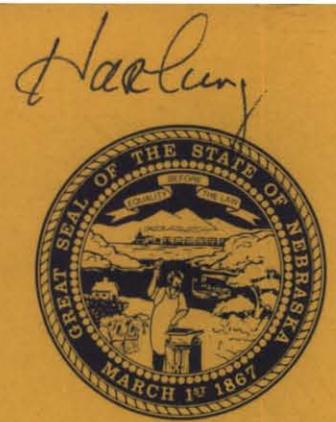


NEBRASKA NATURAL
RESOURCES COMMISSION

STATE WATER PLAN
PUBLICATION NO. 301-4



Status Summary
Volume 1
Potential Projects

FOURTH REVISION
MARCH 1979

STATE OF NEBRASKA
CHARLES THONE, GOVERNOR

Nebraska Natural Resources Commission
Dayle E. Williamson, Executive Secretary

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Robert Gifford, Chairman

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Howard Hardy	Dempsey McNiel
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Benny Martin	- U. S. Department of Agriculture
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Report Prepared by the Planning Division
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Gerald Wallin, Head, Comprehensive Planning Section
Steve Soberski, Water Resources Planner
Carol Dowling, Secretary
Laurie Fredrick, MC/ST Operator

PROGRAMS:

SOIL & WATER CONSERVATION
WATERSHED PROTECTION
COMPREHENSIVE PLANNING
FLOOD PLAIN MANAGEMENT
DATA BANK
WATER QUALITY PLANNING
DEVELOPMENT FUND



STATE OF NEBRASKA

NATURAL RESOURCES COMMISSION

P. O. Box 94876
Lincoln, Nebraska 68509

Office Location:
Fourth Floor
301 Centennial Mall South

March 8, 1979

The Honorable Charles Thone, Governor

and

Members of the Legislature

The Natural Resources Commission is submitting this revision of Volume 1 of the Status Summary as the final publication in the original State Water Plan series. In response to the Legislature's directive to redirect and accelerate water resources planning, the involved state agencies have developed a revised State Water Planning and Review Process that does not include a "State Water Plan" as originally designed. Since it will still be some months before the revised process can be fully implemented, the Commission has prepared this publication to provide current information on potential projects as directed in Legislative Resolution 47 of the 1972 session.

This revised Volume 1 summarizes potential state and federal projects planned or being planned on January 1, 1977. The project summaries include brief descriptions of the project area, project features, and current status of the project. This edition also includes information on the change of status of former potential projects summarized in the original volume and subsequent revisions to give some indication of progress in water resource development in the past ten years.

The publication is intended to provide those people who must make the decisions vital to Nebraska's future development a source of readily available information upon which they can base their decision.

Very truly yours,

A handwritten signature in cursive script that reads "Robert Gifford".

Bob Gifford, Chairman

The State Water Advisory Team provided review and comments for this revision.

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Preparation and publication of this report was supported in part by grants from the Federal Water Resources Council under Title III of the 1965 Water Resources Planning Act.

