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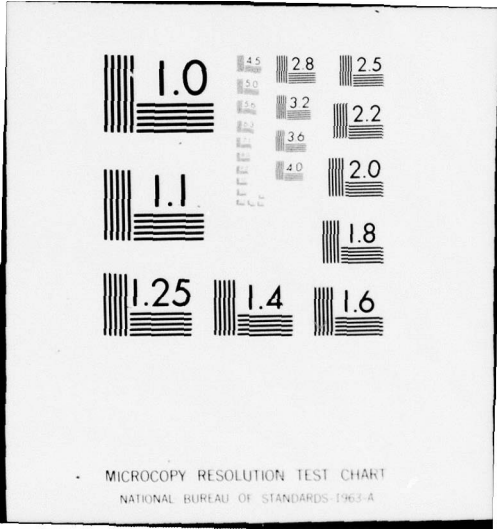
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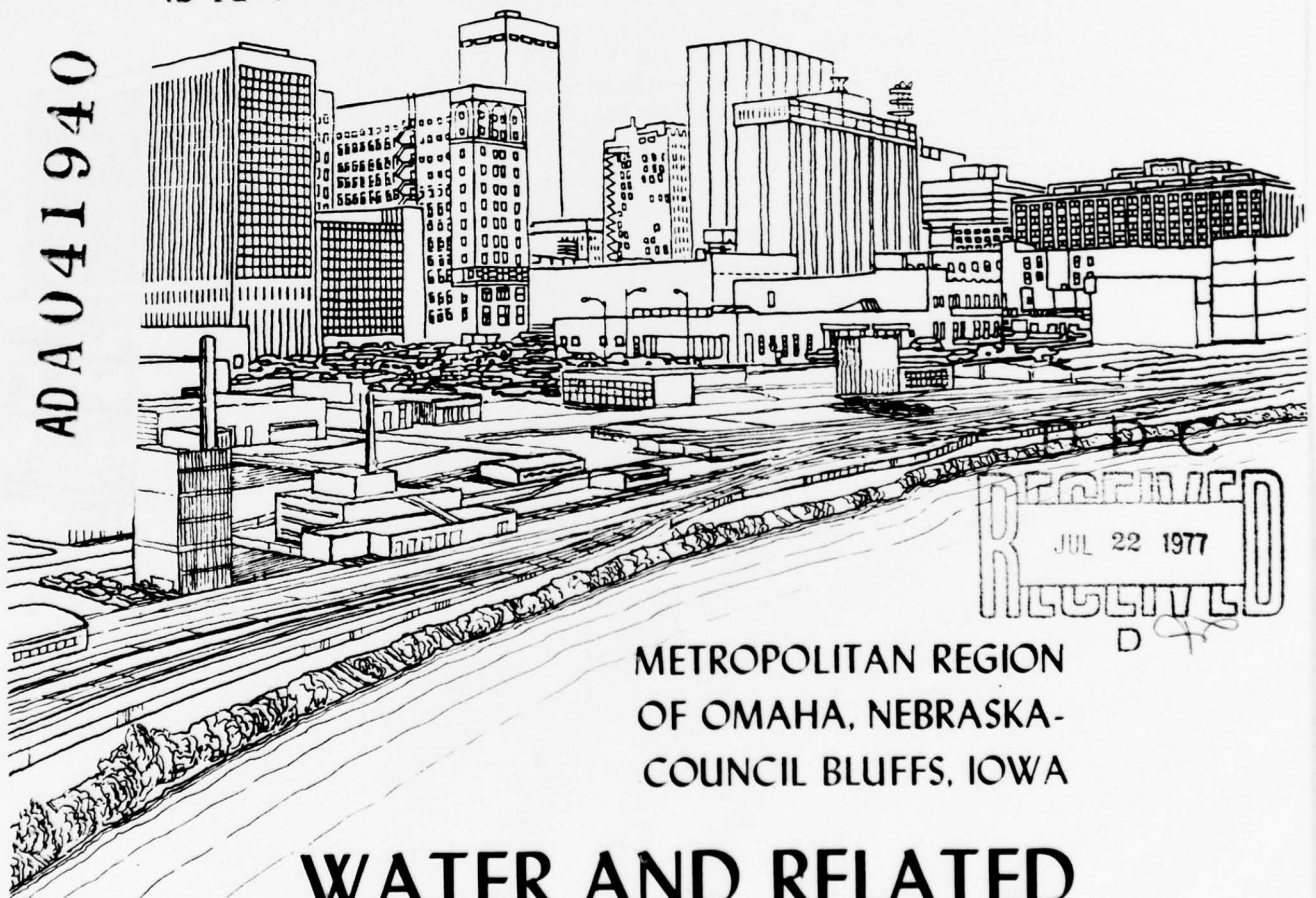
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PUBLIC INVOLVEMENT APPENDIX

REVIEW REPORT ON THE MISSOURI RIVER AND TRIBUTARIES

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JUNE 1975

**REVIEW REPORT FOR
METROPOLITAN OMAHA, NEBRASKA
COUNCIL BLUFFS, IOWA
WATER AND RELATED LAND
RESOURCES MANAGEMENT STUDY**

⑥
Water and Related Land Resources
Management Study.

Volume VI.

Public Involvement Appendix.

SECTION A
SECTION B

PUBLIC INVOLVEMENT PROGRAM
ATTACHMENTS

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SECTION A

PUBLIC INVOLVEMENT PROGRAM

PUBLIC INVOLVEMENT

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PUBLIC INVOLVEMENT

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SECTION A

PUBLIC INVOLVEMENT PROGRAM

Purpose of Public Involvement

1. The purpose of public involvement in the urban studies program is to establish a two-way communication process that will:

- Promote full public understanding of the urban studies program;
- Keep the public fully informed of the status, progress, and results of the urban study planning activities; and
- Actively solicit public opinions on problem identification, preferences regarding resource use, alternative development, and managerial strategies.

2. The primary objective is to provide sufficient information to local, State, and regional officials, influentials, opinion leaders, and the public at large in order to obtain their input during each phase of the planning process.

Public Involvement Program Strategy

3. The strategy for the public involvement program was to solicit public input at each phase of the planning process.

4. During preparation of the Plan of Study, public involvement involved mainly agency coordination with the initial study objectives obtained through individual contacts and review of needs determined through existing data sources. All major units of government were contacted during the preparation of the Plan of Study.

5. During need identification, the agency and individual contact method was continued with public meetings held near the end of this phase to provide the public with an opportunity to comment on the identified needs. Letters were also sent to 13 key organizations requesting time on their programs to explain the results of this phase of the planning progress.

6. During the plan formulation and evaluation stages, greater attempts were made to involve the general public in addition to a continuation of agency coordination and individual contacts. The culmination of these efforts was the last round of public meetings, held in April through June of 1975.

PUBLIC MEETINGS

7. Most experts on public involvement agree that public meetings are not the best means to achieve public involvement. Only two series of public meetings were held. The first series of eight meetings were held in October and November 1973 and attracted a total of 296 people.

The second series of public meetings were held between April and June 1975, basically in the same locations and these meetings attracted over 1,400 people.

8. The first series of public meetings was announced through the normal channels; newspapers, radio, letters, and individual announcements. The typical newspaper announcement listed the public meeting information and gave a concise paragraph of the information to be covered.

9. A 20-minute slide presentation was prepared for use at the initial public meetings. This slide presentation summarized the goals and objectives of the study and summarized the need identification portion of the planning process. The slide program was used extensively in subsequent public contacts. A 19 page information booklet was prepared and used in conjunction with the slide program.

10. The second series of public meetings used the same basic medias but in contrast, the newspaper coverage ran a feature article on each major topic listing the problems and the alternatives, and announcing the availability of more detailed information booklets through the district office. These feature articles resulted in approximately 400 telephone and mail requests covering the five major information booklets.

11. The Metropolitan Area Planning Agency co-sponsored all of the final public meetings. This action strengthened the public's view of MAPA/Corps coordination.

12. The public meetings were held at selected geographic locations throughout the study area. No general public meetings have been

held in the two top priority areas for the land irrigation method of wastewater management for several reasons. Some of these are:

- . Public understanding about land treatment is minimal and a long-term education process is required. The urban study has initiated this process through newspaper articles and discussions with State and local agencies. Acceptance of the land treatment concept is the rule rather than the exception.

- . Implementation of a land treatment plan is a distant possibility for the area due to unfavorable economic conditions and the lack of environmental justification. The emphasis on land treatment at this time is concept rather than project oriented.

- . Small scale pilot projects will be first required to test the land treatment methodology under local soil and climate conditions. These projects, which have received local support, would aid public education as well as provide technical information.

- . Public reception to the land treatment has been unfavorable for other Corps wastewater studies. It is apparent that past approaches using primarily the public meeting medium, have been unsatisfactory as far as public communication and understanding are concerned.

COMMITTEES

13. The Corps of Engineers - Nebraska Committee on Public Involvement, formed in 1968, has served a valuable function for both the District Engineer and the Planning Division. The committee received its first

briefing on the urban studies program in October 1972. At subsequent quarterly or semiannual meetings, the members were provided a briefing on pertinent aspects of the study. Through this parent committee, a working Omaha subcommittee was formed for the purpose of working directly with the study manager. Through the subcommittee membership, many opportunities were made available to expand our area of influence and to receive value input from the public.

14. The function of the Omaha subcommittee was to advise the project manager on public involvement strategies, to review communication methods and materials, to provide contracts with other organized groups, and to serve as a preliminary sounding board of public reaction.

15. In January 1974 an Interagency Coordinating Committee of selected Federal, State, and local agencies was established to guide development of the wastewater management plans. The functions of this committee later expanded into all areas of the urban study.

16. In addition to the Corps sponsored committees several other established committees were used to obtain study input. Most noteworthy were the Executive Committee of the Riverfront Development Program and the Metropolitan Area Planning Agency's Growth Policies Committee.

ADVISORY GROUPS

17. The district did not use Corps sponsored advisory groups in the study. The Citizens Advisory Board of the Metropolitan Area Planning Agency was used as a representative citizen's body to solicit opinions on the alternative plans developed by the urban study.

OTHER

18. In addition to the above strategies, the urban study staff participated on several other local committees and task forces, particularly those under the auspices of the Metropolitan Area Planning Agency, (MAPA). Participation in these organizations was aimed particularly at assisting the staff in the determination of regional problems, concerns, issues, and objectives. Key organizations included:

Riverfront Executive Committee

MAPA Social/Economic Committee

MAPA Riverfront Recreation Task Force

Riverfront New Towns Task Force

19. While the full range of public involvement strategies was employed at various times throughout the study the most successful process appeared to be to (1) generating an interest, (2) having explanatory material available that can be understood by the layman, and (3) making the material and meetings readily accessible to the public.

20. Near the conclusion of the study this process was effectively carried out by (1) printing a feature article in the news media on a particular urban study function, (2) preparing publicly understandable, attractive brochures on that urban study function, and (3) advertising through the media the source of the brochures and the time, location, and subject of the public meeting.

21. Throughout the study presentations were made to organized groups. In the early phases of the study such presentations centered on the problems and needs of the area. Later presentations were related to concepts and alternatives as problem solutions.

22. Individual contacts were probably the most productive public involvement strategy used. Over 60 individuals were interviewed for the institutional analyses portion of the study alone. The total number of individuals interviewed or who supplied data exceeds several hundred.

Participants

PUBLIC MEETINGS

23. Two series of public meetings were held for the purpose of informing the public and soliciting public reaction to the alternative plans. Attendance at the 17 public meetings totalled more than 1,700.

COMMITTEES

24. Five persons served on the Omaha subcommittee of the Corps of Engineers Nebraska Committee on Public Involvement. These five represented the following groups or backgrounds:

MAPA Citizen's Advisory Board

American Association of University Women

League of Women Voters

Quality Environment Council

Public Health

Agriculture

25. Members of the Interagency Coordinating Committee were:

The cities of Omaha, Council Bluffs, and Bellevue and other communities;

Their Public Works and Planning Departments;

The Metropolitan Area Planning Agency (MAPA);

Omaha Metropolitan Utilities District;

Papio Natural Resources District;

Nebraska Natural Resources Commission;

Nebraska Department of Environmental Control;

Nebraska Office of Planning and Programming;

The Iowa Department of Environmental Quality; and

The U. S. Environmental Protection Agency.

26. The Executive Committee of the Riverfront Development Program is composed of business and community leaders from the six-county Riverfront area.

ADVISORY GROUPS

27. The MAPA Citizens Advisory Board is composed of approximately 60 citizens from Washington, Douglas, and Sarpy Counties, Nebraska and Pottawattamie County, Iowa.

Record of Events

PUBLIC MEETINGS

28. Eight public meetings were held upon completion of Phase I or need identification planning. Attendance ranged from 10 persons at Bellevue, Nebraska to 100 persons at Omaha, Nebraska. The following is a list of the meeting date, place, time, and number in attendance at the initial public meetings:

<u>Date</u>	<u>Place</u>	<u>Time</u>	<u>Attendance</u>
16 October 1973	Omaha, Nebraska	7:00 P.M.	100
17 October 1973	Bellevue, Nebraska	10:00 A.M.	10
18 October 1973	Blair, Nebraska	7:00 P.M.	60
19 October 1973	Council Bluffs, Iowa	7:00 P.M.	11
23 October 1973	Papillion, Nebraska	7:00 P.M.	35
24 October 1973	Gretna, Nebraska	7:30 P.M.	50
30 October 1973	Missouri Valley, Iowa	7:00 P.M.	23
6 November 1973	Glenwood, Iowa	7:30 P.M.	35

29. The second and final series of nine public meetings were conducted between 1 April 1975 and 26 June 1975. The smallest attendance at any of these meetings was 23, while the largest attendance exceeded 1,100.

30. The following is a list of the final meeting, dates, place, time, attendance, and topics covered.

<u>Date</u>	<u>Place</u>	<u>Time</u>	<u>Attendance</u>	<u>Topic</u>
1 April 1975	Omaha, Nebraska	7:00 P.M.	45*	Land Use
16 April 1975	Omaha, Nebraska	7:30 P.M.	60	Wastewater
21 May 1975	Omaha, Nebraska	7:30 P.M.	71	Water Supply & Recreation
2 June 1975	Missouri Valley, Iowa	7:30 P.M.	23	All
3 June 1975	Glenwood, Iowa	7:30 P.M.	36	All
9 June 1975	Blair, Nebraska	7:30 P.M.	95	All
10 June 1975	Plattsmouth, Nebraska	7:30 P.M.	33	All
25 June 1975	Boys Town, Nebraska	7:30 P.M.	1,100	Flood Control
26 June 1975	Council Bluffs, Iowa	7:30 P.M.	23	Flood Control

* A sudden snowstorm developed during the early afternoon making conditions rather hazardous. Due to the lateness of the hour and the interest that was generated through the news media, it was decided to continue with the public meeting. The attendance, therefore, at this meeting is significant because it expresses the concern of the public in respect to how the future of the city of Omaha will grow and be developed.

COMMITTEES

31. Briefings on the urban study were given to the Corps of Engineers-Nebraska Committee on Public Involvement on 5 October 1972, 27 March 1974, 21 November 1974, and 18 February 1975.

32. The Omaha subcommittee met six times during the study. The subcommittee met on 21 May 1974, 24 June 1974, 7 August, 1974, 30 August 1974, 18 December 1974, and 20 March 1975.

33. The Interagency Coordinating Committee met seven times during the period of 29 August 1973 to 11 June 1975. The Coordinating Committee met on 29 August 1973, 20 March 1974, 25 April 1974, 17 June 1974, 4 September 1974, 18 November 1974, and 11 June 1975.

34. The Executive Committee of the Riverfront Development Program was briefed on the study on 17 August 1973, 5 February 1974, 25 June 1974, and 18 March 1975.

35. Meetings with the MAPA Growth Policies Committee were held on 17 August 1973, 10 June 1974, and 18 February 1975. The committee meetings were workshops and the four alternative growth patterns were discussed. Written responses were received from the Committee.

ADVISORY GROUPS

36. Presentations of urban study alternatives were given to the MAPA Citizens Advisory Board on 21 November 1974, 19 December 1974, and 28 January 1975. In addition to the presentations, feedback from the CAB was received through the use of a questionnaire.

OTHER

37. In addition to the public meetings, formal presentations or briefings were made to the following groups:

22 August 1973	Omaha Mayor, City Council and News Media
10 September 1973	Omaha Junior League Seminar
13 September 1973	Omaha League of Women Voters
20 September 1973	Water Resource Committee of the Omaha Chamber of Commerce
21 September 1973	Creighton Ecology Class
27 September 1973	Omaha Sierra Club
25 October 1973	Harrison County Improvement Association
8 November 1973	Papio Natural Resource District Board

13 November 1973	Omaha Broadcasters
14 February 1974	Audubon Society of Omaha
2 April 1974	Narcissis Kensington Club
12 April 1974	Missouri Valley Kiwanis Club
29 June 1974	Creighton Urban Economics Class
24 October 1974	Omaha Sierra Club
28 February 1975	Local public officials briefing
5 March 1975	Council Bluffs Riverfront Steering Committee
20 March 1975	Lower Platte South Natural Resource District Board
21 March 1975	Nebraska State Agencies
10 April 1975	Benson Optimists
11 April 1975	Iowa State Agencies
24 April 1975	Metropolitan Utilities District Staff
6 May 1975	Federal Regional Council
7 May 1975	Omaha Engineers Club
18 May 1975	Soujourners Club
20 May 1975	Council Bluffs Waterworks Board of Directors
3 June 1975	Upper Big Blue Natural Resource District Board
25 June 1975	Downtown Rotary
11 July 1975	ASCE Specialty Conference
22 September 1975	Mid-Continent Research and Development Council
25 September 1975	West Council - Omaha Chamber of Commerce
15 October 1975	Aurora, Nebraska Rotary Club

38. The Corps joined with eight other local organizations on 23 September 1974 to hold a day-long citizen workshop on water quality focusing on the Federal Water Pollution Control Act Amendments of 1972. The Corps role in the program was the planning process for water quality.

39. In addition to the above over 100 coordination meetings have been held during the plan formulation phase of the planning process. The majority of these meetings were with the staffs of the Metropolitan Area Planning Agency, the Riverfront Development Program, Omaha and Council Bluffs Public Works Departments, and Nebraska State agencies.

Materials Furnished to the Public

40. Printed information was supplied to the public at various stages in the planning process. Two mailing lists, one composed of over 250 governmental officials and key individuals and the other composed of over 2,100 individuals with a known interest in water resources or related issues, were used to distribute the informational materials. The first mailing list was used to obtain review of the Plan of Study, Phase I Summary, Phase II Program Report, and the January 1975 Information Booklet. The other mailing list was used for the remainder of the materials furnished to the public. The following is a description of the materials provided to the public.

41. Plan of Study. Two editions of the Plan of Study were furnished. The first was printed in April 1972 and the second in October 1972.

42. This Land is Your Land Pamphlet. This pamphlet explained the purpose and function of the study. This pamphlet, produced in the spring of 1973 was the first material provided to the general public on the study.

43. This Land is Your Land Brochure. This 19-page booklet was available to the public at the first series of public meetings held in the fall of 1973. This booklet summarized the results of the "need identification" phase of the planning process. Over 5,000 copies of this booklet have been distributed.

44. Phase I Summary - Phase II Program. This report, distributed in October 1973 to governmental officials and key individuals, provided a more detailed summary of "need identification". The Phase II Study Program was also outlined in this report.
45. May 1974 - Information Booklet. This booklet provided an update on the study progress. It received very limited distribution.
46. January 1975 - Information Booklet. This booklet presented the initial study alternatives for review by governmental officials and key individuals.
47. Introduction and Alternative Growth Potentials - Volume I. The first in a series of five booklets distributed to the general public describes the four alternative growth patterns used in the study and their effects. Over 4,000 copies of this 20-page booklet have been distributed since March 1975. This booklet was the basis of the 1 April 1975 public meeting.
48. Water Quality - Volume II. This 25-page booklet describes the wastewater management alternatives developed during the study. Over 3,000 copies have been distributed since April 1975. This booklet was the basis for the 16 April 1975 public meeting.
49. Water Supply - Volume III. This 21-page booklet describes water supply alternatives. Over 3,000 copies have been distributed since May 1975. The 21 May 1975 public meeting was partially based on this booklet.
50. Recreation - Volume IV. This 22-page booklet describes recreation alternatives. Over 3,000 copies have been distributed

since May, 1975. The 21 May 1975 public meeting was partially based on this booklet.

51. Flood Control - Volume V. This 29-page booklet describes flood control alternatives. Over 4,000 copies have been distributed since June 1975. The 25 and 26 June 1975 public meetings were based on this booklet.

52. What Do You Think. This 1-page flyer was mailed to the general public specifically for the Papillion Creek Flood control alternatives. The flyer was designed specifically for the 25 June 1975 public meeting.

53. Public Meeting Announcements. Public meeting announcements were mailed to the general public preceding each public meeting. The public meetings were also widely advertised via mass-communication methods.

Planning Process Relationship

IMPACT OF THE PUBLIC MEETINGS

54. Public meetings are generally an ineffective means of citizen communication and, therefore, fail to have a significant impact on the planning process.

55. The first series of public meetings did serve to acquaint interested citizens with the urban study. They also provided the

Corps staff with early indications of how people in the area felt about resource management problems.

56. While the first series of public meetings did not significantly affect the planning process they did help verify the needs determined by the first phase of the planning process. Most citizens appreciated the opportunity to have their views made known.

57. The second series of public meetings were preceded by workshop-type sessions with the MAPA Citizen Advisory Board. In almost every instance the general public verified the consensus of CAB opinions. Therefore, the MAPA CAB impacted more on the planning process than did the second series of public meetings.

58. The second series of meetings, co-sponsored by MAPA, helped to strengthen the public's view of coordination between the two agencies. In essence, they helped improve the public visibility of MAPA and helped improve the Corps image in providing assistance in local planning. The end result was a strengthening of regional perspectives and planning.

COMMITTEES

59. The three committees that had the most impact on the planning process were the Omaha subcommittee of the Corps of Engineers-Nebraska Committee on Public Involvement, the Interagency Coordinating Committee, and the MAPA Growth Policies Committee.

60. The contribution of the Omaha subcommittee evolved primarily from individual members rather than from the subcommittee as a whole. The subcommittee did provide suggestions and direction to the public involvement strategies.

61. One member was particularly instrumental in aiding public involvement by providing the study manager with opportunities to meet with the MAPA Citizens Advisory Board. In addition, this individual member provided public input to the alternative growth patterns through her work with the MAPA Growth Policies Committee and the American Association of University Women. Section B contains a resume' of the subcommittee meetings.

62. The Interagency Coordinating Committee provided technical review of the study alternatives as they were developed. This Committee concentrated primarily on wastewater management. This Committee aided in the selection of the final study alternatives. The final study alternatives are in agreement with most Committee members. In addition, individual Committee members provided an invaluable response to crucial planning questions during the Plan Formulation process. The Committee probably provided the most technical impact on the planning process both through the Committee as a whole and more importantly through coordination meetings and letter exchanges with individual committee members. Section B contains a resume' of the Interagency Coordinating Committee meetings and information on their impact to the planning process.

63. The MAPA Growth Policies Committee was the primary group responsible for the retention of the alternative future concept. Without the support and encouragement of this group, the use of alternative futures may have been terminated after need identification. While this committee strongly supported the alternative futures approach, certain members felt that more alternatives should be included.

ADVISORY GROUPS

64. The MAPA Citizens Advisory Board provided valuable public input into the final study alternatives. Its opinions were verified to be accurate at the final series of public meetings. In addition, individual members of the CAB were some of the most vocal publics at the public meetings.

CONCLUSIONS

65. The following summarizes the public's preferences with regard to the alternative plans.

LAND USE

66. Public preferences for the growth concepts, in order of preference, are: Concept C, B, D, and A. It should be stated, however, that developers contend that the majority of the public prefers Concept A. The city of Omaha Planning Department favors Concept C as being most representative of its growth goals. Several agencies favor either Growth Concept B or C. No agency or public interest has expressed a desire for Growth Concept A or D.

WASTEWATER MANAGEMENT

67. The public favored the interceptor sewer configuration in Area-wide Wastewater Management Plan 2, which is consistent with their selection of a growth pattern. The city of Omaha Public Works Department and the Water Quality Section of the Nebraska Department of Environmental Control favored Plan 2. One other State agency and MAPA favored Plan 1, if combined with land use controls and restricted hookups.

68. The Land Irrigation concepts are supported by the public and by State and local agencies. The Nebraska Natural Resources Commission on 27 March 1975 passed a motion to ". . . consider all aspects of the concept of land application of wastewater effluent, promote awareness of the concept throughout the State, and cooperate fully with the Corps of Engineers and others interested in this concept." The Upper Big Blue Natural Resources District encourages more detailed investigation of the land application concept and is prepared to assist and cooperate in planning and implementing a demonstration project in its area.

69. The public is split in its choice of the alternatives to solve the Omaha-Missouri River combined sewer problem. Several people favored sewer separation in spite of the costs (\$530 million). Public reaction has tended to run against all alternatives that involve open storage of the overflows. State and local agencies, with the exception of the Omaha Public Works Department; generally favored Alternatives 2, 4A, and 4B. The exception does not favor any type of open storage.

70. The general public did not make a selection of the method of separate stormwater treatment. Early in the planning process several elected officials questioned the technical and economic feasibility of stormwater treatment. All agencies favored the upstream storage, treatment, and discharge approach. The city of Omaha Public Works Department felt that separate stormwater runoff should be exempted from water quality standards. Generally, the other agencies favored stormwater treatment.

71. The public favors state certification of sewage treatment plant operators. The public also favors that sewer systems for all new development areas be required to connect to existing systems.

WATER SUPPLY

72. No public preferences could be determined for selection of one of the rural water supply plans. There is public concern that implementation of any of the rural supply plans could induce further urban sprawl.

73. The public supported the water distribution plan consistent with the preferred growth concept. In most instances, Distribution Concept C was favored.

74. Public response to the water reduction concepts was favorable, with some agencies strongly supportive of conservation measures.

75. The public generally favors that additional water supplies for Omaha be obtained from the Missouri River. Some opposition can be expected if the Platte West site is developed. Maintenance of the Platte River as a wet stream for fish and wildlife purposes is publicly supported.

FLOOD CONTROL

76. Missouri River Levee Units L 611-614 and R-616 both have local sponsors. Units L 611-614 are generally highly favored by the local public. Unit R-616 has encountered both support and opposition. The opposition is centered among seasonal and permanent residents who would be on the riverward side of R-616. Implementation of L 611-614 and R-616 does not appreciably affect flood stages in the concerned area.

77. Site 10 on the Little Papillion Creek has received considerable opposition from landowners and others in the affected area. Support for Site 10 comes primarily from those interests desiring maximum downstream flood protection.

78. Public input is still being received on the Big Papillion alternatives. The vocal opposition to the authorized project favors the channel alternative. Site 3A (wet) appears to be favored by downstream residents and recreation interests. Residents and local officials in the lower part of the Papillion Creek basin are opposed to the channel. A compromise between all interests would appear to indicate Dam 3A (wet) as the preferred alternative.

79. Generally, strong support has been aired for flood control along West Papillion Creek. The postponement and possible significant reduction in the West Papillion Creek flood control program was received with disappointment by residents and officials in Sarpy County. They feel that a modification of the authorized program is a breach of faith on the part of the Federal Government.

RECREATION

80. No consensus on public preferences to the recreation plans is available. Those desiring additional recreation opportunities are almost equally divided among the three plans. Concern and opposition have been expressed by landowners, particularly in the upper Papillion Creek basin. Favorable response was received for future studies of the feasibility of a National Recreation Area along the lower Platte-Elkhorn Rivers. The Mayor of Omaha has expressed his support for recreation on Big Papillion Creek. Environmental groups tend to favor the Platte-Elkhorn Plan. Local planning and involvement has proceeded further on the Riverfront Development portion of the Missouri River Plan than on the Platte-Elkhorn Plan.

81. Some citizens and officials view the Papillion Creek Recreation Plan as an opportunity to provide much needed water recreation at minimal local costs. Those opposed to the Papillion Creek Plan

generally suggest using the heavily wooded and steeply sloped, non-productive land envisioned in the Platte-Elkhorn and Missouri River Recreation Plans.

Participants View Of The Program

82. Public involvement programs achieve varying degrees of success. The general public impression of the Omaha-Council Bluffs study was that the Corps made an honest attempt to solicit public input. The general consensus was that most people desired larger attendance at the meetings. The lack of attendance was not attributed, by the public, to the lack of Corps efforts, but rather to the apathy of the public to become informed and involved.

83. The main defect in the public involvement program was a lack of total coordination with all agencies, particularly in the areas of flood control (small watershed work of the SCS) and recreation.

84. Excerpts from some of the final public meetings are given below to frame the overall public's impression of the Corps efforts at public involvement.

85. 1 April 1975. "I'd" like to congratulate the Corps too, first for a highly objective, professional and thorough study. Nobody's ever accused the Corps of not being thorough, they've accused them of being slow, and there's a saying current in the profession that

an elephant is a mouse built to Corps specifications. But they are thorough. And yet, they did this very, very thorough study and reduced it to this very clear, understandable booklet that you've all received."

". . . first I want to compliment the Corps on the fine way that it's accepted the mandate from Congress in doing this study. And so often in the last few years I've been to hearings such as this and you've only come--there's only one plan under consideration. I think it's fine that we have some choices. It seems to be different enough where there is a real choice to be made."

"We appreciate the Corps efforts to pull together many philosophies of growth to provide a focus for citizens on the options available. We are very concerned, however, that this effort, like so many others, may get bogged down in the decision making and implementation phases which are responsibilities of many jurisdictions within not only the metropolitan area, but also the State and Federal Governments."

"I'd like to see the Corps offer one more meeting whereby we can get more representatives of the different areas of the city of Omaha, preferably people in community councils, specifically invited to that meeting and have the different factions here."

86. 21 May 1975. "I commend the Corps of Engineers for their definitive publication on the regional water supply, Volume III. I am going to comment only on what affects me as a citizen of Omaha, and as a citizen of Omaha I shall leave out other considerations. I appreciate the opportunity given by the Corps and MAPA to give citizens their opportunity to express choices."

"This here theme of this whole book seems to express the theme of the people today, and the theme of our government; This land is your land. That's a socialist theme. This land is my land. It's not yours. You want your land? Go buy your own. Go make your own lakes."

87. 2 June 1975. "I'd just like to say that I think the MAPA and Riverfront and the Corps has really done a very good job on these. I think there's a lot of interesting information in here (booklets)".

88. 3 June 1975. "The Iowa Conservation Commission is not prepared to respond to the Metropolitan Omaha, Nebraska-Council Bluffs, Iowa Study because of insufficient time to review the four volumes of the Study in total. The most important volume to our organization concerning recreation has not been received by our offices as of Friday, May 30."

"There's one statement I forgot to make. I would suggest that these people here talk to their neighbors--and I'm disappointed we don't have more of them--and bring them. You got to have more interest."

89. 25 June 1975. "First I would like to commend the Corps for their reevaluation of this project for the alternatives they are proposing tonight, and for the public meeting at which time the opportunity for citizen input is given. I believe that this is the first time that there has been open for discussion and consideration, in the alternatives to the much-discussed 20-dam proposal . . . for the Papio Watershed. This is the type of meeting and the type of discussion that has long been sought after by many,

many concerned citizens that would have been directly affected by the 20-dam proposal, and also by many, many citizens who would have been indirectly affected but who are vitally interested in their communities and what happens to those communities and have expressed opposition to the present proposal."

"Again, I commend and thank the Corps for offering these alternatives and for responding to grass roots citizens in their request for alternative proposals and for having this meeting tonight giving people a chance to be heard and to give their opinions."

Mass Media Communications Methods

90. In the spring of 1973 a news conference was held to explain the purpose and objective of the Omaha-Council Bluffs study. Radio spot and newspaper articles preceded the first series of public meetings in the fall of 1973.

91. During the final planning phase two approaches were used to gain public attention and obtain public response. The first method used spot radio announcements and the second used newspaper feature articles in conjunction with release of the five information booklets and public meeting announcements. A public service news bulletin was released by the District Public Affairs Office on 14 March 1975. The public service announcement ran about 20 seconds and was repeated 26 times each by two local radio stations during the succeeding four weeks. This method generated only two responses from the public.

The second method of releasing a feature newspaper article on a specific study topic appearing about two weeks prior to a public meeting was very effective. One newspaper article, printed 17 March 1975, related to Volume I - Introduction and Alternative Growth Potentials. This article appeared 16 days before the public meeting on 1 April 1975. More than 130 telephone and mail requests were received from individuals asking for copies of the information booklet and asking to be placed on the mailing list for succeeding volumes. More than 200 requests were received as succeeding articles, booklets, and public meeting announcements were issued.

92. The titles of the main newspaper articles and their first dates of appearance were:

2 February 1975	"Sewage Water May Fertilize Crops"
3 March 1975	"Water is Healthy, but Substandard in 37 Communities"
8 March 1975	"Three Plans Outlined for Improving Water"
17 March 1975	"Corps Offers 4 Concepts for Growth"
9 April 1975	"New Sewage Plan Devised: Public Meeting April 16"
June 1975	"Corps will Reduce Papio Dam Plans"

93. The above articles were specifically formulated by a reporter with the assistance of the study manager to stimulate interest in alternatives developed by the urban study. These articles are in addition to those that reported on events succeeding the public meetings.

94. In addition to the above, the study manager taped two 30-minute programs on local radio stations concerning the urban study. Shorter taped interviews also preceded the majority of the final public meetings.

SECTION B

ATTACHMENTS

PUBLIC INVOLVEMENT

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LIST OF EXAMPLES

THIS LAND IS YOUR LAND PAMPHLET
THIS LAND IS YOUR LAND BOOKLET
INTRODUCTION AND ALTERNATIVE GROWTH POTENTIALS - VOLUME I
FLOOD CONTROL - FLOOD PLAIN MANAGEMENT - VOLUME V
WHAT DO YOU THINK

SECTION B

ATTACHMENTS

Resume' of Public Meetings

1. 16 October 1973 - Omaha, Nebraska. Statements of study support were received from Senator Hruska, Representative McCollister, and MAPA Chairperson Dorothy Buckingham. The main topic discussed at this meeting was methods of communication between government and the grass roots people.
2. 17 October 1973 - Bellevue, Nebraska. A small turnout, consisting of representatives of government, led the topic of discussion to coordination with other agencies and other planning functions. Most items concerned planning requirements of the Federal Water Pollution Control Act Amendments of 1972. In particular discussion centered around Sec. 208 planning and coordination with MAPA and the Nebraska Office of Planning and Programming.
3. 18 October 1973 - Blair, Nebraska. The need for a comprehensive study of alternative water supplies for Washington County was

emphasized. Lack of public access to the Missouri River was discussed. It was felt that growth of Washington County, generated by Omaha, was unavoidable and that enforcement of zoning to prevent inappropriate land use was lacking. Much discussion centered around the Papillion Creek dams: topics included the environmental and feedlot runoff affects on lake water quality; and disruption of transportation patterns caused by the reservoirs, affecting volunteer emergency health services.

4. 19 October - Council Bluffs, Iowa. Flood problems in the Indian Creek basin were discussed. Council Bluffs has severe growth limitations, either develop in the loess hills at a high cost or develop in the Missouri River flood plain. Drainage and zoning problems were discussed. Interest was expressed in the Corps doing flood plain information studies on Mosquito and Keg Creeks. Concern was expressed about the flood problems on the Nishnabotna River. The practicality of zero discharge requirements of PL 92-500 was discussed.

5. 23 October 1973 - Papillion, Nebraska. Citizens of Papillion expressed a strong desire to retain local autonomy. They view the regionalization of public services such as sewer and water as the first steps toward eroding local autonomy. They fear the creation of super regional agencies. Papillion desires technical assistance in the planning process for flood control, recreation opportunities, particularly in flood plain lands; and exploration of new water supplies. While desire was expressed for improving water quality in Papillion Creek, some citizens felt that environmentalists have gone too far and questioned the need for treatment of storm runoff. One person wanted the Platte River channeled, another said we should

study flood control upstream on the Platte and Elkhorn, and another felt we ought to devote all energies to completing the Papio system.

6. 24 October 1973 - Gretna, Nebraska. The need to attract commercial and industrial growth to aid the tax base was mentioned. The discussion ranged from water supplies from the Platte River, to zero discharge of pollutants, to recreation on the Papio Lakes. The issue of taking food-producing lands for projects such as flood control and recreation was a major concern of some citizens. Two citizens suspicioned the motives of the Corps in conducting the study.

7. 30 October 1973 - Missouri Valley, Iowa. Harrison County seeks more industrial and commercial development. Some felt our population, industrial development, and recreation potential figures for Harrison County were incorrect. Citizens were concerned about flood problems along the Boyer River; some were very interested in our potential recommendations particularly those of flood plain land use. County Commissioners felt that water pollution in this area is caused mainly by soil losses and they are concerned with government policy that calls for all-out production by putting marginal land into production without proper conservation measures and at a time when Federal funding for conservation measures has decreased.

8. 6 November 1973 - Glenwood, Iowa. Concerns in Glenwood almost exclusively addressed flood control, particularly Missouri River levee units L-611-614. Very strong support for proceeding with these units was expressed. Concern was expressed that planners consult with land-owners prior to detailed planning. Provision of flood plain management services for the county was also desired.

9. 1 April 1975 - Omaha, Nebraska. This meeting was co-sponsored with the Metropolitan Area Planning Agency. The purpose was to discuss the four alternative growth patterns used in the urban study. There was almost complete consensus favoring Growth Concept C as the preferred growth concept for the region. Several persons also favored Growth Concept B, particularly officials from the smaller communities. Uncontrolled growth was strongly opposed. A number of individuals favored redevelopment of the inner city. The main concern of the citizens was the preservation of prime agricultural lands. Only one developer attended the meeting. He questioned some of the economic costs of the growth patterns displayed in the brochure. He also suggested that planners meet with developers in a workshop-type forum to discuss land use issues of concern on both sides. Several citizens noted the lack of attendance of their elected officials at the meeting. MAPA also presented a slide show of its Riverfront Development Program at the 1 April meeting.

10. 16 April 1975 - Omaha, Nebraska. The City of Omaha, MAPA, and the Corps of Engineers jointly sponsored this meeting on water quality. The citizens expressed a desire to use the sewer systems as one of the tools to control urban growth. Areawide Wastewater Plan 2 was favored over Plan 1. General acceptance of the land treatment alternatives were expressed although several questions regarding the economics, institutional and legal problems, and impacts on the soil were asked. These questions were not opposition questions, rather they were caution or implementation questions. No opposition to the land treatment alternatives was received. The public was almost equally divided in their choice of an alternative for the Omaha-Missouri River combined sewer solutions. The public felt that all treatment plants should be operated by a certified

operator and that all new subdivisions should be required to connect to existing sewerage systems. The public also supported the creation of a metropolitan sanitary district for the greater Omaha area. Following the meeting the film "The Living Filter" was viewed by most of those in attendance.

11. 21 May 1975 - Omaha, Nebraska. This meeting to discuss the water supply and recreation components of the urban study was co-sponsored by the Metropolitan Area Planning Agency. On the subject of water supply, the consensus was that Omaha should seek its future supplies from the Missouri River rather than the Platte River. One person favored Federal Government control of the Platte River to insure continual water flow and preservation of wildlife habitat. A representative of the Metropolitan Utilities District was questioned by one citizen regarding the Utilities' attitude toward water conservation policies, future plans for Platte River water development, and water line extension policies with regard to urban growth.

