NM. Possible helicopter traffic entire leg. 1065' tower at 35°13.7'N 77°11.5'W.

(F) F-G, Overfly coastal areas 1000' minimum. Avoid overflight of the town of Bath, located 4 NM south of G, by 1.5 NM.

(G) G-H, minimum altitude during this leg is 1000' AGL. Exercise caution for VFR intensive student training area around Donald's Airport. Stay south of the town of Pantego and you will be clear. Two 300' Gray unlighted towers at 35°35.5'N 76°29.0'W 200' tower at 35°30.8'N 76°48.0'W.

(H) H-I avoid town of Gumneck by 1500' or 1.5 NM. 300' Gray, unlighted tower at 35°43'N 76°09'W.

(I) F-F1, overfly coastal areas at 1000' AGL minimum. Mining operations 2 NM north of Aurora with 250' mining booms located at 35°20.0'N 76°47.0'W.

(J) Bird activity all legs.

(K) Extensive helicopter activity at and below 500' between Aurora and Photos Lake. Seasonal spraying and crop dusting could be in progress.

(10) Users must make the 10 minute entry block times or reschedule.

FSS's Within 100 NM Radius:

CHS, CRE, ECG, EWN, FLO, PHF, RDU, RWI

VR-1077

ORIGINATING/SCHEDULING ACTIVITY: 156 TFG (PRANG)
 Muniz ANGB, P.O. Box 12337, Loiza Sta. Santurce Puerto Rico 00914 AUTOVON 860-9234.

HOURS OF OPERATION: 0700-2000 local daily

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Pad/Dist	Lat/Long
As assigned to	A	SJU 225/31	18°01.0'N 66°17.7'W
05 AGL B 15 AGL	B	SJU 233/35	18°01.0'N 66°23.5'W
05 AGL B 15 AGL	C	SJU 234/46	17°53.0'N 66°32.0'W
01 AGL B 15 AGL	D	BQN 201/33	17°57.0'N 67°13.0'W
05 AGL B 15 AGL	E	BQN 201/23	18°07.2'N 67°11.3'W
05 AGL B 15 AGL	F	BQN 130/31	18°14.4'N 66°38.3'W
05 AGL B 15 AGL	G	SJU 286/33	18°29.5'N 66°33.8'W

TERRAIN FOLLOWING OPERATIONS: Not authorized.

ROUTE WIDTH - 2 NM either side of centerline A to C; 3 NM either side of centerline C to D; 2 NM either side of centerline D to G.

Special Operating Procedures:

- (1) Two way route (opposite direction designator is VR-1080).
- (2) Alternate Entry Points: C, D and E.
- (3) Alternate Exit Points: D and F.
- (4) Endangered bird species area 1.5 NM radius at 17°57.0'N 67°06.0'W and 17°58.0'N 67°00.0'W. Do not overfly below 1,000 feet AGL.
- (5) Flights not scheduled to use R-5101 must enter at C.
- (6) CAUTION: Certified light aircraft student training area in vicinity of G.

FSS's Within 100 NM Radius:

SJU

VR-1077

ORIGINATING/SCHEDULING ACTIVITY: 156 TFG (PRANG)
 Muniz ANGB, Puerto Rico 00914 AUTOVON 860-9234.

HOURS OF OPERATION: 1100-2400Z + daily.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
As assigned to	A	SJU 084/41	18°37.0'N 65°18.0'W
01 AGL B 15 AGL to	B	NRR 083/45	18°28.0'N 64°53.5'W
10 AGL B 15 AGL to	C	NRR 082/79	18°40.0'N 64°20.0'W
01 AGL B 15 AGL to	D	NRR 089/79	18°30.0'N 64°17.5'W
05 AGL B 15 AGL to	E	NRR 133/73	17°35.0'N 64°34.0'W
01 AGL B 15 AGL to	F	NRR 157/51	17°32.0'N 65°09.0'W
01 AGL B 15 AGL to	G	NRR 146/28	17°54.0'N 65°17.5'W
01 AGL B 15 AGL to	H	NRR 117/22	18°08.3'N 65°16.8'W

TERRAIN FOLLOWING OPERATIONS: Not authorized.

ROUTE WIDTH - 2 NM either side of centerline from A to H

Special Operating Procedures:

- (1) Alternate Entry: B and C.
- (2) Alternate Exit: F and G.
- (3) Do not overfly Great Tobago or Anegada Islands.
- (4) Flights not scheduled to use R-7104 must exit at G or F.

FSS's Within 200 NM Radius:

SJU

IR-002

ORIGINATING ACTIVITY: 363 TFW/DOO Shaw AFB, SC 29152-5000 AUTOVON 965-3250.

SCHEDULING ACTIVITY: 363 TFW/DOO (Advance/Same Day) Shaw AFB, 29152-5000 AUTOVON 965-3083 (after hours) AUTOVON 965-3339.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
Cross at 60 MSL	A	TYS 288/38	36°04.0'N 84°39.0'W
Maintain 05 AGL B			
60 MSL to	B	TYS 332/42	36°30.0'N 84°20.0'W
01 AGL B 60 MSL to	C	TYS 015/34	36°28.0'N 83°45.0'W
01 AGL B 60 MSL to	D	TYS 065/34	36°10.0'N 83°17.0'W
03 AGL B 40 MSL to	E	TYS 082/31	36°00.0'N 83°16.0'W
03 AGL B 60 MSL to	F	TYS 102/33	35°49.0'N 83°14.0'W
03 AGL B 80 MSL to	G	TYS 115/37	35°40.0'N 83°11.5'W
03 AGL B 110 MSL to	H	TYS 124/41	35°33.0'N 83°10.0'W
Exit at 110 MSL			

TERRAIN FOLLOWING OPERATIONS: Authorized from A to G. Authorized from G to H if cleared into Snowbird 2 MOA by Atlanta ARTCC (269.5)

ROUTE WIDTH - 5 NM either side of centerline for entire route.

Special Operating Procedures:

- (1) Monitor Atlanta ARTCC on 253.5 at B.
- (2) Contact Atlanta ARTCC on 269.5 passing F.
- (3) CAUTION: F-G, MEA and top of the route structure creates vertical bottleneck, difference between MEA and top of the route as low as 300'.
- (4) CAUTION: Hang Glider Activity: 36°26.7'N 84°02.7'W, 36°15.0'N 83°38.0'W to 36°22.0'N 83°22.0'W, 35°54.5'N 83°17.8'W.
- (5) CAUTION: IR-743 same direction Pt E to H. (Schedulers deconflict through scheduling.)
- (6) CAUTION: V-16, V-185, V-136 cross the route Pt D to H.
- (7) Information as of Dec 86.

FSS's Within 100 NM Radius:

AND, ATL, BLF, BNA, BWG, CSV, GSP, HKY, HTS, LOU, LOZ, TRI, TYS

IR-011

ORIGINATING ACTIVITY: 363 TFW/DOO Shaw AFB, SC 29152 AUTOVON 965-3250.

SCHEDULING ACTIVITY: 363 TFW/DOO (Advance/Same Day Scheduling) Shaw AFB, SC 29152 AUTOVON 965-3083, (after hours) AUTOVON 965-3339.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
As assigned to	A	ILM 229/36	33°54.0'N 78°22.0'W
05 AGL B 30 MSL to	B	ILM 277/20	34°21.0'N 78°17.0'W
05 AGL B 30 MSL to	C	POB 161/43	34°31.0'N 78°39.0'W
05 AGL B 30 MSL to	D	POB 170/32	34°39.0'N 78°50.0'W

05 AGL B 20 MSL to E POB 213/24 34°48.0'N 78°14.0'W
05 AGL B 20 MSL to F POB 142/14 35°02.0'N 78°16.0'W

TERRAIN FOLLOWING OPERATIONS: Authorized from A to F.

ROUTE WIDTH - 5 NM either side of centerline from A to B; 7 NM either side of centerline from B to D; 3 NM either side of centerline from D to F.

Special Operating Procedures:

- (1) CAUTION: Numerous large towers along route.
- (2) Aircrews shall confirm their Pt C estimate with Wilmington Approach (276.3/118.25, B/U 343.9/121.4) prior to Pt A.
- (3) Aircrews shall contact Fayetteville Approach (295.0/120.4, B/U 393.0/127.8) prior to Pt C when utilizing the alternate exit and not later than Pt D when utilizing the primary exit.
- (4) Alternate exit Pt C will be filed and utilized unless prior clearance has been received to enter R-5311A.
- (5) Holding for R-5311A, if required, will be south of the restricted area at 2000 MSL or as assigned.
- (6) IFR clearance must be received before departing R-5311A.
- (7) Alternate entry Pt D.
- (8) Alternate exit Pt C.
- (9) CAUTION: VR-1042 crosses left to right at A to B (deconflict AUTOVON 582-4040).
- (10) CAUTION: VR-1069 same direction Pt E to C (deconflict AUTOVON 583-5251).
- (11) Avoid: Raeford NC (34°59'N 79°14'W) by 1.5 NM.
- (12) Information as of Dec 86.

FSS's Within 100 NM Radius:

CHS, CRE, EWN, FLO, GSP, HKY, RDU, RWI

IR-012

ORIGINATING ACTIVITY: 363 TFW/DOO Shaw AFB, SC 29152 AUTOVON 965-3250.

SCHEDULING ACTIVITY: 363 TFW/DOO (Advance/Same Day) Shaw AFB, SC 29152 AUTOVON 965-3083, after hours 965-3339.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
As assigned to	A	ILM 277/20	34°21.0'N 78°17.0'W
05 AGL B 30 MSL to	B	ILM 335/32	34°48.0'N 78°13.0'W
05 AGL B 30 MSL to	C	ILM 013/37	34°58.0'N 77°45.0'W
05 AGL B 30 MSL to	D	NKT 312/30	35°12.0'N 77°22.0'W
05 AGL B 30 MSL to	E	NKT 015/24	35°18.0'N 76°47.0'W
20 MSL to	F	NKT 026/29	35°21.0'N 76°39.0'W
20 MSL to	G	NKT 035/51	35°39.0'N 76°21.0'W
20 MSL to	H	NKT 037/55	35°41.0'N 76°16.5'W

Alternate Exit from E to R5306A

05 AGL B 30 MSL at E1 NKT 016/24 35°18.0'N 76°47.0'W
15 AGL B 30 MSL to FA NKT 026/24 35°16.5'N 76°42.0'W

TERRAIN FOLLOWING OPERATIONS: Authorized from A to E and from A to FA.

ROUTE WIDTH - 5 NM either side of centerline from A to B; 4 NM either side of centerline from B to E; 3 NM either side of centerline from E to H.

Routing Procedures:

- (2) Monitor Wilmington Approach (276.3 & 276.343.9) passing Pt A.
 (3) Contact Seymour Approach (338.6) at Pt B.
 (4) Contact Cherry Point Approach (374.9) passing D.
 (5) Alternate Exit E will be filed and utilized unless prior clearance has been coordinated to enter R-5314 or R-5306A.
 (6) FR clearance must be received before departing R-5314 (Washington 272.7) or R-5306A (Cherry Point 268.7).
 (7) Alternate Entry: B.
 (8) Alternate Exit: E1 and FA.
 (9) Minimum exit altitude for the alternate exit route is 1500' AGL.
 (10) Avoid: Overflight of towns east of Pt D by 1 NM.
 (11) CAUTION: VR-1043 (VR-1069 crosses right to left Pt A to B).
 (12) CAUTION: IR-062 crosses left to right Pt A to B and crosses right to left Pt B to C.
 (13) CAUTION: VR-1074 same direction Pt C to F.
 (14) CAUTION: VR-1046 crosses right to left Pt C to D and crosses left to right Pt D to E.
 (15) Avoid: Lake Maumusseet, Pungo Lake, Swan Quarter National Wildlife Refuge by 2000' AGL.
 (16) Information as of Dec 86.

FSS's Within 100 NM Radius:

CEW, DHN, GNV, JAX, MCN, MGM, MOB, PIE, PNS, SSI, TLH, VLD

IR-015

ORIGINATING/SCHEDULING ACTIVITY: 347 TFW/DOTS Moody AFB, GA 31699 AUTOVON 460-3531, after duty hrs. 460-3503.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
Cross	A	TLH 092/21	30°32.0'N 83°58.0'W
at 20 MSL or as assign			
05 AGL B 20 MSL to	B	TLH 141/39	30°02.0'N 83°55.0'W
05 AGL B 20 MSL to	C	TLH 176/31	30°02.0'N 84°21.0'W
05 AGL - 70 MSL			
as assign to	D	TLH 235/19	30°23.0'N 84°41.0'W
05 AGL B 20 MSL to	E	TLH 265/31	30°31.5'N 84°58.0'W
05 AGL B 20 MSL to	F	PFN 034/28	30°36.0'N 85°23.0'W
05 AGL B 20 MSL to	G	PFN 343/21	30°33.0'N 85°48.0'W
05 AGL B 20 MSL to	H	VPS 048/21	30°38.0'N 86°14.0'W
Alternate Entry: C			
70 MSL or as assign at	C1	TLH 176/31	30°02.0'N 84°21.0'W
Then descend to			
20 MSL to	D1	TLH 235/19	30°23.0'N 84°41.0'W

TERRAIN FOLLOWING OPERATIONS: Not authorized.

ROUTE WIDTH - 5 NM either side of centerline from A to B; 5 NM left and 2 NM right from B to C; 5 NM either side of centerline from C to D; 5 NM left and 3 NM right from D to E; 3 NM left and 4 NM right from E to G; 5 NM either side of centerline from G to H.

Special Operating Procedures:

- (1) Tie-in FSS: Valdosta (VLD).
 (2) Alternate Entry/Exit: E.
 (3) This route is authorized only for aircraft scheduled to enter R-2914A.
 (4) Altitudes up to 7000' MSL for maneuvers between C and D are available when approved by Tallahassee Apch Ctl. Contact Tallahassee Apch Ctl at A and request maneuver area.

(5) Report over D to Tallahassee Apch Ctl. Report over E to Tynahall Apch Ctl.

(6) Climb and maintain 2000' MSL at C until passing Hwy 319. Noise sensitive area.

(7) At E climb to cross the Apalachicola River at 1500' MSL. Remain at 1500' MSL until past Point F. Noise sensitive area.

(8) MARSA applies to route participants and is accomplished by scheduling and "see and avoid".