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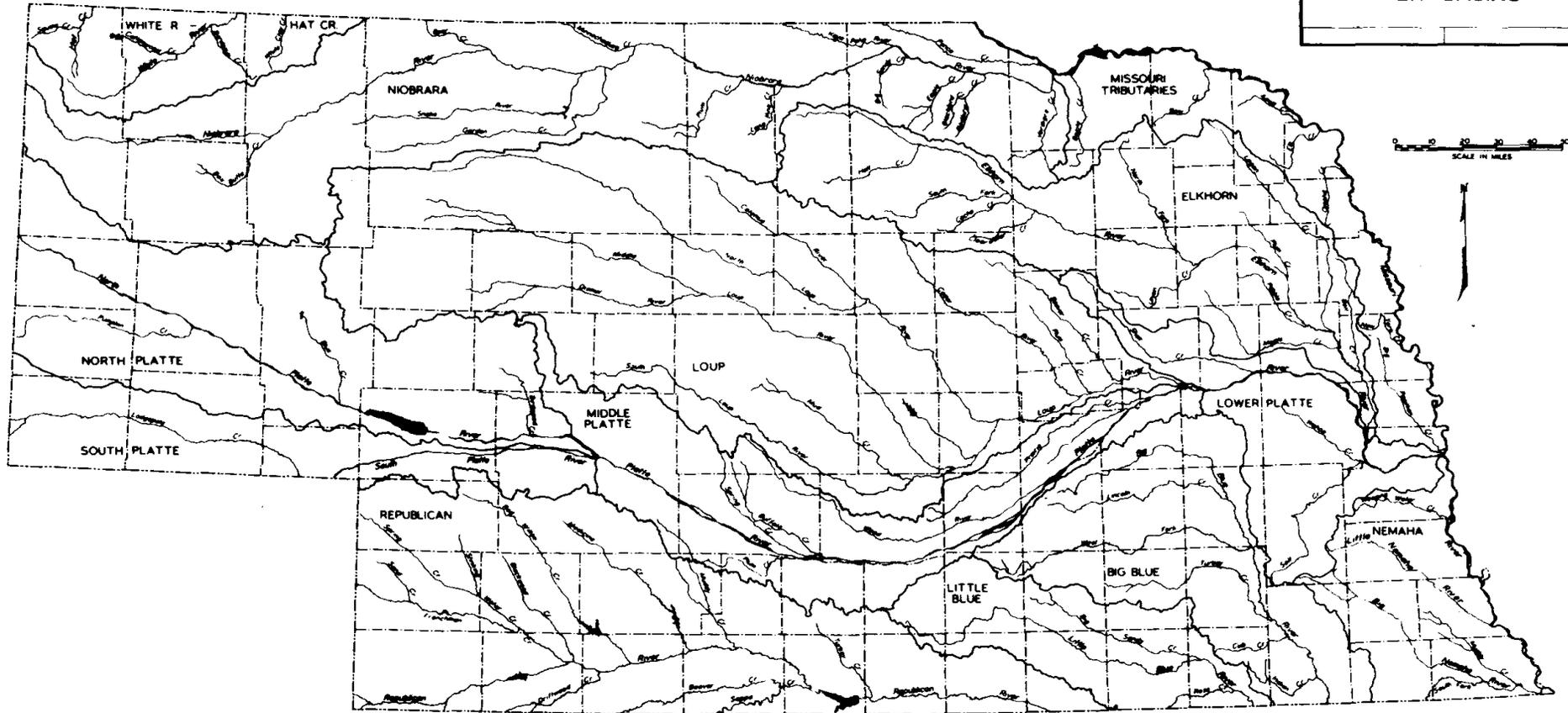
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