12. On the subject of recreation, the main concern of citizens was the taking of agricultural land either for single purpose or multipurpose recreation projects. Some landowners opposed any taking of their land. Several persons indicated the need for better operation and maintenance of existing recreation areas rather than developing more areas. Other citizens stressed the need to preserve recreation areas for future generations. MAPA made a presentation of the recreation component of the Riverfront Development Program.

13. 2 June 1975 - Missouri Valley, Iowa. The meeting covered all study topics along with a presentation of the Riverfront Development Plan from MAPA and the initial announcement of the updating of the Missouri River Recreation Master Plan from Rulo to Sioux City. The main thrust of the meeting centered on flood control. Since a viable plan to provide flood protection for Missouri Valley is not possible, it appears that flood plain regulation and flood proofing offer the best alternative. Flood insurance was explained at the meeting. Preservation of the bluff lands along the Missouri River was discussed. The citizens generally wanted to know what methods government would use for preserving these areas. One county official expressed interest in developing additional recreation along the Missouri in conjunction with the Corps Master Plan. Flood control dominated the meeting, however, one individual commented that he favored Growth Concept B.

14. 3 June 1975 - Glenwood, Iowa. This meeting, co-sponsored by MAPA, covered all study topics along with a presentation of the Riverfront Development Plan and an announcement of the updating of the Missouri River Recreation Master Plan. The main discussion centered on a scenic road proposed for the top of Missouri River levee units L-611-614 by the Riverfront Program. Recreation coordination was also discussed. Local landowners generally in favor of the levees were opposed to construction of a scenic drive because of increased traffic, trespassing, and roadway litter. They also questioned the value of the scenic drive. In the area of recreation, citizens were concerned with how the recreation areas are proposed, coordinated, and what rights the individual landowner has. A staff member from the Iowa Conservation Commission stressed the need for better coordination between his agency and the Corps.

He suggested that the Corps should contract for consulting services in recreation with the National Park Service, Bureau of Outdoor Recreation, and the U. S. Fish and Wildlife Service. Both BOR and U. S. Fish and Wildlife Service were contracted with for certain portions of the urban study.

15. 9 June 1975 - Blair, Nebraska. This meeting covered all study topics except flood control. It also included a presentation of the Riverfront Development Plan and an announcement of the updating of the Missouri River Recreation Master Plan. Growth Concept C or B was supported at the meeting. A prime concern was the taking of agricultural land for recreation purposes primarily in connection with the Papillion Creeks flood control program. Two state senators were also present at the meeting and questioned the financial ability of state and local governments to adequately operate and maintain more recreation areas and the public-demand figures cited in the recreation brochure.

16. 19 June 1975 - Plattsmouth, Nebraska. This meeting covered all study topics plus announcing the update of the Missouri River Recreation Master Plan. Since Cass County is not in MAPA's planning area, that agency did not participate. Questions at the Plattsmouth meeting centered on construction of Missouri River levee unit R-616, industrial development for Cass County, wastewater management, and recreation needs determination. Several individuals were interested in recreation access to the Missouri River. Following the meeting, the Mayor of Plattsmouth stated that he planned to form a committee to study recreational needs in the area and that this committee could provide input into the Corps Recreation Master Plan for the Missouri River.

17. 25 June 1975 - Omaha, Nebraska. Approximately 1,100 people attended this meeting which lasted more than six hours. The main subject was the Papillion Creek flood control program. The Papio Valley Preservation Association and its members strongly favored channelization rather than construction of Dam Site 1, 2, and 3 or 3A. They also strongly protested the proposed land acquisition for Dam Site 10. Most people from Washington County favored channelization. Omaha and Bellevue expressed approval of Dam Site 3A. Of the nine organizations who identified themselves, four favored channelization, one favored the original concept, one favored alternative Dam Site 3A, one was against the entire project, and two expressed no position. Of the 24 persons who spoke, one favored the 20-dam concept, 10 favored channelization, one favored flood protection without expressing a preference and 12 primarily asked questions concerning the alternatives.

18. This meeting was well publicized, however, few private citizens from the urban area attended. Subsequent written statements totalling 144 have been received since the meeting. More than 8,000 petition signatures have been received favoring channelization and 1,000 signatures favoring dam construction.

19. 26 June 1975 - Council Bluffs, Iowa. The purpose of this meeting was to discuss flood control for Council Bluffs from Indian and Mosquito Creeks. The majority of the questions concerned flood plain mapping and zoning and the effect and relationship of the Indian Creek alternatives on the nearly completed Soil Conservation Service watershed work. A representative from the SCS outlined the current status of their projects. It was also explained that the Corps alternatives were in addition to and supplement the SCS

work which is primarily for grade stabilization. A question was also raised concerning differences in local cost-sharing required for Indian Creek as opposed to that required on Papillion Creek. The local nature of the Indian Creek problem as opposed to the regional nature of the Papillion Creek problem was the explanation given for the differences.

Resume' of Committee Meetings

OMAHA SUBCOMMITTEE TO THE NEBRASKA COMMITTEE ON PUBLIC INVOLVEMENT

20. 21 May 1974. This was the first subcommittee meeting established at the 27 March 1974 meeting of the Nebraska Committee. The purpose of this meeting was to discuss elements of the study, previous attempts at citizen involvement, and goals and objectives of the subcommittee. Three levels of subcommittee involvement were discussed, that of (1) a review group, (2) designers of the citizen involvement program, including active participation in setting up meetings, workshops, preparing news articles, and visual aids, and (3) solicitors of public comment. The subcommittee elected to become involved in all three aspects. Subcommittee members assigned themselves specific study topics to become involved in.

21. 24 June 1974. The study manager gave a progress report to the subcommittee. The addition of a new member from Council Bluffs was discussed and approved. The film "Living Filter" was shown. The subcommittee voted to fully participate in the fall water quality workshop.

22. 7 August 1974. The purpose of this meeting was to formulate an effective plan for communicating study alternatives to the public. The main items discussed concerned topics for newspaper articles on the study. It was agreed that a news reporter should be invited to attend the next subcommittee meeting to discuss the news articles.

23. 30 August 1974. The purpose of this meeting was to discuss with reporters from the Omaha World-Herald news articles that would be of interest to citizens concerning the study. The study manager provided a progress report. Topics of news articles discussed with the reporter were the study in general, citizen involvement, growth pattern alternatives, wastewater and water quality management, including the land irrigation concept, recreation, and water supply. Sources of other contacts familiar with these topics were provided the reporter. The relationship between the urban study and the Riverfront Development Program's land use, recreation needs, and scenic drive studies was discussed.

24. 18 December 1974. The study manager provided a progress report to the subcommittee and outlined a proposal for public involvement events for the remainder of the study which included the preparation of the final brochures and the series of public meetings. The relationships between the Omaha subcommittee and a subcommittee for the Papio reevaluation were discussed.

25. 20 March 1975. The purpose of the 20 March 1975 meeting was to specifically outline the strategy, times, and places for the April through June public meetings. The subcommittee concurred on the meetings and the co-sponsoring agencies. The subcommittee suggested that more agencies and local governments also co-sponsor the meetings. This suggestion was not adopted due to the fact that MAPA is a council of elected officials and represents local governments in these matters. The subcommittee also suggested that the study manager tape shows on radio and television to stimulate interest in the public meetings.

INTERAGENCY COORDINATING COMMITTEE

26. 29 August 1974. This meeting was held prior to the formation of the committee. The purpose of this meeting was to discuss the Corps' role under the Urban Studies Program in wastewater management planning in the Omaha-Council Bluffs area. General acceptance of the Corps involvement was received. Several agencies suggested that the Corps assist local governments in facilities planning, particularly infiltration/inflow studies. The wastewater management portion of the Plan of Study was subsequently revised to reflect this assistance to Omaha and Council Bluffs.

27. 20 March 1974. The purpose of this interagency meeting was to discuss preliminary concepts developed by Harza Engineering Company to solve the Omaha-Missouri River combined sewer overflow problem. More than 30 concepts were presented by Harza. The Interagency Committee provided comments that enabled these 30 concepts to be narrowed to 12. The comments were mainly of a technical nature.

28. 25 April 1974. Harza representatives outlined impacts of the Riverfront Development Program on alternatives to eliminate the combined overflows. Harza presented their analysis of the 12 alternatives selected at the 20 March meeting. The analysis presented the costs and a subjective evaluation of other factors.

29. 17 June 1974. Harza representatives presented their Phase I report on the combined sewer alternatives to the committee. The representative from the EPA stated that evaluation of the alternatives should reflect parameters indicated in Sec. 208 guidelines. Representatives from the city of Omaha expressed reservation about open storage of the overflows and cited public acceptance problems. The city also stated that sewer separation could solve other environmental problems such as rodent control. From the general discussions only three alternatives were definitely excluded. It was agreed that emphasis should be placed on arranging the better system components into four or five basic alternatives. The agencies felt that some water quality modeling should be performed to determine the impact of the overflows and the alternatives on water quality. It was agreed that this would be performed under the regional wastewater management contract.

30. 4 September 1974. This meeting was held to discuss the initial alternatives developed for regional wastewater management developed by the firm of Havens and Emerson. The committee had previously reviewed the contract scope of work and commented via letters. Considerable discussion centered on the alternatives involving land treatment. The EPA representative suggested that we should consider flooding areas for ground water recharge. The representative from the Iowa Department of Environmental Quality

expressed concern about winter application. Some problems with farming practices were also noted. The committee was promised a copy of Havens and Emerson's Phase I report in approximately one month. They were requested to review this report.

31. 18 November 1974. The purpose of this meeting was to discuss the Havens and Emerson Phase I Report. The consultant presented an overview of their Phase I work. Again much discussion centered on the land treatment alternatives. Concern was expressed over the low infiltration rates. A low application rate would be necessary to avoid flooding problems. The value of the irrigation water was discussed with values of \$10-\$20 per acre-foot suggested. Some concern was raised about the salt content of the wastewater. This caused the Council Bluffs plant to be eliminated from consideration for land treatment. A general consensus suggested that an envelope of costs be developed depicting a range of costs from the most favorable to least favorable site conditions. This suggestion was included in the consultant's Phase II work.

32. Treatment of stormwater was also discussed. The high costs involved caused concern among the agencies; some suggested exempting stormflows from water quality standards. This exemption is not allowed under PL 92-500.

33. Discussions related to this meeting with committee members, pertinent to the consultant's Phase II work, indicated the following:

- Land Treatment alternatives should receive further study.

- Treatment of stormwater should be a low priority item with upstream treatment and discharge back to the stream the preferred method. This selection of the stormwater handling method was responsible for the rejection of several of the areawide wastewater management plans.

- There is a desire for staged implementation of interceptor sewers that would relate directly to urban growth goals.

- Phase II efforts should give as much attention as possible to shorter term problems such as the Papillion Creek combined sewers, sewer system malfunctions, and industrial waste pretreatment. The consultant's Phase II work was adjusted accordingly.

34. 11 June 1975. The purpose of the meeting was to brief the committee on the final alternatives and findings of the wastewater management studies and to bring the agencies together to discuss the designation of a Sec. 208 planning agency for the area. The study manager and his staff briefed the agencies on the results of the study, including the wastewater management institutional analysis. The discussion centered primarily on designation of a Sec. 208 planning agency. A representative from the Omaha Public Works Department stated that 208 planning was not needed at this time and that Omaha could take last minute measures to get someone designated if the State were required to do 208 planning. The Director of MAPA concurred. Omaha's planning department representative objected to 208 planning because he felt the city would lose some of its land use powers to the 208 agency.

35. The above meeting represented a reversal of local agencies' thinking with respect to 208 designation. At previous meetings

the Nebraska Department of Environmental Control urged MAPA to seek designation. A 23 April 1975 memorandum to the Mayor from the Omaha Planning Department indicated a strong desire for 208 designation. A 29 April 1975 letter from MAPA to the Omaha District indicated a willingness to pursue 208 designation. Informal discussions with the Omaha Public Works Department and the Mayor's office also indicated a strong desire for 208 designation. A 29 April 1975 letter from MAPA to the Omaha District indicated a willingness to pursue 208 designation. Informal discussions with the Omaha Public Works Department and the Mayor's office also indicated 208 preference. The Corps had been acting as an intermediary between these groups largely through the institutional analysis efforts.

Examples of Materials Furnished to the Public

36. The following examples of materials furnished to the public are included to illustrate the breadth of information provided throughout the planning period.

37. This Land is Your Land Pamphlet. This pamphlet was the initial information provided to the general public to acquaint them with the study. This pamphlet was produced in the spring of 1973 and used through the "need identification" phase of the planning process.

38. This Land is Your Land Booklet. This booklet produced in the fall of 1973 summarized the need identification phase of the planning process. It was used for the initial public meetings and meetings with the public during the plan formulation phase of the planning process.

39. Introduction and Alternative Growth Potentials - Volume I. This booklet was the first in a series of five booklets explaining the final study alternatives and their effects. This booklet received the most public praise and illustrates some of the non-traditional aspects of the study.

40. Flood Control - Flood Plain Management - Volume V. This booklet was the last in the series of five booklets explaining study alternatives and their effects. This booklet represents the most traditional Corps of Engineer role in local water resources planning.

41. What Do You Think. This flyer was designed to stimulate additional public interest in the 25 June 1975 public meeting. This flyer supplemented the Volume V - Flood Control - Flood Plain Management Booklet.

To the Citizens of this Region:

This study will provide a coordinated investigation of the water and related land resource problems of the Metropolitan Omaha-Council Bluffs Region.

It will be flexible, attuned to citizens' needs and desires. It is aimed to assist other agencies in their planning decisions. It requires the mutual cooperation of Federal, state and local agencies and the people living here. It will be the basis for making decisions on spending of public moneys for years to come.

Authority for the study is contained in a resolution of the Senate Committee on Public Works, adopted on May 6, 1971, and a resolution of the Committee on Public Works of the House of Representatives, adopted on July 29, 1971. This **people oriented** study seeks:

1. To determine public desires including the wise use of land, enhancement and conservation of fish and wildlife, overall protection and improvement of the environment and quality of life related to the public's social and economic concerns.
2. To meet the area's requirements related to flooding, water supply, water quality, recreation and navigation.
3. To provide flexible solutions to meet changing economic, social and environmental patterns. To this end, planning will be considered to the Year 2020 and will be revised on a continuing basis.

What's your stake in this?

Water—and its proper use—is one of your most precious assets. It is among the richest inheritances you can pass on to your children. Today's planning will influence the future of this entire region. Also, through taxes and use fees, you must pay for improvements which may result from this planning. You have a large stake in all of this.

What will be studied?

Flood control and flood plain land use; drainage and urban/farm runoff; waste water planning and management; water supply management; commercial and recreational navigation; water-related recreation; conservation of fish and wildlife resources and the natural environment.

What area is affected?

Washington, Douglas, Sarpy and Cass Counties in Nebraska; Harrison, Pottawattamie and Mills Counties in Iowa.

Who's involved?

All of the 602,000 people (1970 Census) living in these seven counties.

How does water affect land use?

Water and land planning cannot be separated. Where can we build and expand? ... Where should we control growth? ... What use of the land is most desirable? ... All of these questions involve water-related answers.

What other concerns should I consider?

One of the problems all of us face is the basic conflict between preservation of the natural environment and the economic development of the area. How clean do we want our water? ... How much recreation is necessary? Where? These are just some of the fundamental questions which should be addressed in these studies.

What's the Corps of Engineers role in this study?

The Corps is the responsible Federal agency working in cooperation with the dozens of state and local agencies already involved. It offers a broad scope of technical and planning disciplines valuable in any long-range study! In addition, the Corps seeks the participation of every citizen in the seven-county area. **You must help plan your own future.**

Is the Corps of Engineers in conflict with other agencies, national, state or local?

Not in the slightest. The Corps takes its direction from the Congress of the United States. It is specifically directed to work closely with all agencies and organizations to develop solutions to water problems in this region.

How will this study relate to the work of the Metropolitan Area Planning Agency (MAPA)?

The Corps and MAPA are co-operating agencies, with mutual exchanges of data and informa-

tion. MAPA has a broader planning role involving coordination of all local governmental planning

To the Riverfront Committee?

While water planning and development is a part of the Riverfront groups work, it, too, has broader functions with primary emphasis on other than water related development. This study will be coordinated regularly with Riverfront developmental plans.

Is there a danger of duplicating planning efforts?

Too much planning—and not enough action—is always a danger. This study is a mechanism to coordinate all planning activities in this area in relation to water management. Specific authorization exists to prevent duplicate planning efforts.

What is the study procedure?

First, the Corps will solicit citizen participation in the determination of the Region's needs. Then program planning and alternatives can be developed. Alternatives with cost/benefit figures then are reported to the public and involved agencies for full discussion. A plan of action—based on input from all citizens—then can be implemented, with the cooperation of all concerned citizens.

What is the timetable?

Phase I, involving what broad problems should be considered, is timed for completion during 1973. The entire study is to be completed in 1975.

Your involvement — why is it so important?

This is **your** land and **your** water. Without your involvement in this study, there is no assurance that the plans will respond to public needs and desires.

What public participation events are scheduled?

Workshops with concerned organizations, agencies and the general public will be scheduled periodically during the study. Public meetings will be held to exchange information. Citizen groups will be contacted throughout the program. In addition, explanatory brochures, public displays and news articles will appear regularly.

What do I need to enable me to participate in this study?

You only need an interest in the future development of this region.

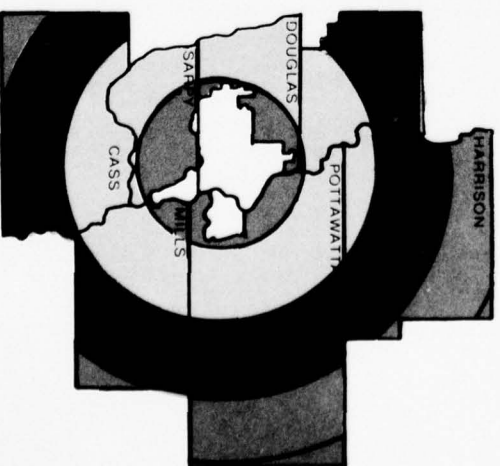
Who should I contact for more information or to present my ideas or views?

Mr. John Velehradsky
Regional Planning Branch
U.S. Army Corps of Engineers,
Omaha
215 N. 17th St
Omaha, NE 68102
(402) 221-4602

Why is all this so important?

It's **your** future—and **your** children's!

this land is your land.



a comprehensive water resources management study for the Omaha-Council Bluffs Area.

This land is your land

Water resources management alternatives for the Omaha-Council Bluffs area



Proper water planning and land planning—consistent with the socio-economic goals of the community—are inseparable.

This booklet presents a summary of results of Phase I studies in water and related land resource management problems for the Omaha-Council Bluffs metropolitan area.

The purpose of Phase I planning was to determine the factors affecting water and related land resources and to identify concerns, possible opportunities and constraints in the development of alternative plans to resolve the water and related land needs in a seven county area (Washington, Douglas, Sarpy and Cass in Nebraska; Harrison, Pottawattamie and Mills in Iowa).

Major functional areas studied included flood control and flood plain land use; drainage and urban runoff; waste water and water supply management; commercial and recreational navigation; water

related recreation; conservation of fish and wildlife resources and the natural environment. For the purposes of this report, these study areas were grouped into six categories:

- Concern I – Water Quality/Wastewater Management
- Concern II – Flood Problems and Possible Solutions
- Concern III – Water Recreation and Related Land Use
- Concern IV – Water Supply
- Concern V – Natural Environment
- Concern VI – Commercial Navigation

For each concern—and in some cases, for each watershed in the

study area—the major problems have been summarized, a range of possible solutions offered and alternatives listed for your consideration and discussion.

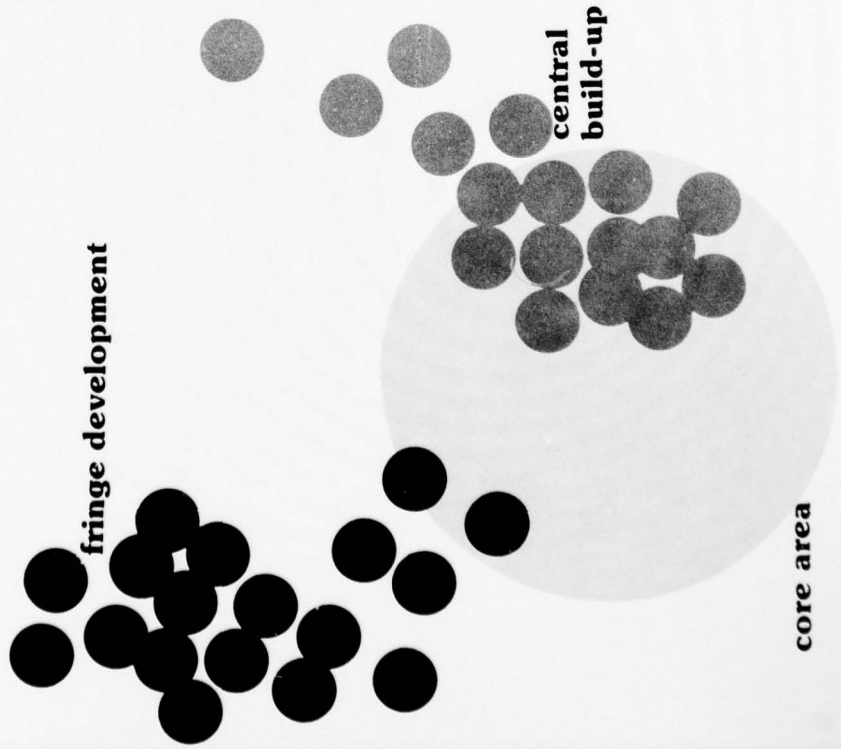
In this manner, the Corps of Engineers hopes to develop full public involvement in the planning process. The wise use of water and related lands is a citizen prerogative. Your needs and desires are primary.

Any planning done for a 50-year time span must, of necessity, remain flexible. It must be responsive to both short-range and long-range regional goals. The Corps of Engineers' charge from Congress provides for coordination with all local, state, regional and Federal agencies also involved in this area. The metropolitan Omaha-Council Bluffs area study is the first of 27 such studies in the U.S.

The first section of this report concerns population growth and growth patterns. It is an amalgam of various studies, plus input from Corps consultants who have researched the area extensively over the past years. Population, growth and direction of development are fundamental to this study. As in all sections of this report, the Corps of Engineers advances only the demographic data available to it and the possible alternatives to be considered.

Comments or suggestions should be directed to the Regional Planning Branch U.S. Army Corps of Engineers, 6014 U.S. Post Office and Court House 215 North 17th Street, Omaha, Neb. 68102.

The question is: which way?



Why is the location and direction of urban growth important to water resources planning?

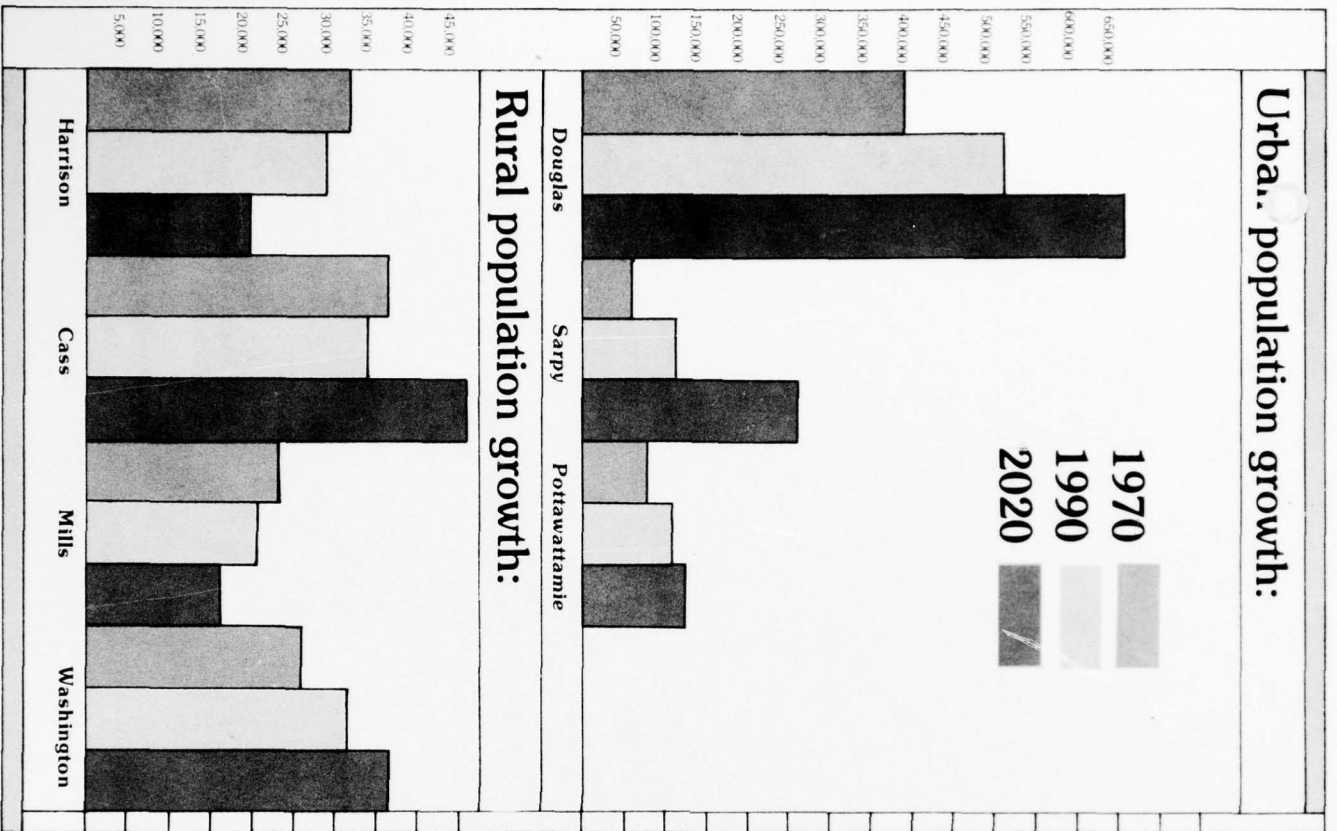
In the metropolitan Omaha Council Bluffs, area new development usually takes place in areas where crops were grown. In order that people may locate in these areas, certain urban services must be provided, including water, sanitary sewers and stormwater drains. Natural hazards, such as floods, bad drainage or high groundwater, may take on new importance as people begin to locate in what were formerly rural areas.

If the direction and location of future growth is known, plans can be made to provide the necessary services and to reduce the potential effects of natural hazards on people and property.

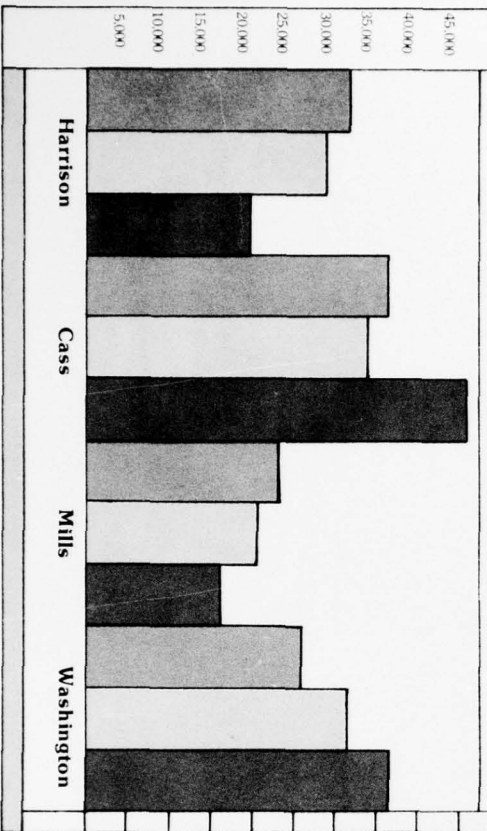
The quality of life in these areas may be enhanced by taking advantage of recreational and open space opportunities provided by limiting development in hazardous areas. At the same time, these open areas may reduce the chance or minimize the effects of flooding.

In developing alternative water resources management programs to satisfy the region's needs through the Year 2020, uncertainty exists regarding some important variables. How many people will live in the area? Where will they live? Will they live in single-family units or in multiple-family high rise apartments? These and other questions may have a major influence on the size, composition of and the schedule for implementing water resources systems.

Urban population growth:



Rural population growth:



Variables

Even total population projections are difficult over a 50-year time span. Growth charts on this page are the combined results of seven population studies.

While some differences in the various projections are apparent, all seven studies agreed:

1. Major population growth will occur in the SMSA (Standard Metropolitan Statistical Area) urban portion of the study area. Omaha, Council Bluffs, Douglas, Pottawattamie and Sarpy Counties thus will continue to present prime population and population movement problems.
2. Rural areas in the seven-county area (Washington, Cass Counties in Nebraska; Harrison, Mills Counties in Iowa) will not diverge from historical patterns of slow

growth and likely will not present major problems.

3. Primary concern is directed toward determining the optimum size of the metropolitan area that is required to maintain a whole-some quality of life for future generations. A definitive study on this question is vital to any plan for resource development.

The most conservative estimate calculates 1.8 children per completed family—less than zero population growth.

In the absence of a national plan to redistribute population, it is likely that the seven-county population for the target Year 2020 will fall in the range of 883,000 to 1,116,000.

To grow or not to grow -- and where?

Where this population will be located within political subdivisions is a major concern to the citizens of this area and a prime factor in planning resource management.

An objective of Phase I studies was to narrow the uncertainties regarding numbers of people, location and densities in the seven-county area.

Average population densities in areas experiencing development is expected to range from 6.5 to 30 persons per acre. The lower density would be the average value in areas housing single-family residential units. The higher density would be an average value in areas having multiple-family units.

Historically, development in the Omaha-Council Bluffs area has occurred on the fringe of the urbanized area. This urbanization of rural lands has been coupled with the lowering of population densities in older urban sections.

Over a period of time, neighborhoods have buildings characteristic of a certain era in history. Thus, the urban area takes in the appearance of a series of rings with the oldest developments near the urban core.

Redevelopment of some of the older areas will take place and vacant areas will be developed between now and the Year 2020.

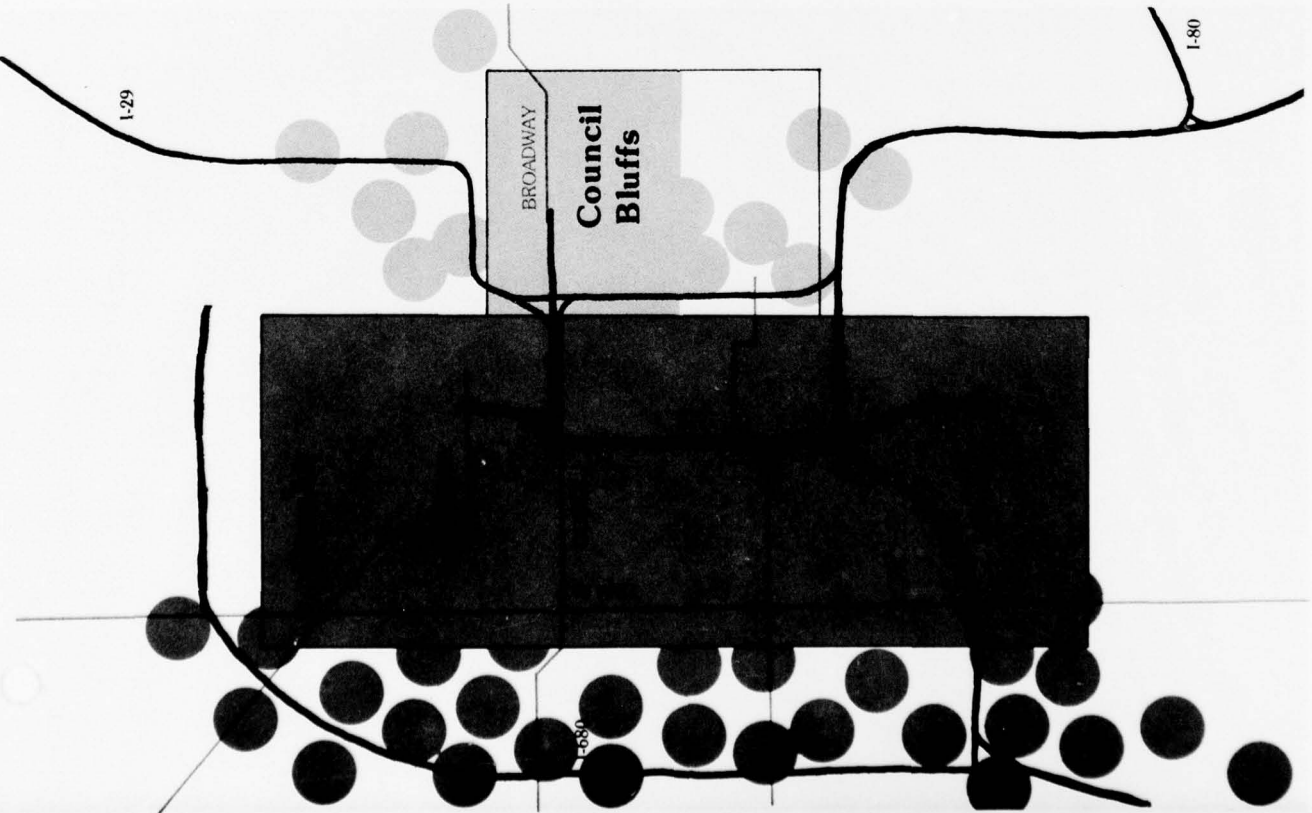
Continuation of the trend to fringe area development can have a significant effect on requirements for water resources and systems to support population movements in the urban areas.

Prior to World War II, Omaha had a general north-south configuration. Council Bluffs, during that period, was generally oriented east-west.

Both cities have changed patterns. Omaha's growth since 1946 has been west, southwest and more recently, northwest. Council Bluffs has been experiencing growth on its northern and eastern fringes.

Urban development normally follows transportation improvements. Thus, Interstate 80, I-680 in Omaha and I-80 and I-29 in Council Bluffs became important factors in a rapidly increasing urban sprawl.

Other major traffic thoroughways have had impact, too. It is reasonable to assume continued growth patterns along these major existing and planned arteries.



Concern I: Water quality/ wastewater management

Maintaining a desirable level of water quality is a national, regional and local concern, transcending political boundaries. National legislation reflects the concern of citizens for the environment of the country and the world. Regional and local concerns relate to designated uses of water such as swimming, fishing, water supply or even aesthetics.

In the study area pollution is caused by inadequate sewage treatment, combined sewer overflow, industrial wastes and urban and rural storm runoff. Streams in the seven-county agricultural area are relatively clean except during heavy storm periods. Pollutants from agricultural and feedlot operations then enter the flows. Streams in the urban areas such as Papillion Creek Basin and Indian Creek are polluted by waste treatment plant discharges, combined sewer overflows and storm runoff—in addition to pollutants from agriculture runoff in the upstream reaches. There are serious water quality problems in these two watersheds.

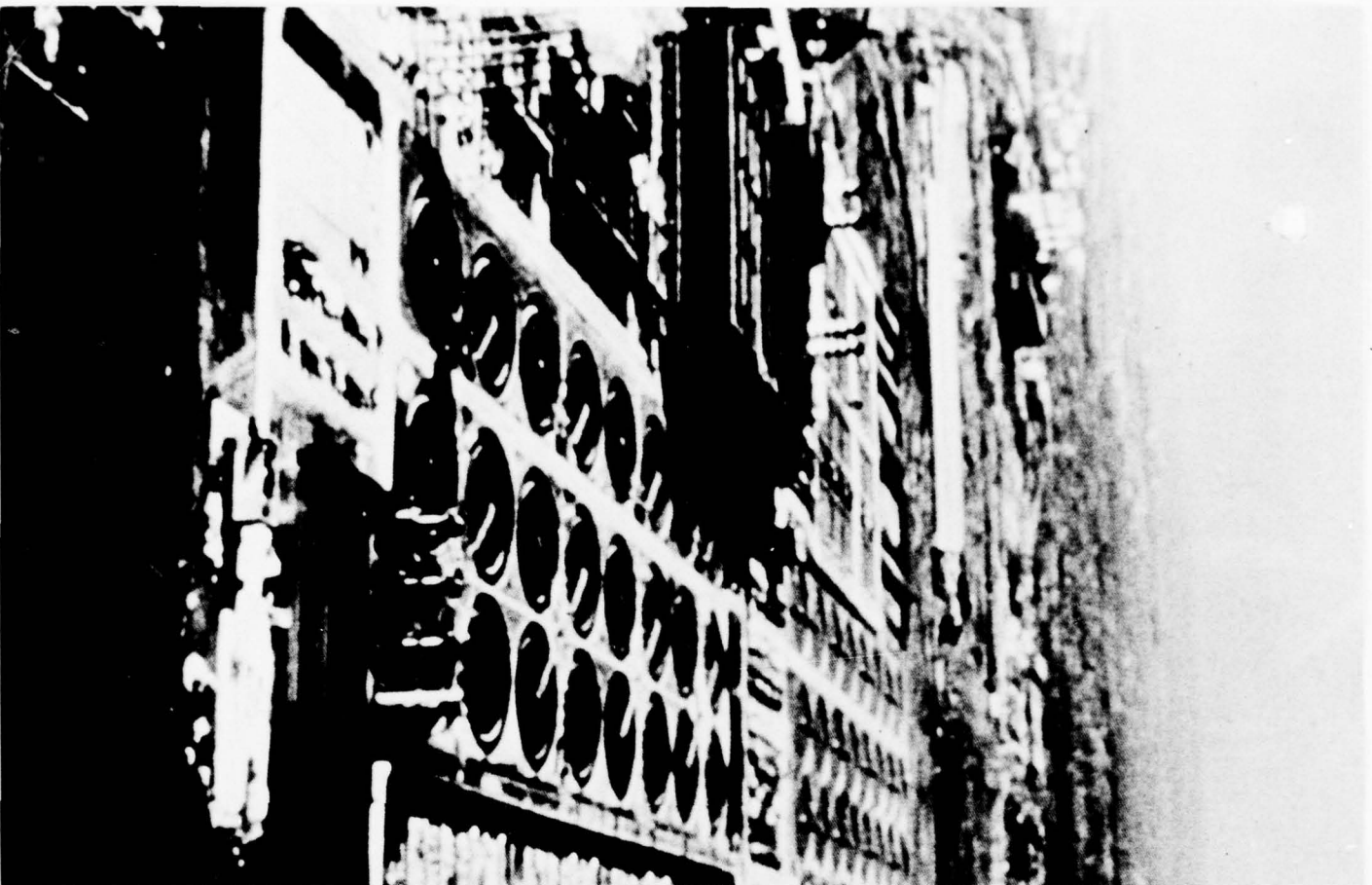
Eliminating water quality problems requires keeping pollutants out of

receiving waters. Generally this requires some type of pollution control program. The planning, construction, operation and maintenance of pollution control measures is called wastewater management.