FSS's Within 100 NM Radius:

CEW, DHN, GNV, JAX, MCN, MGM, MOB, PIE, PNS, SSI, TLH, VLD

IR-016

ORIGINATING/SCHEDULING ACTIVITY: 347 TFW/DOTS Moody AFB, GA 31699 AUTOVON 460-3531, after duty hrs. 460-3503.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
Cross	A	TLH 092/40	30°32.0'N 83°58.0'W
at 20 MSL			
03 AGL B 20 MSL to	D	VAC 010/20	31°17.0'N 83°03.5'W
03 AGL B 20 MSL to	C	TAY 332/33	30°59.0'N 82°53.0'W
03 AGL B 60 MSL to	D	TAY 309/17	30°40.5'N 82°49.5'W
03 AGL B 10 MSL to	E	TAY 243/23	30°19.0'N 82°56.0'W
03 AGL B 60 MSL to	F	GNV 310/39	30°00.0'N 82°56.0'W
03 AGL B 60 MSL to	G	GNV 319/28	29°56.0'N 82°43.0'W
40 MSL -			
60 MSL to	H	GNV 349/22	29°56.0'N 82°26.0'W
40 MSL - 60 MSL to	I	GNV 044/18	29°47.0'N 82°07.0'W
40 MSL -			
60 MSL to	J	GNV 077/29	29°40.5'N 81°49.0'W

TERRAIN FOLLOWING OPERATIONS: Not authorized.

ROUTE WIDTH: 8 NM either side of centerline from A to D; 3 NM right and 4 NM left from D to E; 9 NM right and 15 NM left from E to F; 4 NM either side of centerline from F to J.

Special Operating Procedures:

- (1) Tie-in FSS: Valdosta.
 (2) Cross Point A at 2000 MSL and maintain 2000 MSL until south of Ocala, GA.
 (3) Alternate Entry: D.
 (4) Alternate Exit: D and F.
 (5) Route segment from F to J is authorized only for aircraft scheduled to enter R-2903, R-2906 or R-2907.
 (6) Contact Valdosta approach (285.6) prior to B for clearance into Moody 2 MOA.
 (7) Maneuvering between C and D is permitted when approved by Valdosta approach.
 (8) Climb to 1000' MSL approaching I-75 prior to Point E. Maintain 1000' AGL minimum until required to climb at Point G.
 (9) Altitudes up to 6000 MSL for maneuvers between E and F are available when approved by Jacksonville Center.
 (10) Contact Jacksonville Center (365.6) for clearance to maneuver between E and F.
 (11) Cross G at 4000 MSL or as assigned.
 (12) Contact FACSFACJAX and 2 min W. Clear. Point to deconflict IR-019 and IR-023.

VR-025

ORIGINATING/SCHEDULING ACTIVITY: 123 TRW Standiford Field, ANG, KY 40213 AUTOVON 989-4460

HOURS OF OPERATION: Continuous 16th-end of month VR-630 other days.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
Enter at 30 MSL then	A	IIU 255/47	37°55.0'N 86°32.0'W
03 AGL B 30 MSL to	B	IIU 251/53	37°50.0'N 86°38.0'W
03 AGL B 30 MSL to	C	BWG 332/19	37°13.0'N 86°37.0'W
03 AGL B 30 MSL to	D	CCT 148/23	37°03.0'N 87°02.0'W
03 AGL B 30 MSL to	E	CCT 203/24	37°01.0'N 87°29.0'W
03 AGL B 40 MSL to	F	CNG 086/39	37°01.0'N 88°01.0'W
03 AGL B 30 MSL to	G	CNG 080/36	37°05.0'N 88°06.0'W
03 AGL B 30 MSL to	H	CNG 034/29	37°24.0'N 88°28.0'W
03 AGL B 30 MSL to	I	PRV 293/13	38°01.5'N 88°01.0'W
Exit at 30 MSL			

TERRAIN FOLLOWING OPERATIONS: Authorized entire route.

ROUTE WIDTH - 5 NM either side of centerline.

Special Operating Procedures:

- (1) Entire route has been flight checked down to 300' AGL.
- (2) Alternate Entry: Points B, C and F.
- (3) Alternate Exit: D, F and H.
- (4) CAUTION: Helicopter operations at or below 500' AGL between E and G.
- (5) Tie-in FSS: Louisville (LOU).
- (6) Call the ORIGINATING/SCHEDULING ACTIVITY for detailed briefing on sensitive areas prior to flying this route. The 123 TRW will mail users a copy of route restrictions upon request.
- (7) VR-025 will not be scheduled/flown when VR-630 is in use.

FSS's Within 100 NM Radius:

BNA, BWG, CGI, CSV, DEC, DYR, HUF, JBR, LOU, LOZ, LUK, MKL, MSL, PAH, STL

VR-058

ORIGINATING ACTIVITY: 363 TFW/DOOA, Shaw AFB, SC 29152 AUTOVON 965-3250.

SCHEDULING ACTIVITY: 363 TFW/DOO (Advance Same Day), Shaw AFB, SC 29152 AUTOVON 965-3083, after hours 965-3339.

HOURS OF OPERATION: Continuous (Jan, Mar, May, Jul, Sep, Nov).

TIMES OF OPERATION: Route is open only during months of January, March, May, July, September, November. Reverse direction route VR-92 is open the remaining months.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
Cross as assigned	A	SPA 264/54	34°54.0'N 83°00.0'W
01 AGL B 80 MSL to	B	SPA 262/65	34°46.0'N 83°37.0'W
01 AGL B 80 MSL to	C	CHA 081/54	35°05.0'N 84°04.0'W
01 AGL B 80 MSL to	D	CHA 054/45	35°23.0'N 84°24.0'W

01 AGL B 50 MSL to E CHA 325/51 35°42.0'N 84°44.0'W
01 AGL B 50 MSL to F CHA 260/30 34°53.0'N 85°45.0'W

TERRAIN FOLLOWING OPERATIONS: Authorized entire route.

ROUTE WIDTH - 8 NM either side of centerline from A to B; 10 NM either side of centerline from B to C; 13 NM either side of centerline from C to F.

Special Operating Procedures:

- (1) CAUTION: Numerous powerlines along route above 100' AGL.
- (2) Alternate Entry: Points B and D.
- (3) Alternate Exit: Points C, D and E.
- (4) Congressional noise sensitive area 35°05'N 84°04'W. Avoid by 1500' 5 NM.
- (5) Congressional noise sensitive Coker Creek, TN., 35°16'N 84°17'W. Avoid by 1000'/1 NM.
- (6) CAUTION: VR-1052 same direction Pt B to F (deconflict AUTOVON 694-2441).
- (7) CAUTION: VR-1055 crosses right to left Pt C to D (deconflict AUTOVON 694-2441).
- (8) CAUTION: Hang gliding activity, 35°06'N 85°30'W 35°02'N 85°20.5'W 35°01'N 85°23'W to 34°46'N 85°34'W 35°12.5'N 85°02'W.
- (9) Avoid: Power plant 35°36.1'N 84°47.5'W. Avoid by 1000' 1 NM.
- (10) Avoid: Chlorine gas plant 35°17.5'N 84°45.0'W. Avoid by 1000' 1 NM.
- (11) CAUTION: IR-069 opposite direction Pt D to F (deconflict AUTOVON 694-2441).
- (12) CAUTION: IR-078 same direction Pt E to F (deconflict AUTOVON 922-2735).
- (13) Avoid steam plant 34°53'N 85°45'W. Avoid by 1000' 1 NM.
- (14) Information as of Dec 86.
- (15) Make entry time plus or minus 5 minutes or reschedule.

FSS's Within 100 NM Radius:

ANB, AND, ATL, BHM, BNA, BWG, CSV, GSP, HKY, LOZ, MCN, MSL, TCL, TRI, TYS

VR-060

ORIGINATING/SCHEDULING ACTIVITY: 187 TFG (ANG) Dannelly Field, Montgomery, AL 36196-0001 AUTOVON 742-9255.

HOURS OF OPERATION: 0700-1730 local daily.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
As assigned to	A	MGM 256/38	32°06.0'N 87°03.0'W
05 AGL B 15 AGL to	B	MGM 262/71	32°06.1'N 87°42.3'W
01 AGL B 15 AGL to	C	GCV 038/37	31°33.0'N 88°00.0'W
01 AGL B 50 MSL to	D	GCV 057/39	31°15.0'N 88°09.4'W
01 AGL B 100 MSL to	E	GCV 273/16	31°05.0'N 88°48.0'W

TERRAIN FOLLOWING OPERATIONS: Authorized for entire route.

ROUTE WIDTH - From A to B, route is 5 NM either side centerline; B to C width is 2 NM left and 13.5 NM Right of centerline; route width C to D and D to E is 5 NM either side of centerline.

Special Operating Procedures:

- (1) Cross Millers Ferry Lock and Dam 1000' AGL or above.
- (2) Flights entering at A or B will transmit in the blind their intentions to transit the Camden Ridge MCA 1500' and below on 267.9;

FSS's Within 100 NM Radius:

PHF, RWI, ECG, CRW, MGW, FLO, MRB, AND, SBY, HKY, RDU, GSP, EWN, BLE, EKN, CRE, TR, DCA

IR-720

ORIGINATING ACTIVITY: COMMATWING ONE, NAS Oceana, VA 23460.

SCHEDULING ACTIVITY: FACSAC VACAPES, NAS Oceana, Virginia Beach, VA 23460 AUTOVON 433-2851/Ext 228.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
70 MSL at	A	RIC VORTAC	37°30.1'N 77°19.2'W
70 MSL to	B	GVE 335/7	38°08.0'N 78°11.0'W
70 MSL-60 MSL to	C	CSN 210/11	38°29.0'N 78°00.0'W
70 MSL-60 MSL to	D	LDN 005/5	38°56.0'N 78°12.0'W
70 MSL-60 MSL to	E	EKN 091/12	38°56.0'N 79°51.0'W
70 MSL-60 MSL to	F	GVE 287/45	38°09.0'N 77°05.0'W
70 MSL-60 MSL to	G	GVE 280/16	38°02.0'N 78°30.0'W
70 MSL-60 MSL to	H	HPW 254/13	37°14.0'N 77°25.0'W
Climb to cross			
20 NM S of H at			
60 MSL			
60 MSL to	I	CVI 247/23	36°10.0'N 77°17.0'W

ROUTE WIDTH - 5 NM either side of centerline.

Special Operating Procedures:

- (1) Where more than one altitude is indicated the lowest altitude will be the primary altitude. The higher altitudes will be used by ATC only when required for IFR separation.
- (2) In order to fly this route, aircraft must be equipped with, or fly in section with aircraft equipped with an inertial navigation system and ground mapping radar.
- (3) USAF "Evers" MOA between E and F; 1000' AGL to 17,000' MSL. A-10 VFR ops.
- (4) All route reservations and briefings, including weekend flights, must be made through FACSAC VACAPES AUTOVON 433-2851/Ext 228.
- (5) No Alternate Entry or Exit authorized.

FSS's Within 100 NM Radius:

PHF, RWI, ECG, CRW, MGW, MRB, AGC, HTS, SBY, RDU, PKB, EWN, DUJ, BLE, JST, EKN, YNG, MIV, ACO, DCA, PSB

IR-721

ORIGINATING ACTIVITY: 363 TFW/DOTA Shaw AFB, SC 29152 AUTOVON 965-3250.

SCHEDULING ACTIVITY: 363 TFW/DOO (Advance/Some day) Shaw AFB, SC 29152 AUTOVON 965-3083, After hours 965-3339.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
Cross	A	ROA VORTAC	37°29.6'N 80°04.3'W
at 60 MSL B 80 MSL			
or as asgnd			
60 MSL B 80 MSL			
or as asgnd to	B	ROA 181/17	37°03.5'N 80°03.0'W
03 AGL B 80 MSL to	C	ROA 195/27	36°53.8'N 80°11.0'W
03 AGL B 60 MSL to	D	GSO 336/42	36°40.0'N 80°22.0'W
03 AGL B 50 MSL to	E	GSO 326/34	36°30.0'N 80°24.0'W
03 AGL B 50 MSL to	F	GSO 297/35	36°17.0'N 80°38.5'W
03 AGL B 40 MSL to	G	GSO 249/34	35°48.5'N 80°36.7'W
03 AGL B 30 MSL to	H	GSO 231/27	35°44.8'N 80°22.8'W
03 AGL B 30 MSL to	I	GSO 180/41	35°21.6'N 79°56.0'W
03 AGL B 30 MSL to	J	SSC 024/43	34°39.0'N 80°11.3'W
30 MSL to	K	SSC 024/33	34°30.0'N 80°15.0'W

TERRAIN FOLLOWING OPERATIONS: Authorized from B to J. Maintain top of the altitudes between B to J unless Terrain Following Operations are approved with entry clearance from Roanoke Approach.

ROUTE WIDTH - 5 NM either side of centerline from A to I, 5 NM left and 9 NM right of centerline from I to J, or centerline from J to K.

Special Operating Procedures:

- (1) Monitor Greensboro Approach 222.3 passing Pt C.
- (2) Monitor Charlotte Approach 316.7 passing Pt H and report passing Pt J level at 3000' MSL.
- (3) Contact Shaw RAPCON 327.3 passing Pt J.
- (4) Caution: VR-1752 crosses left to right Pt C to Pt D. (Deconflict AUTOVON 443-2211 Extm 116)
- (5) Caution: Hang gliders and experimental aircraft in vicinity of Mount Airy Airport.
- (6) Caution: SR-13 and SR-14 cross right to left, Pt H to Pt I. (Deconflict AUTOVON 583-4141)
- (7) Caution: VR-87 Crosses from NW to SE, Pt I to Pt J. (Deconflict with 363 TFW/DOTS)
- (8) Avoid: Pee Dee National Wildlife Refuge by 2000' AGL (35°05.0'N 80°03.0'W)
- (9) Caution: Ultralight aircraft near Pt J below 1500' AGL.
- (10) Avoid: Sandhill National Wildlife Refuge by 2000' AGL. Refuge is centered at 34°35'N 80°13'W, charted boundary exceeds 5 NM radius.
- (11) VR-1721 may be flown, weather permitting, if the controlling agency delays or refuses clearance to fly IR-721. Check Flip AP-18 guidance for specifics on VR-1721.

FSS's Within 100 NM Radius:

RWI, CRW, MGW, FLO, AND, HTS, HKY, RDU, PKB, GSP, EWN, BLE, EKN, CHC, CRE, CHS, TR

IR-723

ORIGINATING/SCHEDULING ACTIVITY: FACSACNPA, NAS Pensacola, FL 32508 AUTOVON 922-2735.

HOURS OF OPERATION: 1200-0400Z + +, Monday through Friday, occasionally weekends.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
90 MSL or as asgn at	A	HNN 048/14	36°55.0'N 81°49.0'W
90 MSL or as asgn to	B	BKW 357/23	38°10.0'N 81°12.0'W

(7) CAUTION: VR-1004 crosses left to right from Pt D to E. VR-1004 crosses left to right at Pt E (deconflict AUTOVON 989-4460).
 (8) Avoid: Cumberland Gap National Historic Park. Avoid by 2000' AGL (Pt F to G).
 (9) Information as of Dec 86.
 (10) Make entry time plus or minus 5 minutes or reschedule.
 (11) CAUTION: 400' AGL powerline located at 37°14'N 82°02'W.

FSS's Within 100 NM Radius:

AND, BLF, BWG, CRW, CSV, EKN, FLO, GSP, HKY, HTS, LOU, LOZ, LUK, PKB, RDU, RWI, TRI, TYS

VR-094

ORIGINATING ACTIVITY: 363 TFW/DOOA, Shaw AFB, SC 29152 AUTOVON 965-3250.