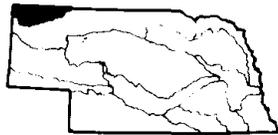
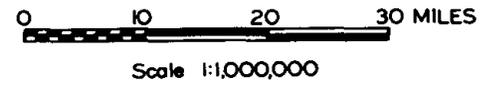
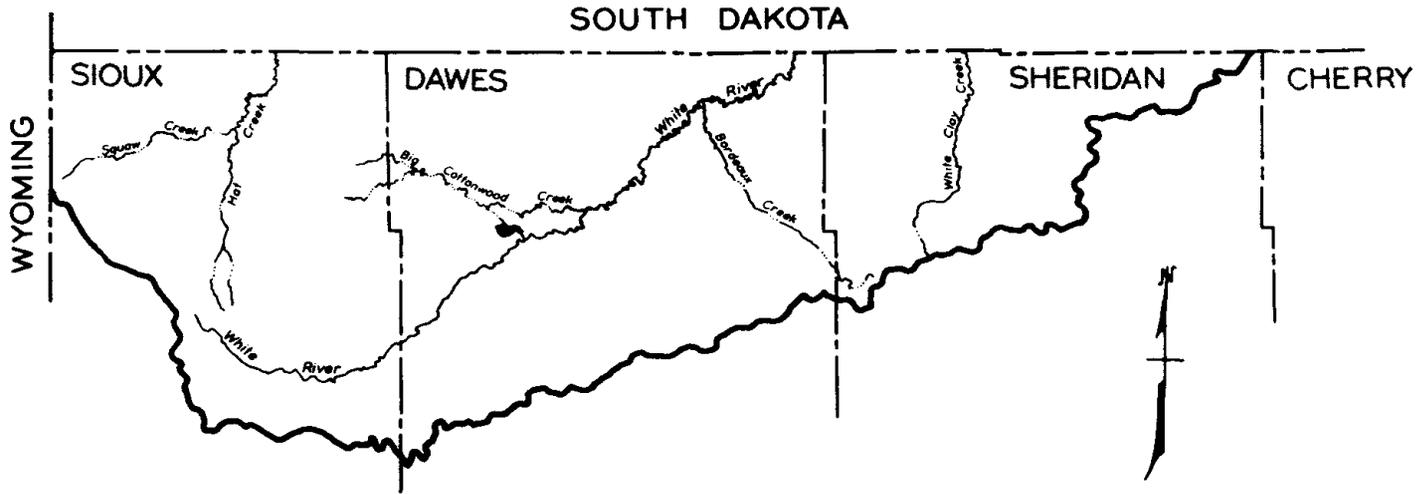
ABBREVIATIONS