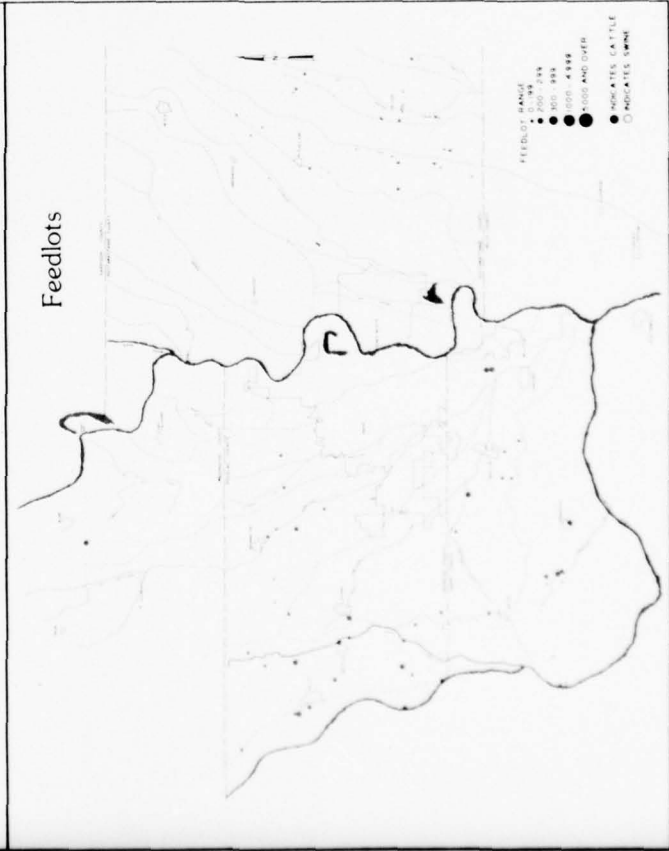
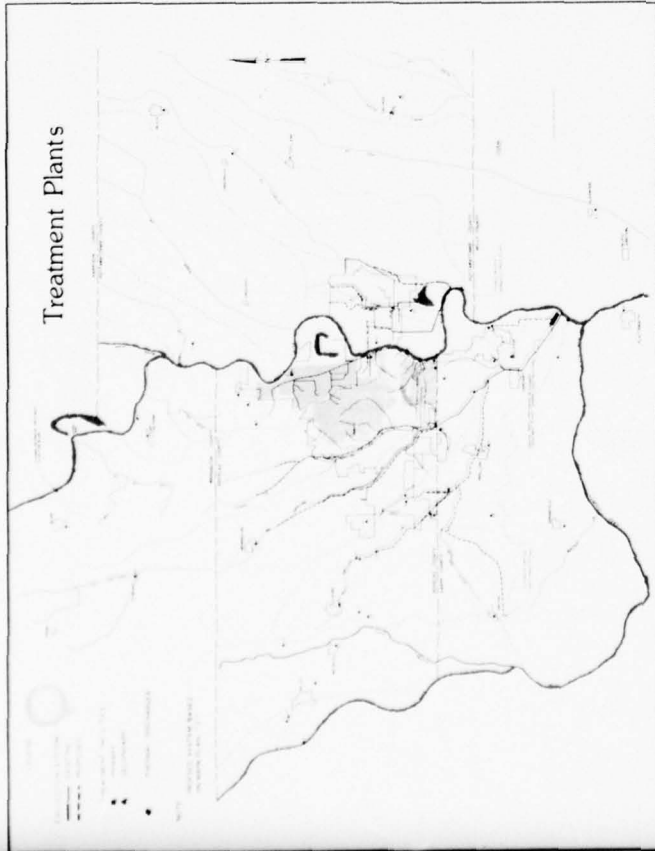
Historically, wastewater management has been directed at treating wastes of domestic or commercial/industrial origin. In the Omaha-Council Bluffs area this effort has resulted in the recently adopted MAPA plan which will provide secondary treatment in the near future for most domestic wastes.

Other activities have been recognized as significant contributors of pollution to the study region streams. Runoff from streets, feedlots and croplands contain pollutants that can degrade water quality to a very significant extent. Keeping these pollutants out of the streams will be difficult and expensive but may be necessary to maintain the desired level of quality.

Determining the most cost-effective method of providing wastewater resources is a major part of this study.



Pollution elimination by 1985



In October, 1972, Congress passed the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500). This act sets up two goals:

(1) To achieve wherever possible by July 1, 1983 water that is clean enough for swimming and other recreational uses, and clean enough for the protection and propagation of fish, shellfish and wildlife.

(2) And by 1985, to have no discharges of pollutants into the nation's waters.

These goals and the process to achieve them have dramatic implications on wastewater management. The emphasis is on management planning in the Omaha-Council Bluffs area of wastewater resources. The 1972 Amendments may require a substantial extension of the MAPA Comprehensive Water Pollution Control Plan.

The 1972 Amendments require the determination of solutions to eliminate all pollution, regardless of source. It requires that alternative treatment methods be studied. It encourages consideration of

advanced waste management techniques. It requires determination of alternative solutions for eliminating combined sewer overflows and for reducing pollution caused by urban and rural runoff. It places emphasis on management-recycle wastewater systems. It represents a new thrust to clean up the nation's waters and to preserve them for future generations.

A timetable has been set to reach the 1985 zero discharge goals. By 1977 all industrial wastes must be receiving the best practicable control technology currently available; all municipal wastes must be receiving secondary type treatment. By 1983 all industrial wastes must be receiving the best available technology economically achievable; all municipal wastes must be receiving the best practicable waste treatment technology.

The planning requirements of PL 92-500 will be fulfilled during this study. Some of these requirements must be accomplished in an accelerated manner to meet 1977 requirements. Others are longer term, designed to meet 1983 requirements and 1985 goals.

Preliminary study results:

Methods of treatment:

Based on the analyses of Phase I the following preliminary conclusions have been reached:

After most of the domestic and compatible industrial wastes are given secondary treatment, other waste sources will still exist that partially negate the beneficial effects of providing secondary treatment—particularly in streams with low assimilative capacity such as the Papillion Creek. This is particularly true during storm related events.

Discharge from combined sewer overflows allows raw, unstabilized sewage to enter the receiving streams and may violate potential Federal and State effluent standards. This problem is very serious in Omaha where 20,000 acres of land are served by combined services. The elimination of these overflows is part of the 1985 goals.

Storm runoff, both urban and agricultural, may introduce large quantities of wastes into receiving waters in a shock-loading condition.

Alternatives for the future must address elimination of all waste sources. Attention to only treatment plant discharges may not result

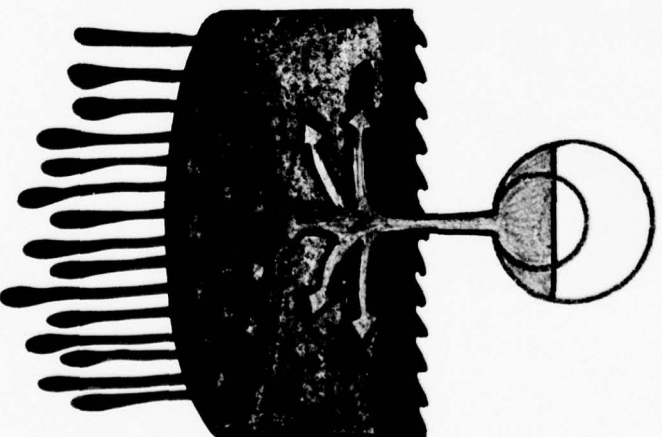
in cost effective solutions. Projected waste loadings in terms of BOD (Biochemical Oxygen Demand) and suspended solids reveals that overall removal effectiveness will be limited if treatment continues to be addressed only to treatment plant discharges.

Treatment of domestic wastes from non-urban communities generally lacks adequate operation and maintenance, indicating a need for more regional management.

After secondary treatment is achieved for municipal and industrial wastes, the following problems should be addressed, in this suggested order of priority:

- (1) Combined sewer overflow
- (2) Feedlot runoff
- (3) Agricultural runoff
- (4) Urban storm runoff
- (5) Advanced waste treatment for municipal and industrial wastes.

Tertiary treatment for wastes disposed of in the Missouri River would be hard to justify on water quality criteria. If stricter requirements are imposed a reuse potential should be found for the wastewater resources.



There are three basic technologies for treating wastewater resources. Technologies may also be combined to form cost effective methods of abating pollution. The technologies are explained below:

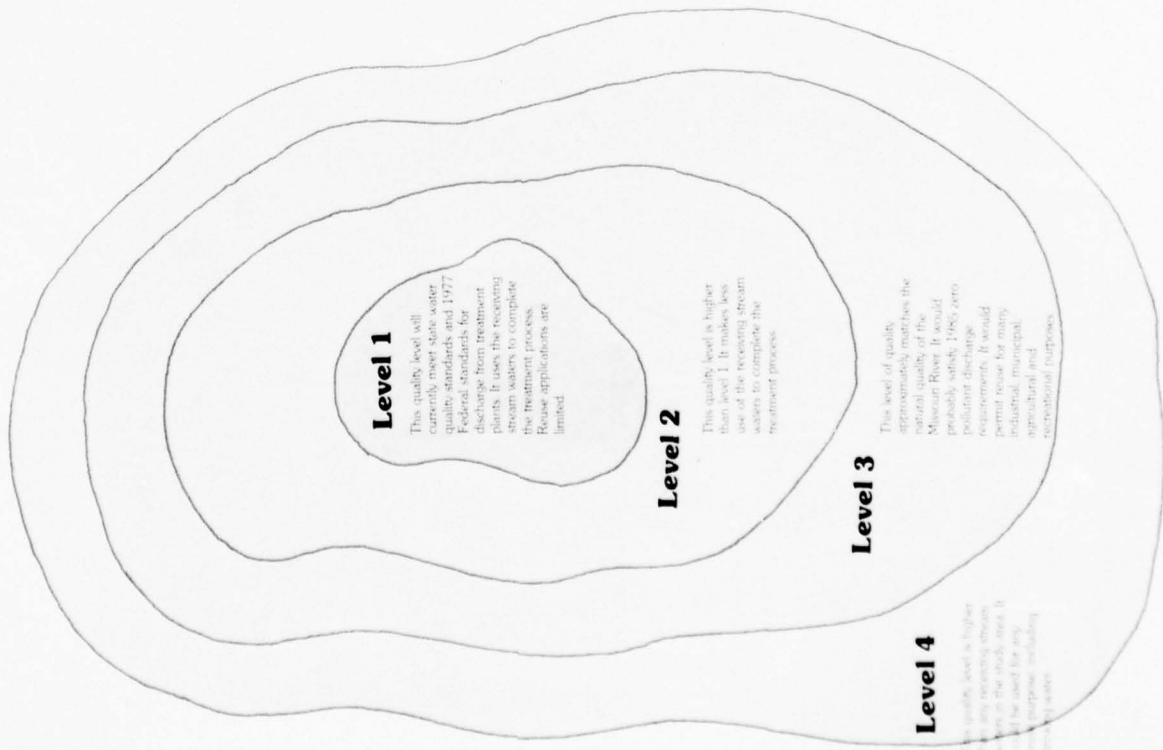
Biological System—Utilizes oxygen and bacteria to remove a certain level of pollutants.

Physical-Chemical System—Replaces biological processes and uses chemicals and physical methods such as settling, filtering and absorption to remove pollutants.

Land Treatment System—After wastewaters receive a certain level of treatment they can be irrigated onto the land to remove more pollutants and also to recycle nutrients to the agricultural industry as fertilizer. The land is used as a living filter.

Combination—Historically, sewage has been treated by a combination of the above methods. Not all technologies are suitable to treat a particular pollutant source, but by employing proper processes under each technology almost any level of pollutant removal can be achieved for any type of waste.

How clean should our water be?



The States of Nebraska and Iowa have designated all streams according to a beneficial use and assigned applicable water quality standards to protect that use. National legislation implies that we should return streams to their natural state. How clean should our water be? Are we willing to pay the price? And what is it worth?

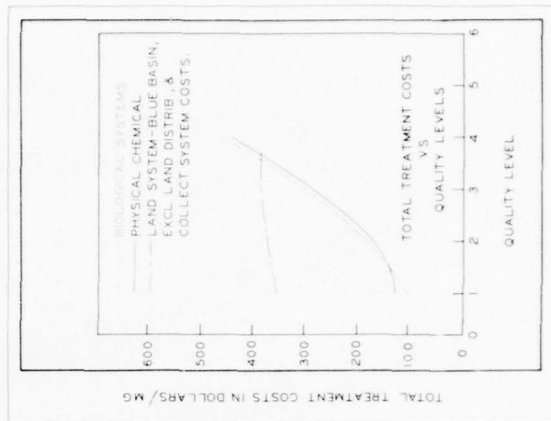
To use our streams as open sewers would cost nothing. To provide water of a quality required to support fisheries will cost a certain amount, to allow swimming costs more, to produce water clean enough to drink is very expensive but can be done. Each quality level has a value. Each quality level has an additional amount of pollutant removal will double or quadruple treatment costs. Secondary treatment removes approximately 85 percent of oxygen demanding wastes and suspended solids and costs about \$100 per million gallons. To remove an additional 10 percent may double treatment costs. Add nutrient removal and the treatment costs may triple.

When a beneficial use of a stream is changed, water quality often becomes more critical. The Papillion Creek is an example. This system is the most polluted in the study region. It does not support a fishery, is not physically suitable for swimming, and has no demand on it to provide water supply. It serves as a waste carrier. Now the use has been changed. Reservoirs are being built. They could support

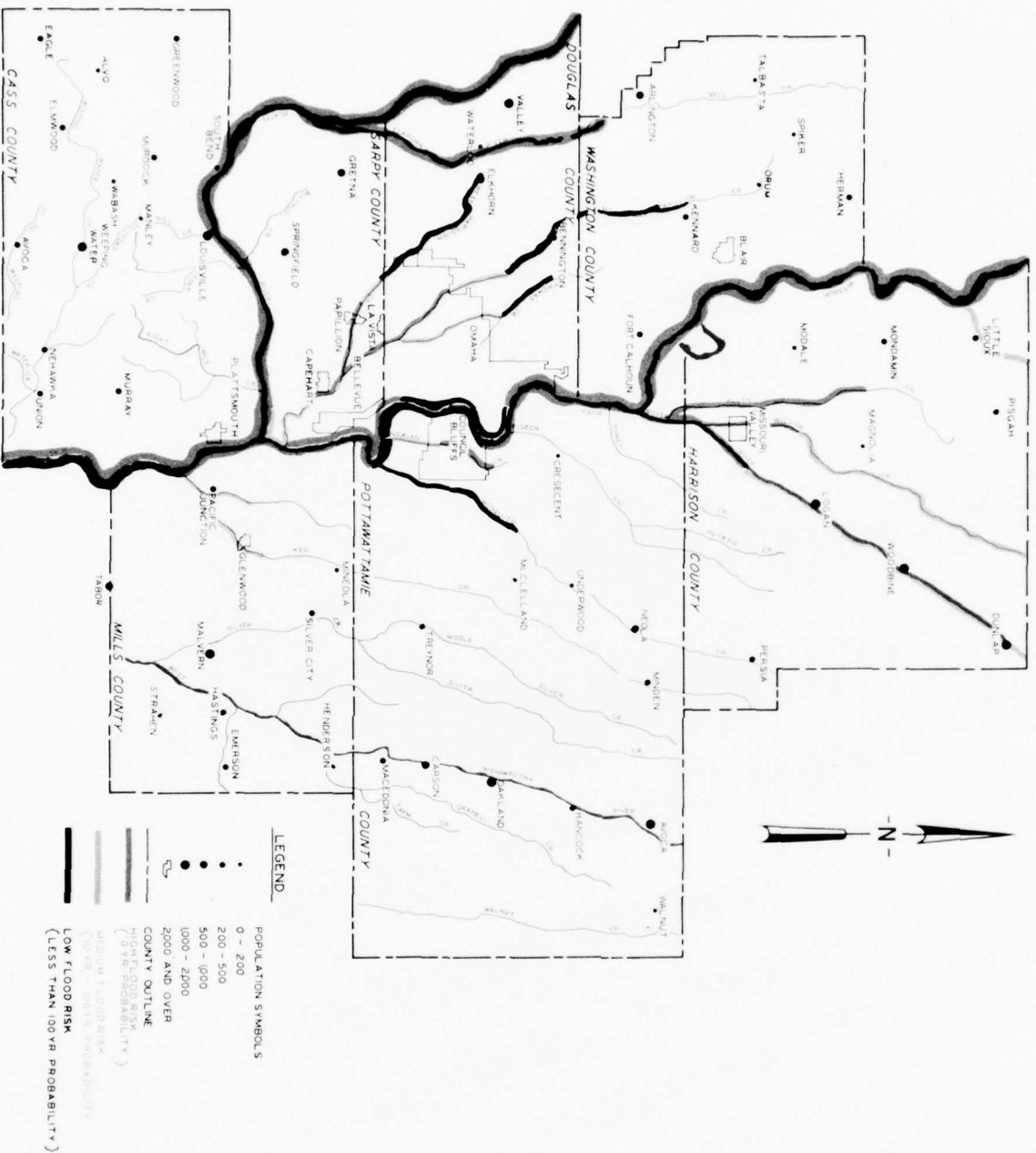
swimming and fishing. However, if these uses are desired, the system can no longer function as a waste carrier. Keeping pollutants out of the system will cost money; will it be worth the price?

Wastewater can be reused for a variety of municipal, industrial and agricultural applications. A certain level of treatment will be required. Again, is the cost of treatment worth the benefit in reuse and water quality terms?

This study will show what the costs of achieving a certain level of water quality will be, and will attempt to determine the benefits thereof. The public can then make a choice between receiving a certain benefit from water quality and paying the corresponding price.



Concern II: Flood problems and possible solutions



The seven-county area surrounding metropolitan Omaha Council Bluffs contains thousands of acres of flood plain lands bordering the Boyer, the Missouri and the lower Platte-Elkhorn Rivers. Additional flood plain lands border Indian Creek, Mosquito Creek and Papillion Creek Basins. The system of large dams and levees protect huge areas of Omaha and Council Bluffs from the once mighty Missouri River. The system of 20 lakes, under construction in the Papillion Creek Basin, will reduce flood damages on more than 21,000 acres of land bordering the Papillion Creek and its tributary streams in West Omaha. These structural measures have provided and will continue to provide a major reduction of flood damages.

To assure that flood hazards will be minimized in the future, consideration of a flood plain management program is mandatory. Such a program may consist of both structural and non-structural measures. An objective of this study is to determine the best balance of structural and non-structural measures to provide flood hazard reduction consistent with the uses for which flood plain lands are best suited.



When flood plain lands are located near major transportation arteries or near major business and employment centers, the best use may be to develop and provide flood protection. In other instances, lack of development in a flood plain may provide opportunities for providing environmentally-oriented open space or for agricultural purposes. Phase I studies identified potential flood hazards constraints and opportunities for developing a flood plain management program. The results of these studies follow:

Boyer River

The major flood problem in the Boyer River basin is caused by ice jams from Missouri Valley to the mouth. Approximately 19,000 acres of land, mostly agricultural and located in the Missouri River flood plain, are subject to inundation. An additional 14,000 acres of land

are subject to flooding along Willow Creek. The flood hazard posed by these streams has a limiting influence to development in these hazard areas.

The existence of a major highway and railroads paralleling the Boyer River upstream from Missouri Valley make the construction of large reservoir projects costly and therefore economically infeasible. Small impoundments in the upstream portions of the Boyer River and Willow Creek watersheds may be effective in reducing flood problems in those areas. Conversely, the magnitude of the flood hazard would make small impoundments and levees relatively ineffective.

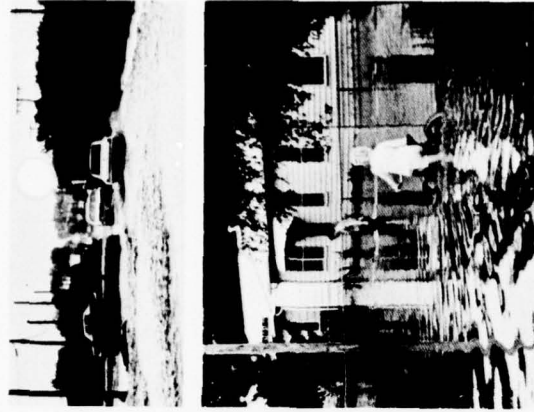
Future residential, commercial and industrial development located in flood plain areas could be flood proofed or constructed on raised sites. Ring levees may also be effective in reducing flood damages



to future development, provided that internal drainage and high water tables in the areas are considered in the planning for these developments.

Missouri River Flood Plain

The flood problem along the Missouri River varies according to the flood potential from tributary streams and the degree of protection afforded by levees along the Missouri River and tributary streams. The flood problem area through Omaha and Council Bluffs is generally confined between the levees protecting the low areas in these cities. A major area subject to flooding is located south of Council Bluffs between Mosquito Creek and Keg Creek. In general, areas protected by Federal levees are relatively free from potential flood damages. Those areas protected by private levees may have a potential of being flooded at least once in



every 10 years.

A related problem that exists along the Missouri River flood plain is high groundwater and poor drainage. This problem occurs during periods of abnormally high precipitation and when Missouri River stages are high. Basements, septic systems, sanitary sewers and storm sewers are affected by high groundwater conditions. Future development in the areas both protected and unprotected by levees must recognize the possibility of high groundwater and inadequate surface drainage.

Solution of the flood and related drainage problems along the Missouri River flood plain is limited. Control of surface flooding, caused by high stages along the Missouri River and tributary streams is generally limited to the construction of levees. Control of high groundwater and inadequate surface

drainage require the establishment of ponding areas and pumping stations in leveed areas. Construction of inactive Federal levee units, flood plain regulations and the raising of building sites could be utilized to prevent damages to existing and future development in areas currently not protected by adequate levees.

Papillion Creek Basin

The Papillion Creek Basin currently contains more than 21,000 acres of land subject to flooding. Flood potentials in portions of the Basin are controlled by the Little Papillion Creek Channel Project, by Missouri River Levee Unit R613, and by locally constructed channel enlargements.

Construction of a system of 20 lakes has been initiated. When completed, the lakes will substantially reduce flood damages in the Basin. But a residual problem will exist after completion along the small tributaries and along Little Papillion, Big Papillion, West Branch and Papillion Creeks. It is generally attributable to runoff occurring in uncontrolled portions of the Basin. There are opportunities to augment the 20-dam system with small tributary impoundments. In addition, opportunities exist to zone portions of the Papillion Creek flood plain to prevent unwise development. The Papillion Creek lakes also provide opportunities for the development of a water resource management system for a major portion of the Omaha-Council Bluffs area.

Platte and Elkhorn Rivers

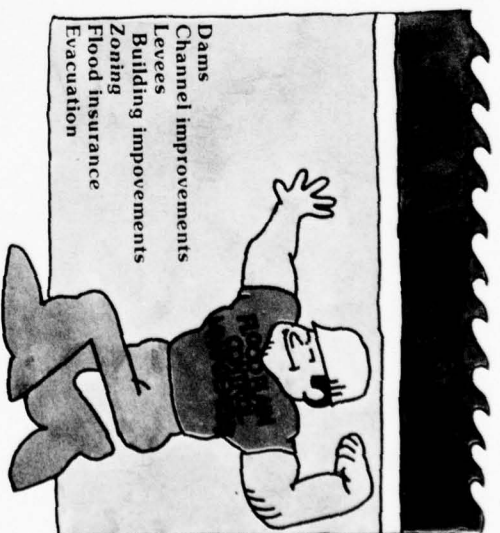
The combined flood plain for the lower Platte and Elkhorn Rivers in the study area is relatively large geographically. Land use in the flood plain areas is predominately agricultural. The remainder of the area contains gravel pits, recreation lands and transportation right-of-ways. The communities of Valley, Waterloo and King Lake lie in the flood plain. Waterloo is protected by a Federally constructed levee.

Except for levees and flood plain regulations, potential solutions to the flood problems would require the construction of measures in areas not covered by the study.

The Platte River Level B study is addressing the feasibility of potential upstream reservoir storage in the Platte River and its tributaries. Until such construction is authorized and completed, flood plain regulations appear to be the most practical method of reducing potential flood damages. Early use of such a program is required if unwise development is to be prohibited in hazardous areas.

Indian Creek

Flooding on Indian Creek is caused by intense rainfall over a short period of time. About 2,100 acres of land, ranging from highly-developed commercial properties to agricultural uses, is subject to flooding. Through the metropolitan areas of Council Bluffs, Indian Creek is confined by a concrete-lined channel and a conduit, both of which have inadequate capacity



to carry flood flows. The downstream portion of Indian Creek is confined by tieback levees from the Missouri River levee system.

Development in the Indian Creek Basin upstream from Council Bluffs has encroached on potential reservoir sites, including the authorized Indian Creek Dam and Reservoir site. Encroachment along the channel through the highly developed area makes the cost of channel enlargement extremely high. The feasibility of constructing either the authorized Indian Creek Dam and Reservoir or channel enlargement would be questionable at this time.

A program for flood control in the Indian Creek Basin would require a combination of measures. Elements of the program might include small reservoirs, channel

restoration, zoning, floodproofing and flood insurance.

Other Tributary Streams

Honey, Pigeon, Mosquito and Keg Creeks enter the Missouri River on the Iowa side. The downstream portions of these streams, located in the Missouri River flood plain, are confined by levees. The degree of protection afforded by these levees varies. Development associated with the growth of Council Bluffs and Glenwood is likely to occur in the vicinity of these streams. Currently, flood plains along these streams are relatively undeveloped. An opportunity exists to limit development through a program of flood plain regulations and zoning.

Various attempts have been made to identify deficiencies. However, demand for additional water related recreation is best supported in relation to the use of existing facilities.

According to recreational experts, all major facilities in this area are being over-used. When this happens the enjoyment of the resource is diminished. Satisfying the present and future recreational demands is a vital part of an urban water resource program.

Several questions surface when considering expansion of the recreational resource. Can the natural resources of the region support additional recreation without harm to the natural environment? Where are the best places to develop additional recreation? Who will be the main beneficiaries of the expansion? Are citizens of the region willing to pay the price of additional recreational development?

There are opportunities to expand water recreation in the study region. Solutions to flood control, such as the Papillion Creek lakes, will provide a good opportunity if adequate water quality and land use controls can be maintained. Flood plains of the Missouri, Platte

Acres of Deficiency*

	1972	1990
Picnicking	410	578
Camping	599	989
Boating (Power)	8,082	9,887
Water skiing	4,380	5,450
Swimming (Beach)	32	44
Fishing	6,303	4,129

*Needs determined for Washington, Douglas, Sargey and Dodge Counties, Nebraska. The 1990 statistics assume completion of 20 Papilio Reservoirs

and Elkhorn River and the Papillion Creek System provide another excellent opportunity. Programs developed by MAPA already have recognized this potential. Other elements of the water resource system can be used to promote recreational open space concepts.

This study will work to provide the water resource support for on-going recreational and open-space programs. As opportunities to resolve other water needs are developed the recreational potential of the opportunities will be identified.

All associated costs and benefits—including social and environmental—incurred by development will be determined. In this manner the public can have a voice in selecting the recreational future of the Omaha-Council Bluffs area.

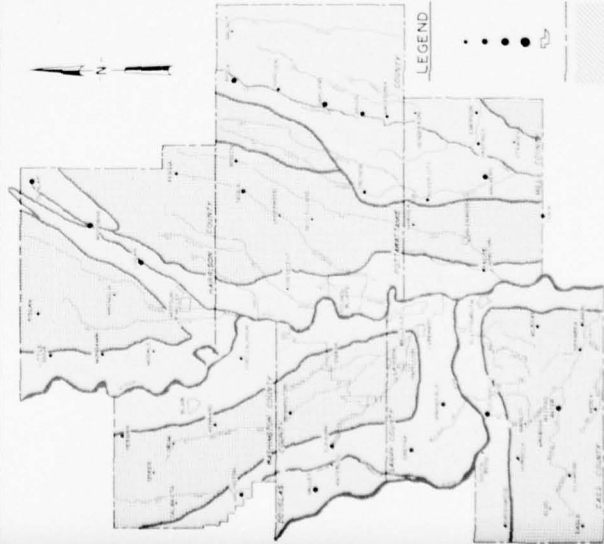


Concern IV: Water supply

	1970	1995	2020
Omaha	112.38	215.25	338.59
Domestic			
Commercial & Industrial	44.89	84.46	117.87
Council Bluffs			
Domestic	7.77	14.68	20.50
Commercial & Industrial	5.37	7.18	11.85

The above figures are in millions of gallons per day (MGD) and are based on a projected maximum day.

Estimated needs to year 2020



Generally, water resources in the seven-county study area are adequate for the existing and projected needs. However, water quantity and quality problems do exist in some of the communities and rural areas surrounding Omaha and Council Bluffs. These problems are especially noticeable during dry periods when surface flows and groundwater tables are reduced.

For the Omaha Council Bluffs Urban Area, the Metropolitan Utilities District (MUD) and the Council Bluffs Water Works are the major suppliers with all water treated to meet U.S. Public Health Service drinking water standards. MUD currently operates two treatment plants; the Florence Treatment Plant has a capacity of 140 million gallons per day using the Missouri River as a source; the Platte River Plant southwest of Omaha, utilizing well fields, has a capacity of 60 MGD. MUD plans to expand both of the existing plants. With continued westward expansion MUD will construct a new facility utilizing the Platte River aquifer west of Omaha. The combined capacity of the three plants to the Year 2020 is projected to be 420 MGD.

Lincoln also obtains its water from the Platte River aquifer. Opportunities exist to regionalize future well fields and treatment facilities for providing water to both Omaha and Lincoln.

The Council Bluffs Water Works uses the Missouri River for a raw water source with the Council Bluffs Treatment Plant rated at 17 MGD. Current plans call for expansion of the existing Missouri River facility.

With the exception of Glenwood, Iowa, on Keg Creek, all communities rely on groundwater. Some communities and private rural areas have systems providing untreated well water with constituents violating U.S. Public Health Service standards. Some communities are without public water systems.

To correct deficiencies, all the counties have some sort of water supply and distribution plans. Harrison, Mills and Washington Counties have plans for the development of county-wide treatment and distribution systems, interconnecting the smaller communities and providing service to most rural areas.

Concern V: Natural environment

The term "natural environment" is used in describing man's physical surroundings. Discussed are categories such as topography, soils, wildlife, vegetation and water clarity.

Woody habitat of importance to wildlife occurs as dense stands of trees along river and creek bottomlands, plus numerous small woodlots and shrub areas scattered throughout the agricultural lands. Urbanization, intensive agriculture and some water resource development have encroached upon wildlife's natural habitat. This forces wildlife to adapt to new surroundings or cease to exist in the area. For example, large flocks of migratory waterfowl which formerly used marshy areas near the Missouri and Platte Rivers for rest and feeding now find many areas drained and

replaced with urban type facilities. Farm pond and other standing waters provide some relief but generally are not major factors.

The topography of the seven-county area ranges from river flatlands to rolling hills and bluffs delineating bottomlands. Soils in the bluff and hill areas tend to be erosive and require watershed planning. This problem is compounded when urban expansion strips protective vegetation and exposes barren soil to wind and rain storms. Soils in the bottomlands tend to be poorly drained and are not suitable for soil absorption sewage systems or sewage lagoons. They tend to pollute the ground-water. Higher water tables in the bottomlands increase construction costs and create maintenance problems in addition to the increased flood damage potential.



Total environment

Environment includes man's physical, social and economic surroundings. Environmental policy influences all aspects of urban water and related land management.

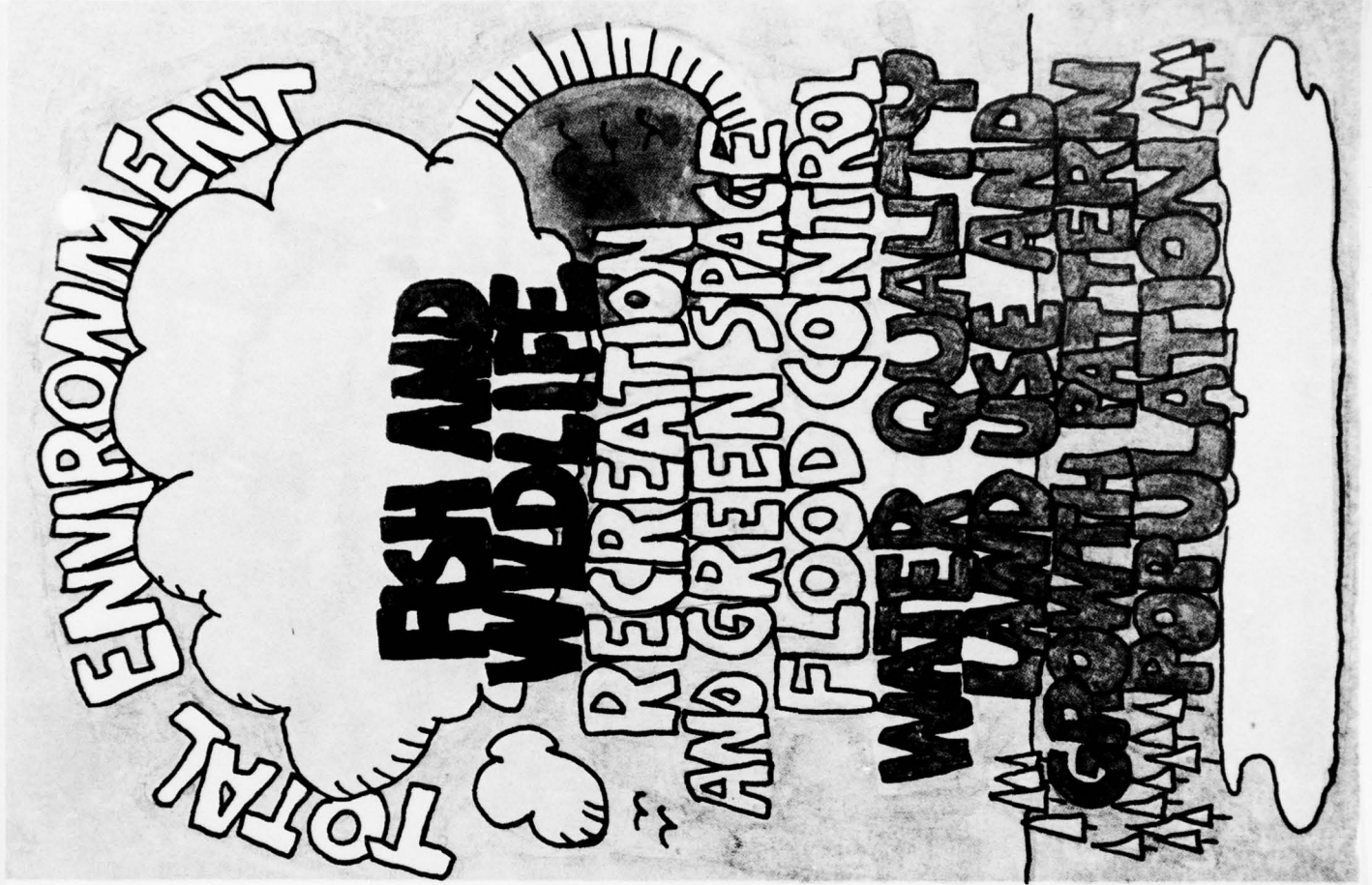
Urbanization has created unique environmental problems: air, noise, and water pollution, increased storm water runoff, transportation problems, flood plain development and the myriad of social issues that are created by masses of people living in a small area.

These and other physical, social, and economic environments produce trade-offs: i.e. often what is positive to one element is negative to another. Redevelopment of the blighted areas of the cities generally would have a positive physical environmental impact. It would have both positive and negative social and economic implications.

Soil types, topography, lack of vegetation and current land investments favor a westward expansion — but increasingly convert prime agricultural land to urban uses. Provision of open space and related recreational opportunities in an urban setting play a major role in man's environment.

Provision of open space can be complementary to proper land use, flood plain management, recreation and the ecology of the area.

All of these urban, core area environmental problems are also part of a water and land related resource development plan.



Concern VI: Commercial navigation



The Missouri River is the only river used for commercial navigation in the region, and this is generally scheduled for an eight-month season extending from April 1 through November 30. The season can be lengthened in ice-free conditions and sufficient water flows. Currently, the river is navigable from St. Louis, Missouri to Sioux City, Iowa.

Traffic on the Missouri River has been steadily increasing. Approximately 1,440,000 tons of waterborne commerce were moved in 1960. This had increased to an unofficial total of 2,695,000 tons in 1972. Traffic is expected to increase significantly after a nine-foot channel, currently under construction, is completed in 1977.

It is not anticipated that any additional navigation projects will

be forthcoming from this study. However, navigation uses of the Missouri River will be analyzed with emphasis on recreational utilization. Of particular importance will be consideration of the effect of changing flows in the Missouri River. The Missouri River Basin Comprehensive Framework Study indicated that by the Year 2020, the effects of Basin development on the navigation function could be extreme, particularly during a severe drought.

This study will examine the impact that changes in flow on the Missouri River could have on the recreational use of the river.

This land is your land . . .

The primary goal of this study is the development of a water and related land resource management program for the seven-county area.

What is meant by a water and related land resource management program?

It is a description and evolution of the most desirable alternatives for managing wastewater, improving water supply, increasing water recreation opportunities, conserving and improving wildlife habitat and enhancing the quality of urban life. It is a plan for proceeding with solutions to water problems. It outlines requirements necessary to implement solutions, including required institutions, financial arrangements and the role of the citizen. *It includes recommendations in policy and legislation concerning water and related land uses.*

As previously stated, the purpose of the Phase I studies was to determine the factors affecting water and related land resources and to identify concerns, possible opportunities and constraints in the development of alternative plans to resolve the water and related land needs of the study area. Phase II studies will concentrate on the development of alternative plans for the area. As stated, all planning will have public exposure.

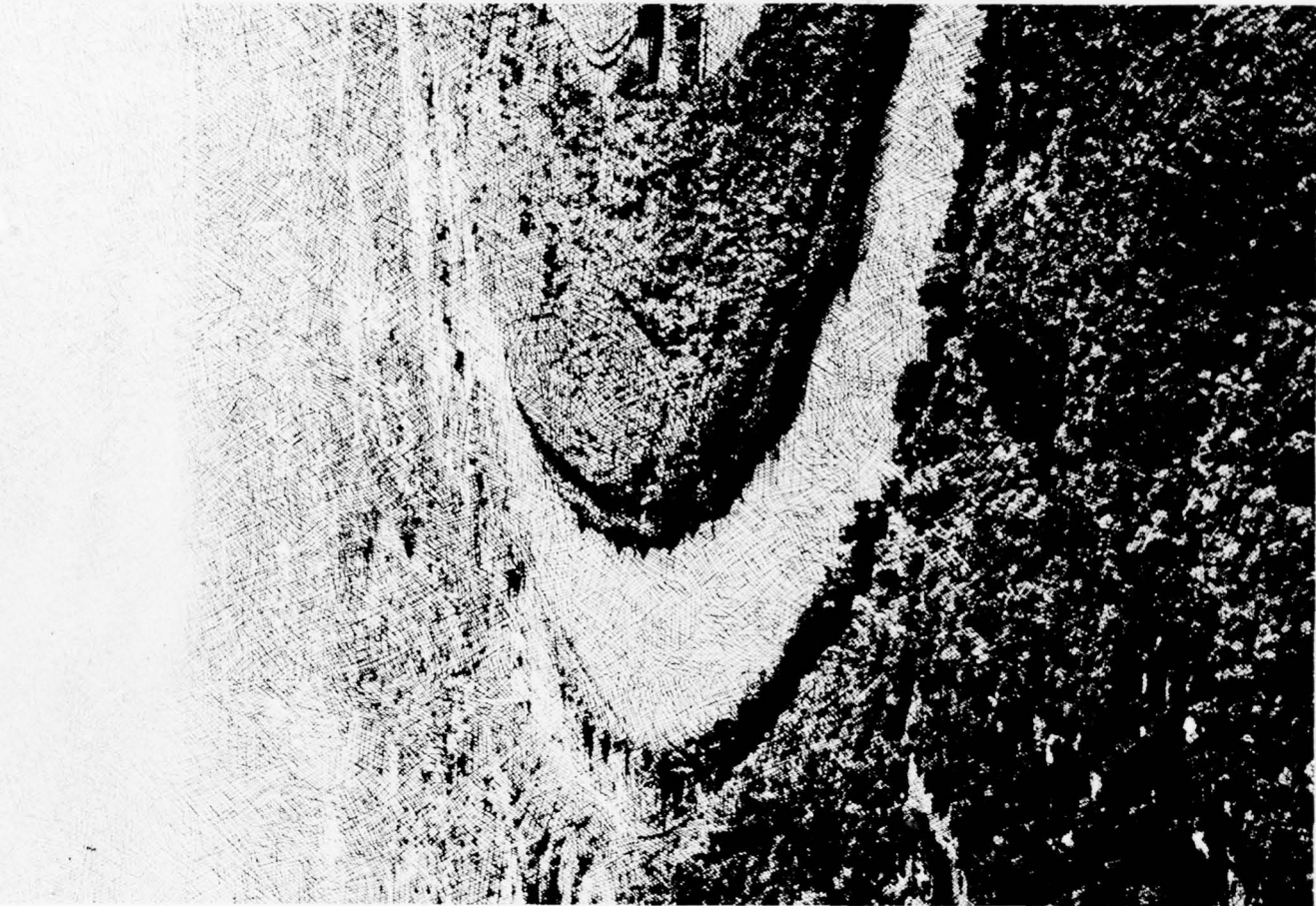
In the formulation and detailing of alternatives, your views regarding priorities and potential solutions to problems are required. For example, which of the concerns

cited in this booklet has the highest priority? Lowest priority? How would you rank these concerns? Are there other water related concerns? What is your opinion regarding solutions to the concerns listed in this booklet? Do you have any suggestions regarding other solutions?