SCHEDULING ACTIVITY: 363 TFW/DOO (Advance/Same Day), Shaw AFB, SC 29152 AUTOVON 965-3083, after hours, 965-3339.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
Cross as assigned to	A	AYS 303/27	31°31.0'N 83°00.0'W
01 AGL B 30 MSL to	B	AYS 315/48	31°50.0'N 83°13.0'W
01 AGL B 30 MSL to	C	AYS 338/57	32°09.0'N 82°58.0'W
01 AGL B 30 MSL to	D	VAN 239/70	32°50.0'N 81°37.0'W
01 AGL B 30 MSL to	E	VAN 217/67	32°33.0'N 81°12.0'W

TERRAIN FOLLOWING OPERATIONS: Authorized entire route.

ROUTE WIDTH - 10 NM either side of centerline for entire route.

Special Operating Procedures:

- (1) Alternate Entry: Points B and C.
- (2) Alternate Exit: Point D.
- (3) CAUTION: Crop dusters from Pt C to E 300' and below, 15 June to 15 September.
- (4) CAUTION: Multiple VR/IR routes cross from Pt A to B.
- (5) CAUTION: VR-1004 crosses right to left and then left to right Pt C to D (deconflict AUTOVON 942-2525).
- (6) CAUTION: VR-1059 same direction at Pt D (deconflict with 363 TFW/DOO).
- (7) Information as of Dec 86.
- (8) Make entry time plus or minus 5 minutes or reschedule.

FSS's Within 100 NM Radius:

AND, ATL, CHS, CRE, DHN, FLO, GNV, GSP, JAX, MCN, SAV, SSI, TLH, VLD

VR-095

ORIGINATING ACTIVITY: 363 TFW/DOOA, Shaw AFB, SC 29152 AUTOVON 965-3250.

SCHEDULING ACTIVITY: 363 TFW/DOO (Advance/Same Day), Shaw AFB, SC 29152 AUTOVON 965-3083, after hours 965-3339.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
Cross as assigned to	A	SPA 207/29	34°36.0'N 82°10.0'W
01 AGL B 15 AGL to	B	SPA 208/39	34°27.0'N 82°16.0'W
01 AGL B 15 AGL to	C	SPA 209/61	34°07.0'N 82°29.0'W
01 AGL B 15 AGL to	D	SPA 209/93	33°39.0'N 82°46.0'W
01 AGL B 15 AGL to	E	SPA 212/113	33°24.0'N 83°03.0'W
01 AGL B 40 MSL to	F	VNA 318/54	32°53.0'N 84°12.0'W
01 AGL B 40 MSL to	G	VNA 213/54	31°45.0'N 83°52.0'W
01 AGL B 40 MSL to	H	VNA 190/31	31°42.0'N 83°37.0'W
Alternate Exit:			
01 AGL B 40 MSL to	F1	VNA 318/54	32°53.0'N 84°12.0'W
01 AGL B 40 MSL to	FF	VNA 283/59	32°27.0'N 84°37.0'W

TERRAIN FOLLOWING OPERATIONS: Authorized entire route except 300' AGL minimum from Pt A to D, 15 June to 15 September.

ROUTE WIDTH - 10 NM either side of centerline from A to G and F1 to FF; 5 NM either side of centerline from G to H.

Special Operating Procedures:

- (1) Alternate Entry: Points D, E and F.
- (2) Alternate Exit: Points D, E and F.
- (3) Only aircraft scheduled for entry into A-3012 are authorized to fly segment F1 to FF.
- (4) Congressional noise sensitive area, Washington, GA 30°44'30"N 82°44'30"W. Avoid by 1500' AGL.
- (5) CAUTION: IR-074 same direction from Pt A to D (deconflict with 363 TFW/DOO).
- (6) CAUTION: IR-089/090 crosses at 34°13'N 84°30'W (deconflict with 363 TFW/DOO).
- (7) CAUTION: VR-1059 crosses left to right and right to left from Pt D to E (deconflict with 363 TFW/DOO).
- (8) CAUTION: VR-1004 crosses right to left and left to right from Pt D to E (deconflict AUTOVON 942-2525).
- (9) CAUTION: IR-019 opposite direction at Pt G (deconflict AUTOVON 942-2525).
- (10) CAUTION: VR-1001 crosses left to right from Pt G to H (deconflict AUTOVON 942-2525).
- (11) IFR pick-up with Atlanta ARTCC (348.7). IFR pick-up with Jacksonville ARTCC (379.2).
- (12) Information as of Dec 86.
- (13) Make entry time plus or minus 5 minutes or reschedule.

FSS's Within 100 NM Radius:

ANB, AND, ATL, BHM, CEW, CHS, DHN, FLO, GNV, GSP, HKY, JAX, MCN, MGM, SAV, SSI, TLH, TRI, TYS, VLD

VR-096

ORIGINATING ACTIVITY: 363 TFW DOOA, Shaw AFB, SC 29152 AUTOVON 965-3250.

SCHEDULING ACTIVITY: 363 TFW DOO (Advance/Same Day Scheduling), Shaw AFB, SC 29152 AUTOVON 965-3083, after hours AUTOVON 965-3339.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
As assigned to	A	TYI 336/26	36°23.0'N 77°59.0'W
05 AGL B 65 MSL to	B	LYH 085/28	37°20.0'N 78°39.0'W
05 AGL B 65 MSL to	C	LYH 024/29	37°43.0'N 79°02.0'W
05 AGL B 65 MSL to	D	ROA 002/22	37°43.0'N 80°05.0'W

TERRAIN FOLLOWING OPERATIONS: Authorized for entire route.

ROUTE WIDTH - 5 NM either side of centerline entire route.

Special Operating Procedures

- (1) CAUTION: Farmville MOA (317.7) may be in use between sunrise to 0900 local and 1600-1700 local. Call in the blind when transiting the MOA during the times published.
- (2) CAUTION: Multiple low level routes cross entire route.
- (3) CAUTION: Numerous powerlines in mountainous sections.
- (4) Congressional noise sensitive area 37°08.1'N 78°34.4'W avoid by 1 NM.
- (5) CAUTION: IR-715/VR-1751 opposite direction from Pt B to C (deconflict AUTOVON 433-2851, ext 215).
- (6) CAUTION: VR-1756 same direction PT B to C (deconflict AUTOVON 433-2851, ext 215).
- (7) Information as of Dec 86.
- (8) Make entry time plus or minus 5 minutes or reschedule.

FSS's Within 100 NM Radius:

BLF, CRW, DCA, ECG, EKN, EWN, HKY, HTS, MGW, MRB, PHF, PKB, RDU, RWI, TRI

VR-100

ORIGINATING ACTIVITY: 27 TFW/DOR, Cannon AFB, NM 88103-5129 AUTOVON 681-2877.

SCHEDULING ACTIVITY: 27 TFW/DOTU, Cannon AFB, NM 88103-5129 AUTOVON 681-2276 ngt 681-2253 weekends.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
As assigned to	A	CVS 232/27	34°10.0'N 103°48.0'W
SFC B 110 to	B	ROW 042/49	33°49.0'N 103°49.0'W
SFC B 110 to	C	ROW 056/43	33°36.0'N 103°50.0'W
SFC B 110 to	D	ROW 057/33	33°32.0'N 104°00.0'W
SFC B 110 to	E	ROW 344/34	33°54.0'N 104°40.0'W
SFC B 110 to	F	ROW 333/34	33°53.0'N 104°48.0'W
SFC B 110 to	G	ROW 292/32	33°38.0'N 105°09.0'W
SFC B 125 to	H	CNX 143/44	33°41.5'N 105°19.5'W
SFC B 125 to	I	CNX 167/38	33°43.5'N 105°40.5'W
SFC B 125 to	J	CNX 176/35	33°47.5'N 105°47.5'W
SFC B 110 to	K	CNX 241/16	34°17.5'N 105°59.5'W
SFC B 110 to	L	CNX 280/23	34°31.0'N 106°06.0'W
SFC B 110 to	M	CNX 307/21	34°38.0'N 105°57.0'W
SFC B 110 to	N	CNX 332/14	34°35.5'N 105°45.0'W
SFC B 110 to	O	CNX 012/21	34°41.0'N 105°30.0'W
SFC B 110 to	P	TCC 196/34	34°41.0'N 103°55.0'W
SFC B 110 to	Q	CVS 307/25	34°41.0'N 103°40.0'W

TERRAIN FOLLOWING OPERATIONS: Authorized entire route.

ROUTE WIDTH - 5 NM left and 5 NM right of centerline from A to B; 1.5 NM either side of centerline from B to F; 5 NM either side of centerline from F to N; 5 NM increasing to 28 NM either side of centerline from N to Q; 28 NM either side of centerline from Q to F; 28 NM left and 2 NM right of centerline from P to Q.

Special Operating Procedures:

- (1) Non-27 TFW aircraft entry times are booked no closer than 15 minutes. Users must meet booked entry and exit times plus or minus 5 minutes. If unable to meet planned entry time, enter at an alternate entry so as to meet booked exit time or do not enter the route. Route times are planned at 450 kts ground speed.
- (2) Aircraft must call in the blind route entry and exit on 255.4. Monitor 255.4 while on this route unless operational requirements dictate otherwise.
- (3) Alternate Entry: B through P.
- (4) Alternate Exit: C through P.
- (5) When practicable, avoid all uncontrolled airfields by 1500' AGL or 3 NM.
- (6) Non-27 TFW aircraft maintain 1000' AGL min altitude between points G and J.
- (7) Avoid Gran Guivira National Monument 34°55.0'N 104°56.0'W by 3 NM.
- (8) Avoid ranch at 34°55.0'N 103°46.0'W by 1000' AGL or 3 NM.
- (9) Avoid by 2 NM:
 - (a) Ranch 34°21.0'N 104°22.0'W
 - (b) Ranch 34°15.0'N 104°00.0'W
 - (c) Ranch 34°18.0'N 104°25.0'W
- (10) Avoid Ranch at 34°21.0'N 104°33.0'W by 2 NM or 1000' AGL.
- (11) Avoid White Oaks, NM 34°45.0'N 105°44.0'W by 1.5 NM or 1000' AGL.
- (12) Avoid by 1000' AGL or 1 NM:
 - (a) Ranch 34°54.0'N 103°50.0'W
 - (b) Ranch 34°22.0'N 104°05.0'W
 - (c) Ranch 34°50.0'N 103°59.0'W
 - (d) Ranch 34°17.0'N 105°05.0'W
- (e) Area 1 NM either side of a line from 34°21.0'N 104°44.0'W to 34°13.0'N 104°41.0'W.
- (13) Aircraft not scheduled into R-5104/R-5105 must exit at or prior to Point P.
- (14) Deconfliction is by 27 TFW Scheduling.
- (15) Route conflicts with IR-109, IR-113, IR-128, IR-133, IR-180, VR-176, and VR-1195/1107. Consult FLIP AP/18 chart for particulars.
- (16) Uncharted/unclimbed obstructions as of 1 July 87.

(a) Towers at:

34°59.5'N 104°08.0'W (200')
 34°57.3'N 105°12.7'W (295')
 33°50.0'N 103°45.0'W (125')
 33°51.5'N 103°46.0'W (100')
 33°56.0'N 103°53.0'W (200')
 34°09.0'N 105°04.8'W (125')
 35°03.8'N 104°02.2'W (150')
 34°50.5'N 103°44.2'W (200')
 34°18.8'N 105°46.8'W (200')
 35°07.0'N 105°35.4'W (125')

(b) Powerline (100') from 34°24.0'N 103°35.0'W to 34°24.0'N 103°40.5'W to 34°27.5'N 103°40.5'W to 34°27.5'N 103°48.5'W to 34°28.5'N 103°51.5'W to 34°28.5'N 103°55.0'W to 34°37.5'N 104°05.0'W to 34°57.5'N 104°37.0'W to 35°01.0'N 104°55.0'W to 35°06.5'N 104°58.0'W to 35°03.5'N 105°12.5'W to 35°03.0'N 105°37.0'W.

FSS's Within 100 NM Radius:

ABQ, TCC, LVS, DHT, LBB, ROW, MAF, TCS, CNM, INK, AMA, DMN, ELP, GUP

(4) Alternate Exit: E, G, and H.
(5) Information as of December 1986

FSS's Within 100 NM Radius:

RWI, CRW, AND, HTS, HKY, RDU, LOZ, PKB, TRI, GSP, BLF, EKN, TYS, FLO, CSV

VR-1743

ORIGINATING ACTIVITY: 363 TFW/DOOA, Shaw AFB, SC 29152
AUTOVON 965-3250/3310.

SCHEDULING ACTIVITY: 363 TFW/DOO (Advanced/Same Day)
Shaw AFB, SC 29152 AUTOVON 965-3083.

363 TFW/DOC (After Hours) Shaw AFB, SC 29152 AUTOVON
965-3339.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
Cross at 15 AGL	A	HMV 054/49	36°58.0'N 81°21.0'W
01 AGL B 15 AGL to	B	HMV 023/26	36°51.0'N 81°57.0'W
01 AGL B 15 AGL to	C	GZG 204/1	36°49.0'N 82°05.0'W
01 AGL B 15 AGL to	D	HMV 302/34	36°42.0'N 82°45.0'W
01 AGL B 15 AGL to	E	HMV 289/34	36°35.0'N 82°49.0'W
03 AGL B 15 AGL to	F	TYS 071/44	36°11.0'N 83°03.0'W
03 AGL B 15 AGL to	G	TYS 085/36	35°59.0'N 83°10.0'W
03 AGL B 15 AGL to	H	TYS 097/32	35°52.0'N 83°14.0'W
03 AGL B 15 AGL to	I	TYS 109/35	35°44.5'N 83°12.0'W
03 AGL B 15 AGL to	J	TYS 124/41	35°33.0'N 83°10.0'W

TERRAIN FOLLOWING OPERATIONS: Authorized from A to J.

ROUTE WIDTH - 5 NM either side of centerline for entire route.

Special Operating Procedures:

- (1) VR-1743 will not be flown unless the aircrew has filed for IR-743 and procedural problems are encountered. If refused entry into IR-743, please call 363 TFW/DOOA with time and reason entry was refused.
- (2) See Special Operating Procedures for IR-743 for other route information.
- (3) Alternate Entry: C and D.
- (4) Alternate Exit: E and H.
- (5) Information as of December 1986

FSS's Within 100 NM Radius:

CRW, AND, HTS, CSV, HKY, RDU, PKB, LOZ, TRI, GSP, BLF, EKN, TYS, ATL

VR-1751

ORIGINATING ACTIVITY: COMMATWING ONE, NAS Oceana Virginia Beach, VA 23460 AUTOVON 433-2211/Ext 114.