BuRec	Bureau of Reclamation
COE	Corps of Engineers
EDA	Economic Development Administration
FmHa	Farmers Home Administration
MW	Megawatts
NAWAPA	North American Water and Power Alliance
NRD	Natural Resource District
P-SMBP	Pick-Sloan Missouri Basin Program
SCS	Soil Conservation Service
UNL	University of Nebraska-Lincoln

RIVER BASINS



WHITE RIVER-HAT CREEK BASIN



- LEGEND*
-  EXISTING PROJECT SERVICE AREA
 -  EXISTING DAM & RESERVOIR
- *NOTE: All basin map legends were standardized and all features will not appear on every map.

CHAPTER 1. WHITE RIVER - HAT CREEK BASIN

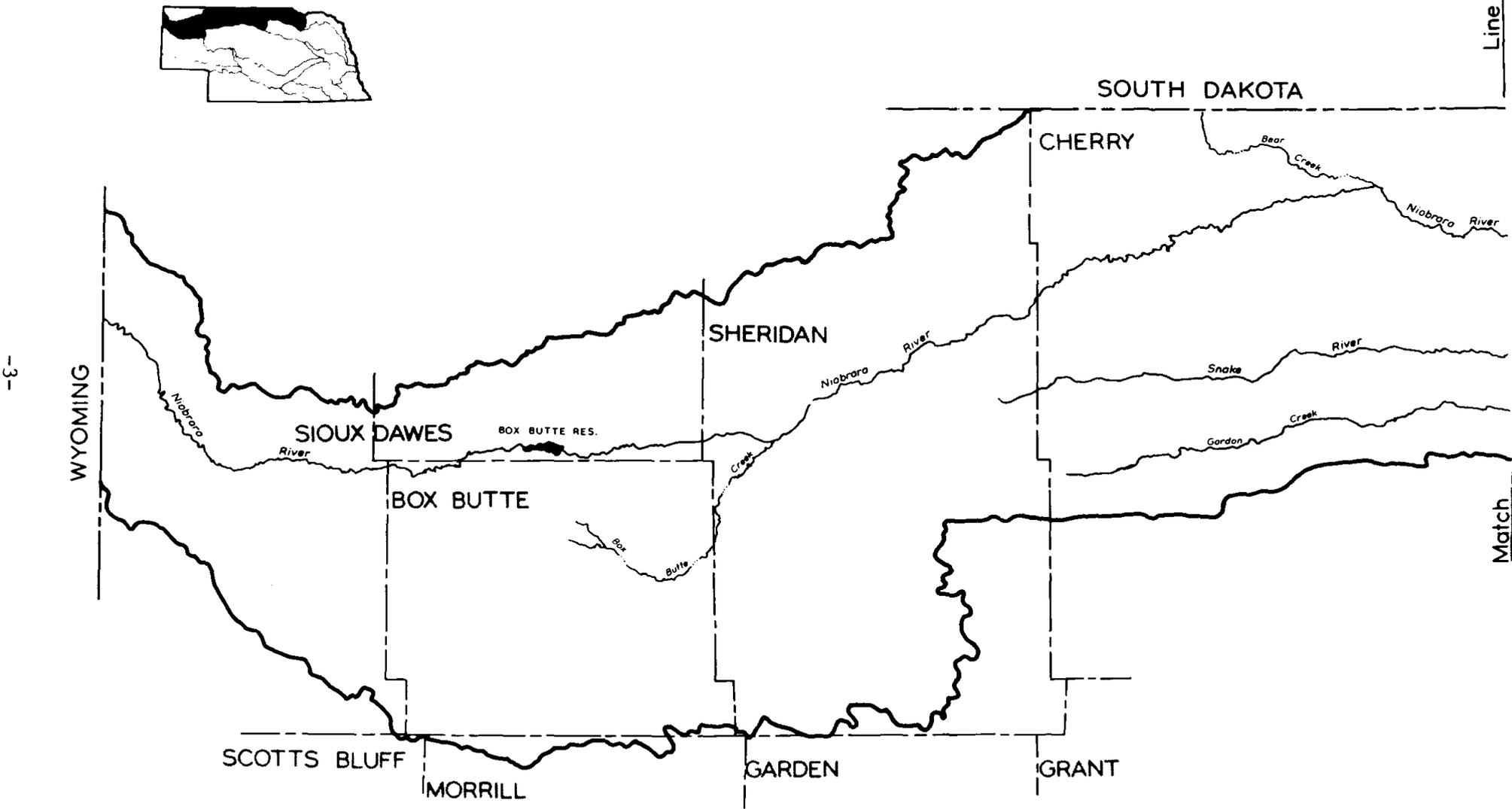
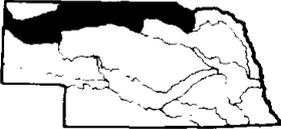
This Basin is located in the extreme northwestern corner of the State. It includes only 2,130 square miles within Nebraska, making it the smallest Basin. The White River, with its many tributaries, drains the major portion of the Basin. Hat Creek, which drains the remainder of the Basin, rises in the northwestern part of Sioux County and flows northward into the Cheyenne River in South Dakota.

Potential Projects

There are no documented potential projects in this Basin of the type presented in this volume.