The information you provide will assist the Corps of Engineers in the development of alternative plans for the area. In addition, the information will be useful in identifying how one element of a plan may affect the entire plan. There can be many interlocking solutions, and what is done in one concern area likely will affect several others. The need for trade-offs in proper planning is paramount.

Public attitudes regarding the alternatives will be sought as the study progresses. From these alternatives a program for the area's water and related land resources will develop. This program will be furnished to state and local agencies to aid in their decision making. If you need more information, or if you have suggestions or questions, please contact:

Regional Planning Branch
U.S. Army Corps of Engineers
6014 U.S. Post Office &
Court House
215 North 17th Street
Omaha, Nebraska 68102



Introduction and Alternative Growth Potentials-Volume I

Water resources management alternatives for the Omaha – Council Bluffs area



This land is your land

VOLUME I - INTRODUCTION

ALTERNATIVE GROWTH POTENTIALS

Introduction - What is an Urban Study?

The Metropolitan Omaha-Council Bluffs study is the first of the Corps of Engineers' national Urban Studies Program. The intent of the Urban Studies Program is to provide an integrated approach to local water and related land resources management needs consistent with State and Federal requirements and compatible with the comprehensive development goals of the region.

The Omaha-Council Bluffs study region consists of the counties of Washington, Douglas, Sarpy, and Cass Counties in Nebraska, and Harrison, Pottawattamie, and Mills Counties in Iowa with particular emphasis given to the metropolitan areas.

The study is being coordinated with:

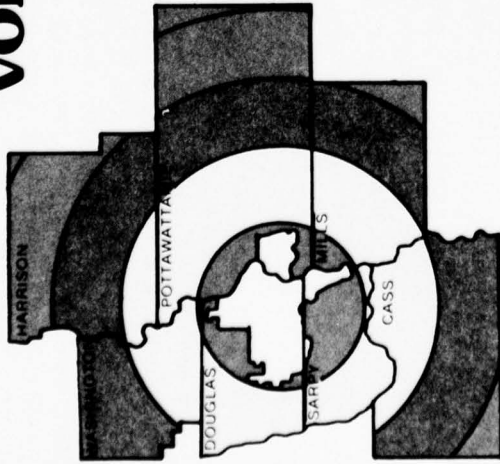
- The Cities of Omaha, Council Bluffs, Bellevue, and other communities;
- Their Public Works and Planning Departments;
- The Metropolitan Area Planning Agency (MAPA);
- Omaha Metropolitan Utilities District;
- Omaha Subcommittee, Nebraska Committee on Public Involvement;
- Nebraska Natural Resources Commission;
- Nebraska Department of Environmental Control;
- Nebraska Office of Planning and Programming;
- The Iowa Department of Environmental Quality; and
- The U.S. Environmental Protection Agency.

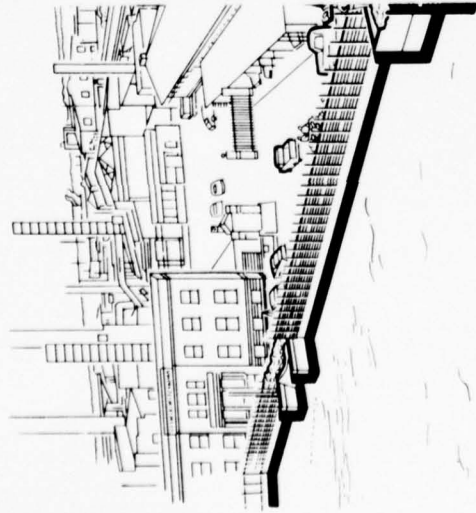
In addition, elements of the study concerning recreation and fish and wildlife are being prepared by the Bureau of Outdoor Recreation and the U. S. Fish and Wildlife Service.

The water and related land management programs have entailed the identification and evaluation of the most desirable alternatives for managing wastewater, improving water supply, increasing water recreation opportunities, conserving and improving wildlife habitat, and enhancing the quality of urban life.

The end product of the programs is a plan, or choice of plans, for proceeding with solutions to a variety of water problems. A viable plan should outline requirements necessary to implement solutions, including the identification of governmental and other institutions with legal and financial ability to carry out the plans. The plan should also include recommendations on policy and legislation regarding water and related land uses. **Of primary importance is the emphasis on the role of the citizen in determining what solutions are the most desirable for accomplishing the selected plans.**

To achieve a management program that best serves all interests, we have followed a planning process which: (1) identifies problems; (2) develops alternative solutions; (3) determines the social, economical, and environmental effects of the solutions; and (4) develops a set of recommendations to offer to the planning agencies having responsibility for implementing regional and local programs.





In both the formulation and refining of a variety of potential solutions, you, the citizens of the study area, play a vital role by providing your views on the priority of needs and the solutions.

The comments and information you provide will aid us in determining what recommendations should be made to assist State and local agencies in their decision making and planning.

The Phase I Study

Phase I of the study investigated factors which affect the region's water and related land resources; and identified concerns, opportunities, and the constraints that could have a bearing on solutions to the problems. The Phase I studies were completed in the fall of 1973 and were presented to the public at eight meetings held at various locations throughout the study area.

Phase II

Using the information obtained from the Phase I study and from the public meetings, and subsequent public discussions, we have since been developing alternatives, or choices, for solving the problems identified in the first part of our study. This information booklet, Volume I, is the first of six which will serve to acquaint all interests with the problems and alternative solutions. This booklet presents the estimates of future population growth in the study area and discusses potential growth patterns upon which we have based our studies. The other information booklets will be:

- Vol. II—Wastewater—Water Quality Management
- Vol. III—Water Supply Management
- Vol. IV—Water Related Recreation
- Vol. V—Flood Control—Flood Plain Management
- Vol. VI—Water and Related Land Resources

Alternate Growth Potentials

A basic concept in our study is that water resources planning and land use planning are inseparable. Each is dependent on the other; one can dramatically affect the other.

The growth of an urban community is related to water resources planning in three ways: (1) water and sewer systems are basic municipal services that allow development to take place where it does; (2) if the growth pattern is uncertain, then water resource systems, i.e. water supply and sewer systems, must be designed to respond to the possibility of changing demands; or (3) if a desirable growth pattern is to be achieved, then water

resource planning and implementation must be used as tools to help accomplish the desired growth patterns.

An objective of our Phase I studies was to narrow the uncertainties regarding numbers of people (population), their location, and the densities of population (number of people per acre) in the seven-county study area. We found, however, that no agreement existed as to what a future Omaha-Council Bluffs metro area should look like.

We also found that several factors of the 1970's could influence the pattern of urban growth. For example:

- Energy shortages;
- Concern with urban sprawl;
- The desire to preserve open space and agricultural land;
- The Riverfront Development Program;
- Rising construction costs; and
- Unstable economic conditions

Perhaps an even more important and over-riding factor is the realization that the citizens of the study area should have a larger role in determining the future growth of their communities.

Citizens and planners are searching for the means to bring about a more desirable form of urban growth than currently exists. Water and sewer systems, flood control, and development of recreation opportunities must be used to accomplish whatever growth pattern is desired by you, the citizens of the region.

Where to Grow from Here?

When it became evident that growth is a prime factor in water resources planning it also became evident that it was necessary to study alternative growth potentials. Out of that study came four potential growth patterns for the Omaha-Council Bluffs metro area for the years 1995 and 2020. The selection of the four potential patterns was determined by: (1) an analysis of possible social and economic trends of the Nation and of the Midwest as applied to the study area; (2) an examination of alternative forms of future urban growth discussed in studies of other metropolitan areas with problems comparable to ours; and (3) by listening to the views and comments of local citizens, interested organizations, and planners concerning desired future goals.

Early in the planning process we engaged the services of Dana College at Blair, Nebraska to analyze the effects of various social and economic trends on land use the study area. Factors analyzed in the study included the effects of energy and natural resource shortages, changing family structures, birth and death statistics, industrial employment, transportation problems and needs, and other factors that influence the way people live.

The analysis by Dana College revealed that continuation of urban sprawl was most likely to occur, but also that two other patterns of growth were possible. In the Dana College study, the three possible patterns are identified as:

- "Super Industrial State" — continuation of sprawl where economic power structures determine land use;
- "Green Revolution" — characterized by a desire of citizens to live in smaller "satellite" communities in close proximity to Omaha and Council Bluffs; and
- "Restoration Society" — in which the older parts of the metro area are revitalized and urban sprawl is curbed.

An examination of published urban planning literature uncovered six future urban pattern possibilities for areas like the Omaha-Council Bluffs metro area. The six patterns are:

- Redevelopment of older urban areas;
- Unplanned sprawl around the edges of existing cities;
- Planned fringe growth;
- Satellite city growth within commuting range of existing metropolitan areas;
- Non-metropolitan growth beyond the commuting range of existing metropolitan areas; and
- Star-like growth, where development is spread in a strip-like fashion along transportation corridors.

The following comments are representative of the views of local citizens and planners:

- Many citizens would like to see urban growth controlled, citing as the main reasons the need to preserve farmland and a desire for more efficient public services.

The Metropolitan Area Planning Agency (MAPA), through its various programs, is seeking to redirect urban growth. MAPA's Riverfront Development Program is intended to pull growth and redevelopment back to inner-city riverfront areas as a means of reducing urban sprawl. In 1971 the MAPA Council of Elected Officials indicated a preference for planned suburban expansion coupled with increased emphasis on small city growth.

- MAPA, in its year 2000 transportation planning, is studying the two growth alternatives of sprawl and controlled higher density growth.

- Many smaller communities around Omaha have indicated a desire to grow and to attract industrial development; but at the same time they prefer to remain independent of metropolitan Omaha.
- Omaha's Planning Department is seeking to implement an urban expansion policy that would slow the rate of urban sprawl.

this land is your land.

The 4 Growth Concepts

The four growth concepts described herein resulted from a careful analysis of the foregoing concerns and desires expressed by citizens, city governments, and planners. The ultimate selection, however, should be made by you, the citizens of the Omaha-Council Bluffs metro area.

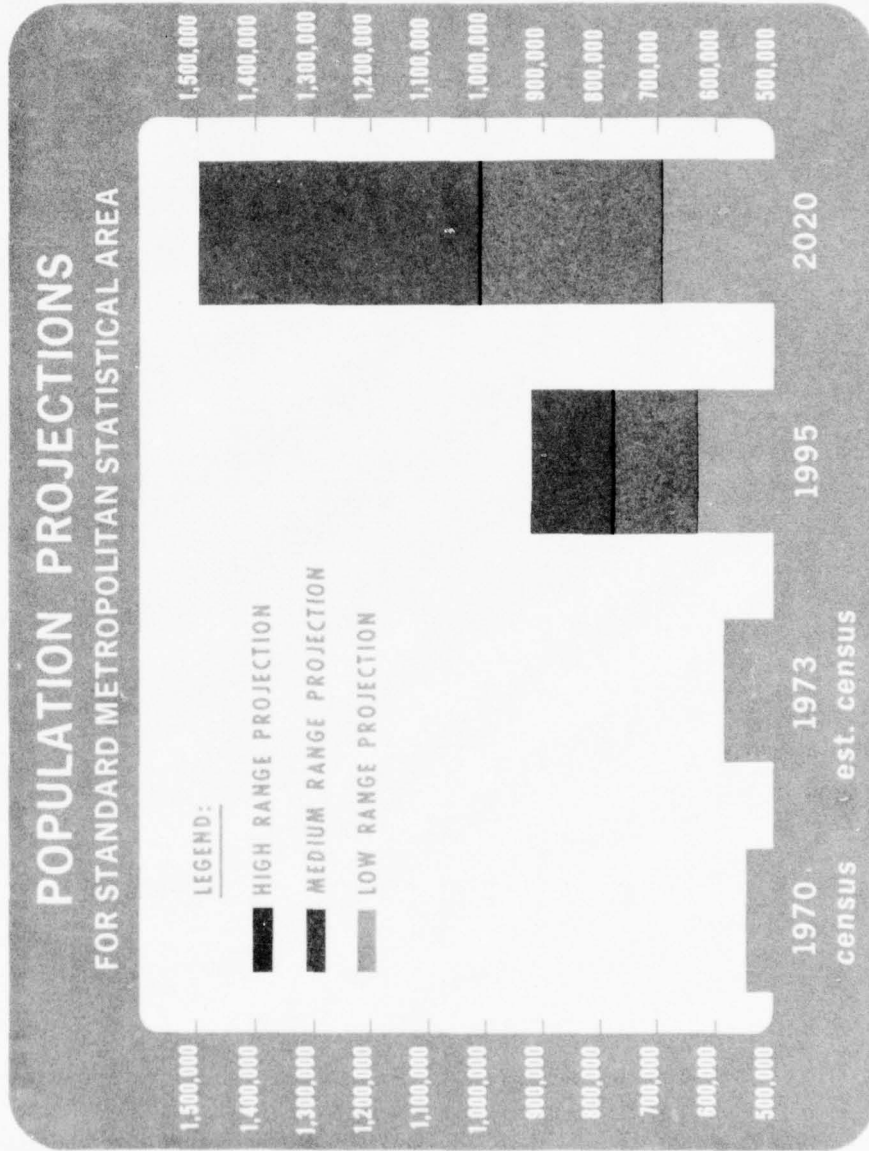
About Population Growth

Population studies and projections for the study area have generally determined that:

- Major population growth will continue in or near the presently urbanized portions of the study area.
- Rural areas will not experience major population changes but will probably

stabilize near current levels.

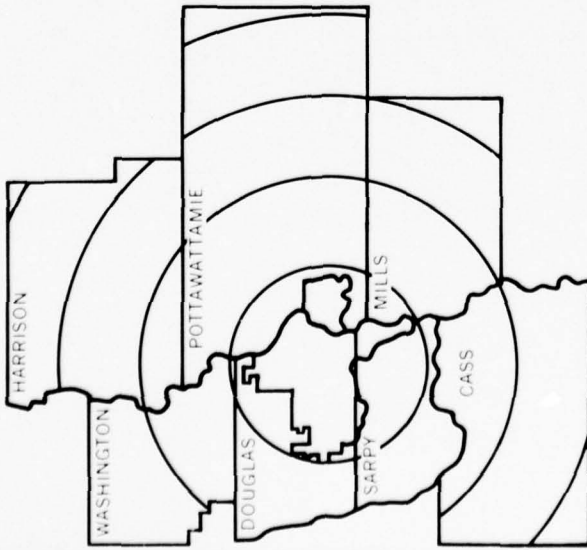
A wide variety of population projections exists for the urban area as depicted by the following graph. These projections are based on different assumptions as to how many people may move from other parts of the Nation to the study area.



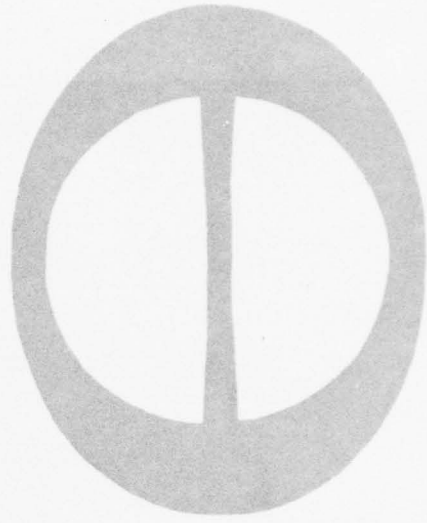
The Alternative Concepts

The maps presented on the following pages depict: (1) the existing land use patterns of the study area; (2) the four alternative growth concepts which represent the widest choice of possibilities; (3) the Riverfront Development Plan as envisioned by the Metropolitan Area Planning Agency; and (4) a composite of the four concepts for side-by-side comparison.

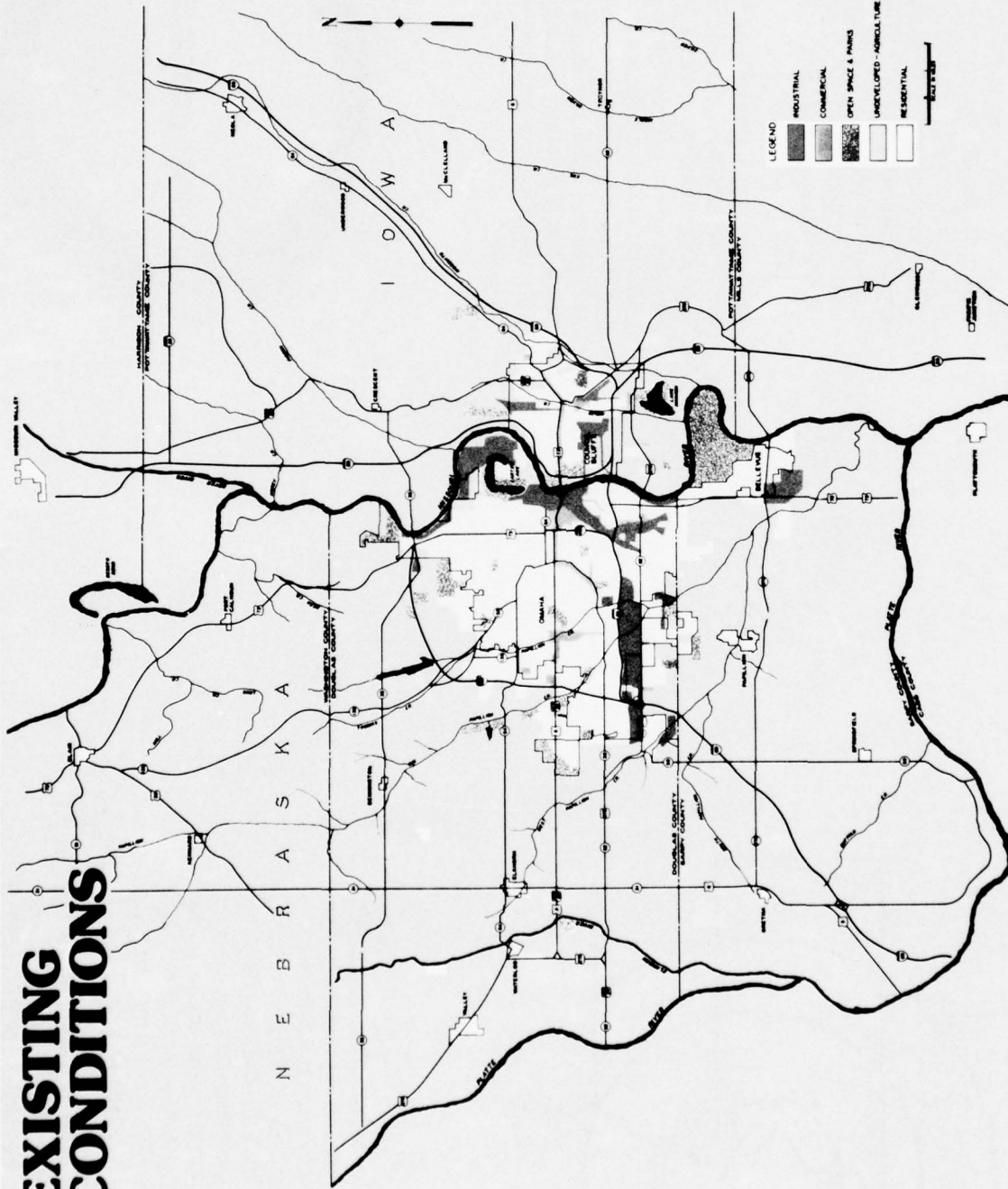
Accompanying each map is a brief description of the information displayed thereon. The four alternatives are not land use plans as such, rather they are concepts of what could occur with a given set of circumstances. It is highly probable that no one alternative, as portrayed, will materialize; it is more likely that a mix of patterns probably will emerge, with one of the four concepts serving as a nucleus.



The four growth concepts were developed using identical population projections. The seven-county study area population was estimated to reach about 900,000 by 1995 and 1,100,000 by 2020. It should be recognized the projections are not exact forecasts of the future; rather, the projections are estimated to occur somewhere between 1990-2000 and 2010-2030 respectively. In any case, planners should anticipate population growths greater than what may actually occur in order to obtain a degree of flexibility necessary to deal with the uncertainties of population growth.



EXISTING CONDITIONS



Existing Land Use

The Omaha-Council Bluffs metropolitan area is referred to as the Standard Metropolitan Statistical Area (SMSA) and encompasses Douglas and Sarpy Counties in Nebraska and Pottawattamie County in Iowa.

Prior to World War II, Omaha's growth was primarily north and south along the Missouri River, and Council Bluffs developed generally east and west along the main traffic arteries. Since World War II, development has occurred around the western fringe of Omaha and on the north and east of Council Bluffs, following development of major highways in these areas.

Further improvements in the transportation system, particularly the interstate system, have caused urban sprawl to grow rapidly south and west of Omaha. Council Bluffs' growth to the south and farther to the east has also been due to the development of the interstate system.

Douglas County

The largest concentration of population in Douglas County is in the southeast portion of the county, in and surrounding the city of Omaha.

In 1915, the City of Omaha was bounded on three sides by the first circle of small towns. With Florence, Benson, Dundee, and South Omaha all adjoining Omaha, the City faced the possibility of no future expansion. As a result of a popular vote for consolidation by area residents, South Omaha and Dundee were annexed in 1915, and in 1917 Benson and Florence became part of the City. These annexations increased Omaha's total land area to 34.6 square miles.

From 1918 through 1949 the rate of develop-

ment declined, except for a two year period from 1925 to 1927 when the City completed eight annexations containing over 830 acres west and southwest of Omaha. The rate again rose, however, as a result of the post-WW II housing boom. From 1951 to 1956 the City annexed 15 large areas which added over 7.6 square miles to the City's land area, bringing Omaha's total size to 45.6 square miles and the population to 260,000.

Since 1956 Omaha has completed over 200 separate annexations. These annexations ranged in size from single lots to tracts as large as 3.1 square miles.

These annexations have been predominately west and southwest in direction, and have moved Omaha's western boundary from east of 72nd Street in 1956, to its present location at 156th Street.

Although the annexed areas are primarily residential, containing a population of 80,000 people, they also contain considerable commercial and industrial development. Commercial and industrial development kept pace with expansion through corridors along major thoroughfares and railroads from the Missouri River west to Interstate 680 and beyond, both in the north and south portions of the City.

Numerous residential developments currently exist around the fringe of metropolitan Omaha. Services for these developments are provided by Sanitary and Improvement Districts (SID's). Establishment of the SID's has been the prime factor in the growth of Omaha since the late 1940's.

During the period of accelerated westward growth, the central part of Omaha has been

losing housing units at a rate of approximately 2.5 percent annually, while housing units in the balance of the city increased at a rate of 2.4 percent annually.

Sarpy County

The City of Bellevue, Offutt Air Force Base, and Capehart, located along the Missouri River, make up the major centers of population in Sarpy County.

The cities of Papillion and LaVista, located in northcentral Sarpy County, comprise another major concentration of urban population, with the cities of Gretna and Springfield in the western part of the county adding to the urban population.

Since 1940, Sarpy County has experienced the most rapid rate of growth of the three SMSA counties and is one of the Nation's fastest growing counties.

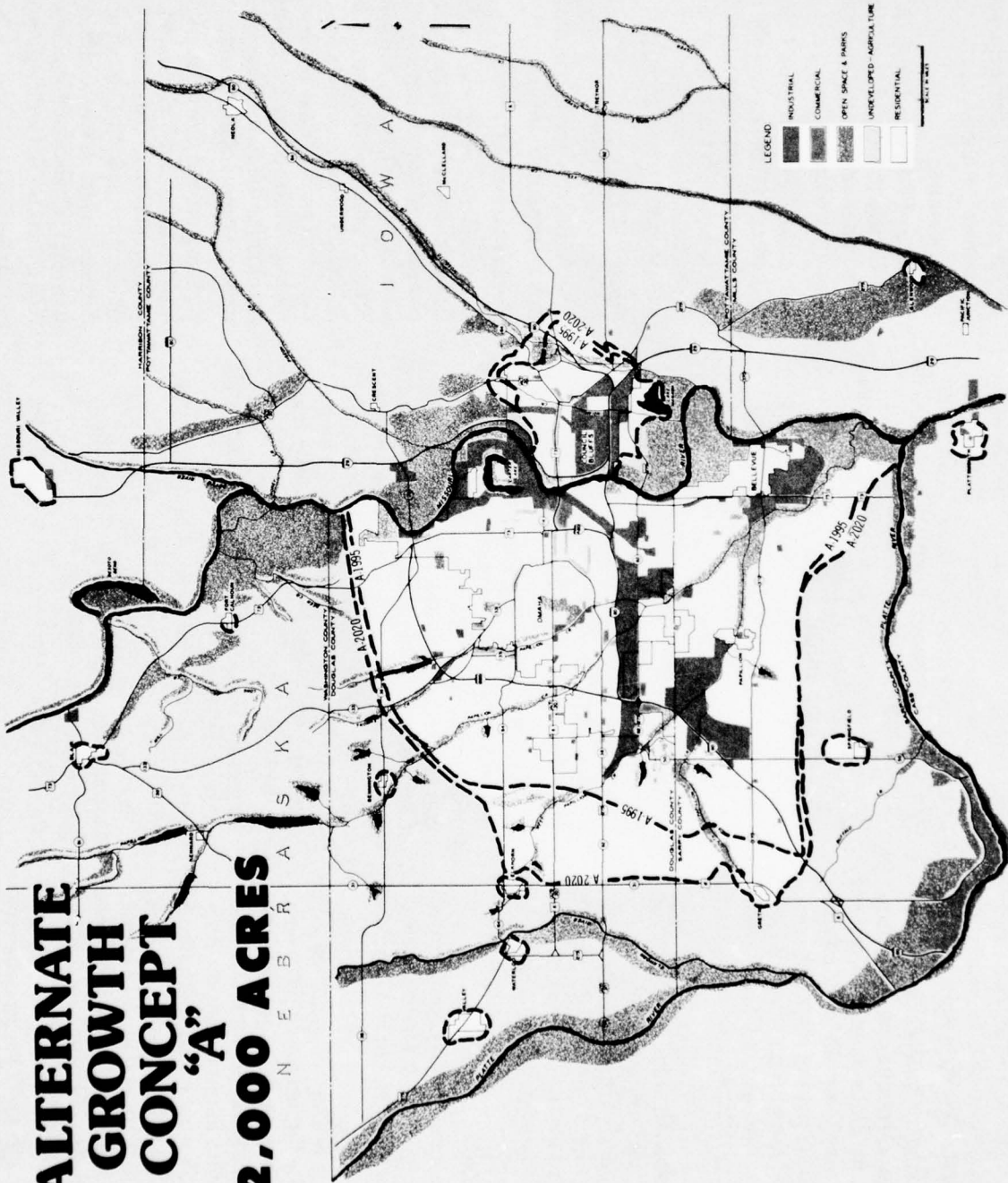
Pottawattamie County

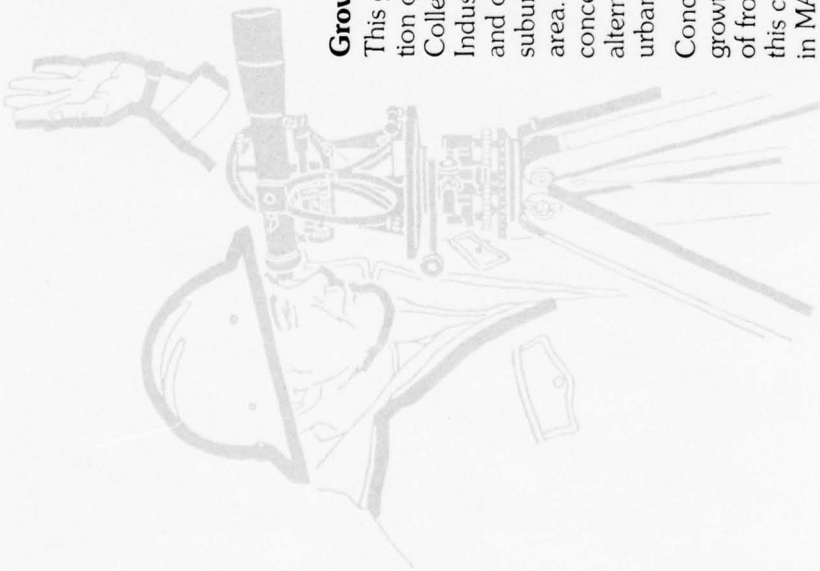
Council Bluffs, along with Carter Lake and Crescent, Iowa account for the largest concentration of population in Pottawattamie County. Minden, Neola, Underwood, and Treynor comprise the second largest concentration of people in the county. A linear belt of six smaller cities between Walnut and Macedonia in eastern Pottawattamie County account for the remaining population of the eastern portion of the county.

Washington and Cass Counties in Nebraska, and Harrison and Mills Counties in Iowa, are predominately rural in nature and have smaller populations. Growth in these four counties, which are now part of the SMSA, has been relatively stable, and available projections do not indicate major increases in population.

**ALTERNATE
GROWTH
CONCEPT
"A"**

72,000 ACRES





Growth Concept A

This growth concept represents a continuation of present trends in land use. Dana College characterized this concept as a "Super Industrial State" wherein political, economic, and other forces encourage continued suburbanization of the Omaha-Council Bluffs area. In the absence of a growth policy, this concept is the "most-likely-to-happen" growth alternative, with a continuing decay of the urban core.

Concept A is characterized by low density growth, with residential development density of from 1 to 9 persons per acre. To develop this concept the population allocations used in MAPA's 1995 transportation plan were duplicated and extended to indicate what the growth pattern would look like in 1995 and 2020.

Concept A's urban sprawl pattern is a compromise between the MAPA Comprehensive Land Use Plan adopted in 1971 and the Metropolitan Utility District's land use plan for water supply master planning developed in 1972. The MAPA plan estimated a density slightly lower than Concept A whereas the latter plan estimated slightly higher densities.

This concept may be the most inefficient growth pattern where the use of land and the provision of public services are concerned. Residential, commercial, and industrial land required under Concept A would total about 72,000 additional acres by the year 2020. Most of this land is presently being used for agricultural production.

The public utilities and services such as water, sewer, gas, electricity, telephone, and transportation needed to serve this urban sprawl pattern would entail major public expenditures. Differences in the approximate costs of public services for the four growth concepts are compared in the table at the back of this booklet.

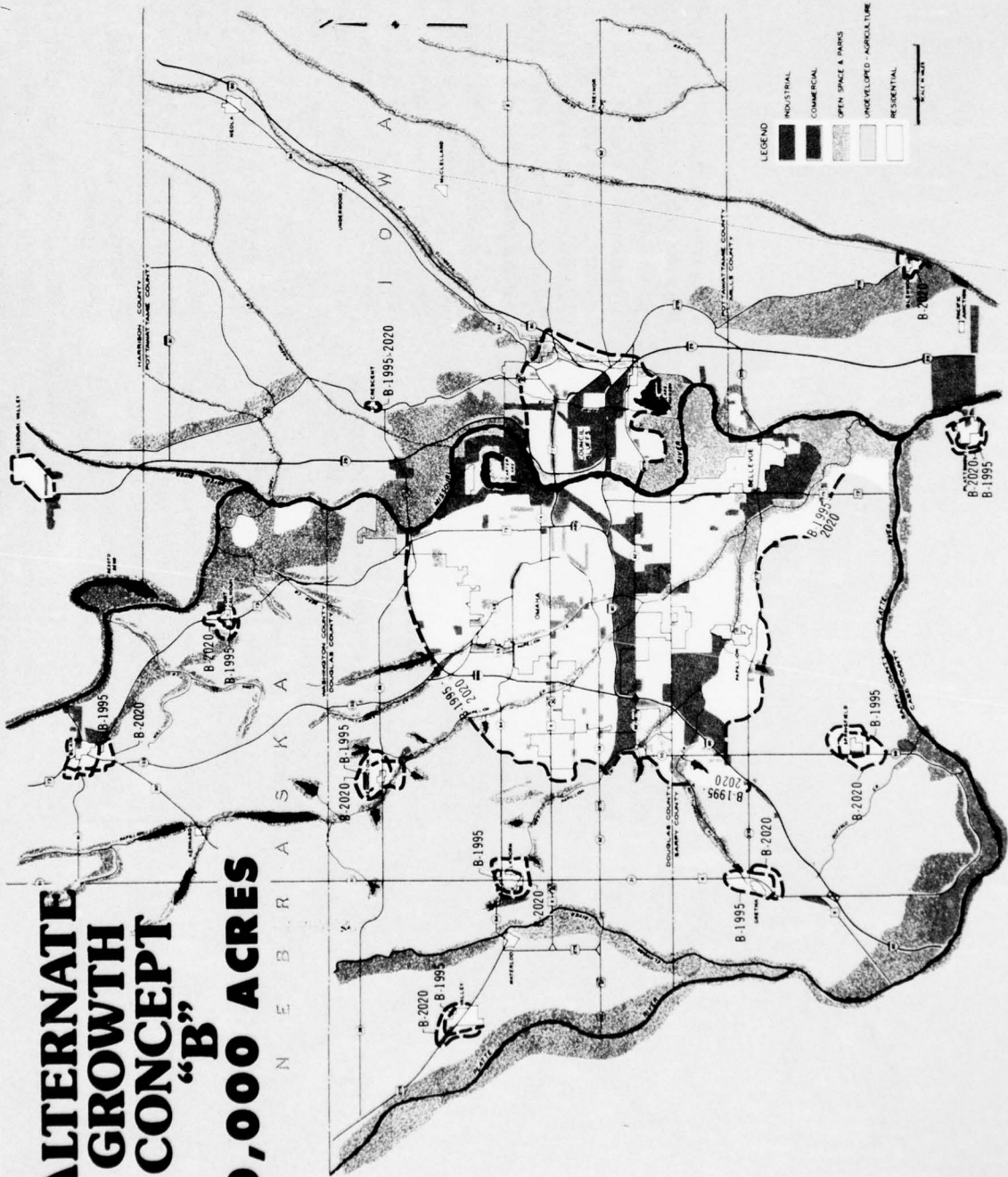
For many, Concept A represents the "American dream" of having a house on a lot large enough to afford some privacy. The growth pattern can be "planned" so that it may develop in an orderly fashion in contrast to the haphazard "leap-frogging" of today's urban growth.

With Concept A, the Riverfront Development Program's goal of redirecting growth to the inner city is assumed to fail.

ALTERNATE GROWTH CONCEPT "B"

30,000 ACRES

N E B R A S K A



POPULATION PROJECTIONS CONCEPT B

	Rural Cities		Satellite Cities	
	1974	2020	2020	2020
City	1,974	2020	2020	2020
Suburb	1,595	3,325	6,000	6,000
Springfield	795	7,093	25,000	25,000
Gretna	1,557	13,208	35,000	35,000
Elkhorn	1,184	3,819	22,500	22,500
Blair	6,106	10,393	30,000	30,000
Ft. Calhoun	642	1,708	8,000	8,000
Bennington	683	3,144	22,500	22,500
Plattsmouth	6,371	8,057	20,000	20,000
Glenwood	4,421	6,312	10,000	10,000
Missouri Valley	3,519	6,059	10,000	10,000

Growth Concept B

Concept B envisions controlled expansion of urban Omaha, with emphasis placed on encouraging higher density residential development, revitalizing the urban core, and developing satellite cities based on existing communities located around the fringes of the metropolitan area.

The Dana College report described this growth alternative as the "Green Revolution". Small cities, and possibly some new communities, separated by open country from metropolitan Omaha, would characterize this concept.

For growth in and connecting to metropolitan Omaha, population densities of from 10 to 15 people per acre were used. In contrast, growth in the satellite communities and new towns was considered to be at a planned high density of 30 persons per acre.

A satellite city is one which is self-sufficient, with adequate economic activity to provide job opportunities. In Concept B, the communities of Blair, Ft. Calhoun, Bennington, Elkhorn, Gretna, Springfield, and Plattsmouth, Nebraska, and Missouri Valley and Glenwood in Iowa are envisioned as satellite communities. Population projections for these "satellites" are shown in the accompanying table. The Riverfront Development Program's "New Towns" are incorporated in Concept B. This growth pattern assumes substantial redevelopment of older sections of Omaha-Council Bluffs, which is a goal of the Riverfront's "New Towns-In-Town" concept. The additional Riverfront satellite New Towns and their locations are: (1) Deer Creek located southeast of Fort Calhoun, Nebraska; and (2) East of Bellevue located on the Iowa side of the Missouri River opposite Bellevue, Nebraska. A relatively low population of 7,000 was assigned to each of the New Town sites. Concept B is attractive for a number of reasons. The first, if Concept B were to develop with the population densities discussed previously, additional land required for urban development to the year 2020 would be less than half the 72,000 acres required for Concept A.

Second, existing small communities close to Omaha could grow while having their own industry for a tax base and at the same time remain independent of Omaha.