SCHEDULING ACTIVITY: FACSAC VACAPES, Oceana, VA 23460
AUTOVON 433-2851/Ext 228.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
As assigned to	A	LYH 026/29	37°42.0'N 79°01.0'W
10 AGL B 15 AGL to	B	LYH 345/18	37°32.0'N 79°22.0'W
05 AGL B 15 AGL to	C	ROA 052/22	37°35.0'N 79°44.0'W
SFC B 15 AGL to	D	BKW 141/14	37°37.0'N 80°55.0'W
SFC B 15 AGL to	E	BLF 303/13	37°25.0'N 81°26.0'W
SFC B 15 AGL to	F	GZG 060.16	36°58.0'N 81°48.0'W
SFC B 15 AGL to	G	LNP 033.17	37°14.0'N 82°21.0'W
05 AGL B 15 AGL to	H	ECB 093/25	38°09.0'N 82°23.0'W
05 AGL B 15 AGL to	I	BKW 359/22	38°09.0'N 81°11.0'W
SFC B 15 AGL to	J	BKW 053/34	38°10.0'N 80°36.0'W
SFC B 15 AGL to	K	LYH 358/49	38°04.0'N 79°22.0'W
SFC B 15 AGL to	L	LYH 057/29	37°33.0'N 78°46.0'W

TERRAIN FOLLOWING OPERATIONS: Authorized C to G then J to L.

ROUTE WIDTH - 5 NM either side of centerline from A to B; 2 NM left and 5 NM right of centerline from B to E; 5 NM either side of centerline from E to J; 5 NM left and 4 NM right of centerline from J to K; 3 NM left and 1 NM right of centerline from K to L.

Special Operating Procedures:

- (1) Alternate Entry/Exit: G.
- (2) Attempt contact Roanoke (A) or London (G) FSS on 255.4 with entry/ex times prior to entry.
- (3) All route reservations and briefings, including weekend flights, must be made through FACSAC VACAPES, AUTOVON 433-2851/Ext 228.
- (4) Extensive helicopter operations entire route.
- (5) A-B avoid private airport (Flatwood) 37°44'N 78°58'W.
- (6) Avoid Springwood Gliderport (37°31.5'N 79°41.5'W), vicinity of Pt C. Remain right of centerline. Glider activity on Saturdays, Sundays, and Wednesdays from 0900 to sunset, surface to 14,000.
- (7) E-F avoid Welch Municipal Airport west of E, Richland Airport north of F.
- (8) F-G VR-1751 crosses IR-075 and VR-093 between Pt F and Pt G and again between Pt G and Pt H. VR-1751 crosses IR-079 at Pt G.
- (9) G-H avoid Mingo Co Airport.
- (10) H-I numerous powerlines. Contact Charleston Approach on 259.1/257.8 and give estimated time of arrival at H and I.
- (11) I-J avoid Summersville Airport, New River Gorge Airport, private airport 38°08'N 81°03'W.
- (12) J-K minimum altitude over Craigsville (K) is 4000' MSL VR-1751 crosses VR-1756 twice (J-K, K-L) at forward of abeam angles.
- (13) Avoid private airport (Bath Alum) west of Pt K.
- (14) K-L Avoid Flatwood Airport and Starr Airport northwest of Pt L.
- (15) VR-096 conflicts head-on with VR-1751 from 18 NM northwest of Pt L until the end of the route. Contact 363 TFW for VR-096 flight information (AUTOVON 965-3083 or 965-3339 after hours).

FSS's Within 100 NM Radius:

PHF, HTS, GSP, ECG, RWI, TRI, JST, CRW, HKY, DCA, TYS, AGC, MDW, RDU, BLF, AGC, MRB, PKB, EKN, DAY, LUK

VR-1752

ORIGINATING ACTIVITY: COMMATWING ONE, NAS Oceana Virginia Beach, VA 23460 AUTOVON 433-2211/Ext 114.

SCHEDULING ACTIVITY: FACSAC VACAPES, NAS Oceana AUTOVON 433-2851/Ext 228.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
As assigned to	A	CVI 129/11	36°17.0'N 76°41.0'W
05 AGL B 15 AGL to	B	TYI 066/23	36°10.0'N 77°17.0'W
05 AGL B 15 AGL to	C	LVL 235/31	36°28.0'N 78°22.0'W
05 AGL B 15 AGL to	D	SBV 055/20	36°53.0'N 78°42.0'W
05 AGL B 15 AGL to	E	SBV 309/22	36°53.0'N 79°24.0'W
05 AGL B 15 AGL to			
22 NM east of F			
Then SFC B 15 AGL to	F	ROA 178/34	36°47.0'N 80°00.0'W
SFC B 15 AGL to	G	PSK 153/20	36°48.0'N 80°29.0'W
SFC B 15 AGL to	H	GSO 297/53	36°24.0'N 80°59.0'W
SFC B 15 AGL to	I	HMV 069/31	36°39.0'N 81°33.0'W
SFC B 15 AGL to	J	BLF 187/25	36°53.0'N 81°14.0'W
SFC B 15 AGL to	K	PSK 187/07	36°58.0'N 80°43.0'W
SFC B 15 AGL until			
35 NM east of K then			
05 AGL B 15 AGL to	L	LYH 234/19	37°03.0'N 79°32.0'W
05 AGL B 15 AGL to	M	SBV 038/23	37°00.0'N 78°45.0'W
05 AGL B 15 AGL to	N	FKN 265/28	36°36.0'N 77°35.0'W
05 AGL B 15 AGL to	O	FKN 147/11	36°35.0'N 76°52.0'W

TERRAIN FOLLOWING OPERATIONS: Authorized 22 NM east of F to 35 NM east of K.

ROUTE WIDTH—4 NM left and 2 NM right of centerline from A to B; 4 NM either side of centerline from B to C; 1 NM either side of centerline from C to D; 4 NM left and 3 NM right of centerline from D to E; 4 NM either side of centerline from E to G; 3 NM either side of centerline from G to J; 4 NM either side of centerline from J to M; 2 NM left and 4 NM right of centerline from M to O.

Special Operating Procedures:

- (1) Alternate Entry: D, F, H, J, L.
- (2) Alternate Exit: D, F, H, J, L, N.
- (3) Contact Newport News (Pt A) or Hickory (Pt I) FSS on 255.4 with Entry/Exit times prior to route entry.
- (4) All route reservations and briefings, including weekend flights, must be made through FACSAC VACAPES, AUTOVON 433-2851/Ext 228.
- (5) B—C. Scotland Neck Airport 36°11'N 77°24'W; Warren County Airport.
- (6) Minimum 2000' AGL over Warranton 36°24'N 78°09'W.
- (7) C—D avoid Lakefield, Merrifield, Marks, Chase City Airports.
- (8) VR-1758 is head on with VR-1752 at Pt C.
- (9) D—E. Avoid Jefferson-Watson Airport 2 NM south of Pt E.
- (10) F—G. Avoid Bush Airport.
- (11) G—L. Extensive HELO operations.
- (12) J—K. Remain south of centerline to avoid Echo Valley Airport 36°56'N 81°03'W and Wytheville Hospital.
- (13) Farmville MOA active from sunrise to 0930 and 1600-1700 Monday through Friday, from 300' AGL to 5000' MSL. Washington ARTCC controlling frequency is 317.7. Call IFTW AUTOVON 574-2303 for flight information regarding MOA flight operations.
- (14) K—L. Extremely noise/altitude sensitive area. Avoid Floyd Agricultural Energy Cooperative (with 130' AGL tower) at 36°58.5'N 80°15.0'W by 1000' AGL or 1 NM. Avoid town and private airport to the north 36°59'N 79°56'W.
- (15) Ensure strict adherence to route altitudes over Smith Mountain Lake.
- (16) L—M. Avoid town of Long Island 37°04'N 79°05'W.
- (17) M—N. VR-1060/VR-1061 is head on to VR-1752. Contact 363 TFW/DOOS AUTOVON 965-2353 or 965-3339 for flight information.
- (18) N—O. Avoid Mann Airport.

FSS's Within 100 NM Radius:

PHF, SBV, DCA, FLO, GSP, ECG, HKY, BLF, AND, TYS, RWI, RDU, EKN, HTS, MRB, CRW, TRI, PKB, EWN, LOZ

VR-1753

ORIGINATING ACTIVITY: COMBATWING ONE, NAS Oceana Virginia Beach, VA 23460 AUTOVON 433-2211/Ext 114.

SCHEDULING ACTIVITY: FACSAC VACAPES, NAS Oceana Virginia Beach AUTOVON 433-2851/Ext 228.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
As assigned to	A	CCV 116/11	37°18.0'N 75°47.0'W
10 AGL B 15 AGL to	B	HCM 081/15	37°31.0'N 76°25.0'W
10 AGL B 15 AGL to	C	HPW 223/16	37°07.0'N 77°19.0'W
05 AGL B 15 AGL to	D	FKN 225/08	36°36.0'N 77°07.0'W
05 AGL B 15 AGL to	E	CVI 328/01	36°23.0'N 76°53.0'W
05 AGL B 15 AGL to	F	CVI 166/21	36°03.0'N 76°42.0'W
05 AGL B 15 AGL to	G	CVI 162/29	35°56.0'N 76°36.0'W
05 AGL B 15 AGL to	H	CVI 159/40	35°48.0'N 76°26.0'W

ROUTE WIDTH—3 NM either side of centerline from A to C; 5 NM either side of centerline from C to F; 2 NM either side of centerline from F to G; 3 NM either side of centerline from G to H.

Special Operating Procedures:

- (1) Alternate Entry: C, E.
- (2) Alternate Exit: G.
- (3) Attempt contact Newport News FSS on 255.4 with Entry/Exit times prior to entry.
- (4) All route reservations and briefings, including weekend flights, must be made through FACSAC VACAPES, AUTOVON 433-2211/Ext 228.
- (5) A—B. Avoid Eastville 12 NM W of Pt A.
- (6) Extensive fish-spotter traffic between A and B, surface to 5000' MSL, April to November.
- (7) Avoid Walter Reed Hospital near Gloucester, Pt B 37°25'N 76°32'W.
- (8) B—C. Avoid Williamsburg; avoid Gloucester Airport.
- (9) Avoid Petersburg, Pt C.
- (10) Remain north of centerline 5 NM prior to Pt C to avoid Disputanta by 3 NM.
- (11) Parallel traffic with VR-1713 between D and H. Contact 113th TFW AUTOVON 858-4171 for flight information.

FSS's Within 100 NM Radius:

PHF, RDU, ECG, EWN, RWI, DCA, MRB, MIV, SBV

VR-1754

ORIGINATING ACTIVITY: COMBATWING ONE, NAS Oceana Virginia Beach, VA 23460 AUTOVON 433-2211/Ext 114.

SCHEDULING ACTIVITY: FACSAC VACAPES, Oceana, VA AUTOVON 433-2851/Ext 228.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
05 AGL B 15 AGL to	A	CCV 305/00	37°20.9'N 76°00.0'W
SFC B 15 AGL to	B	HGM 054/15	37°37.0'N 76°24.0'W
SFC B 15 AGL to	C	BRV 230/25	38°01.0'N 77°42.0'W
15 AGL to	D	GVE 330/20	38°19.0'N 78°26.0'W
15 AGL to			

FSS's Within 100 NM Radius:
GNV, JAX, ORL, PIE, SSI, VLD, VRB

SCHEDULING ACTIVITY: CG MCAS CHERRY POINT CENTRAL
SCHEDULING CENTER, Cherry Point, NC 28533 AUTOVON
582-4040/4041.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

VR-1040

ORIGINATING ACTIVITY: CG MCAS CHERRY POINT, Cherry Point,
NC 28533 AUTOVON 582-4040/4041.

SCHEDULING ACTIVITY: CG MCAS CHERRY POINT CENTRAL
SCHEDULING CENTER, Cherry Point, NC 28533 AUTOVON
582-4040/4041.

HOURS OF OPERATION: Continuous.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
As assigned to	A	ILM 229/36	33°54.0'N 78°22.0'W
05 AGL B 15 AGL to	B	ILM 292/20	34°26.1'N 78°16.0'W
02 AGL B 15 AGL to	C	FLO 072/37	34°27.0'N 78°58.0'W
02 AGL B 15 AGL to	D	FLO 190/29	33°45.0'N 79°44.0'W
02 AGL B 15 AGL to	E	CHS 022/39	33°31.0'N 79°49.0'W
02 AGL B 15 AGL to	F	CHS 015/27	33°20.0'N 79°57.0'W
02 AGL B 15 AGL to	G	CHS 318/23	33°09.0'N 80°22.0'W
02 AGL B 15 AGL to	H	NBC 125/15	32°20.0'N 80°28.0'W
05 AGL B 15 AGL to	I	SAV 151/18	31°54.0'N 80°56.0'W
02 AGL B 15 AGL to	J	SSI 030/31	31°31.0'N 81°11.0'W
02 AGL B 15 AGL to	K	JVC 106/24	30°15.0'N 81°04.0'W
02 AGL B 15 AGL to	L	OMN 345/25	29°42.0'N 81°14.0'W
02 AGL B 15 AGL to	M	OMN 288/19	29°24.0'N 81°27.0'W
02 AGL B 15 AGL to	N	OMN 283/22	29°23.0'N 81°31.0'W

ROUTE WIDTH - 2 NM either side of centerline from A to D; 3 NM left and 1 NM right of centerline from D to E; 3 NM either side of centerline from E to H; 4 NM left and 1 NM right of centerline from H to I; 3 NM either side of centerline from I to N.

Special Operating Procedures:

- (1) CAUTION: Intensive civil aircraft near Hilton Head Airport.
- (2) CAUTION: Intensive low altitude helicopter ops between Point J to L in W-158E and W-158W.
- (3) Alternate Entry: B, G, H and I.
- (4) Alternate Exit: H, I, L, and M.
- (5) 2049 MSL tower located at 34°07'51"N 78°11'16"W.
- (6) Schedule 0700-1630 local Mon-Fri.
- (7) 1009' AGL tower located at 33°05'06"N 80°22'14"W, less than 1 NM off centerline, between Points G and H.
- (8) Do not fly within 1 NM of Harbor, Hunting or Fripp Islands (near Point H) below 1500 AGL.
- (9) Noise sensitive area: vicinity of 32°41'25"N 80°25'38"W. Remain 1 NM west of centerline between Pt G and H. See note (8).

FSS's Within 100 NM Radius:

AND, CHS, CRE, EWN, FLO, GNV, GSP, HKY, JAX, MCN, ORL, PIE, RDU, RWI, SAV, SJU, SSI, VLD, VRB

VR-1041

ORIGINATING ACTIVITY: CG MCAS CHERRY POINT, Cherry Point,
NC 28533 AUTOVON 582-4040/4041.