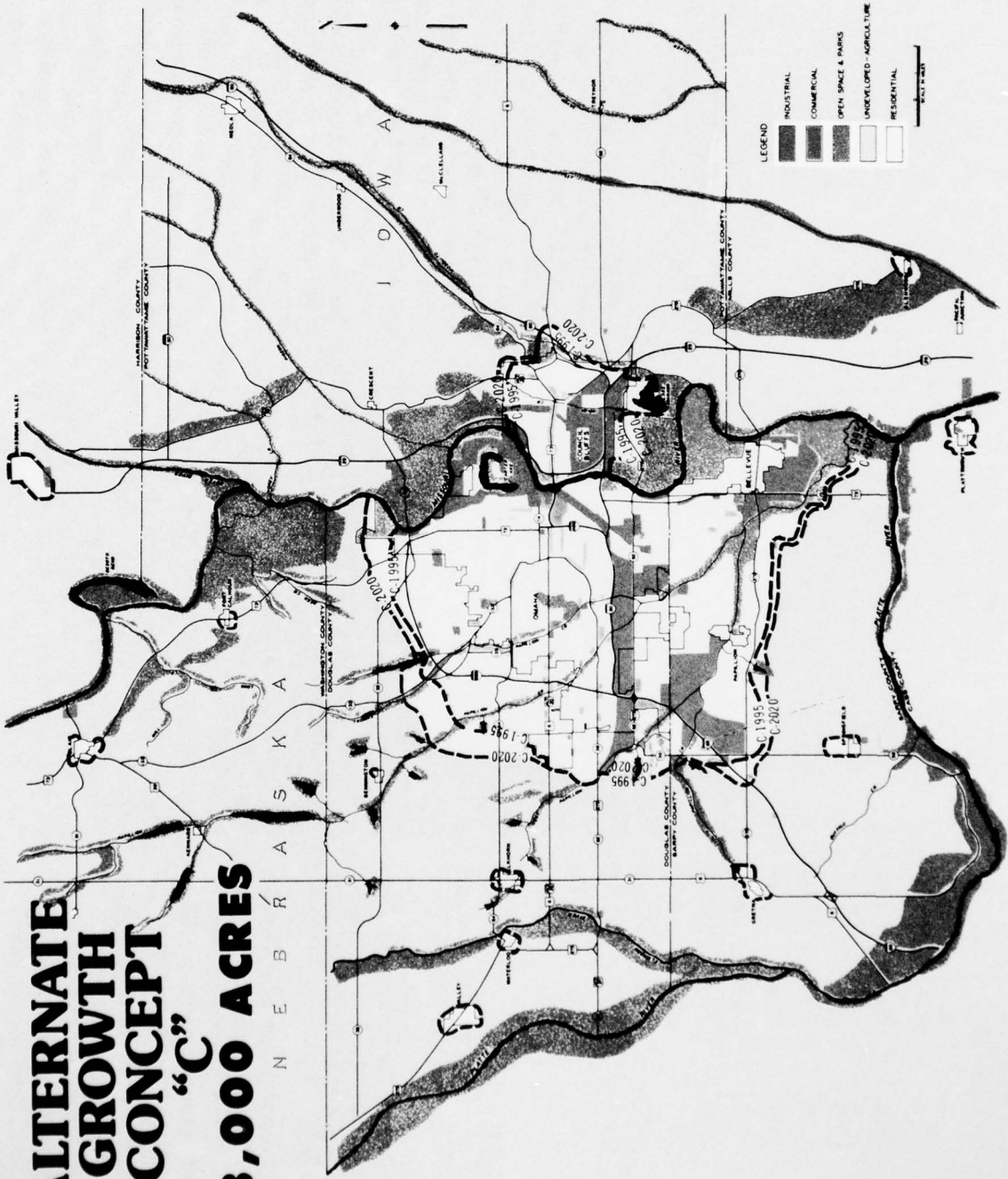
A third advantage of Concept B is the potential for reduction in transportation costs. If satellite cities were self-sustaining with regard to employment, great numbers of workers would not have to travel 10 to 15 miles to their jobs. Even if the satellites were not self-sustaining, the compact nature of the satellites concept may make mass transit to and from metropolitan Omaha more feasible.

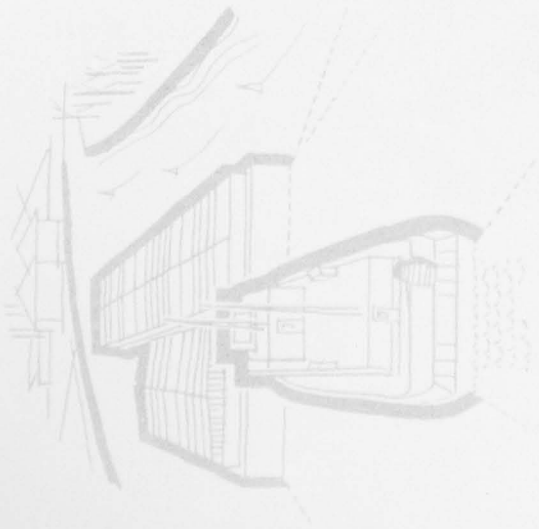
The satellite cities concept would be difficult to implement. The growth of Omaha would have to be curbed; industrial employment opportunities would have to be directed toward the satellite cities. Most of the smaller communities are presently not prepared to accommodate the growth envisioned. New Towns would require the establishment of governmental structures and the construction of all of the facilities needed to provide total services to a community. The problems associated with the construction of a New Town would not be insurmountable, but they would pose numerous difficulties.

ALTERNATE GROWTH CONCEPT "C"

43,000 ACRES

N E B R A S K A





Growth Concept C

Concept C is similar to Concept B but it does not include the satellite cities. Dana College described this concept as the "Restoration Society"; it is characterized by redevelopment of the older areas of Omaha and Council Bluffs coupled with higher-density growth on the urban fringes. The urban area would be more compact than under Concept A. New and redeveloped areas under Concept C were projected at double the density of Concept A.

Concept C includes the New Town-In-Town segment of the Riverfront Development Program. But the Satellite New Towns of Deer Creek, Nebraska and East Bellevue, Iowa are not included. Existing smaller communities are assumed to grow at a rate projected by local and State agencies. A growth pattern similar to Concept C is being studied as an alternative to urban sprawl in MAPA's Transportation Planning for the year 2000.

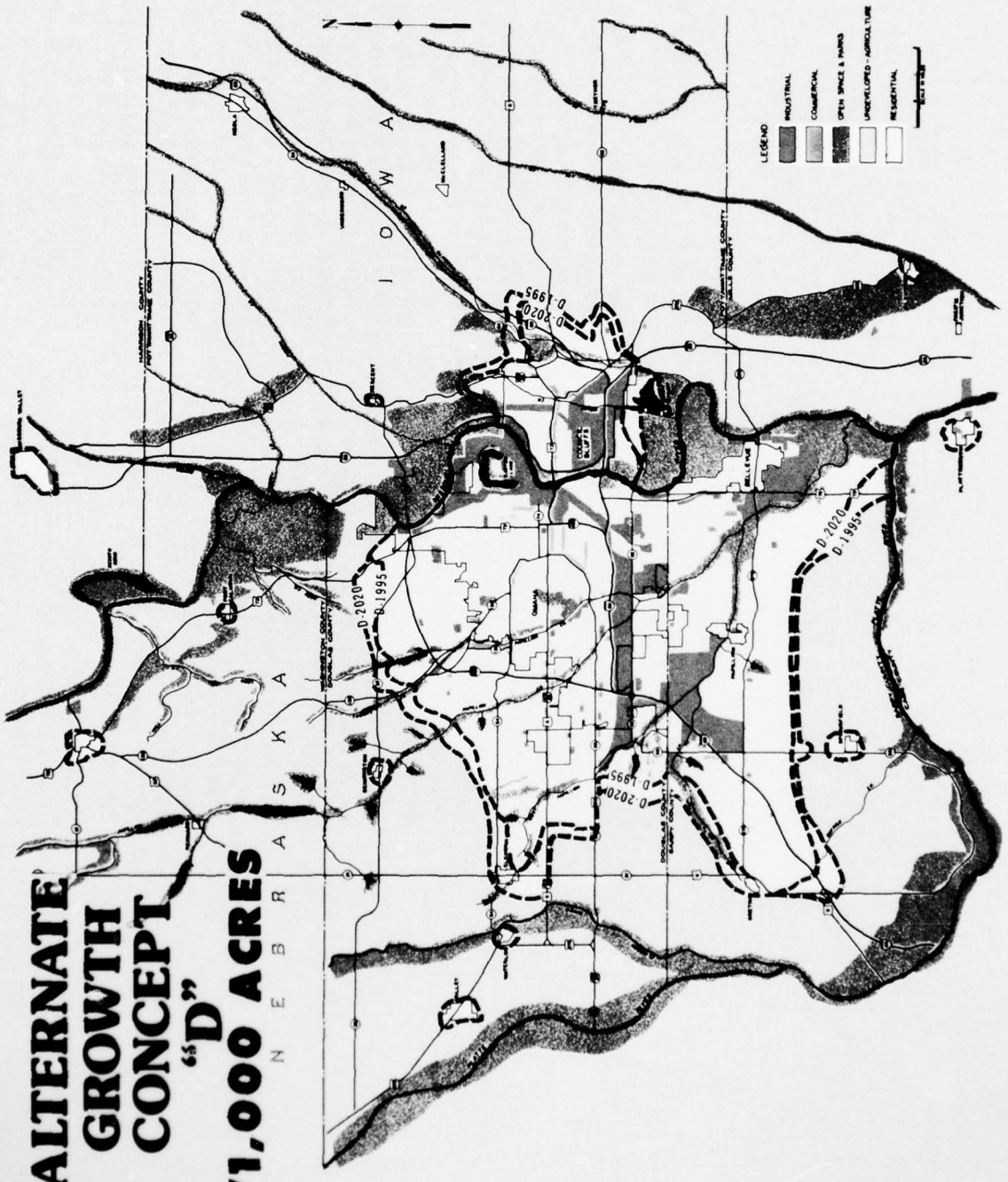
Additional land required for urban use would be on the order of 43,000 acres by 2020. Development would be more compact, thus public services could be provided to more

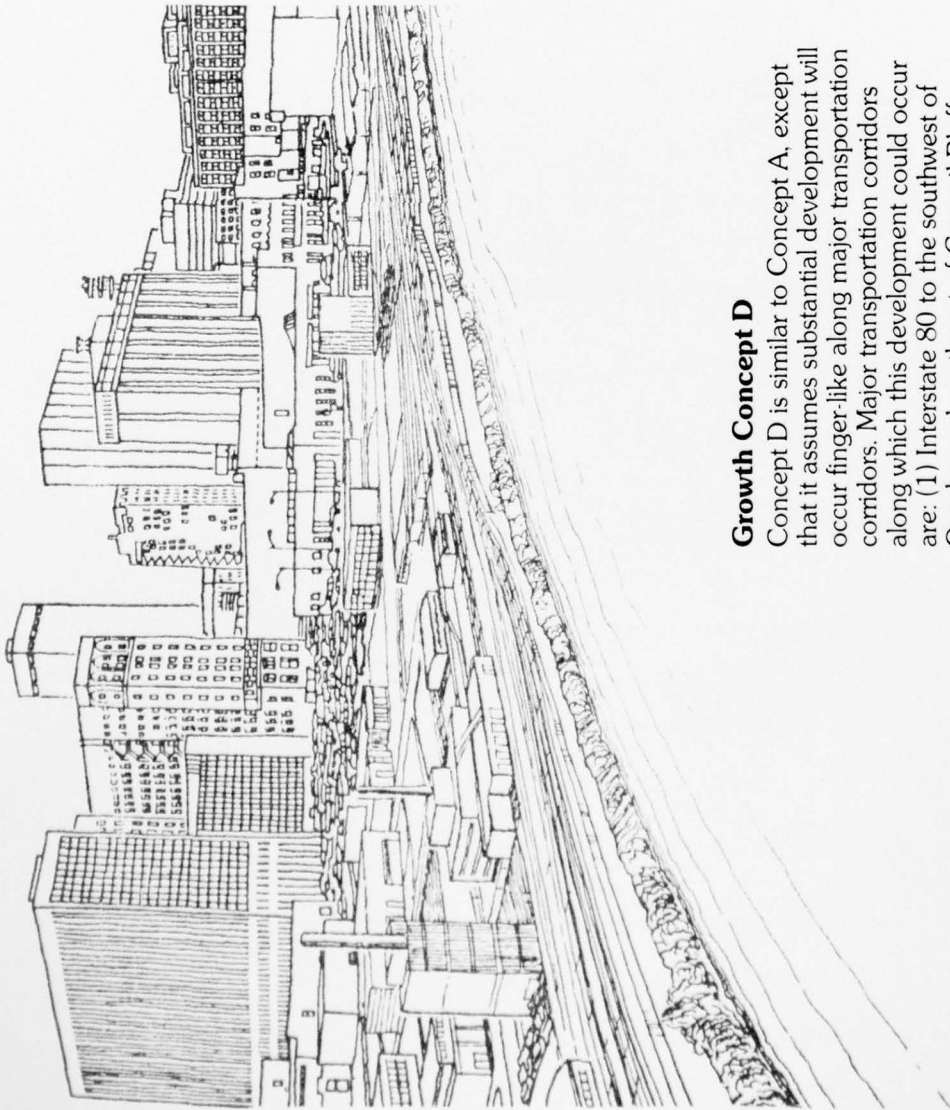
people at less expense. Fewer miles of streets and utility lines would be required.

This concept reflects a potential for energy conservation. With development confined to a more compact area, the distances to work and to shopping areas would be considerably less. And, since such trips are made daily, the savings in energy resources over a period of time could be significant. The higher density of population would make mass transit more practical. It is estimated that Concept C could save at least \$9,000,000 a year in transportation costs as compared with Concept A. A higher density population would mean some loss of individual privacy. Although the Omaha-Council Bluffs Metro area would see more use made of cluster, condominium, and apartment housing, proper planning and design could assure a reasonable degree of privacy.

While the total amount of air pollutants would decrease under Concept C (less dependence on individual transportation), the concentrations of pollutants in multi-dwelling neighborhoods would increase due to a higher concentration of activity.

**ALTERNATE
GROWTH
CONCEPT
"D"**
NEBRASKA
71,000 ACRES





Growth Concept D

Concept D is similar to Concept A, except that it assumes substantial development will occur finger-like along major transportation corridors. Major transportation corridors along which this development could occur are: (1) Interstate 80 to the southwest of Omaha and northeast of Council Bluffs; (2) the proposed Omaha-Fremont freeway to the northwest of Omaha; and (3) the Kennedy Freeway and the planned Highway 73-75 expressway to the south of Omaha.

Because Concept D envisions a sprawl pattern, population densities used in develop-

ing it were similar to those used in Concept A. Additional land required for urban use is estimated to total 71,000 acres by the year 2020. Most of the beneficial and adverse characteristics attributed to Concept A apply also to Concept D. Public service costs and efficiency are almost identical to Concept A. The one difference would be in transportation systems. Since people would live closer to major transportation arteries, ease of access would be available. Also, the possibility of developing a mass transit system may be increased due to the higher density of population along the corridors.

The Riverfront Development Program

The Omaha Riverfront Development Program (RDP) focuses on the planning and development of projects adjacent to the Missouri River.

The general objectives of the RDP are to:

- Inhibit urban sprawl;
- Revitalize and redevelop the central "core" areas of Omaha and Council Bluffs;
- Take advantage of the unique environmental and developmental potentials of the riverfront.

While the RDP covers elements ranging from transportation to human resources, the main concern here is in land use and the impact the RDP would have on the future growth patterns of the Omaha-Council Bluffs metro area.

The Riverfront Land Use Plan shown here combines local, regional, and RDP land-use plans for lands bordering the Missouri River. Major elements of the land-use plan include industrial, commercial, residential, open space, and park areas.

Industrial areas, shown in red on the plan, were developed from local master plans, from the RDP report on Industrial Parks, from Industrial Development Committees of local Chambers of Commerce, and from comments of local officials. Some of the areas indicated in rural counties are general areas where industrial development is desired. The Industrial areas range in size from 24 acres to the Omaha Industrial Foundation's Riverfront Industrial Park of 273 acres.

The major commercial development in the Riverfront Land Use Plan is in the central business districts of Omaha and Council Bluffs. Both cities have undertaken these development projects to strengthen their downtown areas.

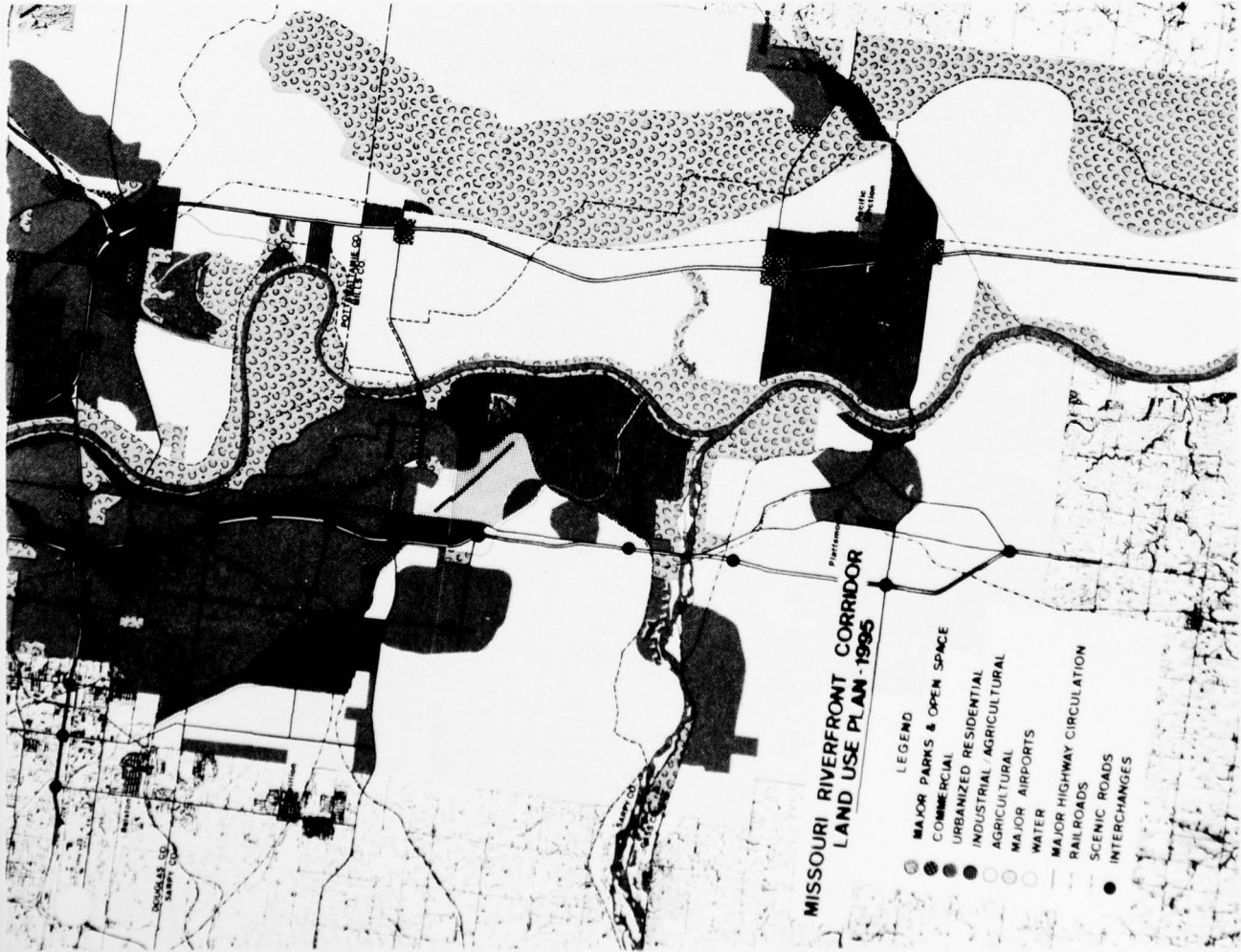


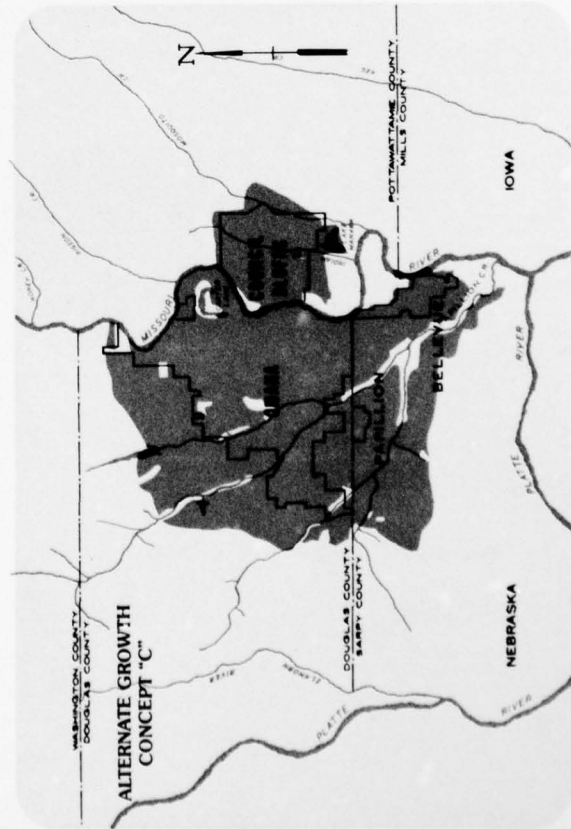
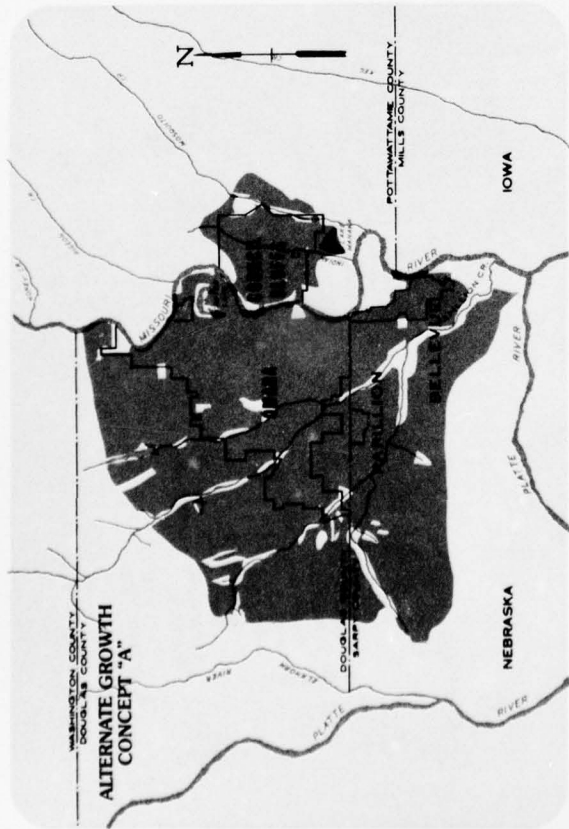
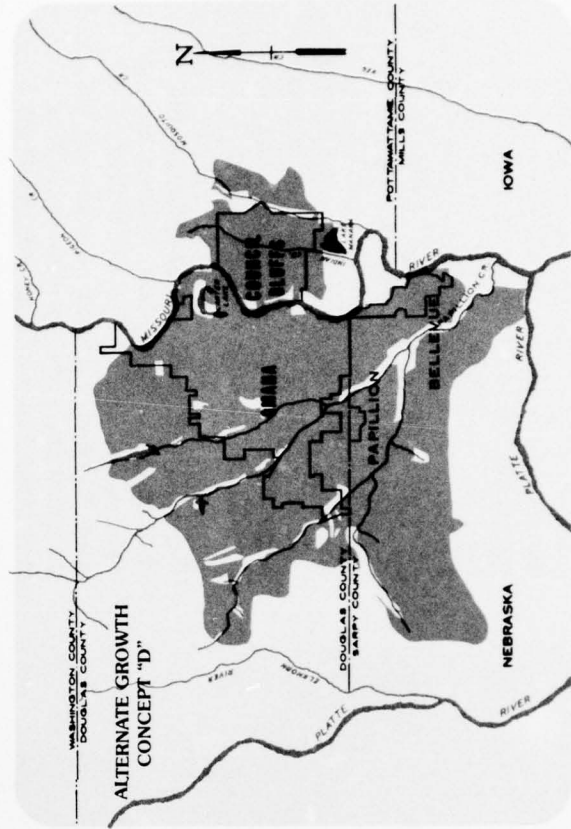
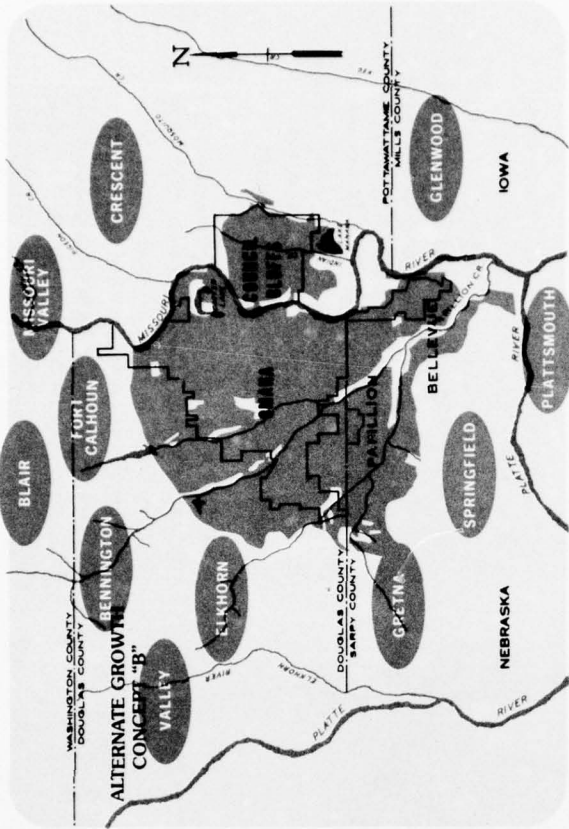
The RDP also desires to increase residential densities in the older parts of the cities near the riverfront. The Riverfront Program has designated redevelopment areas as New Towns-In-Town. The other type of residential development is designated as Satellite New Towns. Three Satellite New Towns are envisioned; one east of Ft. Calhoun in Washington County, a second east of Bellevue in Mills County, Iowa and a third in the southwestern corner of Council Bluffs between Lake Manawa and the Missouri River.

The open space and parks elements of the RDP Land Use Plan, shown in green, include a variety of parks, natural, and open space areas. A prominent feature that has gained strong support is the preservation, in their natural state, of the woodlands and bluffs bordering the Missouri River flood plain.

The discussions presented with Concepts A, B, C, and D give an indication of the Riverfront Development Program's role in the growth pattern potentials of the Omaha-Council Bluffs metro area. Growth concepts A and D do not include the RDP concepts. Concepts B and C, on the other hand, assume the RDP to be a success and include the New Towns-In-Town. In addition, Concept B includes the Satellite City New Towns.

Most of the industrial, parks, and open space proposals for the Riverfront Program have been included in all four growth concepts. The Riverfront Development represents a planning program of major magnitude and possibly a development program that could affect regional land use in the metro area.





EFFECTS OF ALTERNATIVE GROWTH CONCEPTS

	Concept A		Concept B		Concept C		Concept D	
	1995	2020	1995	2020	1995	2020	1995	2020
Urban Land Required (Acres)	49,000	72,000	22,000	30,000	29,000	43,000	45,000	71,000
LAND								
PUBLIC COSTS¹ (All Costs in Millions)								
Utility Costs	113.4	175.0	97.5	142.0	90.0	136.0	117.6	176.0
Water Lines ²	56.0	91.0	45.0	64.0	41.0	62.0	54.0	83.0
Sewer Drainage	84.8	135.5	67.5	99.8	62.0	98.8	80.9	134.7
Gas Lines ³	8.7	13.8	7.0	10.5	6.5	10.4	8.3	13.8
Electricity ³	25.0	33.7	19.0	31.7	17.0	30.3	21.7	34.3
Telephone	14.9	23.7	9.7	20.0	12.9	20.0	14.4	23.6
Streets and Roads ⁴	205.8	328.6	175.3	266.8	165.0	264.4	199.7	327.6
Residential Construction	2,200.0	3,507.0	1,884.0	2,855.0	1,791.0	2,840.0	2,126.0	3,491.0

1. Capital costs to service population at 1995 and 2020 estimates.

2. Does not include water and sewage treatment costs which are relatively equal for the four concepts.

3. Distribution costs only.

4. Does not include major arterials such as expressways, interstates, etc.

ENVIRONMENTAL EFFECTS

	Concept A	Concept B	Concept C	Concept D
Air Pollution	Total amt increases with increased sprawl due to dependence on auto. Concentration in any one area decreases due to low concentration of activities.	Similar to C.	Total amt decreases with increased density due to less travel time and distance. Concentration in particular area may increase due to increased concentration of activities.	Similar to A.
Water Pollution (Erosion)	Greatest amt due to largest percentage of disturbed soils.	Similar to C.	Substantially less than A due to differences in developed acres.	Similar to A.
Noise Pollution	Higher transportation activity, however, noise is diffused over larger area. Decrease in neighborhood noise.	Planned buffers and dwelling location can isolate traffic noise. Traffic on arterials less subject to stop and go motion. Increase in interior noise levels due to multi-family units less adequately constructed.	Higher density causes concentrated traffic flows. Noise sensitive land uses should be located along quiet side streets. Interior noise similar to B.	Traffic noise mitigation likely unless dwelling adequately buffered.
Resource	Greatest water use due to effort to keep lawns green. Single family units greatest user of natural gas and electricity. Higher gasoline use due to distances traveled and infeasibility of mass transit for all residential areas.	Water use similar to C. Gas and electricity use similar to C. Good potential for mass transit results in decreased gasoline consumption.	Lowest water use due to decreased lot size and increased multi-family units. Lowest user of gas and electricity. Greatest potential for mass transit.	Water, gas, and electricity use similar to A. Potential for mass transit along transportation corridors could reduce gasoline consumption.

THE CORPS ROLE

Land use planning is a local responsibility. The Corps of Engineers' role in the Metropolitan Omaha-Council Bluffs water and related land resource management study is to organize ideas about growth and resource use and management, to evaluate impacts, and to present this information to area residents for their decisions. Through the use of these four alternative growth concepts, water resource systems

sensitivity to changing growth conditions can be determined. Once this sensitivity is determined, water resources systems can be planned and implemented to provide a flexible response to growth.

The implementation of water and sewer lines and flood protection measures can and do influence the growth of a community much in the same way as do transportation systems. These services can be used as tools to help

guide, in combination with zoning and other measures, the growth destiny of Omaha and Council Bluffs.

It is therefore important that we know the citizen's preferences toward future growth so that water resources systems can be in harmony with these preferences.

THE CITIZENS ROLE

Public participation is an important element in any water or land resources planning effort. The ultimate shape of an urban community should be the citizen's decision. Planners can assist with technical data and in determining impact; but they cannot and should not decide what is best for the community.

This booklet presents four growth concepts for your consideration. Water and related land resources plan will be presented in future

booklets. Your preference for one or more of the growth concepts and for a compatible water and related land resource management plan will be of great assistance to the agencies listed in the first part of this booklet. All these agencies have responsibilities for programs that in one way or another influence the growth pattern of Omaha-Council Bluffs. The majority of these agencies are required by law to solicit and be responsive to your

views and attitudes.

We urge you to express your preferences. Comments may be addressed to or additional information may be obtained from: Regional Planning Branch Omaha District, U.S. Army Corps of Engineers, 6014 U.S. Post Office & Court House, 215 North 17th Street, Omaha, Nebraska 68102.

SUMMARY OF GROWTH PATTERN EFFECTS

The side-by-side comparison of the four growth concepts and the table on the preceding pages are furnished to aid you in expressing your preferences and opinions. The water and sewer costs were developed in the Corps' study. Other costs were

determined by applying cost data, contained in a document entitled, "The Costs of Sprawl", to the four growth concepts. This document was developed for the Council on Environmental Quality, the Department of Housing and Urban Development, and the Environ-

mental Protection Agency.

These costs are only rough approximations. They do, however, provide some indication of the public costs differences associated with each growth concept.

OMAHA DISTRICT
REGIONAL PLANNING BRANCH
U. S. ARMY CORPS OF ENGINEERS
6014 U. S. POST OFFICE & COURT HOUSE,
215 NORTH 17th STREET,
OMAHA, NEBRASKA 68102

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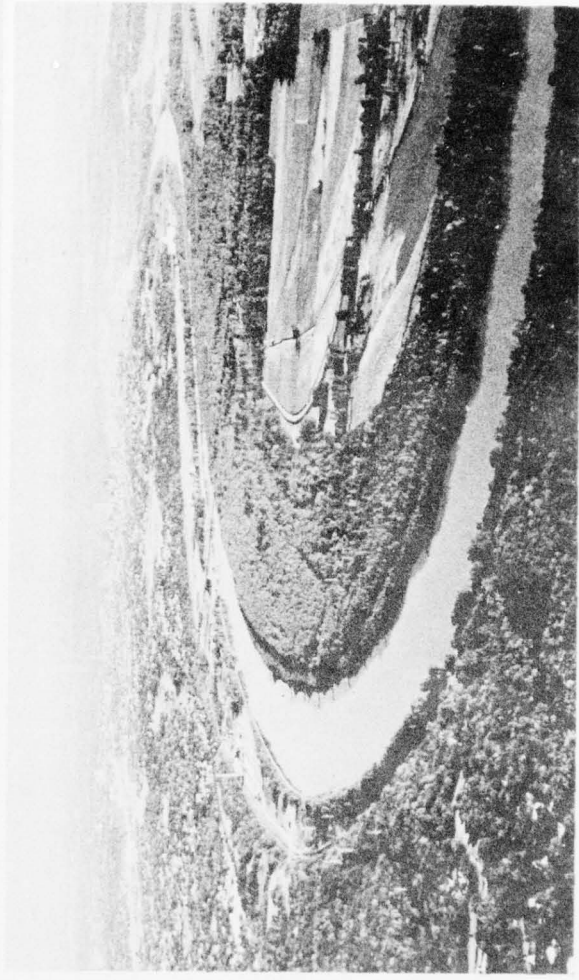


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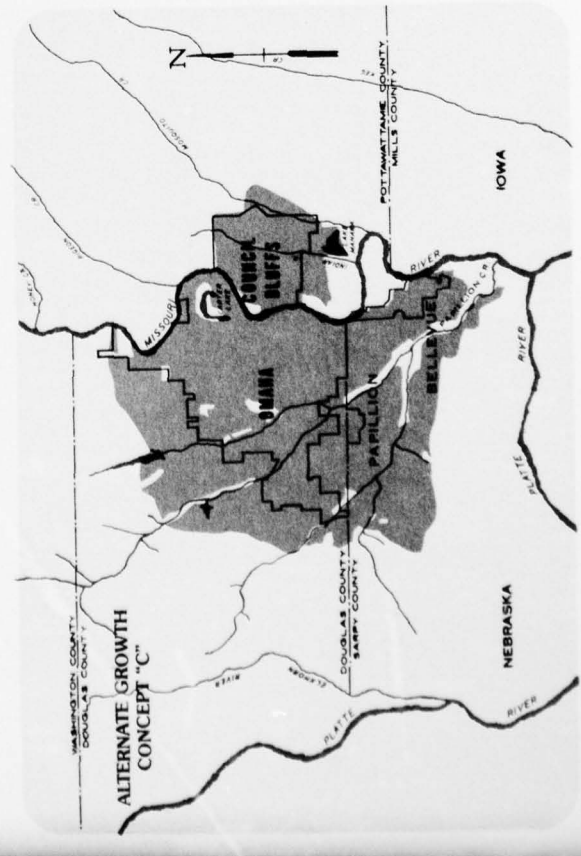
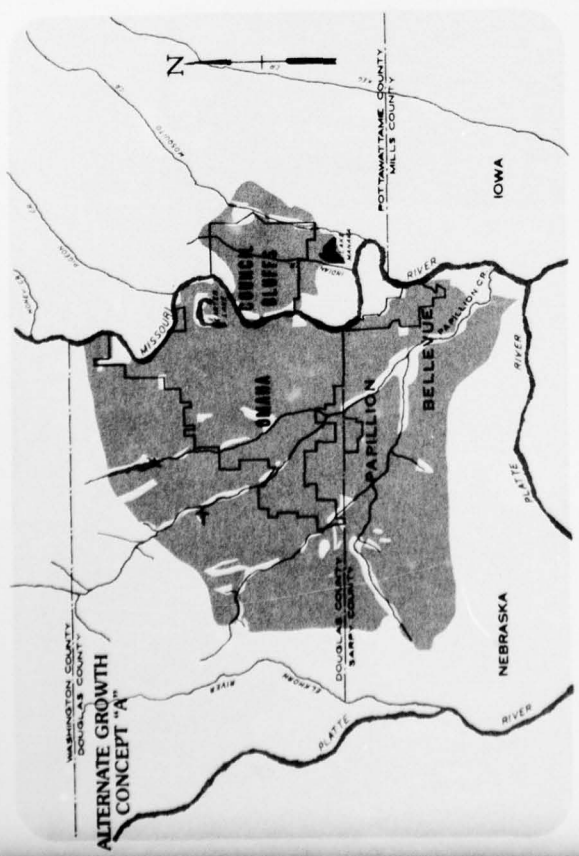
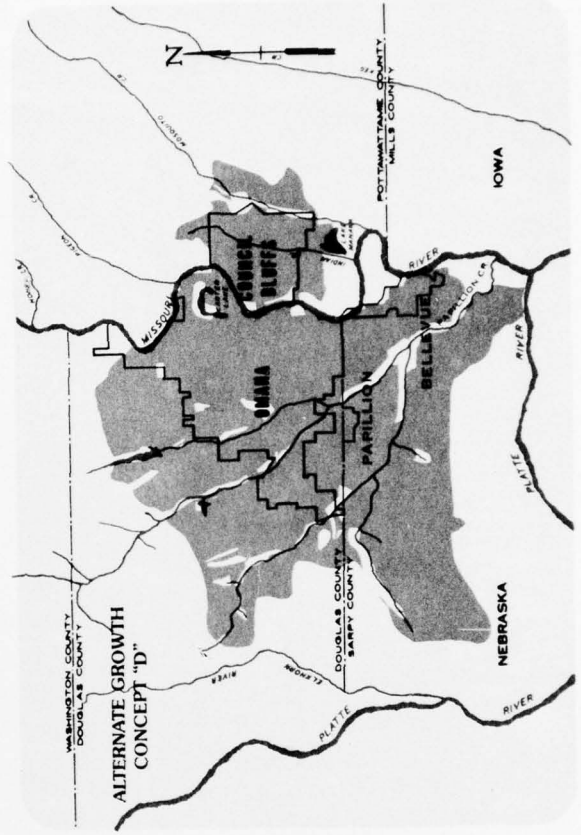
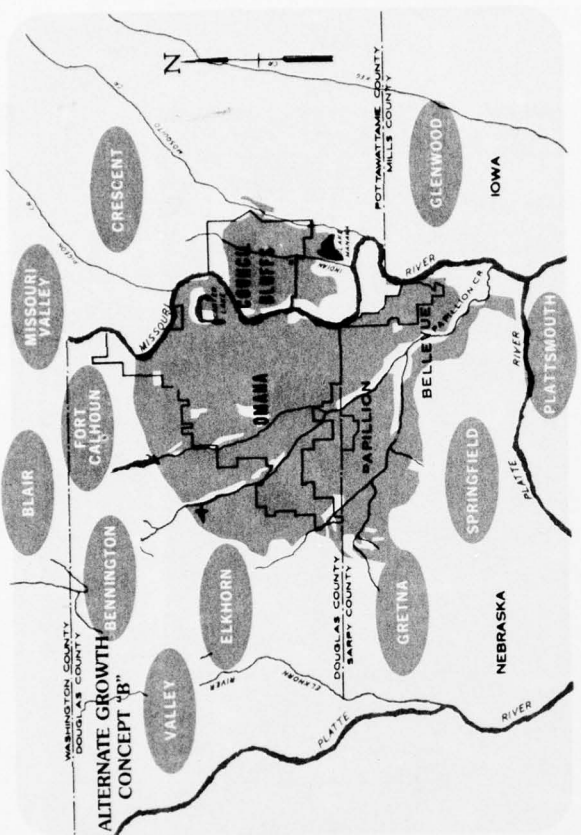


FLOOD CONTROL -- FLOOD PLAIN MANAGEMENT - VOLUME V

Water resources management alternatives for the Omaha - Council Bluffs area



This land is your land



WHAT IS AN URBAN STUDY?