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
02 AGL B 15 AGL to See Special Operating Procedures	A	NBC 110/18	32°23.0'N 80°23.0'W
02 AGL B 15 AGL to	B	CHS 159/16	32°39.0'N 79°54.0'W
02 AGL B 15 AGL to	C	CHS 085/36	33°00.0'N 79°20.0'W
02 AGL B 15 AGL to	D	CHS 077/43	33°07.0'N 79°14.0'W
02 AGL B 15 AGL to	E	CHS 060/36	33°14.0'N 79°27.0'W
02 AGL B 15 AGL to	F	CHS 015/27	33°20.0'N 79°57.0'W
02 AGL B 15 AGL to	G	CHS 318/23	33°09.0'N 80°22.0'W
02 AGL B 15 AGL to	H	NBC 069/15	32°36.0'N 80°25.0'W
02 AGL B 15 AGL to	I	NBC 110/18	32°20.0'N 80°23.0'W
05 AGL B 10 AGL to	J	SAV 151/18	31°54.0'N 80°56.0'W
02 AGL B 15 AGL to	K	SSI 030/31	31°31.0'N 81°11.0'W
02 AGL B 15 AGL to	L	JVC 106/24	30°15.0'N 81°04.0'W
02 AGL B 15 AGL to	M	OMN 345/25	29°42.0'N 81°14.0'W
02 AGL B 15 AGL to	N	OMN 288/19	29°24.0'N 81°27.0'W
02 AGL B 15 AGL to	O	OMN 283/22	29°23.0'N 81°31.0'W

ROUTE WIDTH - 3 NM either side of centerline from A to H; 3 NM right and 1 NM left of centerline from H to I; 3 NM either side of centerline from I to O.

Special Operating Procedures:

- (1) 1500' AGL until 3 NM past Point A and then maintain 200' AGL to 1500' AGL. Do not fly closer than 1 NM from the coast at Point B below 1500' AGL.
- (2) Do not fly within 1 NM of Harbor, Hunting or Fripp Islands (Near Points A/I) below 1500' AGL.
- (3) CAUTION: Intensive civil aircraft ops near Hilton Head Airport.
- (4) CAUTION: Intensive low altitude helicopter ops between Points J and L in W-158E and W-158F.
- (5) Alternate Entry: Points D, G, H and I.
- (6) Alternate Exit: Points E, F, H, I, L, and M.
- (7) Schedule 0700-1630 local Mon-Fri.
- (8) 1009' AGL tower located at 33°05'06"N 80°22'14"W, less than 1 NM off centerline, between Points G and H.
- (9) Noise sensitive area: vicinity of 32°41'25"N 80°25'38"W. Remain 1 NM west of centerline between Pt G and H. See note (8).

FSS's Within 100 NM Radius:

AND, CHS, CRE, FLO, GNV, GSP, JAX, MCN, ORL, PIE, SAV, SSI, VLD, VRB

VR-1043

ORIGINATING ACTIVITY: CG MCAS CHERRY POINT, Cherry Point,
NC 28533 AUTOVON 582-4040/4041.

SCHEDULING ACTIVITY: CG MCAS CHERRY POINT CENTRAL
SCHEDULING CENTER, Cherry Point, NC 28533 AUTOVON
582-4040/4041.

HOURS OF OPERATION: 0700-2300 local daily.

VR-1046

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
As assigned to	A	NKT 262/9	34°52.0'N 77°04.0'W
02 AGL B 15 AGL to	B	NKT 215/28	34°30.0'N 77°10.0'W
02 AGL B 15 AGL to	C	ILM 193/33	33°48.3'N 77°56.6'W
05 AGL B 15 AGL to	D	ILM 229/36	33°54.0'N 78°22.0'W
05 AGL B 15 AGL to	E	ILM 292/20	34°26.1'N 78°16.0'W
02 AGL B 15 AGL to	F	FLO 072/37	34°27.0'N 78°58.0'W
02 AGL B 15 AGL to	G	FLO 026/20	34°32.0'N 79°30.0'W
02 AGL B 15 AGL to	H	FLO 316/31	34°35.0'N 80°07.0'W
02 AGL B 15 AGL to	I	FLO 293/32	34°25.0'N 80°16.0'W
02 AGL B 15 AGL to	J	FLO 236/21	34°01.0'N 80°00.0'W
02 AGL B 15 AGL to	K	FLO 121/23	34°03.0'N 79°15.0'W
02 AGL B 15 AGL to	L	ILM 249/43	34°01.0'N 78°38.0'W
02 AGL B 15 AGL to	M	ILM 191/16	34°05.0'N 77°54.0'W
02 AGL B 15 AGL to	N	NKT 143/26	34°35.0'N 76°32.0'W
05 AGL B 15 AGL to	N1	NKT 120/20	34°45.5'N 076°31.0'W

ROUTE WIDTH - 2 NM either side of centerline from A to I; 1 NM either side of centerline from I to K; 2 NM either side of centerline from K to O.

Special Operating Procedures:

- (1) Minimum altitude 1000' AGL from A until 15 NM past A.
- (2) Permission of W-122H (Pt A to Pt C to Pt M to Pt N) requires approval from FACSAC Vacapes VA. AV 433-2851.
- (3) Alternate Entry: D, E and K.
- (4) Alternate Exit: C, M and N.
- (5) 2049' MSL Tower located at 34°07'51"N 78°11'16"W.
- (6) Minimum altitude 1000' AGL From K until 10 NM past K.
- (7) Minimum altitude 1500' AGL from 20 NM prior to M until 5 NM past M. (Noise Sensitive Area).
- (8) Minimum altitude N to N1 750' AGL (Noise Sensitive Area 34°47'00"N 076°34'00"W).
- (9) Note: 1 June to 1 Sept. Minimum altitude 1500' AGL 5 NM prior to N until N1, Sat-Sun (Noise Sensitive Area).
- (10) Clearance into R5306A does not constitute clearance onto BT-11. Aircrews must have scheduled range time. See Note (12) BT-11 range control (UHF 317.1).
- (11) Avoid towns and populated areas by 1 NM or overfly 1000' AGL. Avoid airports by 3 NM or overfly 1500' AGL.
- (12) Contact scheduling agency 0700-1630 local Mon-Fri, for scheduling and route brief.
- (13) Tie in flight service station: New Bern (255.4)

FSS's Within 100 NM Radius:

AND, CHS, CRE, ECG, EWN, FLO, GSP, HKY, PHF, RDU, RWI, SAV

VR-1046

ORIGINATING ACTIVITY: CG MCAS CHERRY POINT, Cherry Point, NC 28533 AUTOVON 582-4040/4041.

SCHEDULING ACTIVITY: CG MCAS CHERRY POINT CENTRAL SCHEDULING CENTER, Cherry Point, NC 28533 AUTOVON 582-4040/4041.

HOURS OF OPERATION: 0700-2300 local daily.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
As assigned to	A	NKT 245/16	34°46.0'N 77°10.0'W
15 AGL	B	NKT 271/18	34°53.0'N 77°15.0'W
(See Special Operating Procedures)	C	GSB 141/21	35°06.0'N 77°38.0'W
02 AGL B 15 AGL	D	GSB 213/20	35°03.0'N 78°07.0'W
02 AGL B 15 AGL	E	GSB 274/33	35°20.0'N 78°36.0'W
15 AGL	F	RDU 190/15	35°40.0'N 78°37.0'W
15 AGL	G	RDU 073/18	35°59.0'N 78°26.0'W
02 AGL B 15 AGL	H	RDU 072/31	36°04.0'N 78°12.0'W
02 AGL B 15 AGL	I	TYI 001/9	36°08.0'N 77°43.0'W
05 AGL B 15 AGL	J	TYI 098/32	35°57.0'N 77°03.0'W
05 AGL B 15 AGL	K	NKT 006/41	35°35.0'N 76°52.0'W
05 AGL B 15 AGL	L	NKT 009/24	35°18.0'N 76°51.0'W
05 AGL B 15 AGL	L1	NKT 024/21	35°14.0'N 76°44.5'W

ROUTE WIDTH - 1 NM either side of centerline.

Special Operating Procedures:

- (1) Minimum altitude 1500 ft AGL until 6 NM past B, (extensive helicopter activity) then 02 AGL B 15 AGL to C.
- (2) Alternate Entry: C, E, H and L.
- (3) Alternate Exit: E, K and L.
- (4) Aircraft entering at Pt E, avoid overflight of Dutch Field.
- (5) Alternate entry at Pt L, authorized for transition from NKT-074.
- (6) Points E, F to G noise sensitive.
- (7) Minimum altitude 10 AGL B 15 AGL 5 NM prior to Pt K until 5 NM past Pt K.
- (8) Minimum altitude 05 AGL B 15 AGL from Pt L to Pt L1.
- (9) Contact Cherry Point Approach Control for clearance into R-5306.
- (10) Clearance into R-5306 does not constitute clearance into BT-11. Aircrews must have scheduled range time. See note (12). BT-11 range control (UHF 317.1).
- (11) Avoid towns and populated areas by 1 NM or overfly 1000' AGL. Avoid arpt by 3 NM or overfly 1500' AGL.
- (12) Contact scheduling agency 0700-1630 Mon-Fri for scheduling and route brief.
- (13) Tie in FSS: New Bern (255.4).

FSS's Within 100 NM Radius:

CRE, ECG, EWN, FLO, HKY, PHF, RDU, RWI

VR-1049

ORIGINATING ACTIVITY: 363 TFW, DOOA, Shaw AFB, SC 29152 AUTOVON 965-3250.

SCHEDULING ACTIVITY: 363 TFW DOO (Advance Same Day), Shaw AFB, SC 29152 AUTOVON 965-3083, after hours: AUTOVON 965-3339.

HOURS OF OPERATION: Intermittent 1200-0330Z - -.

ROUTE DESCRIPTION:

Altitude Data	Pt	Fac/Rad/Dist	Lat/Long
As assigned to	A	DBN 059/44	32°56.5'N 82°06.0'W
01 AGL B 15 AGL to	B	DBN 051/38	32°58.2'N 82°15.0'W
01 AGL B 15 AGL to	C	DBN 025/31	33°02.0'N 82°35.0'W
Alternate Exit/Entry: B			
01 AGL B 15 AGL to	B	DBN 051/38	32°58.2'N 82°15.0'W
01 AGL B 15 AGL to	B1	DBN 043/47	33°08.0'N 82°12.5'W

APPENDIX B

MILITARY TRAINING ROUTE MAPS

VR-73 Route Width

- A-B 5 NM EITHER SIDE OF CENTERLINE
- B-C 2 NM LEFT AND .5 NM RIGHT OF CENTERLINE
- C-D 5 NM EITHER SIDE OF CENTERLINE

LEGEND

- ▲ State Parks
- △ State Wildlife Management Areas
- ▨ National Wildlife Refuge
- ▤ National and State Forests
- National Parks and Seashores

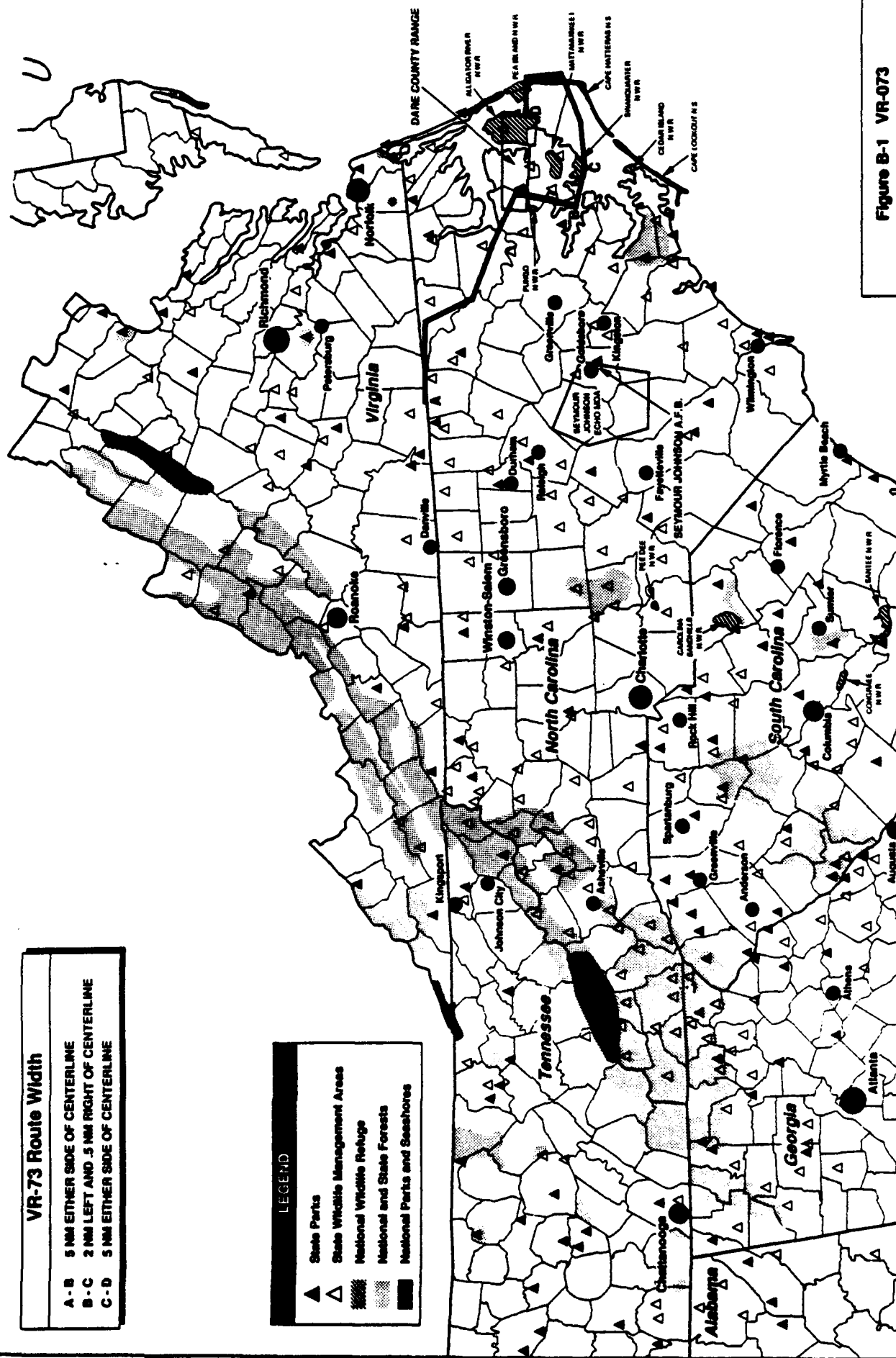


Figure B-1 VR-073

VR-1074 Route Width

- A - B 2 NM LEFT AND 5 NM RIGHT OF CENTERLINE
- B - C 5 NM EITHER SIDE OF CENTERLINE

LEGEND

- State Parks
- State Wildlife Management Areas
- National Wildlife Refuge
- National and State Forests
- National Parks and Seashores

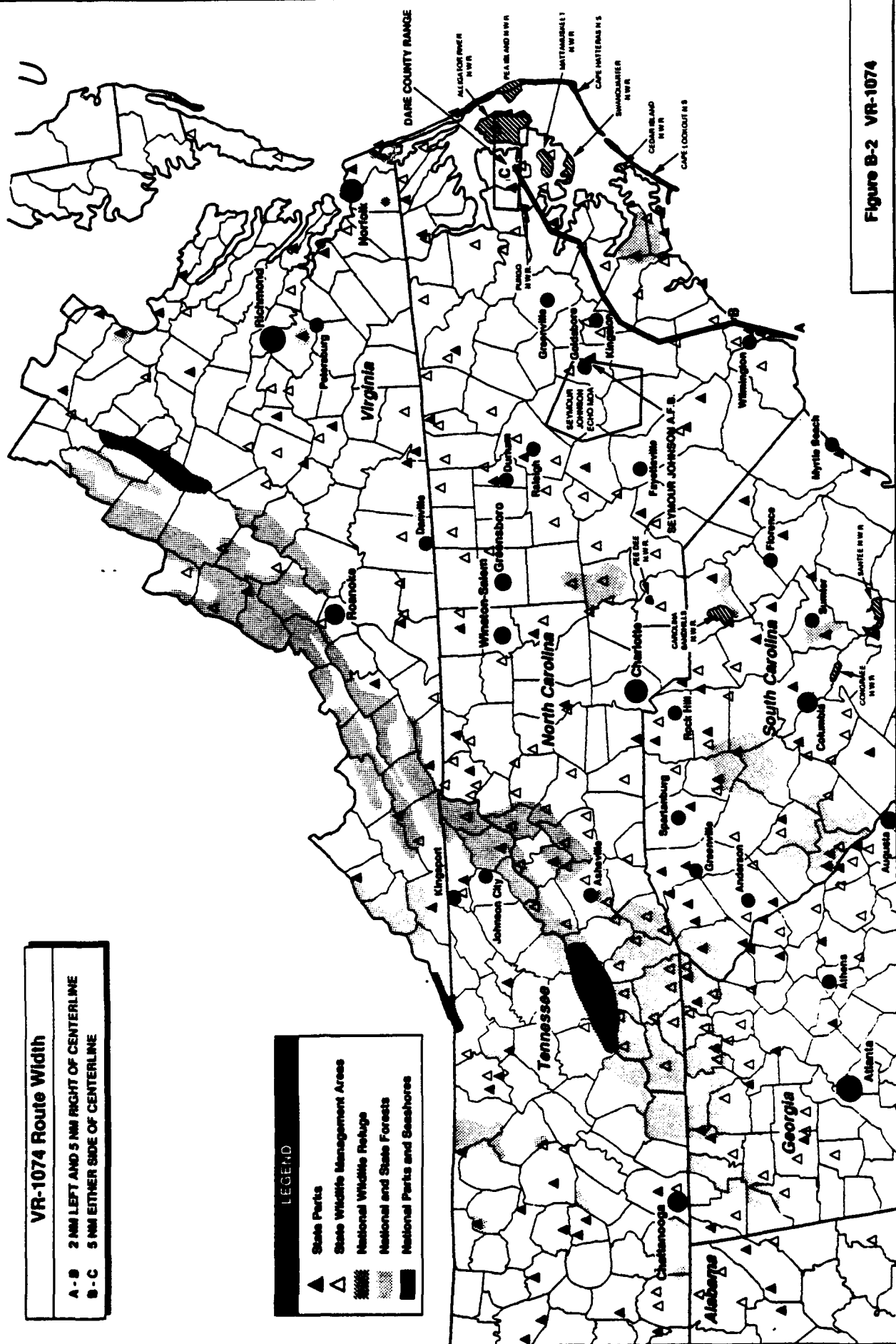
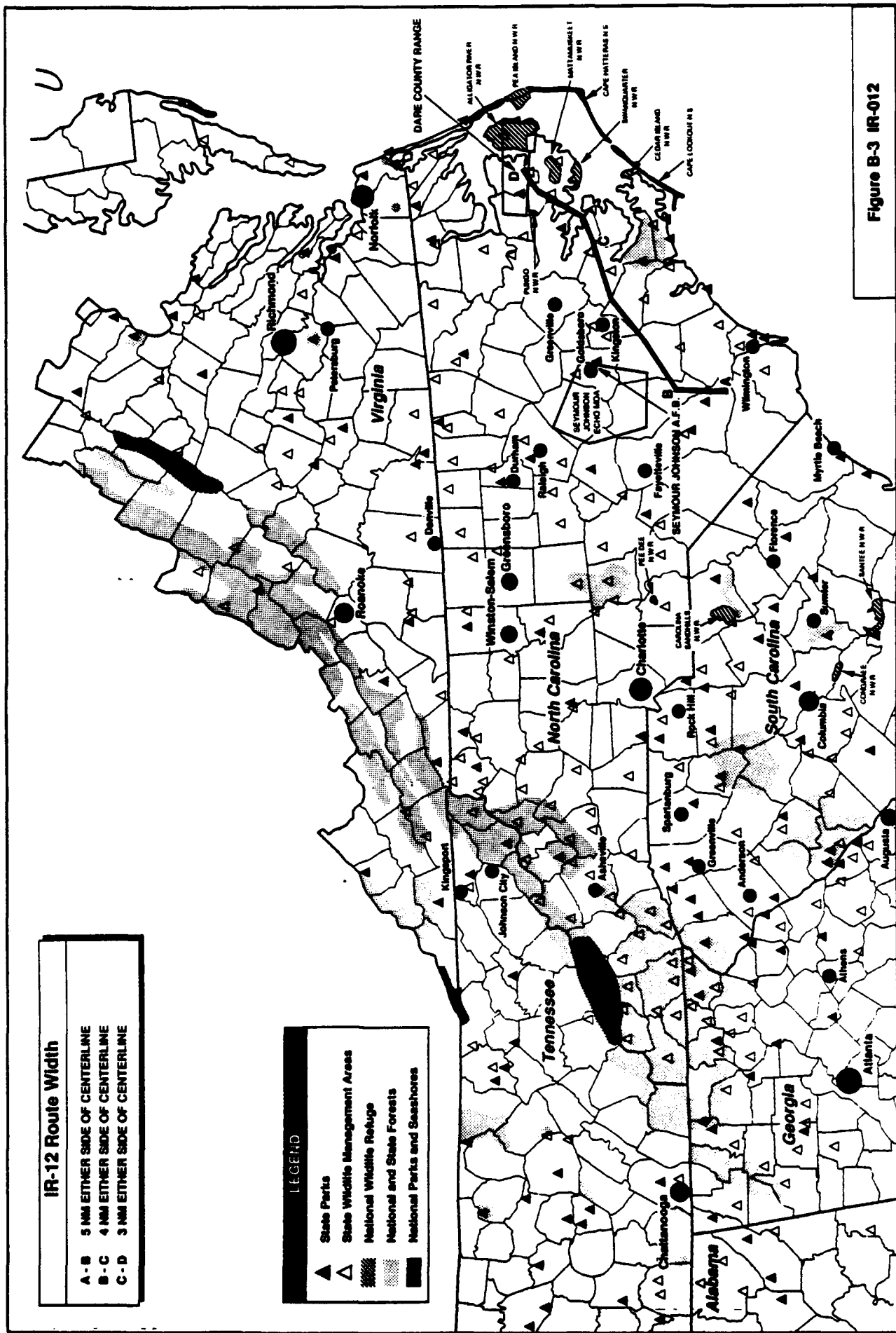
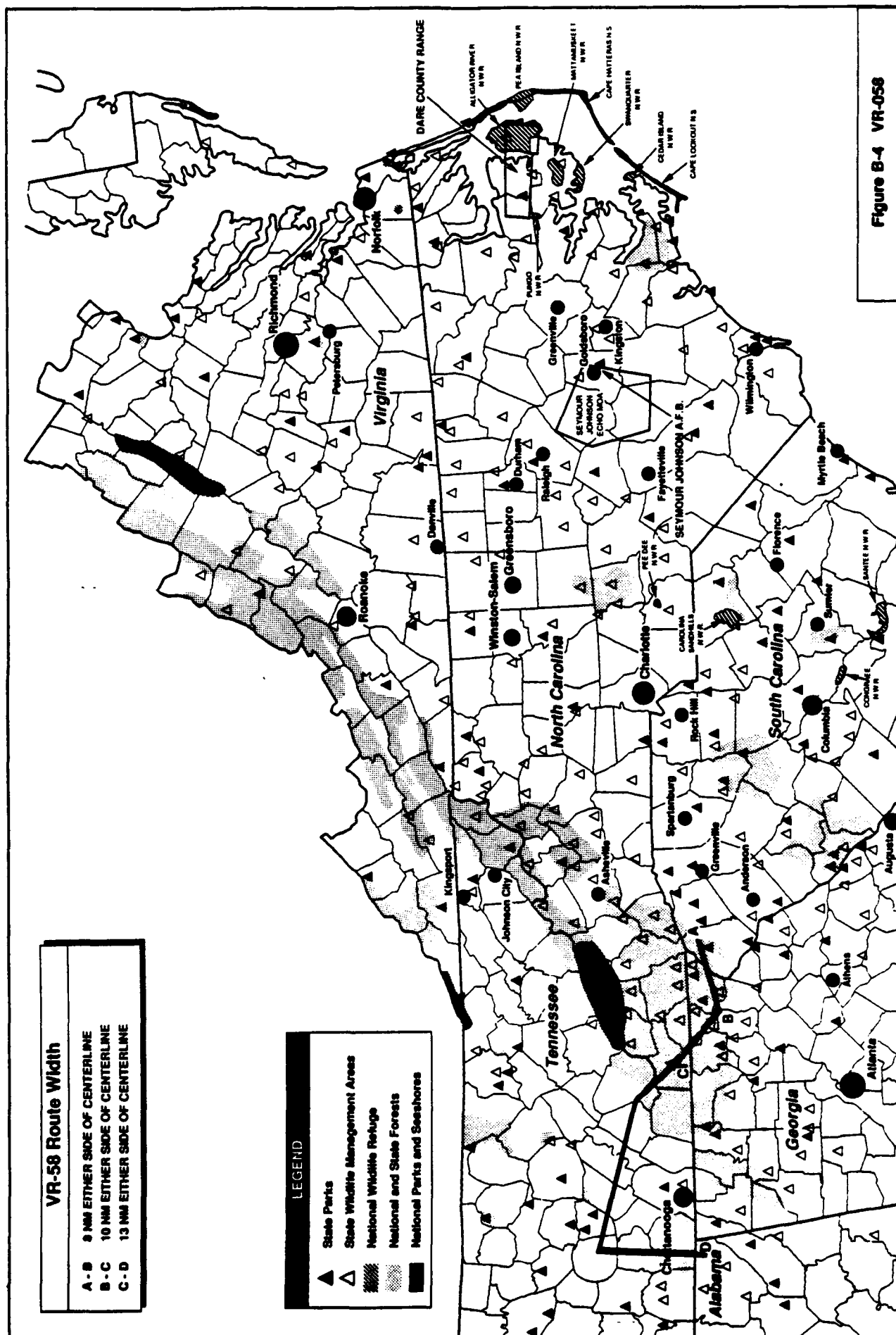
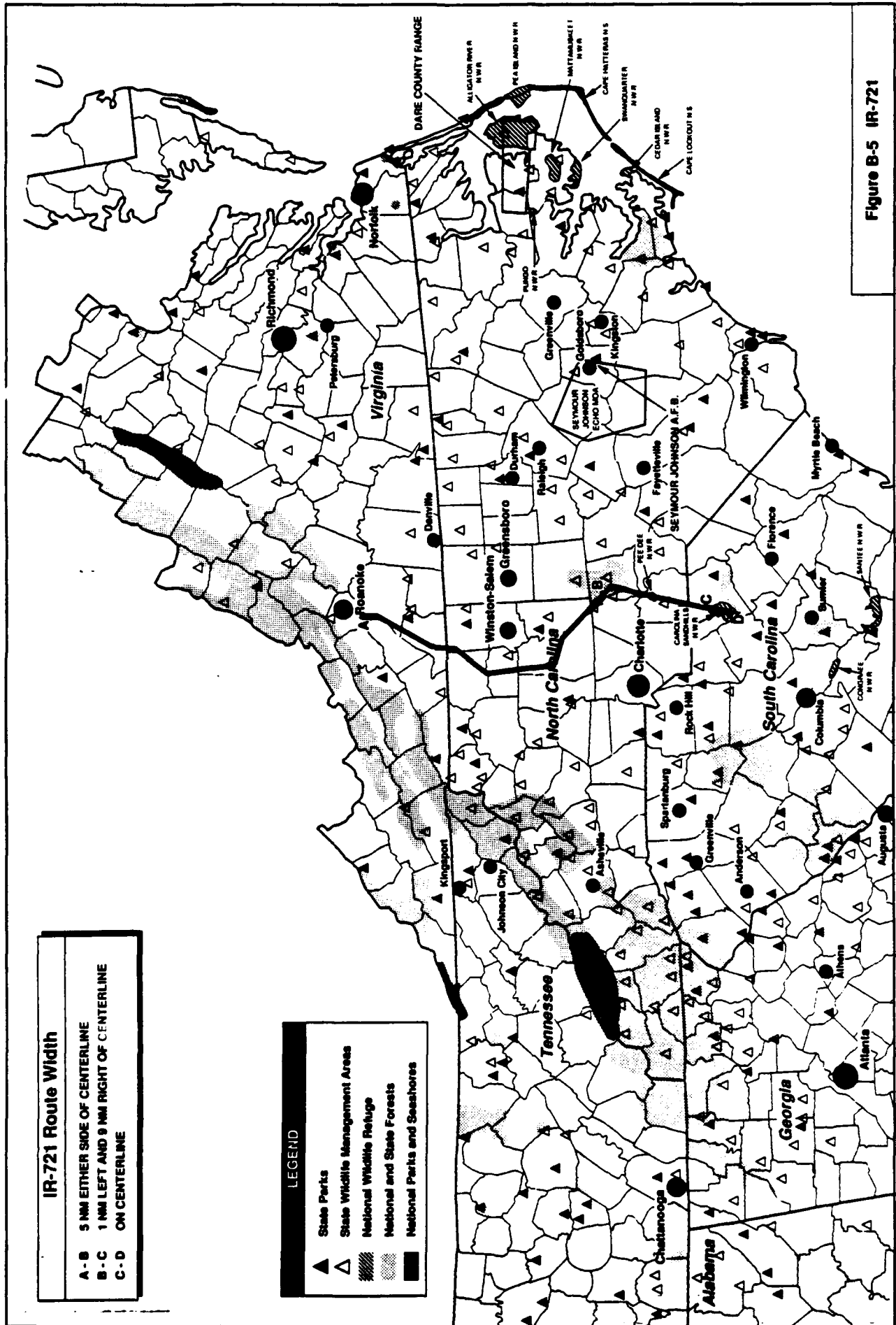
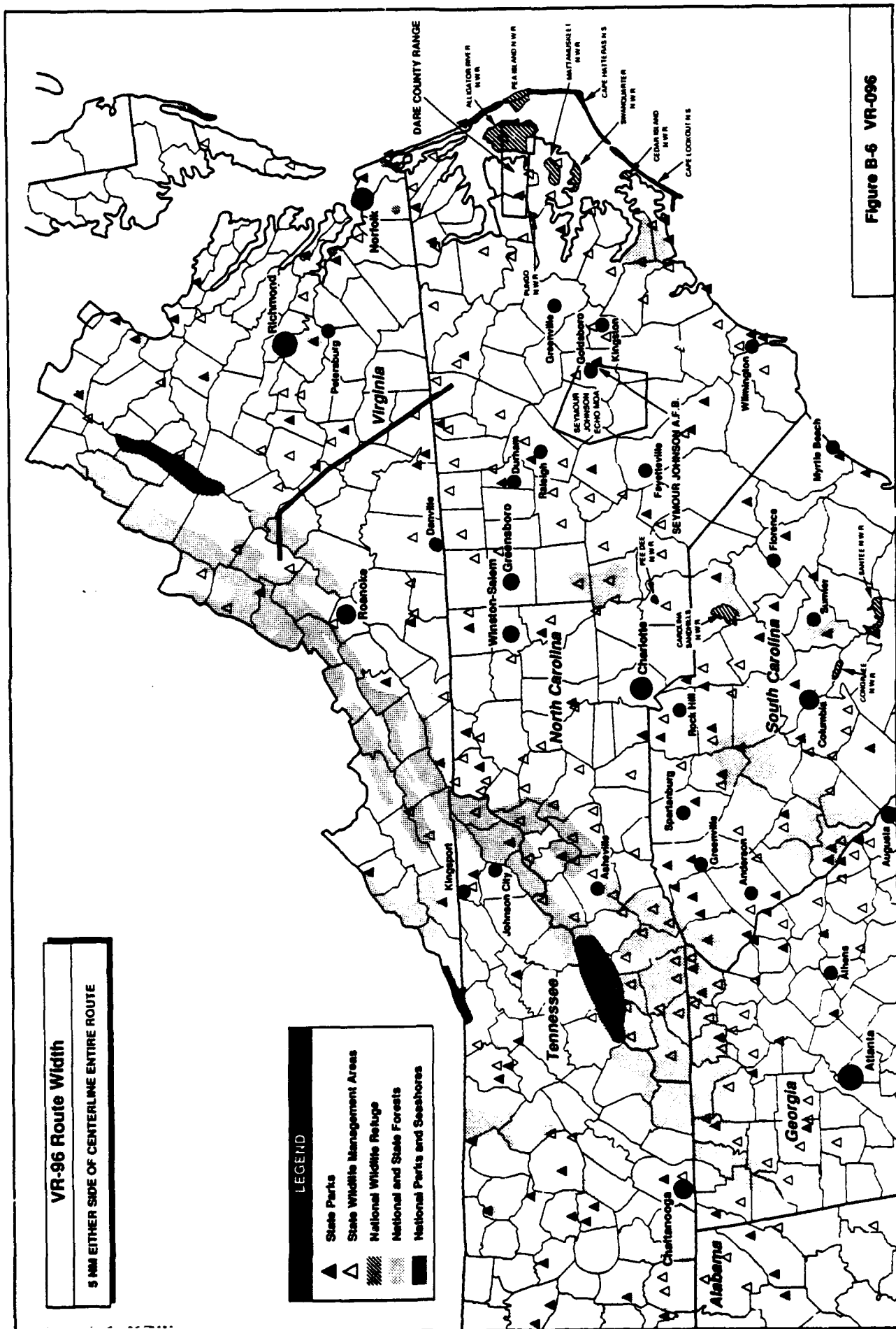