The intent of the Corps of Engineers' Urban Studies Program is to provide an integrated approach to local water and related land resources management needs consistent with State and Federal requirements and compatible with the comprehensive development goals of the region.

The Omaha Council Bluffs study region consists of Washington, Douglas, Sarpy, and Cass Counties in Nebraska, and Harrison, Pottawattamie, and Mills Counties in Iowa, with particular emphasis given to the metropolitan areas.

The study is being coordinated with the:

- Cities of Omaha, Council Bluffs, Bellevue, and other communities;
- Public Works and Planning Departments of participating communities;
- Metropolitan Area Planning Agency (MAPA);
- Omaha Metropolitan Utilities District;
- Omaha Subcommittee, Nebraska Committee on Public Involvement;
- Papio Natural Resources District;
- Nebraska Natural Resources Commission;
- Nebraska Department of Environmental Control;
- Nebraska Office of Planning and Programming;
- Iowa Department of Environmental Quality; and the U.S. Environmental Protection Agency.

In addition, elements of the study concerning recreation and fish and wildlife are being prepared by the Bureau of Outdoor Recreation and the U.S. Fish and Wildlife Service.

The water and related land management studies have entailed the identification and evaluation of the most desirable alternatives for managing wastewater, improving water supply, increasing water recreation opportunities, and conserving and improving wildlife habitat.

In both the formulation and refining of a variety of potential solutions, you, the citizens of the study area, play a vital role by providing your views on the priority of needs and the solutions.

This information booklet, Volume V, is the fifth of six designed to acquaint all interests with water management and related

land management problems and alternative solutions. This booklet presents the flood plain management, or flood control, planning components of the urban study. An introduction to Volume V is presented on the following pages. The other information booklets are:

- Vol. I - Introduction and Alternative Growth Potentials
- Vol. II - Wastewater - Water Quality Management
- Vol. III - Water Supply Management
- Vol. IV - Water Related Recreation
- Vol. V - Water and Related Land Resources - A Summary

ALTERNATIVE GROWTH POTENTIALS

The growth of an urban area is extremely important to water resource planning.

Energy shortages or energy price fluctuations, concern over urban sprawl, the Riverfront Program, and other factors can influence the growth patterns of the region. Citizens and planners are searching for the means to bring about a more desirable form of urban growth than currently exists. The development of water and sewer systems, flood control measures, and recreation plans should be used to accomplish whatever growth pattern is desired by you, the citizens of the region.

The illustrations displayed on the inside front cover represent four potential alternative growth patterns for the future development of the Omaha Council Bluffs area. The growth patterns represent local ideas about growth either from the perspective of what could happen or what is desired. These patterns were explained in Volume I of this information series. Briefly, CONCEPT A represents continuation of present land use practices and is

characterized by low density urban sprawl. CONCEPT B represents higher density, controlled growth for the urban area with substantial development for adjacent rural communities, and redevelopment of the central cities.

CONCEPT C represents controlled growth characterized by higher density development in the suburbs and redevelopment of the central city. CONCEPT D is a low density sprawl concept which indicates that growth may follow major transportation corridors. All concepts use the same population projections, being differentiated only by density, location, and extent of urban development.

GROWTH AND PLANNING FOR FLOOD PLAIN MANAGEMENT

The term "flood plain management" is used to describe the program of structural and non-structural measures for minimizing losses due to flooding. These measures include

engineered structures such as levees, dams, and flood proofing; and legal and administrative measures such as flood plain regulations and flood insurance.

As an urban area develops, flood plain lands formerly used for agricultural production become attractive for economic development. Flood plains are normally easier to develop than are hillsides, and the existence of nearby services and transportation may give the flood plain area a locational advantage over alternative development sites or non-flood plain areas. This locational advantage may lead to the development of flood prone areas in spite of the potential flood hazard.

Historically, in the Omaha Council Bluffs area, development initially leapfrogged the flood plains, occurring in the non-hazard areas first. As these areas developed, flood plain areas became attractive locations for commercial development. Thus, in the absence of flood plain management, flood plain areas were unwisely developed.

A flood plain management plan must, therefore, recognize the economic, environmental, and social needs of the community. In some cases the community's needs may best be served by providing structural measures to minimize losses to existing and future development. In other cases, a program of regulating uses of the flood plain to minimize potential flood losses may be in the best interests of the community and the Nation. The purpose of this booklet is to provide information on the advantages and disadvantages of each.

In December 1973, Congress passed the Flood Disaster Protection Act of 1973 (Public Law 93-234). The purposes of this act are to:

- (1) Substantially increase the limits of coverage authorized under the National Flood Insurance program;
- (2) Provide for the expeditious identification of, and the dissemination of information concerning, flood prone areas;
- (3) Require States or local communities, as a condition of future Federal financial assistance, to participate in the flood insurance program and to adopt adequate flood plain ordinances with effective enforcement provisions consistent with Federal standards to reduce or avoid future flood losses; and
- (4) Require the purchase of flood insurance by property owners who are assisted by Federal programs or by Federally supervised, regulated, or insured agencies or institutions in the acquisition or improvement of land or facilities located or to be located in identified areas having special flood hazards.

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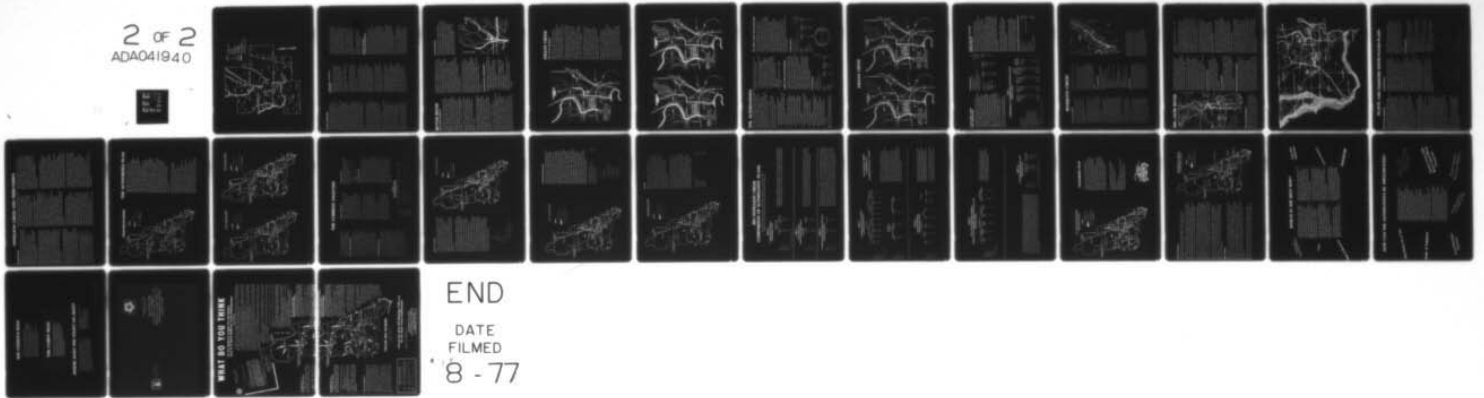
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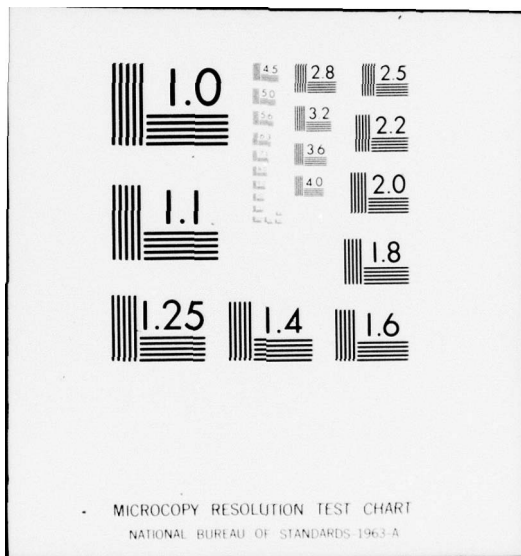
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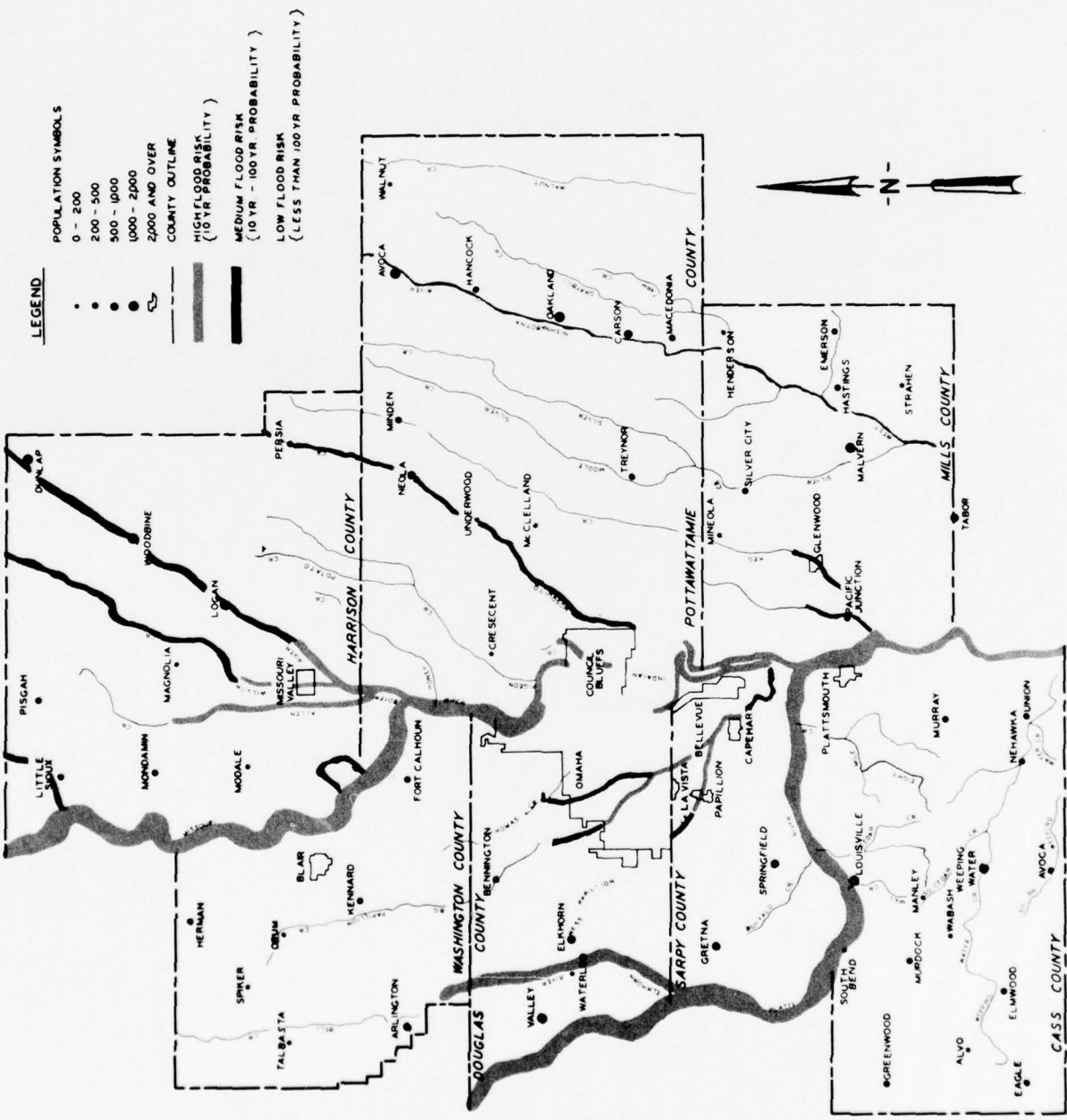


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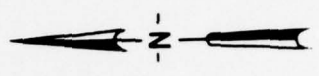


MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



LEGEND

- POPULATION SYMBOLS**
- 0 - 200
 - 200 - 500
 - 500 - 1000
 - 1000 - 2000
 - 2000 AND OVER
- COUNTY OUTLINE**
- (dashed line)
- HIGH FLOOD RISK (10 YR PROBABILITY)**
- (thick solid line)
- MEDIUM FLOOD RISK (10 YR - 100 YR PROBABILITY)**
- (medium solid line)
- LOW FLOOD RISK (LESS THAN 100 YR PROBABILITY)**
- (thin solid line)



FLOOD PROBLEMS

Flood problems in a region are related to climate, topography, channel size, flood plain elevation, development in the flood plain, and the effectiveness of existing flood control works. The severity of floods increases with greater depth, velocity, duration, and sediment load. Floods on small streams in the study area are commonly caused by brief, heavy thunderstorms that occur from May to September. These floods occur suddenly due to rapid runoff from the hilly landscape characteristic of this area. Such streams include Papillion, Indian, and Mosquito Creeks, and the Boyer River. Larger streams like the Missouri, Platte, and Elkhorn Rivers overflow after major storms covering a wide area. Their flood periods may be measured in terms of days rather than hours. Flat flood plains and winding channels create ice jams which aggravate snowmelt flooding, particularly on the Platte, Elkhorn, and Boyer Rivers.

The map shows the varying degrees of flood hazard in the urban area. The hazard is defined by the risk of floodwaters overtopping the channel bank. For example, a 1 percent flood would have one chance in 100 of being equalled or exceeded in any particular year. It is commonly called the 100 Year Flood or the "Intermediate Regional Flood". The Flood Insurance Administration uses this flood for regulatory purposes.

Flood damages in urban areas can be classified as physical losses, flood fighting costs, and loss of business. Physical losses include damages to buildings or contents, clean up, and utilities. These may be categorized as residential, commercial, industrial, public, recreational, utility, and transportation damages. Damages in rural areas include crops, bridges, roads, railroads, utility lines, farmsteads, erosion, and sedimentation.

Urban developments are most intense along Papillion Creek and Indian Creek. With a widespread growth pattern, future encroachment is a possibility on the other streams.

DEVELOPING ALTERNATIVE SOLUTIONS

The Corps' planning process is governed by the Water Resources Council's "Principles and Standards" published in 1973. These standards require that National Economic Development and Environmental Quality be co-equal objectives in planning.

Planning involves problem identification, formulation of alternatives, impact assessment, and evaluation.

In formulating flood control alternatives, the pertinent problems and needs of the study area must be addressed. The whole range of alternatives—structural and non-structural—must be considered.

The National Economic Development objective is to produce the maximum excess of monetary benefits over flood control costs. The Environmental Quality objective is to preserve or enhance the natural resources of the study area, thereby causing the least adverse environmental effect. Other project criteria are acceptability, completeness, effectiveness, equity, possible irreversible effects, and ease of maintenance.

Current policies require the assumption that, in the absence of a project, all flood-prone communities will come under the National Flood Insurance Program. Effective flood plain management must be assumed.

In urban areas, a high degree of protection is desired. Beyond 100-year flood protection, the "Standard Project Flood" and the "Maximum Probable Flood" may be considered. The standard project flood represents the flood that may be expected from the most critical combination of precipitation and runoff considered "reasonably characteristic" of the region. The maximum probable flood results from the most critical combination of rainfall and runoff "reasonably possible" from a drainage area. Dams are designed to prevent overtopping by the maximum probable flood.

The third step in planning requires an effect assessment of each alternative. These effects are grouped into national economic, environmental, social, and regional sectors. All effects, beneficial and adverse, short- and long-range, tangible and intangible, that may be expected to accrue to all persons and groups within the zone of influence of the potential development are to be considered. The fourth step in planning is evaluation. Evaluation is a trade off process resulting in a ranking of the alternative plans and provides a basis for choosing the most desirable plan. Public input is a vital part of this step.

The individual flood problem areas and alternatives considered are described in detail on the following pages.

WHAT IS FLOOD PLAIN MANAGEMENT?

Flood plain management is a term used to describe a program for reducing flood damages by using a combination of measures. These measures may include structural, non-structural, and regulatory elements for reducing existing and future potential flood damages. Structural elements include storage reservoirs, levees, channel enlargement, and water-retarding structures. Flood proofing of buildings, such as raising building sites and structural water proofing may also be considered structural measures. Non-structural measures would include removal of buildings from the flood plain, acquisition of the flood plain by a legal entity to prevent development, and the use of flood plain regulations to control use of the flood plain.

Flood insurance is not a flood damage reduction measure. It is a method of insuring flood losses. Coupled with flood plain regulations, flood insurance is a method of minimizing flood losses by limiting future development and insuring against damages to existing and eligible future development.

BOYER RIVER

THE FLOOD PROBLEM

The Boyer River drains an area of 1,185 square miles and enters the Missouri River south of Missouri Valley, Iowa. The most frequent flooding occurs in the Missouri Valley area. There are approximately 300 homes, 66 businesses, an electric substation, a power plant, water works, and sewage treatment lagoons located within the potential flood area. Average annual flood damages are estimated to be \$200,000.

Local officials are convinced that the flood problem has impeded the growth of the community. Studies confirm that the flood problem is a major factor in limiting the location of new homes and businesses in Missouri Valley.

Channel straightening in the upstream areas of the basin changed runoff characteristics in many places, and the magnitude of the flood problem increased in the downstream reaches. In addition, the channel work intensified a natural erosion process which enlarged the channels and increased their capacity in the upstream reaches.

Flood problems at Missouri Valley are aggravated by the effects of locally constructed levees along the Boyer River and Willow Creek. Most floods in this reach of the Boyer River and on Willow and Allen Creeks are the result of ice jam conditions in the early spring. During the period of annual ice breakup, floating ice in these channels can accumulate against the stationary ice on the Missouri River thereby obstructing the creek

channels for miles upstream. Flows in the Boyer River or in Willow Creek cause failure of the levees, and large areas of the adjacent flat land are inundated to shallow depths. These floodwaters usually have low velocities and, depending on soil conditions, are slow to recede. Levee failures upstream from Missouri Valley result in the floodwaters ponding behind the levees at the junction of the Boyer River and Willow Creek levee units. This ponding then results in the flooding of Missouri Valley to record depths of approximately 5 feet.

The floods in the past have been caused by snowmelt, ice jams, general rains, intense localized rainstorms, and combinations of these factors. The snowmelt and ice jam floods are the result of the spring thaw being delayed by subnormal temperatures followed by a sudden return to normal seasonal temperatures, usually in late March, releasing the winter's accumulation of snow in one surge.

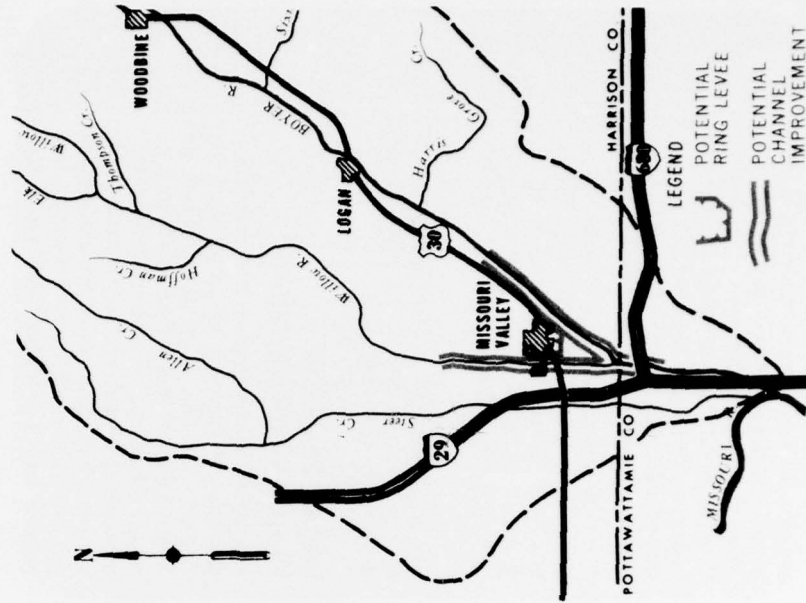
ALTERNATIVES CONSIDERED

The following alternatives were considered:

- Upstream storage in the Boyer River and Willow Creek drainage areas;
- Channel improvements along Willow Creek and Boyer River in the vicinity of Missouri Valley;
- A ring levee to protect Missouri Valley from Boyer River and Willow Creek;
- Off-stream storage in the Missouri River flood plain;
- Flood proofing of existing structures; and
- Flood plain regulations and flood insurance.

CONCLUSIONS

The current and future flood hazard to Missouri Valley has an adverse effect on the community. Structural solutions were found to be economically infeasible. It appears that the most practicable solution to the flood problems at Missouri Valley is a program consisting of flood plain regulation and insurance and of flood proofing of future development in the flood plain.



INDIAN CREEK

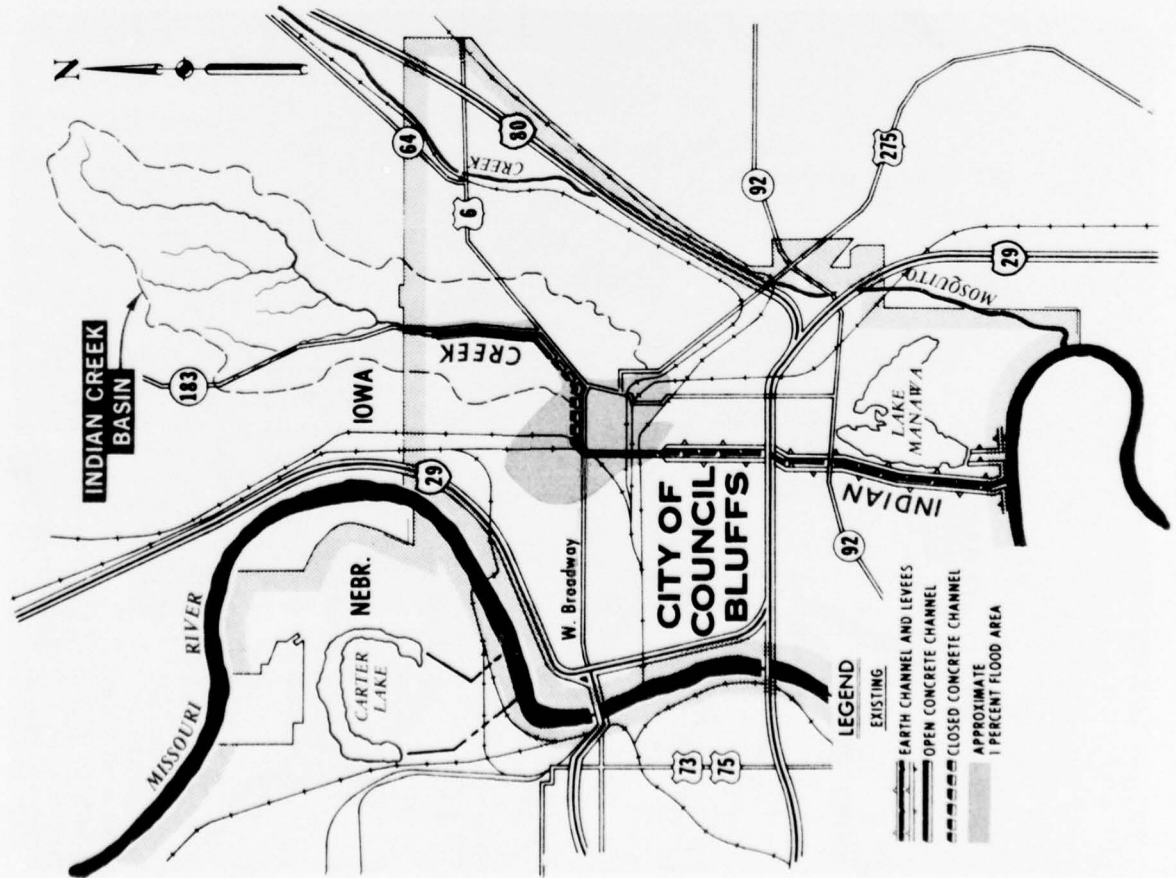
THE FLOOD PROBLEM

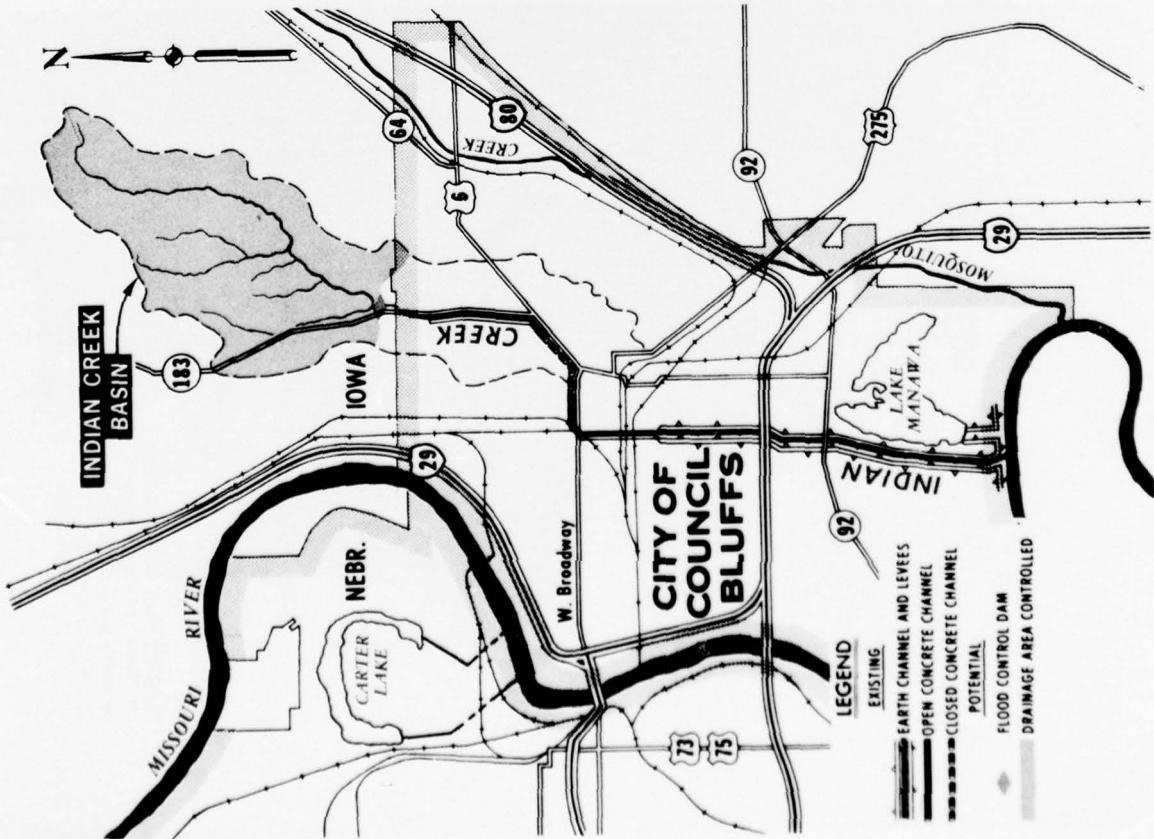
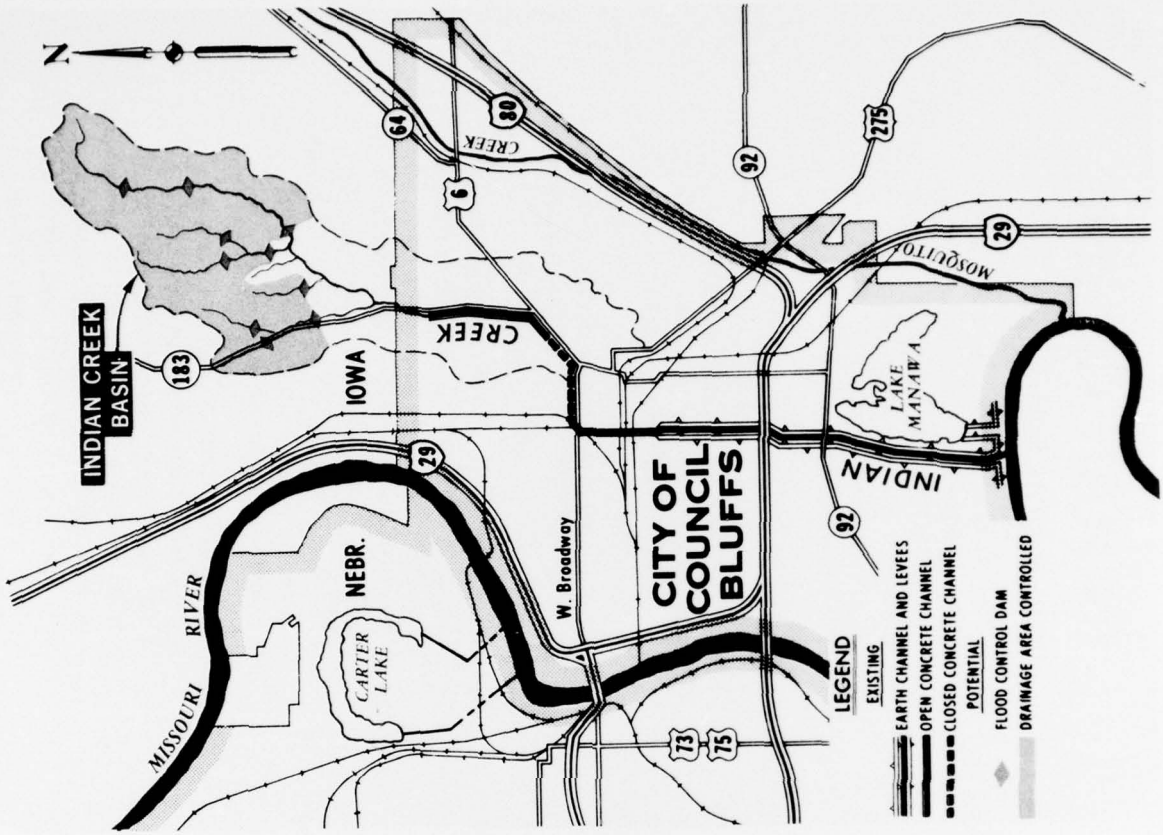
Indian Creek, a minor tributary of the Missouri River, drains an area of about 15 square miles. The stream originates about 4 miles north of Council Bluffs, flows in a southerly direction through Council Bluffs, and enters the Missouri River south of the city.

Flooding on Indian Creek is caused by high intensity rainfall of short duration. The creek through Council Bluffs consists of an open concrete channel, a concrete conduit, and an open earth-lined channel. Capacities are sufficient to carry floods up to about a 25-year frequency. Major floods can affect up to about 2,100 acres of highly developed areas in the city of Council Bluffs.

At least 16 significant floods have occurred on Indian Creek since 1883. The flood of June 20, 1942 covered an area generally from 7th Street to 21st Street, and from Avenue G to 16th Avenue. On June 22, 1947, over 3 inches of rain fell in 12 hours and caused Indian Creek to flood 148 blocks in the center of the city.

The flood problem on Indian Creek is aggravated by two separate conditions: (1) channel capacities along Indian Creek can vary between 3,500 cubic feet per second to 6,000 cubic feet per second depending on the amount of sediment and debris in the channel; and (2) an urban renewal project located in the main business district is situated across the flood plain. The urban renewal project can affect and be affected by major flood events.





THE ALTERNATIVES

A number of alternative measures are possible as solutions to the problems and needs of the area. Some of these measures, however, are not practical or economical or are otherwise objectionable to local interests. The alternatives were evaluated according to the technical, economic, and environmental criteria listed earlier in this booklet.

For this study, a number of structural and non-structural solutions were considered. These alternatives are as follows:

- Levees along both banks of Indian Creek through Council Bluffs;
- A large dam and reservoir located at the north city limits (Indian Creek Dam and Reservoir site);
- A system of 4 dams and reservoirs located upstream from Council Bluffs;
- A system of 10 dams and reservoirs located upstream from Council Bluffs;
- A system of 4 dams and reservoirs located upstream from Council Bluffs and channel improvements through Council Bluffs;
- A large dam and reservoir located at the north city limits and channel improvements through Council Bluffs;
- Channel improvements through Council Bluffs;
- Diversion of flood flow upstream from Council Bluffs to the Missouri River;
- Evacuation of the flood plain;
- Flood proofing of existing structures located in the flood plain; and
- Flood plain regulations and flood insurance.

These alternatives were screened and the number of alternatives were reduced to 5 on

the basis of economic, environmental, and social effects. The 5 alternatives are:

- A large dam and reservoir located at the north city limits of Council Bluffs;
- A system of 4 dams and reservoirs located upstream from Council Bluffs;
- A system of 10 dams and reservoirs located upstream from Council Bluffs;
- A large dam and reservoir at the north city limits of Council Bluffs and channel improvements through Council Bluffs; and
- Flood plain regulations and flood insurance.

LARGE DAM AND RESERVOIR

In this plan, a single dam on Indian Creek would be located just north of the city limits, about 2 miles north of the central business district. The project location, the site for the previously authorized Indian Creek Dam and Reservoir, is shown on the accompanying map. This alternative controls the maximum drainage area. The dam would be capable of storing the maximum probable flood with a token spillway. It would control 7 of the 10 square miles of hill area which contributes to flood peaks.

Pertinent Data

Land required in acres.....	1,013
Crest length in feet.....	900
Embankment height in feet.....	65
Embankment volume in cubic yards.....	444,350
Reservoir length in miles.....	2.8

Storage Zone	Volume, Acre-Feet	Elevation, ft. above m.s.l.	Area, Acres
Valley floor	0	1055.0	0
Sediment	300	1076.0	30
Maximum Probable Flood	7,360	1118.5	360
Total	7,660		

TEN SMALL DAMS AND RESERVOIRS

This plan considers a system of 10 small dams located upstream from the large dam site. The locations range from 1 to 4 miles north of the city limits as shown on the accompanying map. These dams were located to avoid most of the relocations that would be needed with the large dam. They would store the standard project flood and the maximum probable flood without spillways. These criteria would serve to indicate the minimum costs required for a small dam system. This system would control 5.4 square miles of the 10 square miles of hill area, somewhat less than the large dam. Information for the total system is summarized in the table below.

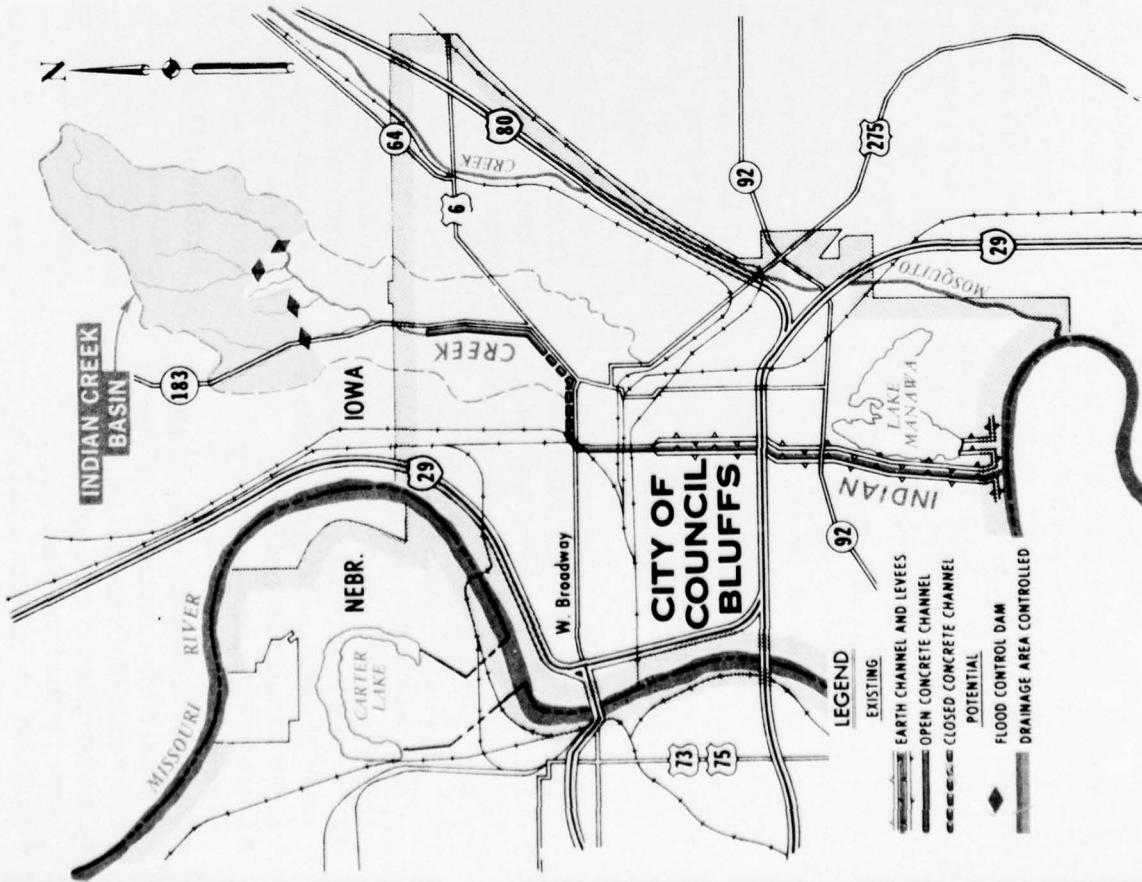
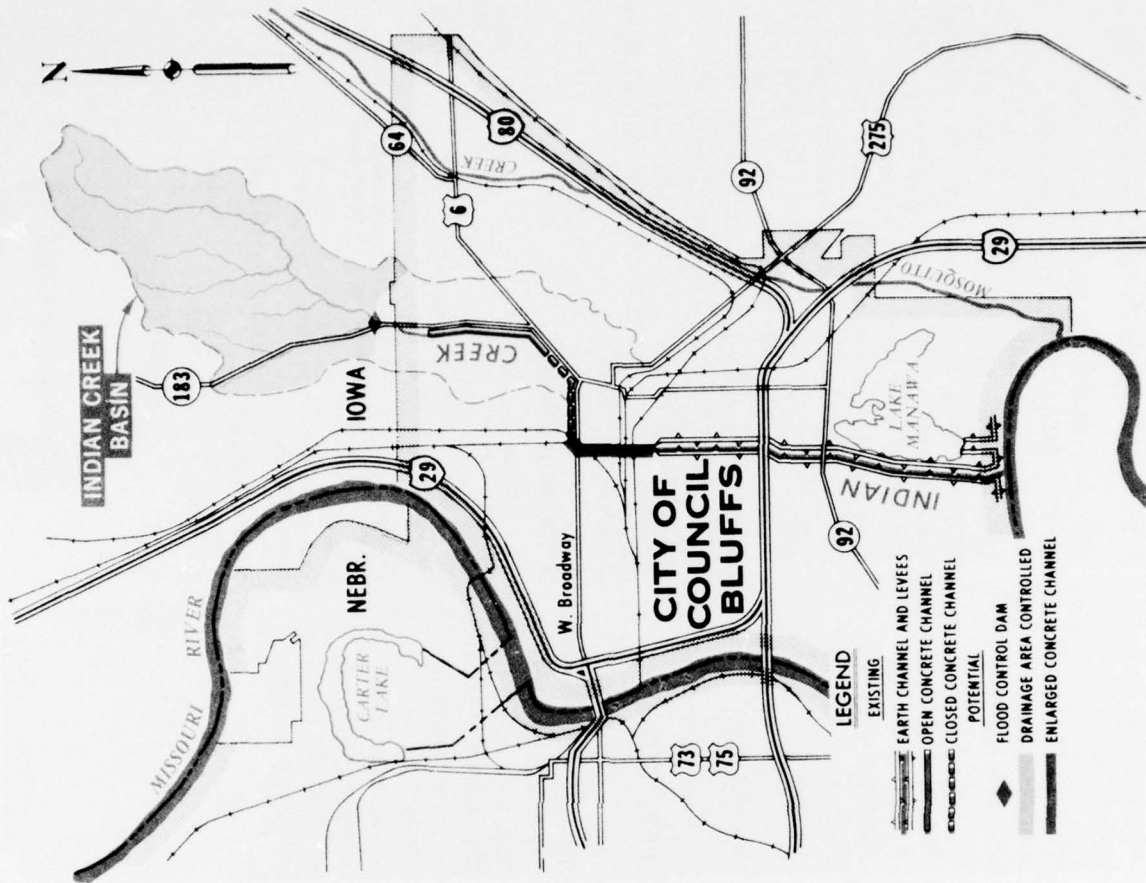
Pertinent Data

Total land required in acres.....	1,365
Crest length in feet.....	700 to 1,000
Embankment height in feet.....	Approx. 35 to 60
Total embankment volume in cubic yards.....	940,000
Reservoir length in miles.....	0.3 to 1.0

Storage Zone	Volume, Acre-Feet	Elevation, ft. above m.s.l.	Area, Acres
Valley floor	0	Variable	0
Sediment	538	Variable	66
Standard Project Flood	2,152	Variable	228
Maximum Probable Flood	5,842	Variable	521
Total	8,532		



INDIAN CREEK



FOUR SMALL DAMS AND RESERVOIRS

The available capacity at the 10 small damsites was greater than required for flood control storage. Since the site capacities were not fully utilized, the upstream dams might be considered unnecessary. A plan comprised of 4 small dams was considered. The dams would be located upstream from the site of the large dam and each one is about 1 mile north of the city limits. These dams would also retain the standard project flood and maximum probable flood, without spillways, and would control the same total drainage area as the 10-dam system.