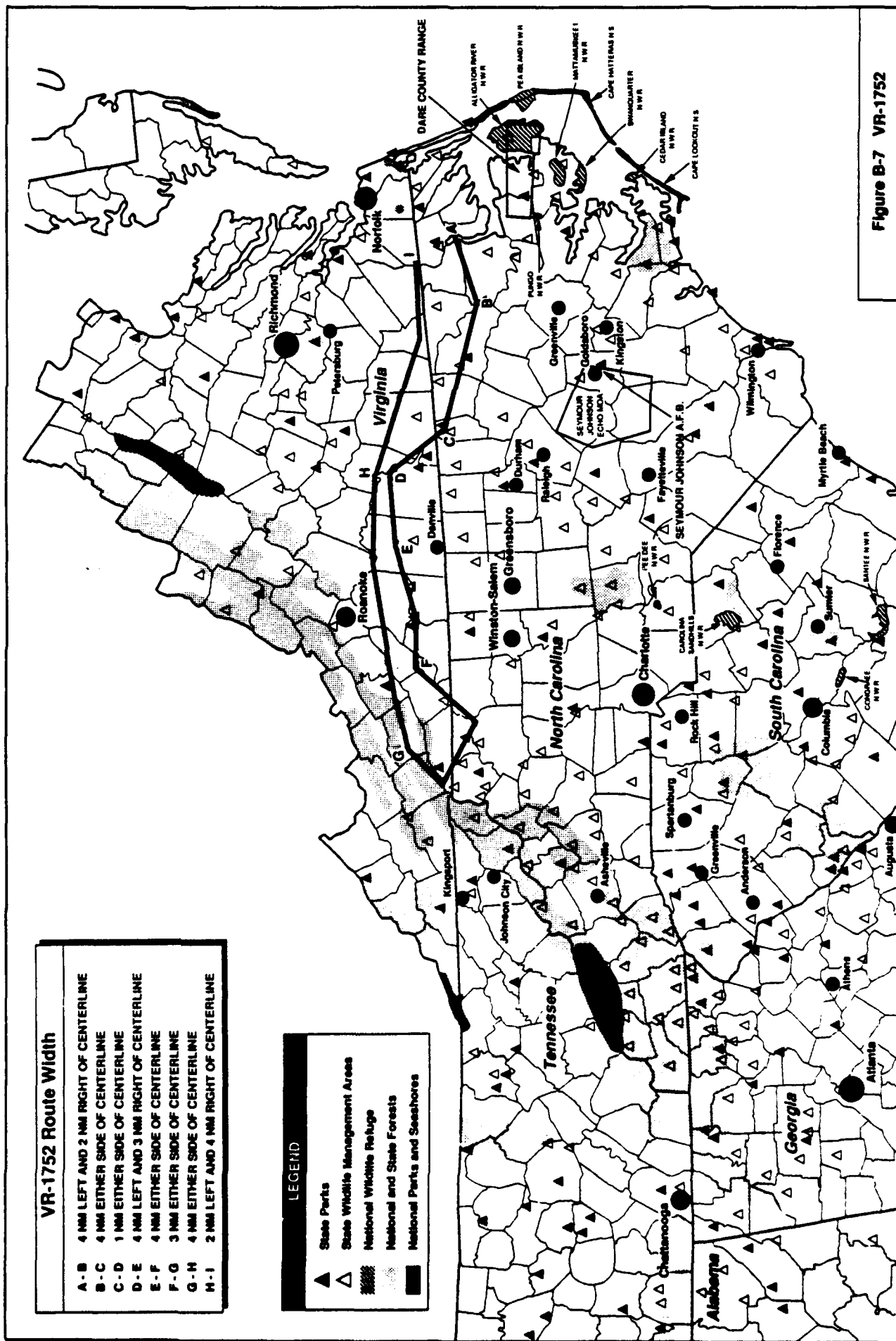
Figure B-2 VR-1074

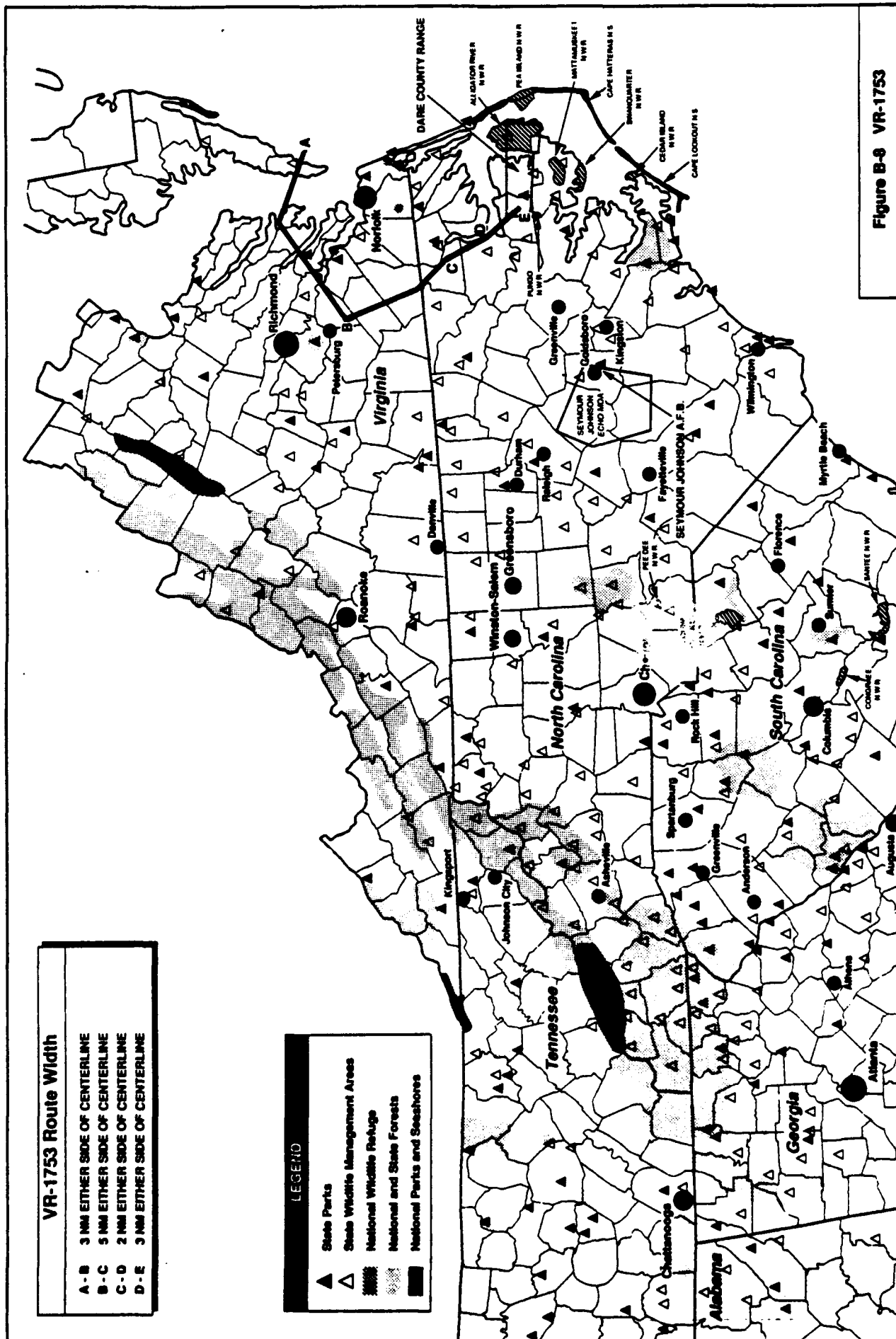












VR-1043 Route Width

- A-B 2 NM EITHER SIDE OF CENTERLINE
- B-C 1 NM EITHER SIDE OF CENTERLINE
- C-D 2 NM EITHER SIDE OF CENTERLINE

LEGEND

- State Parks
- State Wildlife Management Areas
- National Wildlife Refuge
- National and State Forests
- National Parks and Seashores