This plan would also avoid most of the relocations associated with the large dam.

Pertinent Data

Total land required in acres	1,007
Crest length in feet	700 to 1,000
Embankment height in feet	38 to 60
Total embankment volume in cubic yards	744,000
Crest elevation in feet above m.s.l.	varies
Reservoir length in miles	0.3 to 1.7

Storage Zone	Volume, Acres-Feet	Elevation, ft. above m.s.l.	Area, Acres
Valley floor	0	Variable	0
Sediment	538	Variable	43
Standard Project Flood	2,152	Variable	183
Maximum Probable Flood	5,842	Variable	443
Total	8,532		

LARGE DAM AND CHANNEL IMPROVEMENTS

This plan combines the large dam with downstream channel improvements. The 3-square mile drainage area downstream from the dam could produce a 100-year flood which would overflow the concrete channel. The improvements would control the 100-year flood hazard. The existing concrete channel would be enlarged from the vicinity of 11th Street and Broadway southward to 16th Avenue. The route of the channel is shown on the accompanying map. Work in this reach would involve very little of the covered portion of the channel.

With the small dam system, or with no reservoir control, the existing channel would have to be enlarged upstream through the central business district.

COMPARISON OF ALTERNATIVES FOR INDIAN CREEK (Flood Control)

Table 1

	Large Dam and Reservoir	4 Dams and Reservoirs	10 Dams and Reservoirs	Large Dam Reservoir and Channel Improvements	Flood Plain Regulations and Insurance
Construction Cost	\$13,600,000	\$6,700,000	\$10,564,000	\$21,100,000	\$ 0
Annual Benefits	816,000	595,000	595,000	888,000	112,000
Annual Costs	826,000	447,000	748,000	1,277,000	146,000(1)
Benefit-Cost Ratio	0.99	1.3	0.8	0.7	0.8
Area Required for Plan (acres)	1,013	1,007	1,365	1,013	0
Area Protected from 100-Year Flood by Plan (acres)	746	505	505	1,118	0
Residential Units Affected by Plan	129	22	35	129	0
Residential Units Protected from 100-Year Flood by Plan	1,705	1,154	1,154	2,555	2,555
Damage Reduction in Percent	87	63	63	94	12
Federal Costs	\$ 6,800,000	\$3,350,000	\$ 5,282,000	\$10,550,000	\$ 0
Non-Federal Costs	6,800,000	3,350,000	5,282,000	10,550,000	146,000(1)

(1) Represents annual costs for flood proofing.

Pertinent data for the large dam are given in the previous discussion of that alternative. Information on the channel portion of the project is displayed in the following table.

(Pertinent Data) Channel Improvements

Land required in acres	6
Channel type	Concrete
Length in feet	6,200
Design discharge, c.f.s.	6,500
Section	Vertical sides, triangular bottom
Freeboard, feet	2
Channel width, feet	50
Channel depth, feet	13
Slope, ft. ft.	.001
Excavation volume, cubic yards	55,000
Concrete volume, cubic yards	16,600

MOSQUITO CREEK

THE FLOOD PROBLEM

Mosquito Creek drains an area of about 240 square miles and enters the Missouri River south of Council Bluffs, Iowa. Floods on Mosquito Creek apparently have been infrequent in recent years. In the early 1900's, local interests straightened most of the Mosquito Creek channel to reduce drainage and flooding problems.

The downstream end of Mosquito Creek lies in the flat Missouri River flood plain. The area from the mouth upstream for about 3 1/2 miles is protected by Missouri River Levee Unit L-624 tie back levees. A watershed work plan prepared by the Soil Conservation Service in 1965 proposed 57 erosion-control structures within the Mosquito Creek drainage area in Harrison County. Two of the structures have been completed.

The only significant floods recorded in recent years occurred during June 1947 when the downstream portion of Mosquito Creek flooded twice. The flood of June 12 inundated about 1,000 acres and severely damaged crops. On June 22 and 23, rainfall over the basin, averaging 2.5 inches in about 2 hours, flooded about 1,200 acres in the vicinity of Highways 375 and 275. Local levees along the creek failed and 20 business places and 84 residences in Manawa Park were damaged. Also damaged were crops, fences, bridges, county roads, and an oil and gasoline storage storage plant.

As with most streams in the area, floods are caused by short duration, high intensity thunderstorms. Flood peaks are reached in 4 to 10 hours, and flood stages may persist from 6 hours to a day.

Large floods, as much as a half mile wide, would cover the entire valley floor upstream from the bluff line. In the event of a levee break during a standard project flood, the floodwaters could spread over the Missouri River flood plain a mile or more from the Mosquito Creek channel, as in the floods of 1947. The accompanying map shows the estimated area covered by a 1 percent flood. Flood velocities have been high enough to cause erosion damage to bridges, roads,

railroads, and levees, and to deposit layers of mud on the flood plain near the mouth of the creek.

The flood plain of Mosquito Creek is almost entirely agricultural. Improvements that could be damaged by a standard project flood include cropland, pasture, bridges, county and state roads, railroads, farmsteads, fences, utility lines, and urban residences and commercial buildings in several upstream towns and in the vicinity of Council Bluffs and Lake Manawa. The 100 year flood would inundate about 3,700 acres in Pottawattamie County. The average annual flood damage on Mosquito Creek is estimated about \$100,000.

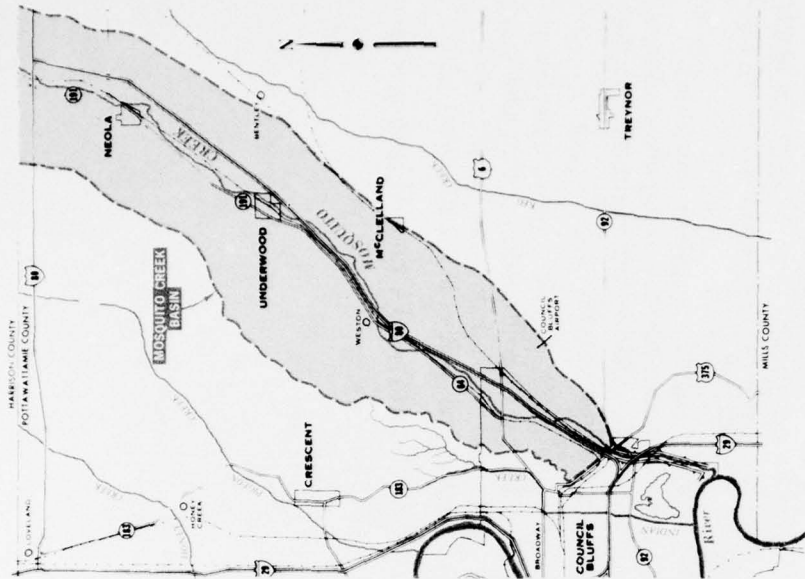
THE ALTERNATIVES

A number of possible alternative measures were considered to achieve flood damage reduction. These include:

- Flood insurance and zoning;
- Flood forecasting and temporary evacuation;
- Permanent evacuation of the 100 year flood plain;
- Flood proofing;
- A system of 4 large dams on Mosquito Creek;
- A single large dam;
- A system of 58 small dams to control all the significant sidehill tributaries of Mosquito Creek;
- Diversion;
- An improved channel to control the 100 year flood; and
- A levee to control the 100-year flood.

CONCLUSIONS

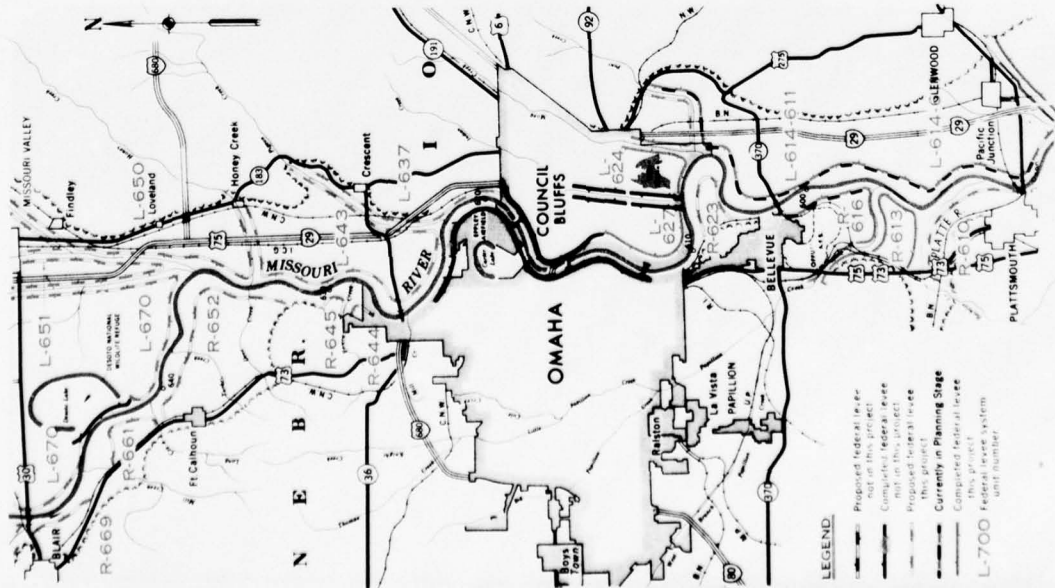
Non-structural measures, including flood plain regulations, could reduce damages in the future by preventing undue development in the flood plain. Such measures, however, would do nothing to protect existing development. Most of Mosquito Creek lies in a rural area which is not subject to regulation. Effective flood forecasting would reduce the risk to human life, but little property could be evacuated. Flood proofing to protect against the 100 year flood would reduce



damages to residential and commercial buildings, but would be expensive and socially objectionable. In addition, it appears most of the urban development subject to a standard project flood is above the 100 year flood level. Rural damages would not be decreased.

The structural alternatives considered were economically infeasible. The rural portion of the Mosquito Creek basin could best be benefited by projects of the type constructed by the Soil Conservation Service. In the urban area, Mosquito Creek presents an opportunity for flood plain regulations, as the flood plain is still mostly undeveloped.

MISSOURI RIVER



THE FLOOD PROBLEM

The flood hazard on the main stem of the Missouri River has been dramatically reduced as a result of constructed projects, including the main stem reservoirs, bank stabilization, and agricultural and Federal levees. The

flood area through the presently urbanized areas of Omaha, Nebraska and Council Bluffs, Iowa is confined within the levees protecting these cities. Upstream and downstream of the leveed areas, the potential flood area could extend from bluff to bluff.

The river extends about 20 miles through the urban reach of the study area, with the remainder of the reach devoted to agriculture. Federal levees, where completed, provide adequate flood protection. Locally constructed levees provide a relatively low degree of flood protection or receive inadequate maintenance. Existing and authorized levees in the study area are shown on the accompanying illustration.

Levee Units L-611-614

Planning for Missouri River Levee Units L-611-614 is nearing completion. These levees will protect the Iowa side of the river from Keg Creek upstream to Pony Creek. The cost of the levees is estimated at \$5,710,000.

Levee Unit R-616

Planning for Missouri River Levee Unit R-616 in Nebraska is also nearing completion. This levee system will tie into Missouri River Levee R-613 and will extend upstream to Highway 370. The cost of the levee is estimated to be \$1,150,000.

MISSOURI RIVER FLOODWAY

The growth concepts represent four potential alternative growth patterns for the future development of the Omaha-Council Bluffs area. These patterns were explained in Volume I of this information series. The Riverfront Development Program (RDP) Land Use Plan shown here combines local, regional, and RDP land use plans for lands bordering the Missouri River. Major elements of the land use plan include industrial, com-

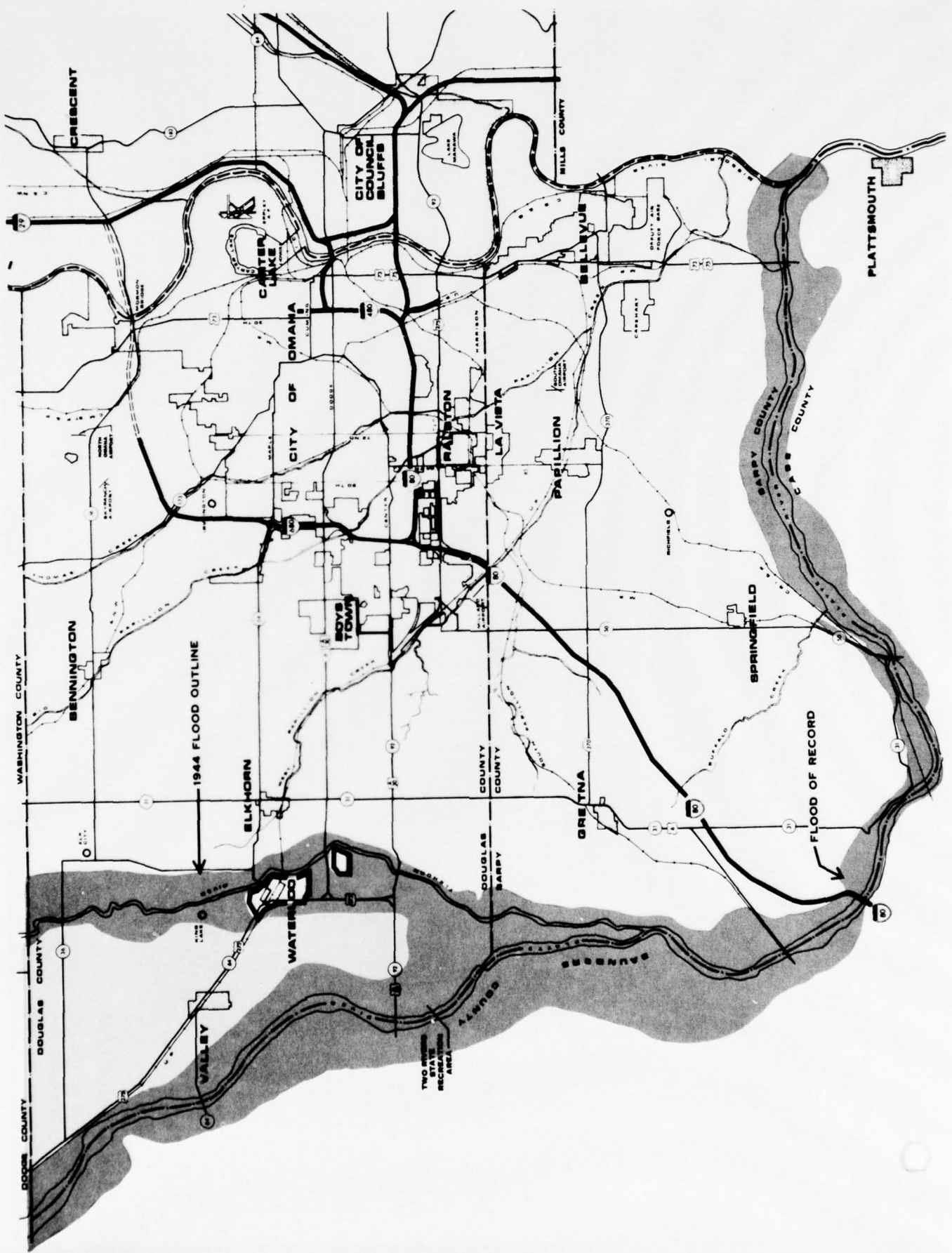
mercial, residential, open space, and park areas.

The discussions presented with Concepts A, B, C, and D give an indication of the Riverfront Development Program's role in the growth pattern potentials of the Omaha-Council Bluffs metro area. Growth Concepts A and D do not include the RDP concepts. Concepts B and C, on the other hand, assume the RDP to be a success and include the New Towns-In-Town. In addition, Concept B includes the Satellite City New Towns.

Most of the industrial, parks, and open space proposals for the Riverfront Program have been included in all four growth concepts. The Riverfront Development Program represents a planning program of major magnitude and possibly a development program that could affect land use in the Missouri River flood plain.

The open space and park elements of the RDP Land Use Plan and the four concept plans include a variety of parks, natural and open space areas. The areas that are currently undeveloped adjacent to the Missouri River channel should be preserved, and any existing or future structures in the floodway should be flood proofed to make them resistant to flood damages.

The Omaha District currently has a floodway study underway for the Missouri River. This study will show flood profiles relative to the stream-bed and both banks. The flood profiles will be based on existing conditions of the basin, river, and valley at the time of the study. These profiles are reasonable, not precise, indications of probable flood depths. The report will provide a suitable basis for adoption of land use controls to guide flood plain development and to prevent intensification of flood losses.



PLATTE AND ELKHORN RIVER FLOOD PLAIN

THE FLOOD PROBLEM

The combined Platte and Elkhorn River floodplain affects between 10 and 20 percent of Douglas County. The most severe flood of recent years on the Platte River in the study area occurred in March-April 1960. This flood inundated an area $1\frac{1}{2}$ to 3 miles wide upstream from Interstate 80 and averaged 1 mile wide downstream from the Interstate. The area flooded covered about 50,000 acres. The flood of record on the Elkhorn River occurred in June 1944; it spread over an area averaging $1\frac{1}{2}$ miles wide through the study area. About 15,000 acres were inundated. Flooding is often compounded by ice jams.

The principal flood problem of the Platte River and its tributary, the Elkhorn River, are the flood losses sustained by the agricultural, transportation, and urban sectors of development which threaten the economic stability of the study area. Urban expansion into the flood plain, such as the Riverside Lake Development, Buccaneer Bay, and Ginger Cove, has increased the threat to human life. The flood plain is traversed by several railroads, by numerous Federal and State highways, and by county roads which are subject to flood damage. In the absence of suitable flood protection or flood plain zoning measures, flood prone areas will continue to experience severe and costly damages.

Although the four alternative growth patterns do not show extensive urban development in this flood plain, it is strongly suspected that uncontrolled urban sprawl would allow such development.

ALTERNATIVES

Dams were considered for the Platte River, the Elkhorn River, and its other tributaries. Preliminary studies indicated that there were insufficient damages to warrant additional studies. Other structural alternatives considered included a levee system along the Platte and Elkhorn Rivers. The cost of such a levee system would be about \$1,000,000 per mile. The entire levee system could not be economically justified. Channel improvements are opposed by local interests and would not be compatible with the habitat and environmental qualities. Missouri River Levee Unit R-610 in the vicinity of Plattsmouth, Nebraska was studied since the levee unit would provide flood protection from both Platte River and Missouri River flooding. The study indicated that the levee unit was not economically justified.

Flood plain zoning would be the best way to limit flood damages in the future. Zoning should be implemented as soon as possible to limit future urban expansion into the flood plain.

While detailed topographic mapping is required to specifically delineate the flood hazard area, it is known, from historic flood records, that the flood plain is large. Since a significant portion of Douglas County, between 10 and 20 percent, is in this flood plain, there may be a reluctance on the part of local interests to zone this amount of land.

CONCLUSIONS

Zoning the Platte-Elkhorn flood plains would have many advantages; not all of which can be converted into monetary terms. The advantages include:

- Maintenance of agricultural productivity;
- Avoidance of increasing flood damages in the future;
- Retention of open space;
- Potential of preserving some of the best lands in the region for fish and wildlife habitat; and
- Potential for acquiring some lands for recreation as proposed in MAPA and Platte Level "B" studies.



PAPILLION CREEK AND TRIBUTARIES

BACKGROUND

Papillion Creek and its tributaries were once relatively small, meandering channels draining about 402-square miles of area. The broad flood plains were primarily used for agricultural production. Floods occurred frequently, damaging crops and farm properties. In an attempt to reduce flooding, the counties and landowners straightened and enlarged channels.

Following World War II, development in the Little Papillion Creek flood plain intensified; and by the mid-1950's a major portion of the flood plain was fully developed. In 1961, the Corps of Engineers completed a survey for flood control on Papillion Creek and its tributaries, which recommended channel improvements on Little Papillion Creek and flood plain zoning. The Little Papillion Creek Project, authorized for construction by the Flood Control Act of 1962, was completed in the late 1960's.

Since the late 1950's, urban development has been occurring along the Big Papillion Creek flood plain and to a lesser extent along the West Branch Papillion Creek flood plain. The devastation and loss of life resulting from the 17 June 1964 flood generated local interest in the development of a flood control plan for Papillion Creek and its tributaries.

The Corps of Engineers and the Soil Conservation Service, in cooperation with the Papio Watershed Advisory Board, formulated a plan for minimizing damages in the basin. The Corps of Engineers identified 7 potential reservoir sites in the basin. The Soil Conservation Service

identified 14 additional reservoir sites and 52 grade stabilization structures. Prior to the completion of the cooperative studies, it was agreed that the Corps of Engineers would develop the reservoir projects, and that the Soil Conservation Service would develop the grade stabilization structures and the land treatment measures.

The review report on the Papillion Creek and its tributaries was completed in February 1967. That report recommended a plan of improvement for the Papillion Creek basin consisting of 21 reservoirs for flood control, water quality control, recreation, and fish and wildlife enhancement. The recommendation was contingent on local interests providing certain assurances including providing guidance and leadership in the prudent and economical future development of the flood plain areas by encouraging the use of floodproofing, land-regulation planning, or other flood plain management techniques for reducing future flood losses.

The plan consisting of 21 dams and reservoirs was authorized by the Flood Control Act of 1968. The grade stabilization structures and land treatment measures in the upstream areas of the basin were formulated under provisions of the PL 566 Watershed Work Program. Together, these measures would, if implemented, provide erosion control in the upstream rural areas of the basin and flood damage reduction in the downstream areas of the basin. Flood control projects are designed to function for 50 to 100 years. Implementation of large-scale projects may require more than

10 years from the date of authorization. Since national, State, and local problems, needs, and priorities are constantly changing, plans such as the Papillion Creek Lakes Project require periodic review to insure that the investment will return sufficient benefits to justify the costs. An economic evaluation completed in 1971 determined that Site 17 would not warrant expenditure of funds, and the plan was reduced to 20 dams and reservoirs.

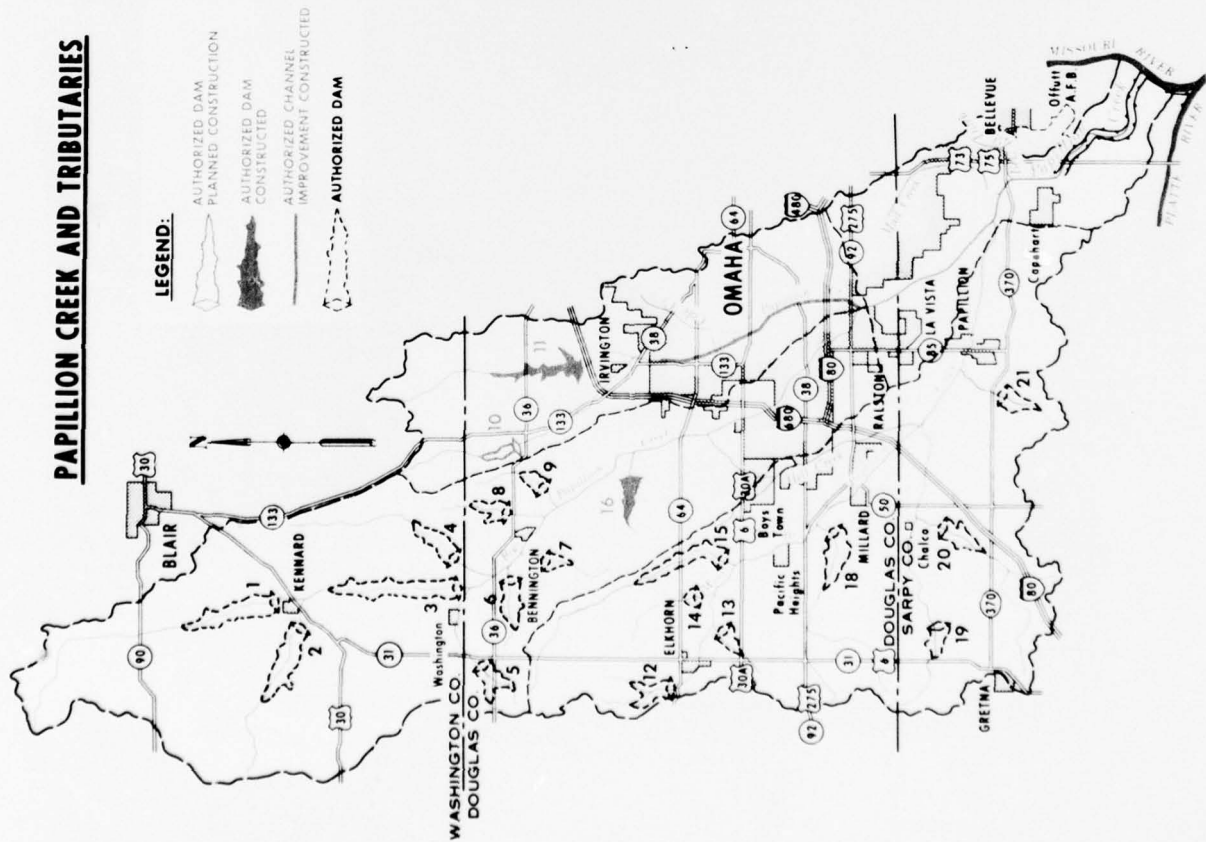
In 1973, Congress passed Public Law 93-234, which amended the National Flood Insurance Program. This act, entitled the "Flood Disaster Protection Act of 1973", requires local units of government to adopt flood plain regulation by 1 July 1975. The city of Omaha adopted the required regulation in October 1974. These regulations require that future development in the flood plain be floodproofed. The adoption of regulations by the city of Omaha and other cities in the Papillion Creek flood plain makes these communities eligible for flood insurance.

In July 1974, the Corps of Engineers initiated a required periodic update of the economic analysis for the Papillion Creek Lakes Project. This update was fully coordinated with studies for the Metropolitan Omaha, Nebraska-Council Bluffs, Iowa Study. The current analysis of the Papillion Creek Lakes Project includes the effects of the implementation of Public Law 93-234 on the economic justification for the authorized plan. Preliminary results of the analysis of the Papillion Creek Lakes Project are summarized in this booklet.

THE AUTHORIZED PLAN




The Papillion Creek Lakes Project was authorized by the Flood Control Act of 1968. The project currently consists of 20 dams and reservoirs on tributaries of Papillion Creek. The reservoirs vary in size from the smallest, which will control less than 2 square miles, to the largest, which will control 36 square miles. The dams will, when constructed, range in height from 40 feet to 77 feet and the length of embankments would range from 1,130 feet to 3,300 feet. The authorized plan will have a multi-purpose capacity of about 46,600 acre-feet including storage for water quality control in eight of the reservoirs. The design flood control capacity of the plan is about 75,300 acre-feet. The multi-purpose pools will provide about 4,200 acres of lake surface for recreation. The total land requirement for the system is about 17,100 acres, including about 912 acres exclusively for recreation enhancement.

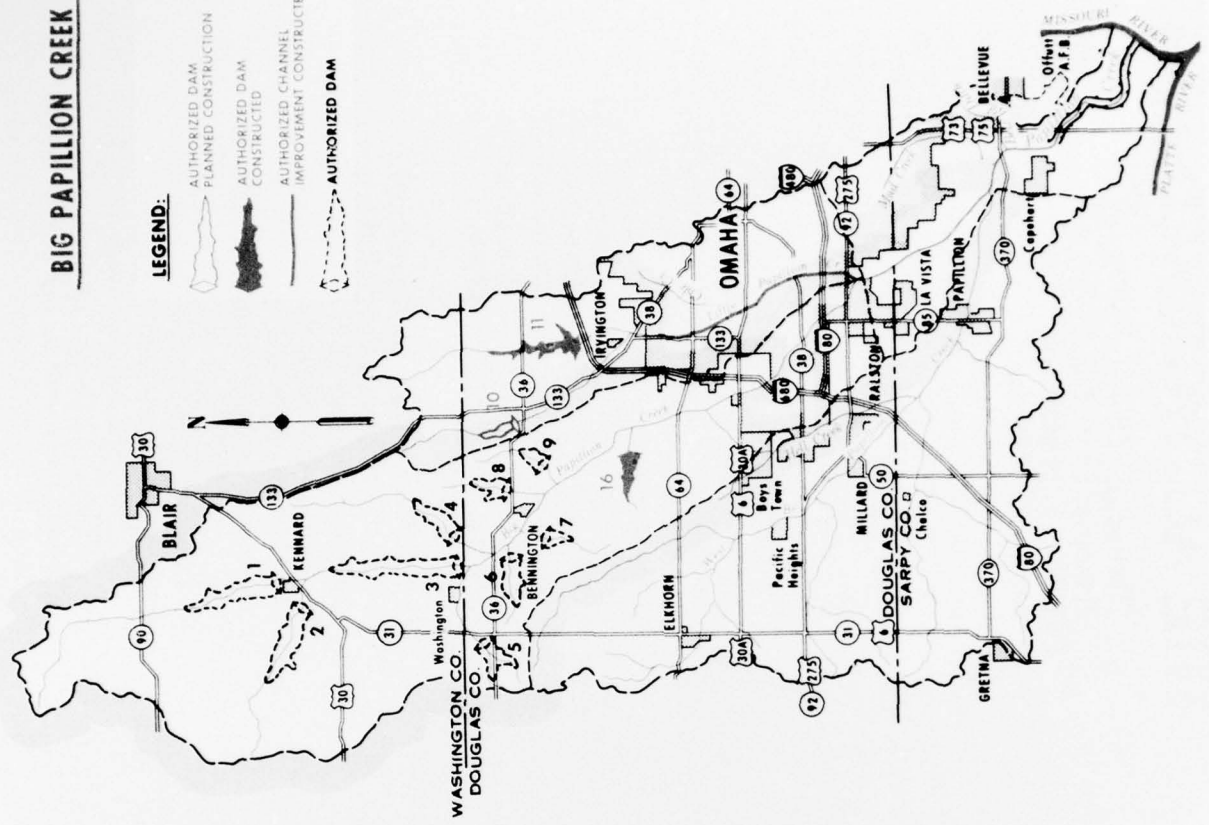
Construction of Dam 16 was initiated in Fiscal Year 1972, and the project began storing water in the Fall of 1973. Recreational facilities at the lake are scheduled for completion in 1975. Construction at Site 11 was initiated in the Summer of 1973, and the project is scheduled to store water in 1976. Acquisition of project lands has been initiated for Site 20, and appraisals are being made for lands at Site 10. Engineering and design studies and real estate actions are in various stages of accomplishment on Sites 15 and 18.



BIG PAPILLION CREEK

LEGEND:

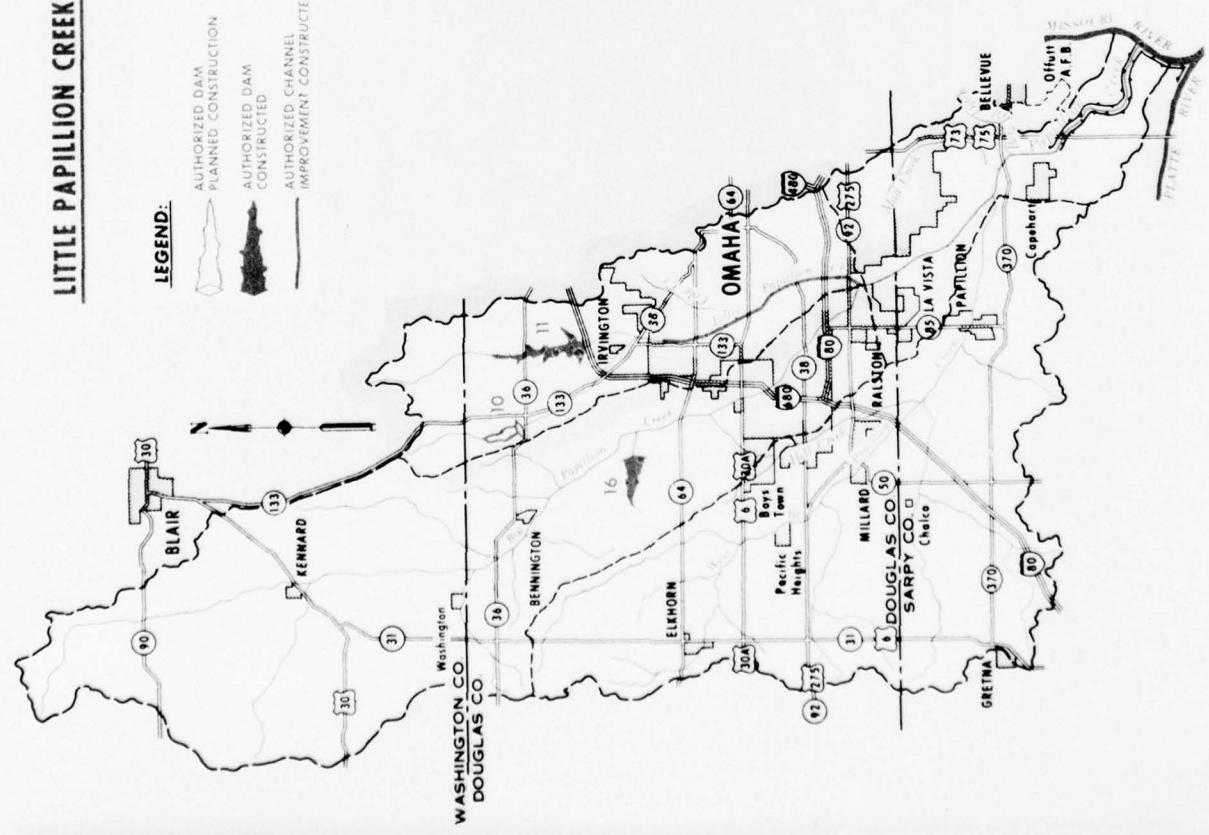
-  AUTHORIZED DAM PLANNED CONSTRUCTION
-  AUTHORIZED DAM CONSTRUCTED
-  AUTHORIZED CHANNEL IMPROVEMENT CONSTRUCTED
-  AUTHORIZED DAM



LITTLE PAPILLION CREEK

LEGEND:

-  AUTHORIZED DAM PLANNED CONSTRUCTION
-  AUTHORIZED DAM CONSTRUCTED
-  AUTHORIZED CHANNEL IMPROVEMENT CONSTRUCTED
-  AUTHORIZED DAM

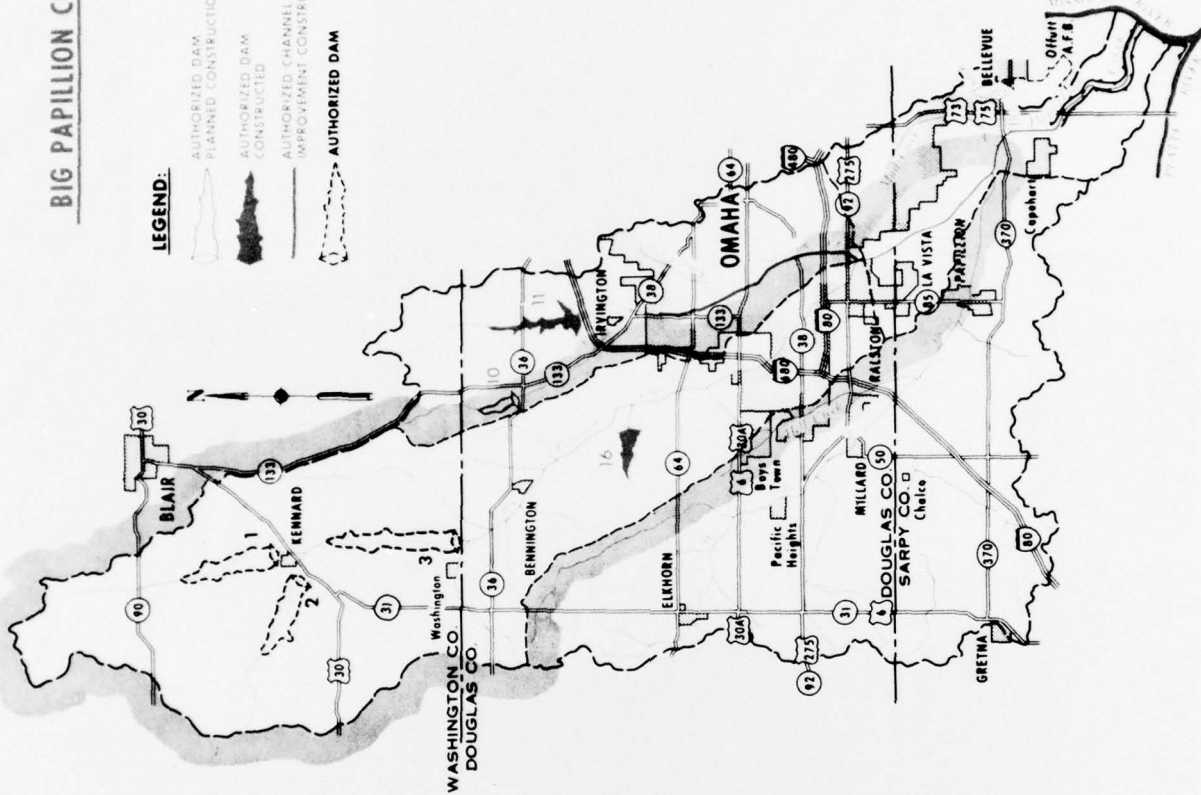


Sites 1, 2, and 3

Dams 1 through 9 were evaluated individually and it was determined that Dams 1, 2, and 3 would provide a desirable degree of flood control and were economically justified. The remainder of the dams, 4 through 9, as separate elements, do not provide any significant increase in flood damage reduction and were not justified when added to Dams 1 through 3.

The 3 justified dams, in addition to Site 16, would be augmented by flood plain regulations to minimize potential residential development along the Big Papillion Creek downstream from the dams. Any one or all of the three dams could be constructed as "wet" or "dry" dams depending upon the desires of the local sponsoring agencies. The total investment cost of the three additional dams for flood control only or as "dry" dams would be about \$20 million. Total investment cost as "wet" dams would be \$20 million plus the cost of recreational lands and facilities. This would vary depending upon the degree of recreational facilities desired. Pertinent data for Sites 1, 2, and 3 are shown on the table presenting the authorized plan.

BIG PAPILLION CREEK

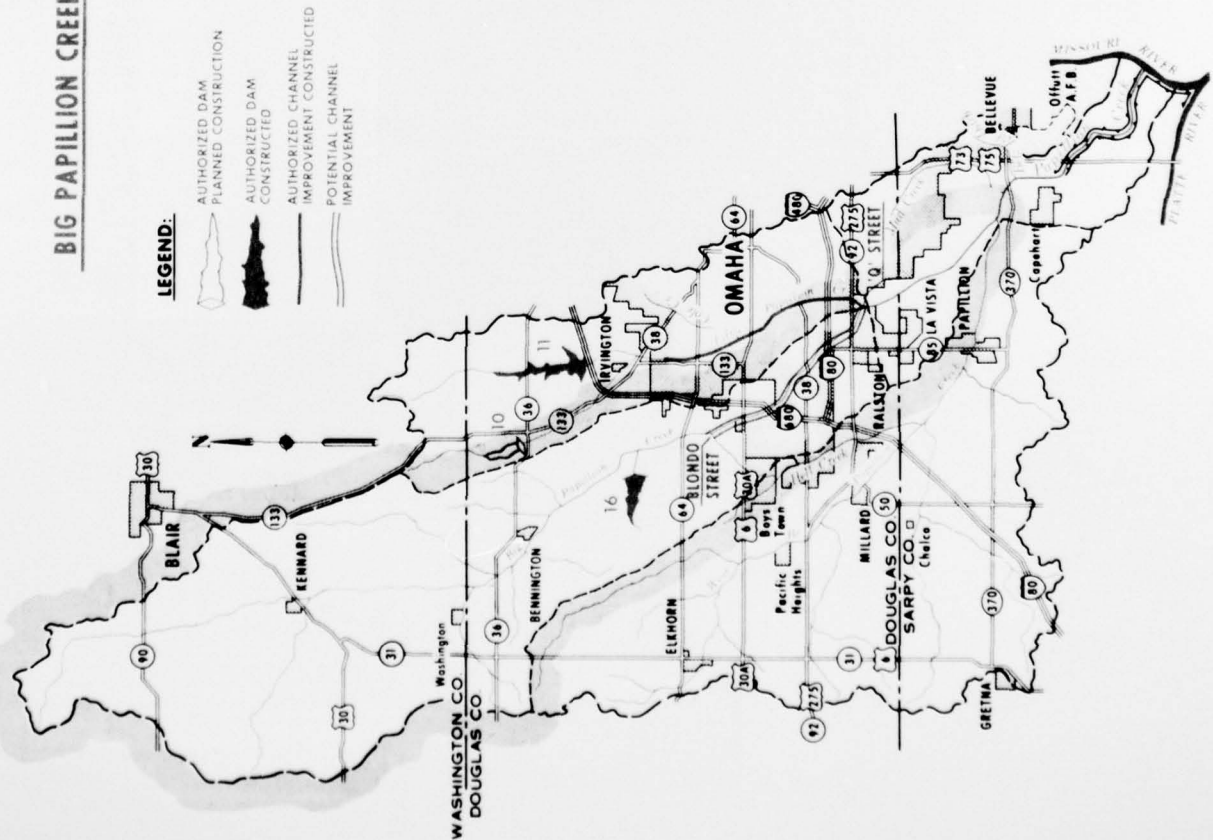


Channel Improvement

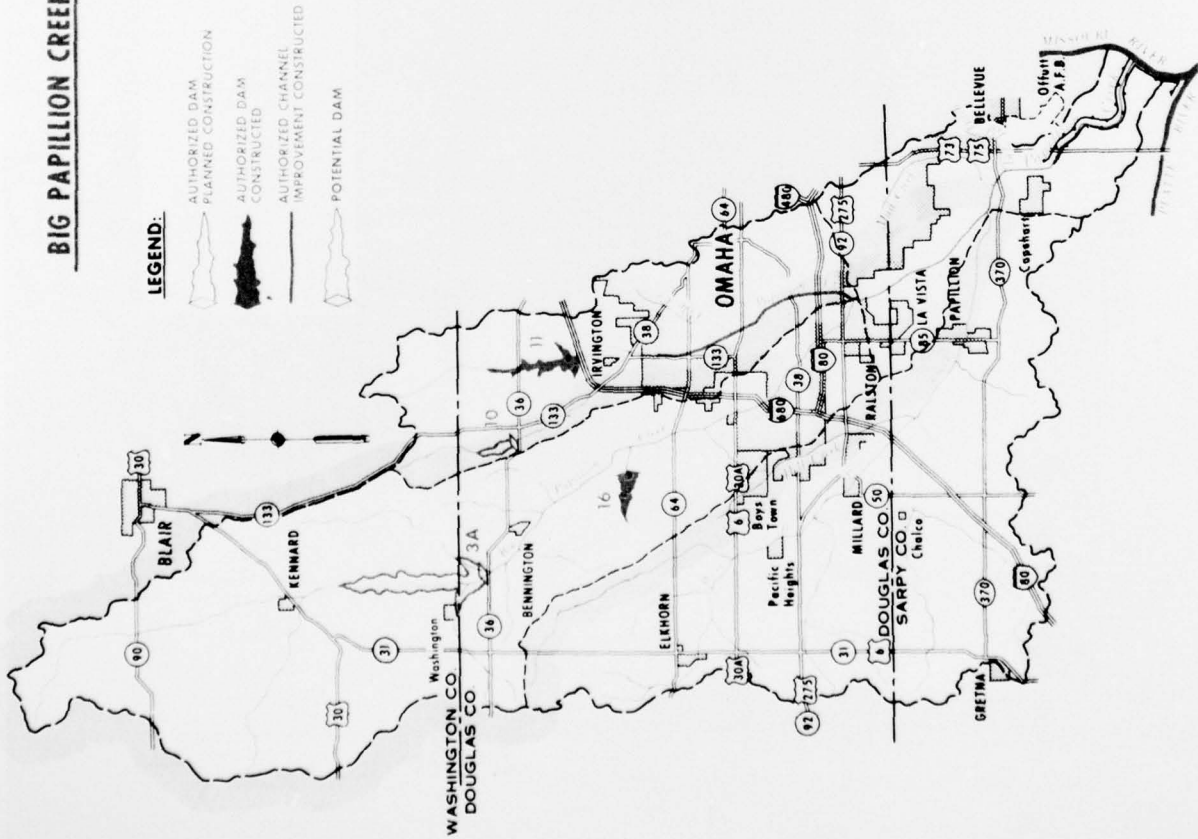
Under this concept, the Big Papillion Creek channel would be enlarged from Blondo Street to Q Street, and would be designed to carry the 100-year flood. The plan for Big Papillion Creek would consist of Site 16, channel improvements, and flood plain regulations from Q Street to the confluence of Papillion Creek with the Missouri River. Local interests would be required to provide lands, easements, and rights-of-way; operate and maintain the project; and if applicable, hold and save the United States free from damages. Total cost of the channel improvement would be \$21 million. This plan would provide a desirable degree of flood protection on the Big Papillion Creek from Q Street to Blondo Street but would increase flood damages downstream of Q Street. No recreation would be provided with channel improvement. Pertinent data for the channel improvement alternative follows:

Length of improvement in miles	9
Design discharge in cubic feet per second	27,000
Bottom width of low-flow channel in feet	40
Side slopes of low-flow channel	1 on 2
Width of channel berms in feet	80
Side slopes of high-flow channel	1 on 3

BIG PAPIILLION CREEK



BIG PAPIILLION CREEK



Site 3A

Site 3A is located near the town of Bennington about 1½ miles downstream from Site 3. The dam and reservoir would be designed to control runoff from the entire drainage area upstream from the dam. Site 3A would essentially replace Sites 1, 2, 3, 4, 5, and 6 of the authorized plan with regard to downstream flood control effectiveness and would basically provide the same protection downstream as would the authorized system.

Dam 3A could be constructed with a "wet" or "dry" reservoir. Flood plain regulations would be adopted to augment the plan of Dams 16 and 3A. Total cost of 3A for flood control only and the "dry" dam concept is about \$25 million. Again, the cost of 3A with a "wet" reservoir and with recreation would be about \$25 million plus the cost of the recreation facilities and the additional lands that might be desired by the local sponsors. Pertinent data for Site 3A are as follows:

Drainage area in square miles	106.0
Storage in acre feet	20,000
Conservation	33,000
Flood Control	55,000
Surcharge	
Land in Acres	4,150
Flood Control	1,000
Recreation	5,150
Total Project	

BIG PAPIILLION CREEK COMPARISON OF ALTERNATIVE PLANS

The following tables provide a side-by-side comparison of each plan. The comparisons are for flood control and for flood control and recreation.

TABLE 3
Comparison of Plans for
Big Papillion Creek

Plan	Comparison of Costs (in millions of \$)	
	Flood Control Only*	Flood Control with Recreation
No Action	\$ 0	\$ 0
Dams 1-3	200	260
Dams 1-9	370	470
Dam 3A	260	330
Channel	210	210

This table presents the total investment cost of each of the alternative plans for Big Papillion Creek. The investment cost includes lands and relocations, construction, engineering and design, and supervision and administration.

*Dry reservoirs would be slightly less.

TABLE 4
Areas Affected by
Flood Control Only Projects
(in acres)

Plan	Protected by Plan	Required for Plan
No Action	0	0
Dams 1-3	4,435	5,255
Dams 1-9	5,500	7,550
Dam 3A	5,200	4,155
Channel	1,404	265

This table presents a comparison of the land acres affected by the alternative plans. The areas beneficially affected are those lands receiving a reduction in flooding due to the plan. The areas adversely affected are those land areas which are required as a result of the plan being implemented.

TABLE 5
Dwelling Units Protected or Disrupted
by Alternative Plans

Plan	Protected	Disrupted
No Action	0	0
Dams 1-3	600	37
Dams 1-9	600	55
Dam 3A	600	37
Channel	490	0

This table presents a comparison of the number of dwelling units and farmsteads affected by the alternative plans. The dwelling units and farmsteads beneficially affected by the plans are those units located downstream from the dams or are located adjacent to the channel improvements. The units adversely affected by the alternative plans are those units located on potential project lands. The potential project lands for the reservoirs include those lands required for the reservoir. For the channel improvement, potential project lands include the lands required for project rights-of-way.

TABLE 6
Lands Removed from Tax Rolls
with Alternative Plans

BIG PAPPILLION CREEK
COMPARISON OF
ALTERNATIVE PLANS (CONT.)

Plan	School Districts															
	Area Removed in Acres				Percent of Total Lands				Area Removed in Acres				Percent of Total Lands			
	Washington		Douglas		Washington		Douglas		Washington		Douglas		Washington		Douglas	
SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	
31	24	8	59	8	31	24	59	8	31	24	59	8	31	24	59	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
667	1,909	2,576	0	0	12.1	4.0	26.8	0	0	4.0	26.8	0	0	0	0	
667	1,909	2,576	1,270	393	12.1	4.0	26.8	7.3	6.8	4.0	26.8	7.3	6.8	4.0	26.9	
0	1,156	2,590	1,404	0	0	2.4	26.9	8.1	0	0	0	0	0	0	0	
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	

SD—School District

These tables show a comparison of the number of acres that would be removed from the tax rolls of the affected School and Fire Districts in Washington and Douglas Counties with the various plans. Also presented are the lands in percent of the total that would be removed from the tax rolls. The Channel and No Action would have no effect on the School Districts shown. The Channel would remove about 250 acres from the tax rolls in Omaha.

TABLE 7
Fire Districts

Plan	Area Removed in Acres		Percent of Total Lands	
	Kenward	Bennington	Kenward	Bennington
No Action	0	0	0	0
Dams 1-3	6,321	0	17.2	0
Dams 1-9	6,176	2,633	16.7	8.6
Dam 3A	3,367	1,783	9.1	5.7
Channel	0	0	0	0

TABLE 8
Increase in Mill Rate
with Alternative Plans

Plan	School Districts											
	Washington				Douglas				Fire Districts			
	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.	SD NO.
31	24	8	59	8	31	24	59	8	31	24	59	8
0	0	0	0	0	0	0	0	0	0	0	0	0
1.83	1.41	1.41	8.09	0	0	0	0	0	0	0	0	0
1.83	1.41	1.41	8.09	0.77	1.4	0.233	0.06	0.233	0.06	0.233	0.06	0.03
0	0.84	0.84	8.15	0.85	0	0.12	0.03	0.12	0.03	0.12	0.03	0
0	0	0	0	0	0	0	0	0	0	0	0	0

This table shows the increase in the tax mill rate for the School and Fire Districts that would be necessary to accommodate the loss of assessed valuation through land that would be acquired for the respective plans.

No Action and the Channel would not result in any increase in the mill rates. Dam 3A would require the least increase in mill rate.

TABLE 9
Acres of Residential Development
Required to Accommodate Assessed Valuation with
Alternative Plans

Plan	School Districts				Fire Districts	
	Washington		Douglas		Kennard	Bennington
	SD NO.	SD NO.	SD NO.	SD NO.		
	31	24	59	8		
No Action	0	0	0	0	0	0
Dams 1-3	4	12	0	0	38	0
Dams 1-9	4	12	10	3	38	21
Dam 3A	0	7	11	0	21	14
Channel	0	0	0	0	0	0

*SD - School District

This table shows the number of acres of residential development that would be required to accommodate the losses of assessed valuation in the School and Fire Districts with the Alternative Plans.

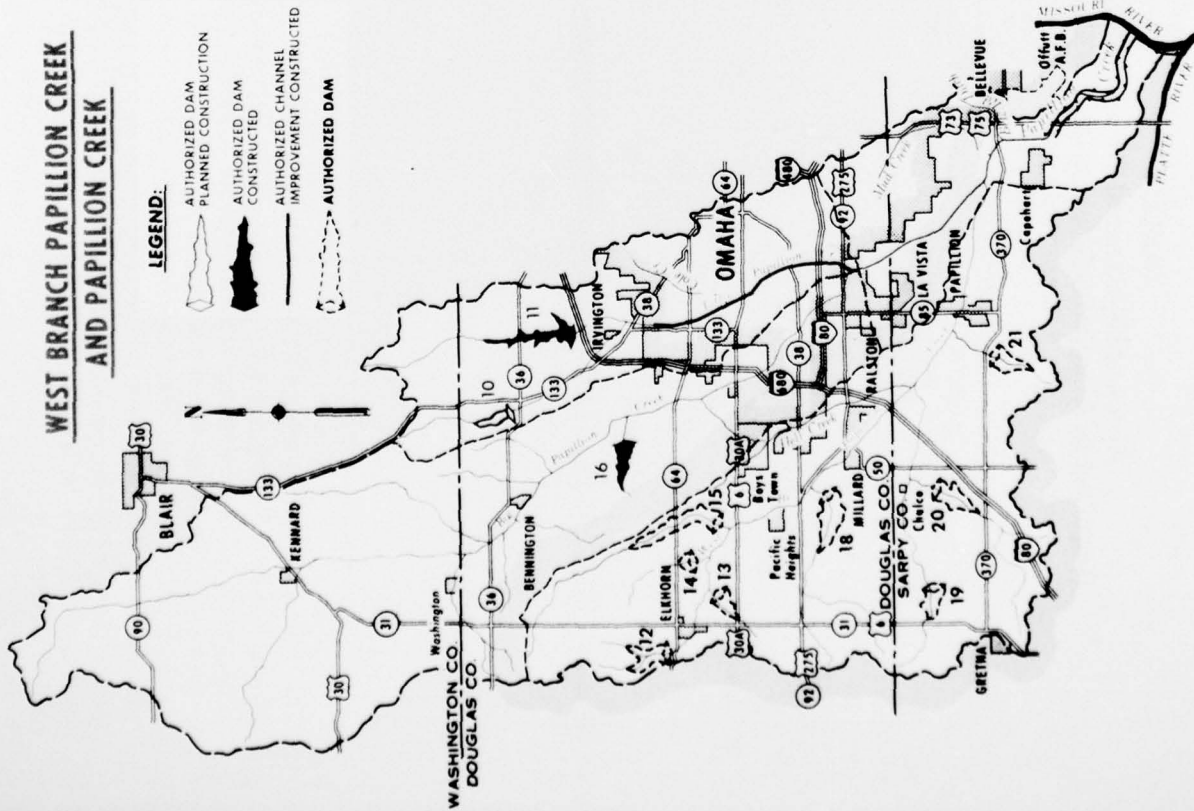
TABLE 10
Flood Damage Reduction with
Alternative Plans

Plan	Average Annual Flood Damages	Average Annual Flood Benefits
No Action	\$ 1,225,000	\$ 0
Dams 1-3	437,000	788,000
Dams 1-9	256,000	969,000
Dam 3A	269,000	956,000
Channel	538,000	687,000

This amount includes \$60,000 of induced damages on the Big Papillion Creek downstream from "Q" Street.

This table shows the effects of the plans presented in terms of average annual benefits of flood damage reduction. Dam 3A provides essentially the same percent of flood damage reduction as the authorized plan. The channel project would increase the discharges and flood damage potential downstream from "Q" Street. No Action alternative which would result in flood insurance and a continuance of the flood plain zoning programs would not reduce the average annual flood damage potential. The cost of flood insurance to occupants within the 100-year flood plain would approximate \$2 million dollars.

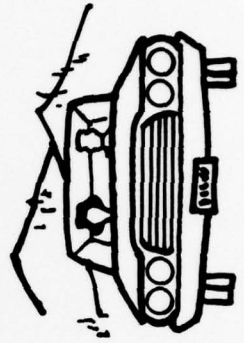
WEST BRANCH PAPILLION CREEK AND PAPILLION CREEK



AUTHORIZED PLAN

The authorized plan for West Branch Papillion Creek consists of 9 dams and reservoirs. Land has been acquired for Site 20. Plans have been nearly completed for Sites 15 and 18 respectively. The analysis of the authorized plan, including alternatives, will be completed during Fiscal Year 1976. Construction of the authorized dams and reservoirs will be postponed until the analysis is completed. The analysis includes the following alternatives:

- The authorized dams and reservoirs;
- Additional dams and reservoirs;
- Channel improvements;
- Levees;
- Floodproofing;
- Evacuation of flood plain development;
- Flood plain regulations; and
- Combinations of these measures.



Other Tributaries

Other tributary streams in the Papillion Creek basin, which were investigated include Betz Ditch, Cole Creek, and Hell Creek.

Betz Ditch is located in Bellevue, Nebraska and drains about 1.8 square miles of area. Structural and non-structural solutions to the flood problems were investigated. It is concluded that structural measures would be economically infeasible by a wide margin. Flood plain regulations appear to be the most practicable early action for the Betz Ditch flood problem.

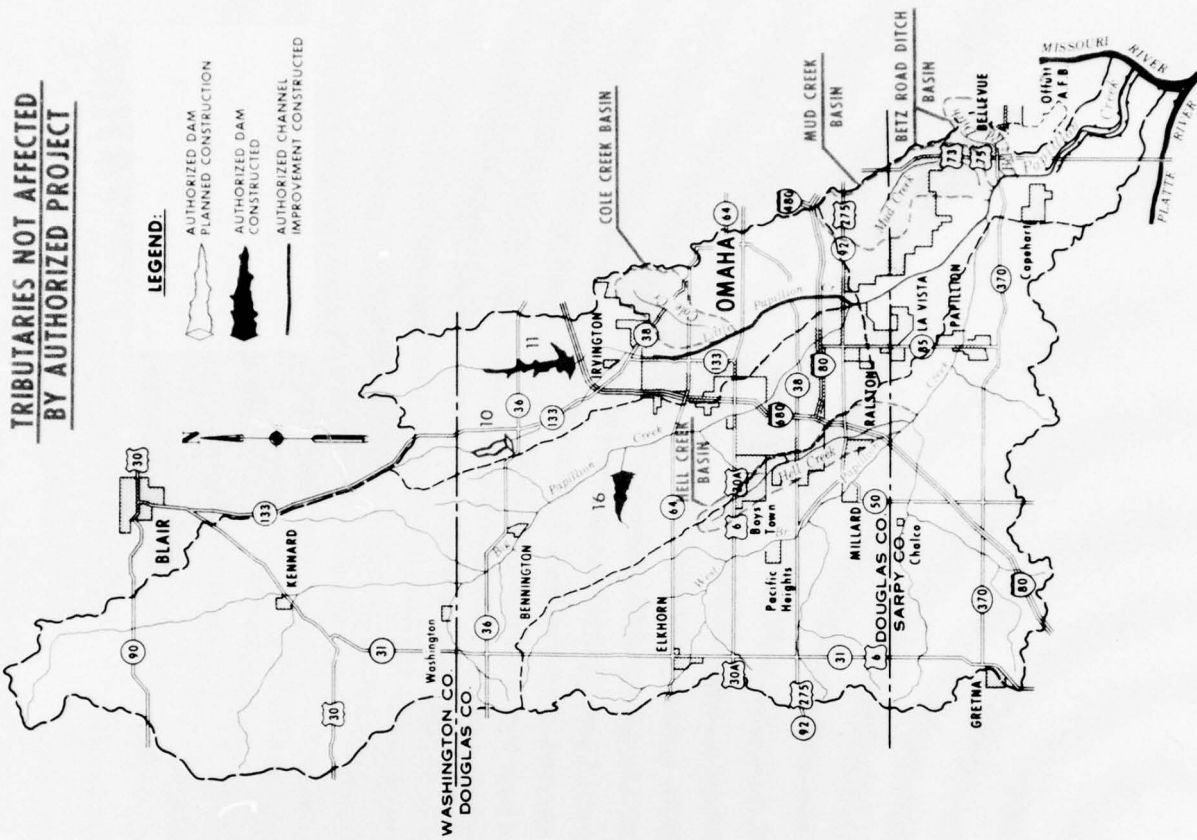
Cole Creek is a small tributary of Little Papillion Creek, entering that stream in the central portion of the city of Omaha. The creek drains nearly 6.1 square miles of area and flood plains along the creek are nearly fully developed. Both structural and non-structural solutions were investigated and found to be impractical. It is concluded that a program of channel maintenance and flood plain regulations and insurance is the most practical program for Cole Creek. Regulations have been adopted for Cole Creek.

Hell Creek is a tributary of West Branch Papillion Creek, entering that stream upstream from Papillion, Nebraska. The stream drains about 5.7 square miles. The upstream portion of the basin is developed and development is occurring in the downstream portion of the basin. Flood plain regulations, which are in effect, appear to be the most practicable program for Hell Creek.

MUD CREEK

Mud Creek is a left bank tributary of Papillion Creek. The Mud Creek basin begins in Douglas County. The southern portion of the basin, in Sarpy County, has mostly residential development except for industrial and commercial developments along Highway 73-75. Mud Creek drains an area of 1,600 acres, has a basin width of about 1 mile, and flows in a southerly direction from northwest of Bellevue, Nebraska to its confluence with Papillion Creek to the west of Bellevue. It is estimated that the intermediate regional flood would cause about \$100,000 in damages at current price levels.

Alternative plans considered include: flood plain regulation, evacuation, flood proofing, levees and channel improvements. Preliminary studies indicate a channel designed for an 8-year flood would be marginally feasible.



WHICH IS THE BEST WAY?

This booklet presented a summary of flood problems and possible alternative solutions for the study area streams. Based on the results of the studies, it appears that the most practicable solution to the flood problems along the Boyer River at Missouri Valley, along Mosquito Creek near Council Bluffs, and along the Lower Platte and Elkhorn Rivers would be a program of flood plain regulations and insurance.

Levees

A major portion of Council Bluffs, Iowa is subject to flood damages from Indian Creek overflows. Alternative plans for minimizing flood damages in the affected areas appear to be feasible; however, each of the alternative plans would require a major local investment.

In the Papillion Creek basin, plans for minimizing flood damages are in various stages of implementation. For the Little Papillion Creek, a plan consisting of 2 dams

and reservoirs, channel improvements along Little Papillion Creek, and flood plain regulations is nearing completion. In the Big Papillion Creek basin, alternative plans are available from which a choice can be made. This booklet presented information on these alternative plans.

In the West Branch Papillion Creek, further study of alternative plans is underway and is expected to be completed during Fiscal Year 1976. Along the smaller tributaries in the Papillion Creek basin, it appears that a program of flood plain regulations and insurance is the most practicable solution to the flood problems.

There is a large amount of environmental assessment material available for the streams in the area including Papio Creek and the Missouri River. This has not been included because of its volume, but it is available by request from the Omaha District.

Flood Plain Regulations

FLOOD INSURANCE

EVACUATION

Channel Improvements

Dams & Reservoirs

THE CITIZEN'S ROLE

The citizen must investigate the facts regarding alternatives presented. If additional questions arise, the citizen has the obligation to ask responsible officials for answers. The eventual selection of any alternative is a citizen choice. Elected officials in implementing agencies ultimately respond to the desires of those affected.

THE CORPS' ROLE

The Corps' role is to provide local interests with information on flood problems and alternative solutions. If a plan is found to be feasible and is supported by local interests, the Corps will seek authorization for plan implementation.

WHERE DOES THE STUDY GO NEXT?

The study will be provided to State, county, and local officials to guide their future decision making. Your input concerning the alternatives will be valuable to their future actions. Comments, opinions, and questions on information contained in this booklet may be sent to:

U. S. Army Corps of Engineers
Omaha District
Regional Planning Branch
215 North 17th Street
Omaha, Nebraska 68102

OMAHA DISTRICT
REGIONAL PLANNING BRANCH
U. S. ARMY CORPS OF ENGINEERS
6014 U. S. POST OFFICE & COURT HOUSE,
215 NORTH 17th STREET,
OMAHA, NEBRASKA 68102

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WHAT DO YOU THINK

Be An Opinion Leader for the Papio; How It Is Built Reflects Your Participation

DEPARTMENT OF THE ARMY
 DISTRICT OFFICE AND DISTRICT ENGINEER
 1115 N. 10TH STREET, LINCOLN, NEBRASKA 68502



23 June 1975

PAPILLION CREEK TRIBUTARIES AND LAKES PROJECT

Dear Concerned Citizen:
 You are invited to participate in decisions regarding flood control on Papillion Creek and its tributaries. In 1975, the Corps will present a summary of our current evaluation of the authorized Papillion Creek and tributaries area project.

Your current reevaluation was identified alternative plans for the Little Papio flood plain. The Big Papio through July 1975, the Corps will reevaluate plans for the Little Papio flood plain that will be developed. We are interested in your views on that alternative plan. We will review your comments, and we will make recommendations on the basis of the plan. We will make recommendations on the basis of the plan. We will make recommendations on the basis of the plan.

Russell A. Glenn
 RUSSELL A. GLENN
 Colonel, Corps of Engineers
 District Engineer

If you desire additional information on these plans, please write to me at the above address.

BACKGROUND

In 1961, the Corps of Engineers completed a study for flood control on Papillion Creek and its tributaries. The study resulted in the authorization and construction, in the 1960's, of channel improvements on Little Papio Creek from Maple Street to the Big Papio Creek. The project provided flood protection for urban and industrial developments along the creek's flood plain; however, later developments in the basin reduced the flood protection to an unacceptable level.

The devastating flood of June 1964 generated renewed interest in flood control for the Papio Basin. In response to requests from local interests, the Corps of Engineers and the Soil Conservation Service (SCS), in cooperation with the Papio Watershed Advisory Board, undertook studies for developing flood control plans. Initially, the Corps identified 8 potential damsites and the SCS identified 13 additional sites and developed a plan for 52 grade stabilization structures.

Before the studies were completed, it was agreed the Corps should develop plans for the dams and the SCS should develop plans for the stabilization structures and for land treatment measures. The Corps' report on its part of the study was completed in early 1967. That report recommended a plan consisting of 21 dams and lakes for flood control, water quality, recreation, and fish and wildlife enhancement. Congress authorized the plan in the Flood Control Act of 1968.

The SCS program of grade stabilization structures and land treatment was drawn up under the provisions of Public Law 566, "Watershed Work Program." In addition, the overall plan included certain local actions for maintaining downstream flowage capabilities. Together, these three companion plans would, if implemented, provide erosion control in the upstream rural areas of the basin and reduce flood damages in the downstream urban areas.

Plans such as the one for Papio Creek and its Tributaries are reviewed each year to determine whether elements of the plan are still economically justified. Also, periodic reviews of the plan determine whether it is consistent with current laws, policies, and criteria regarding water resources projects.

Since the periodic review of the plan in 1971, project costs have risen substantially. In addition, the Environmental Impact Statement for the project needed review to determine that it reflected changes in environmental impacts resulting from the plan of improvement.

Thus, the current reevaluation is more than just an economic update; it is a periodic review and includes consideration of present economic, social, and environmental effects of the authorized plan and offers potential alternatives to the authorized plan.

The following two factors have significant bearing on the present reevaluation process:

- (1) Major increases in land and construction costs have occurred since project authorization; and
- (2) In 1973, Congress passed Public Law 93-234 which amended the National Flood Insurance Program. This Act requires local interests to regulate flood plain use by 1 July 1975 in order to become eligible for flood insurance and other Federal assistance programs.

Regulation of flood plain use reduces the potential for future flood damages by precluding development below the 100-year flood level. This, in turn, reduces future flood protection benefits that would be attributed to the project.

This combination of factors made necessary the review of the relationship of structural and non-structural components of the plan.

In July 1974, the Corps initiated this periodic review of the Papio project as a part of the Metropolitan Omaha, Nebraska - Council Bluffs, Iowa Urban Study.

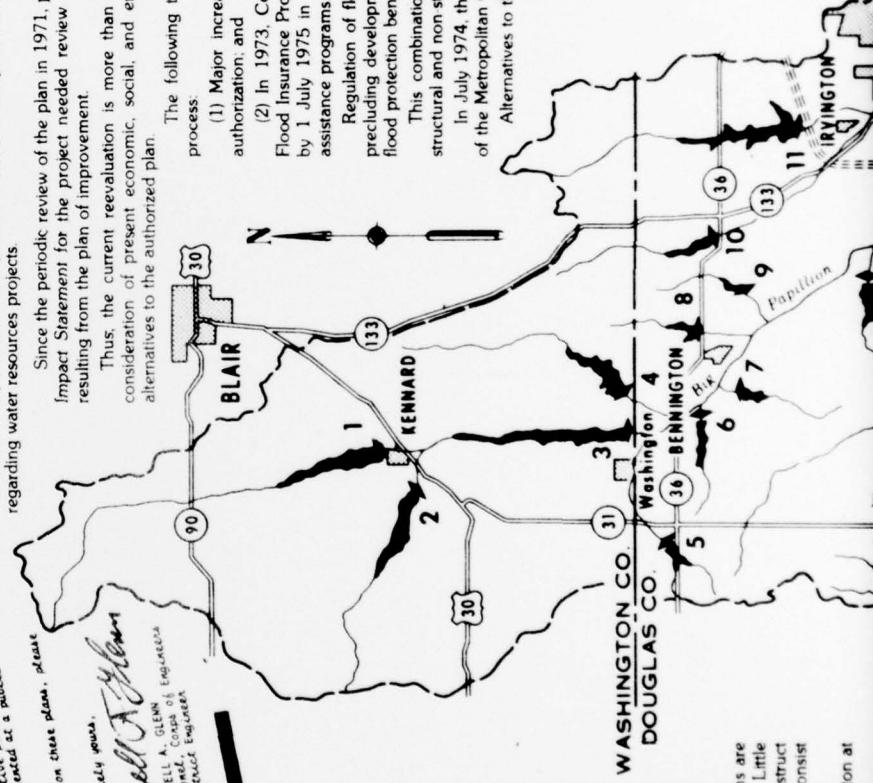
Alternatives to the authorized 29 dam plan are summarized in this leaflet.

BIG PAPIO ALTERNATIVES MIRROR UPDATED THINKING

The authorized plan for the Big Papio basin included 10 dams and lakes plus flood plain regulation. Dam 16 is the only element of the plan that has been constructed. Because existing development in the basin is extensive, nonstructural measures such as temporary evacuation, permanent evacuation, flood plain regulation, and other measures were not found to be effective alternatives for flood control.

Dams 4 thru 9 were found to be no longer economically justified and were dropped from further consideration.

As an alternative, Dams 1, 2, and 3 would be constructed and could be operated either as "wet" dams with water for recreational use or as "dry" dams without water. The choice between "wet" and "dry" dams is an opportunity which rests with State and local governments and requires their willingness to share costs of facilities and to assume operation and



GO AHEAD ON "10" IS LITTLE PAPIO STORY

Like its big brother, the Little Papio's flood plains are highly developed. The current reevaluation of the Little Papio plan clearly demonstrates the need to construct Dam 10 without delay. Other elements of the plan consist of

- (1) A Dam and Reservoir upstream from Irvington at Site 11;

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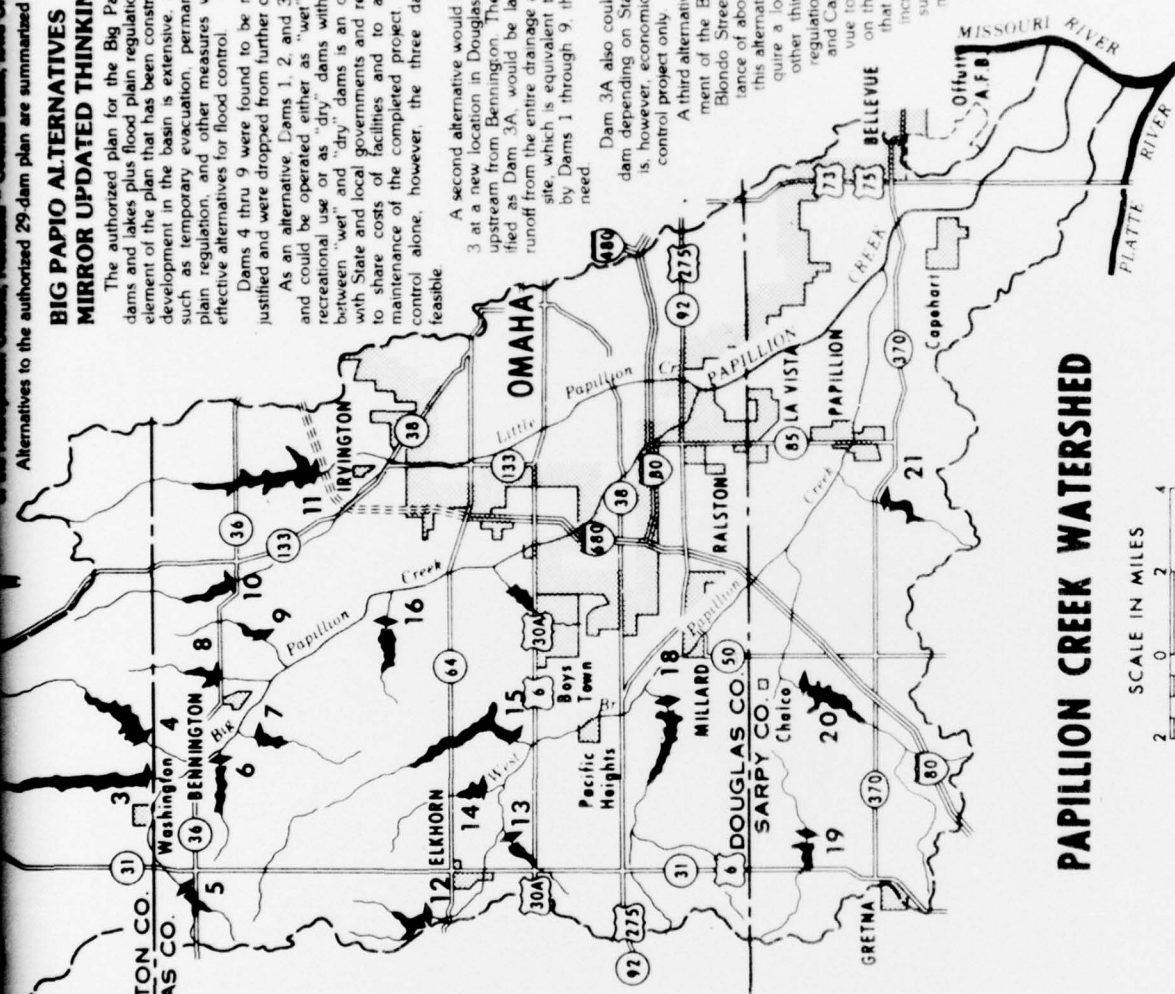
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A second alternative would be construction of Dam 3 at a new location in Douglas County about 2 miles upstream from Bennington. The relocated dam, identified as Dam 3A, would be large enough to control runoff from the entire drainage area upstream from the site, which is equivalent to the control provided by Dams 1 through 9, thereby eliminating their need.

Dam 3A also could be a "wet" or "dry" dam depending on State and local desires. It is, however, economically feasible as a flood control project only.

A third alternative would be the enlargement of the Big Papio channel from Blondo Street to "Q" Street, a distance of about 7 miles. Adoption of this alternative, however, would require a local sponsor to, among other things, adopt flood plain regulations between "Q" Street and Capehart Road near Bellevue to prevent encroachment on the natural flood plain as that area would experience increased flooding as a result of the enlarged channel. Details of these alternative plans will be presented at the public meeting.



PAPILLION CREEK WATERSHED

GO AHEAD ON "10" IS LITTLE PAPIO STORY

Like its big brother, the Little Papio's flood plains are highly developed. The current reevaluation of the Little Papio plan clearly demonstrates the need to construct Dam 10 without delay. Other elements of the plan consist of

- (1) A Dam and Reservoir upstream from Irvington at Site 11;
 - (2) The already completed Little Papio Creek channel improvement, and
 - (3) Flood plain regulation along the Little Papio to prevent encroachment on the remaining flood plain areas downstream from the dams.
- These three elements of the plan are either accomplished or are nearing completion; thus, construction of Dam 10 would complete the Little Papio authorized plan and would provide an acceptable degree of flood protection.

PAPIO WEST BRANCH

The authorized plan for West Branch Papio Creek consists of 9 Dams and Reservoirs. Nearly all of the land for Dam 20 has been acquired. No real estate acquisitions or construction has occurred on the other 8 sites.

The implementation of flood plain regulation along the West Branch has had a pronounced effect on the authorized plan. Current economic analyses show that the 9 dams are no longer economically feasible for flood control alone. Further action leading to construction of the West Branch plan has been postponed pending a complete reformulation of the plan.

The reformulation has been initiated and should be completed during the next year. Residents and land owners in the West Branch Basin will have the opportunity, and will be encouraged to provide their views and suggestions during the reformulation process.

Because Papio Creek will be affected by actions taken in the West Branch basin, alternatives for that stream also will be considered in the reformulation studies.

THIS IS WHAT WE HAVE

- 16 - Dam 16 is essentially complete except for development of the recreational facilities. Public access to this project should be available in 1976.
- 11 - Dam 11 is nearing completion and should begin storing water in 1976.
- 20 - Dam 20 land acquisition is essentially completed.

Attend the June 25 Meeting 7:30 p.m. At the Boys Town Auditorium

Submit Your Comments to:

DEPARTMENT OF THE ARMY
Omaha District, Corps of Engineers
6014 U. S. Post Office and Court House
Omaha, Nebraska 68102
ATTN: MROPD-R or Phone 221-4574