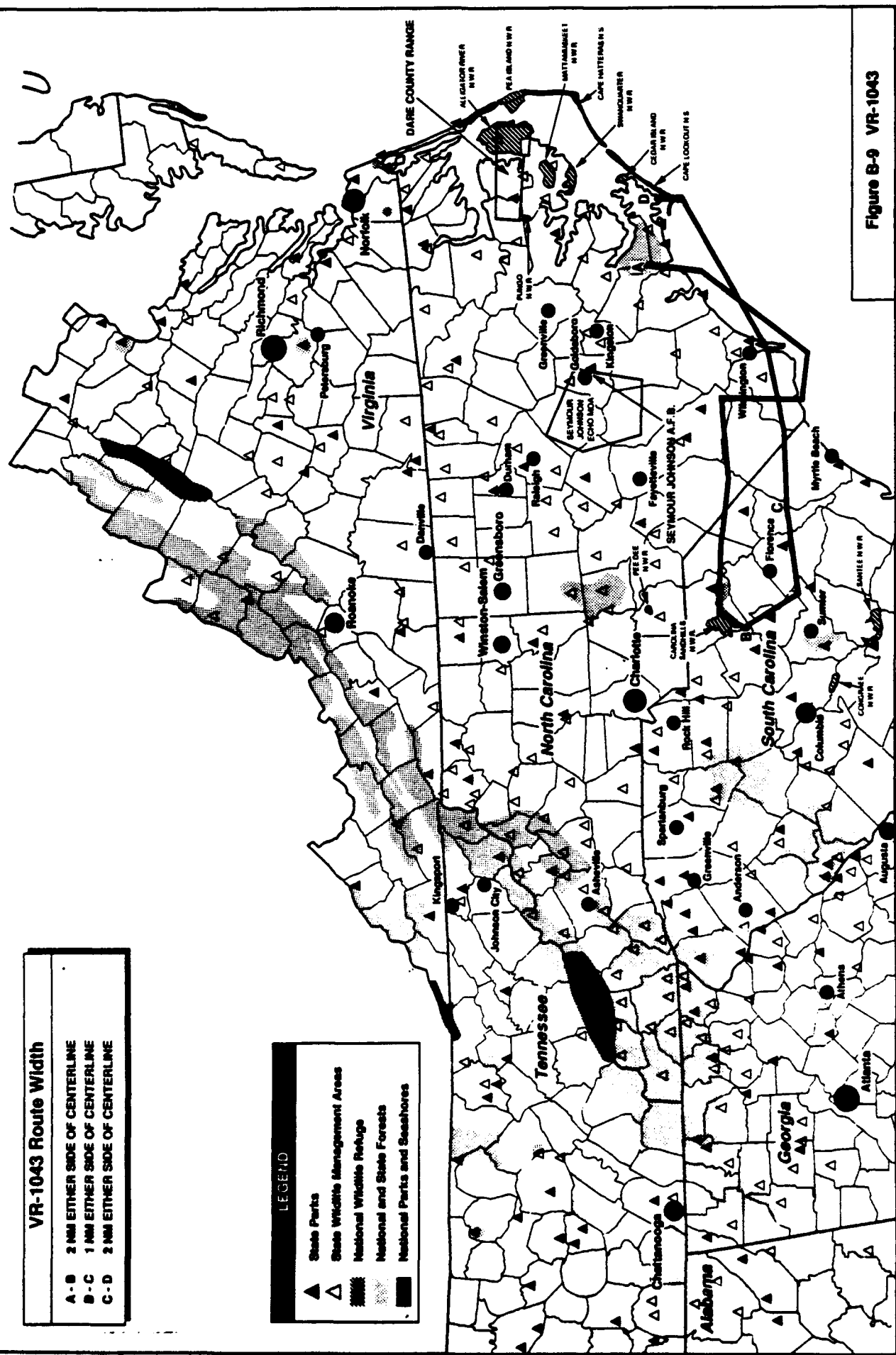
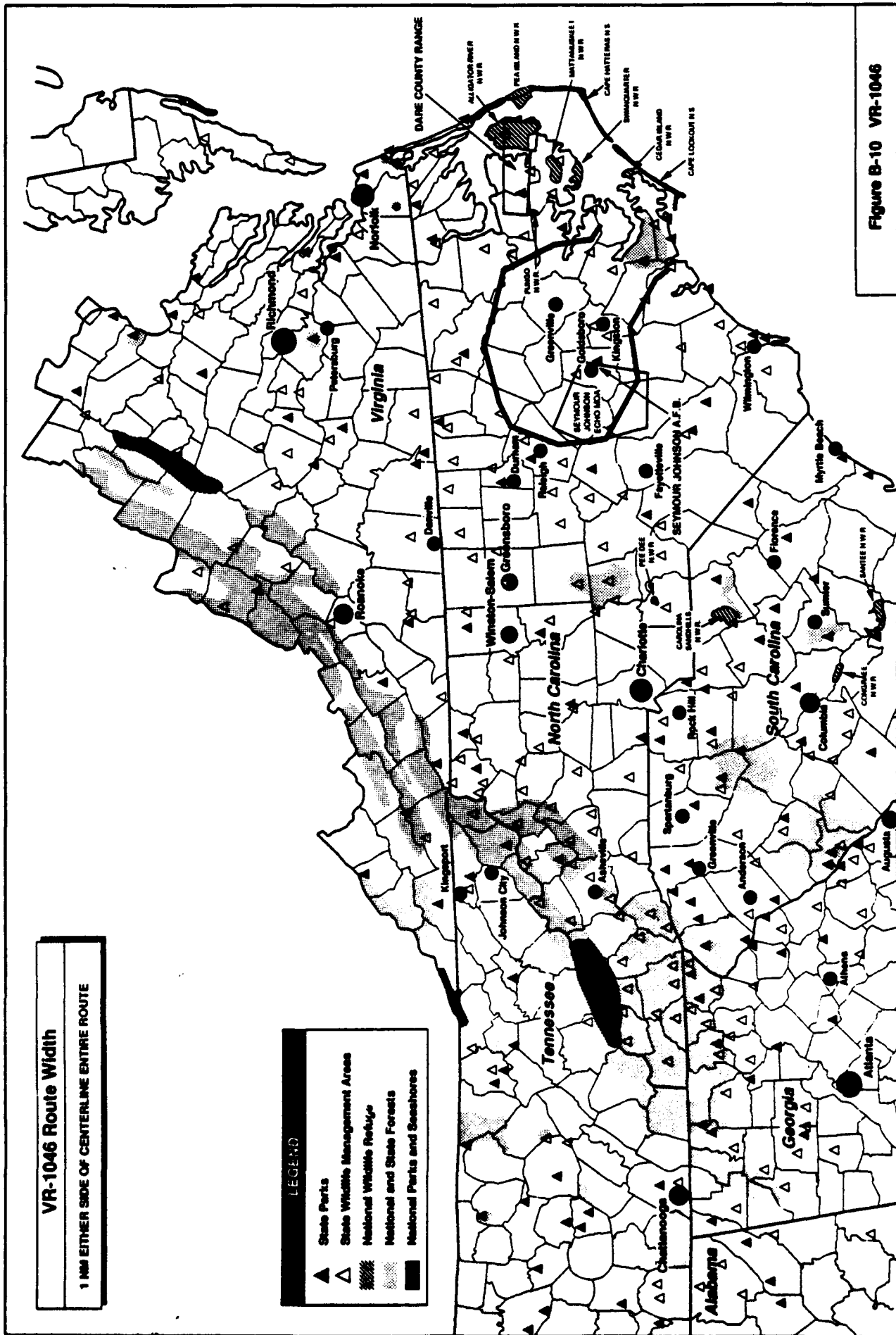


Figure B-9 VR-1043



APPENDIX C

FREQUENCY SPECTRA FOR F-15 AIRCRAFT

	40	50	60	70	80	90	100	110	MEAN	SD
F 50	(	.	.	.	.	.	.	.	93.9	5.3
63	(	.	.	.	.	.	X	.	92.3	3.1
80	(	.	.	.	.	.	X	.	90.8	3.7
100	(	.	.	.	.	.	.	X	101.6	3.4
F 125	(	.	.	.	.	.	.	X	108.5	3.4
R 160	(	.	.	.	.	.	.	.	110.7	1.6
E 200	(	.	.	.	.	.	.	X	107.0	1.9
250	(	.	.	.	.	.	.	X	104.4	3.2
315	(	.	.	.	.	.	.	.	109.6	2.5
400	(	.	.	.	.	.	.	X	105.7	1.8
N 500	(	.	.	.	.	.	.	X	106.1	1.8
630	(	.	.	.	.	.	.	X	105.8	2.2
800	(	.	.	.	.	.	.	X	104.3	1.6
I 1000	(	.	.	.	.	.	.	X	103.0	1.6
N 1250	(	.	.	.	.	.	.	X	101.4	1.7
1600	(	.	.	.	.	.	.	X	101.2	1.7
2000	(	.	.	.	.	.	.	X	101.2	1.2
H 2500	(	.	.	.	.	.	.	X	100.5	2.1
Z 3150	(	.	.	.	.	.	.	X	100.2	1.9
4000	(	.	.	.	.	.	.	X	101.0	2.3
5000	(	.	.	.	.	.	.	X	99.7	2.6
6300	(	.	.	.	.	.	.	X	99.0	0.0
8000	(	.	.	.	.	.	.	X	98.0	0.0
10000	(	.	.	.	.	.	.	X	97.0	0.0

F-15 AFTERBURNER POWER 91 % RPM

AIRSPEED = 350 KNOTS
SLANT DISTANCE = 1000 FEET

TEMP = 59 F
REL HUMID = 70 %

PNLT = 128.6 PNDB
PNL = 127.9 PNDB
ALT = 114.8 DBA
AL = 114.0 DBA

IDENT: 6.6-061-101-120477

NO. OF RECORDS = 8

	30	40	50	60	70	80	90	100	
	MEAN VALUE OF NORMALIZED 1/3 OR SPL IN DB								
F 50	(.	(.	(.	(.	(.	(.	(.	(.	MEAN
R 63	(.	(.	(.	(.	(.	(.	(.	(.	SD
E 80	(.	(.	(.	(.	(.	(.	(.	(.	
Q 100	(.	(.	(.	(.	(.	(.	(.	(.	
U 125	(.	(.	(.	(.	(.	(.	(.	(.	
E 160	(.	(.	(.	(.	(.	(.	(.	(.	
N 200	(.	(.	(.	(.	(.	(.	(.	(.	
C 250	(.	(.	(.	(.	(.	(.	(.	(.	
Y 315	(.	(.	(.	(.	(.	(.	(.	(.	
I 400	(.	(.	(.	(.	(.	(.	(.	(.	
N 500	(.	(.	(.	(.	(.	(.	(.	(.	
C 630	(.	(.	(.	(.	(.	(.	(.	(.	
Y 800	(.	(.	(.	(.	(.	(.	(.	(.	
I 1000	(.	(.	(.	(.	(.	(.	(.	(.	
N 1250	(.	(.	(.	(.	(.	(.	(.	(.	
H 1600	(.	(.	(.	(.	(.	(.	(.	(.	
Z 2000	(.	(.	(.	(.	(.	(.	(.	(.	
H 2500	(.	(.	(.	(.	(.	(.	(.	(.	
Z 3150	(.	(.	(.	(.	(.	(.	(.	(.	
4000	(.	(.	(.	(.	(.	(.	(.	(.	
5000	(.	(.	(.	(.	(.	(.	(.	(.	
6300	(.	(.	(.	(.	(.	(.	(.	(.	
8000	(.	(.	(.	(.	(.	(.	(.	(.	
10000	(.	(.	(.	(.	(.	(.	(.	(.	

F-15

TAKEOFF POWER

90 % RPM

AIKSPED = 300 KNOTS
 SLANT DISTANCE = 1000 FEET

TEMP = 59 F
 REL HUMID = 70 %

PNLT = 116.6 PNDB
 PNL = 115.8 PNDB
 ALT = 105.1 ORA
 AL = 104.3 ORA

IDENT: 6.6-061-103-120477

NO. OF RECORDS = 12

	10	20	30	40	50	60	70	80	MEAN	SD
50	(	(	(	(	(	(	(	(	68.2	4.4
63	(	(	(	(	(	(	(	(	68.1	4.4
80	(	(	(	(	(	(	(	(	68.0	4.4
100	(	(	(	(	(	(	(	(	69.6	2.8
125	(	(	(	(	(	(	(	(	72.0	2.2
160	(	(	(	(	(	(	(	(	73.7	1.5
200	(	(	(	(	(	(	(	(	72.3	1.9
250	(	(	(	(	(	(	(	(	80.8	3.2
315	(	(	(	(	(	(	(	(	76.5	3.3
400	(	(	(	(	(	(	(	(	73.7	1.5
500	(	(	(	(	(	(	(	(	73.8	1.8
630	(	(	(	(	(	(	(	(	73.7	1.2
800	(	(	(	(	(	(	(	(	73.2	1.3
1000	(	(	(	(	(	(	(	(	72.1	.9
1250	(	(	(	(	(	(	(	(	71.4	1.2
1600	(	(	(	(	(	(	(	(	70.6	1.5
2000	(	(	(	(	(	(	(	(	69.5	2.0
2500	(	(	(	(	(	(	(	(	66.6	2.2
3150	(	(	(	(	(	(	(	(	62.6	1.8
4000	(	(	(	(	(	(	(	(	58.0	2.1
5000	(	(	(	(	(	(	(	(	52.6	2.6
6300	(	(	(	(	(	(	(	(	49.0	3.1
8000	(	(	(	(	(	(	(	(	46.4	3.6
10000	(	(	(	(	(	(	(	(	45.5	4.1

F-15 CRUISE POWER 73.5 % RPM

AIRSPEED = 260 KNOTS
SLANT DISTANCE = 1000 FEET

TE4P = 59 F
REL HUMID = 70 %

NO. OF RECORDS = 12

IDENT: 6.6-061-104-120977

PNLT = 94.5 PND8
PNL = 93.5 PND8
ALT = 82.8 DBA
AL = 81.7 DBA

	10	20	30	40	50	60	70	80	
	MEAN VALUE OF NORMALIZED 1/3 OB SPL IN DB								
F 50	(.	(.	(.	(.	(.	(.	(.	(.	MEAN 73.9
R 63	(.	(.	(.	(.	(.	(.	(.	(.	SD 1.8
E 80	(.	(.	(.	(.	(.	(.	(.	(.	73.4
Q 100	(.	(.	(.	(.	(.	(.	(.	(.	1.6
U 125	(.	(.	(.	(.	(.	(.	(.	(.	72.8
E 160	(.	(.	(.	(.	(.	(.	(.	(.	3.0
Q 200	(.	(.	(.	(.	(.	(.	(.	(.	74.2
U 250	(.	(.	(.	(.	(.	(.	(.	(.	2.4
E 315	(.	(.	(.	(.	(.	(.	(.	(.	77.7
Q 400	(.	(.	(.	(.	(.	(.	(.	(.	1.5
U 500	(.	(.	(.	(.	(.	(.	(.	(.	.9
E 630	(.	(.	(.	(.	(.	(.	(.	(.	77.5
Q 800	(.	(.	(.	(.	(.	(.	(.	(.	71.6
U 1000	(.	(.	(.	(.	(.	(.	(.	(.	2.4
E 1250	(.	(.	(.	(.	(.	(.	(.	(.	77.1
Q 1600	(.	(.	(.	(.	(.	(.	(.	(.	1.2
U 2000	(.	(.	(.	(.	(.	(.	(.	(.	2.7
E 2500	(.	(.	(.	(.	(.	(.	(.	(.	76.0
Q 3150	(.	(.	(.	(.	(.	(.	(.	(.	77.2
U 4000	(.	(.	(.	(.	(.	(.	(.	(.	1.1
E 5000	(.	(.	(.	(.	(.	(.	(.	(.	75.1
Q 6300	(.	(.	(.	(.	(.	(.	(.	(.	1.2
U 8000	(.	(.	(.	(.	(.	(.	(.	(.	74.6
E 10000	(.	(.	(.	(.	(.	(.	(.	(.	1.8
	(.	(.	(.	(.	(.	(.	(.	(.	73.4
	(.	(.	(.	(.	(.	(.	(.	(.	2.0
	(.	(.	(.	(.	(.	(.	(.	(.	71.8
	(.	(.	(.	(.	(.	(.	(.	(.	1.0
	(.	(.	(.	(.	(.	(.	(.	(.	70.9
	(.	(.	(.	(.	(.	(.	(.	(.	1.0
	(.	(.	(.	(.	(.	(.	(.	(.	69.0
	(.	(.	(.	(.	(.	(.	(.	(.	1.0
	(.	(.	(.	(.	(.	(.	(.	(.	.9
	(.	(.	(.	(.	(.	(.	(.	(.	67.8
	(.	(.	(.	(.	(.	(.	(.	(.	64.8
	(.	(.	(.	(.	(.	(.	(.	(.	1.3
	(.	(.	(.	(.	(.	(.	(.	(.	61.6
	(.	(.	(.	(.	(.	(.	(.	(.	1.8
	(.	(.	(.	(.	(.	(.	(.	(.	58.5
	(.	(.	(.	(.	(.	(.	(.	(.	1.6
	(.	(.	(.	(.	(.	(.	(.	(.	53.7
	(.	(.	(.	(.	(.	(.	(.	(.	1.2
	(.	(.	(.	(.	(.	(.	(.	(.	.8
	(.	(.	(.	(.	(.	(.	(.	(.	50.8
	(.	(.	(.	(.	(.	(.	(.	(.	49.1
	(.	(.	(.	(.	(.	(.	(.	(.	1.1
	(.	(.	(.	(.	(.	(.	(.	(.	49.0
	(.	(.	(.	(.	(.	(.	(.	(.	2.3

F-15

APPROACH POWER

75 % RPM

AIRSPEED = 170 KNOTS
SLANT DISTANCE = 1000 FEET

TEMP = 59 F
REL HUMID = 70 %

PNLT = 94.0 PNOB
PNL = 93.5 PNOB
ALT = 82.2 DBA
AL = 81.6 DBA

IDENT: 6.6-061-105-120977

NO. OF RECORDS = 8