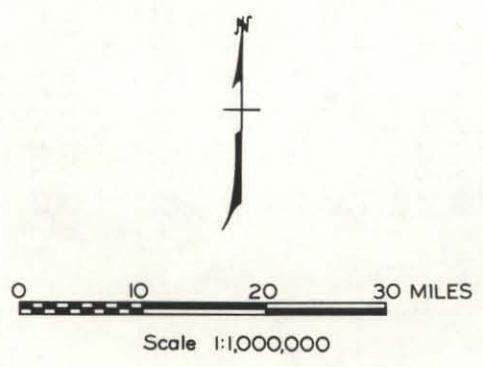
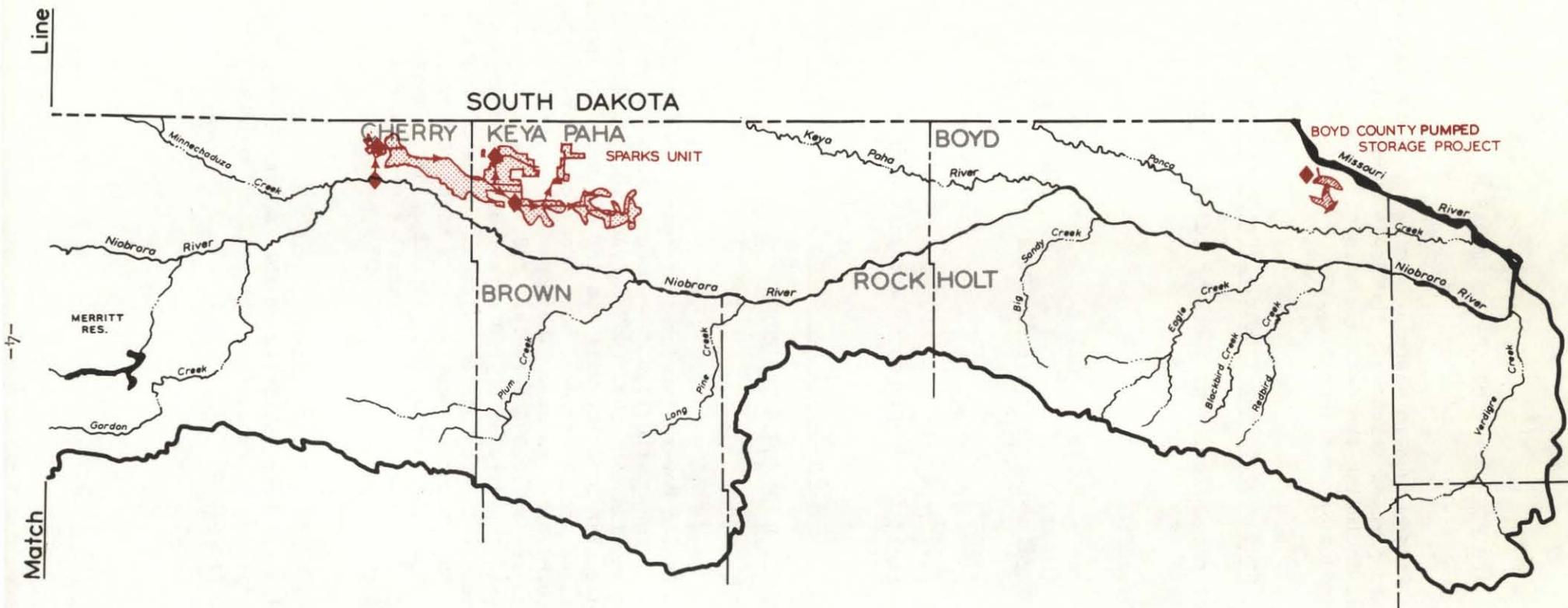
NIOBRARA RIVER BASIN

Sheet 1 of 2



NIOBRARA RIVER BASIN

Sheet 2 of 2



- LEGEND***
- PROPOSED DAM & RESERVOIR SITE
 - PROPOSED CANAL
 - PROPOSED PROJECT SERVICE AREA
 - PROPOSED PUMPING/GENERATING PLANT
 - PROPOSED DIVERSION DAM
 - PROPOSED RIVER SIPHON
 - PROPOSED WATERSHED PROJECT
 - PROPOSED FLOODWAY
 - PROPOSED LOCAL FLOOD PROTECTION PROJECT
 - PROPOSED PROJECT WELL
 - EXISTING PROJECT SERVICE AREA
 - EXISTING DAM & RESERVOIR

*NOTE: All basin map legends were standardized and all features will not appear on every map.

CHAPTER 2. NIOBRARA RIVER BASIN

The Niobrara River rises in eastern Wyoming and flows eastward across the northern part of Nebraska. The Basin covers 11,870 square miles in Nebraska, including the drainage area of Ponca Creek and several minor Missouri River tributaries.

Status of Former Potential Projects

The status of the following projects included in previous editions of this publication has changed as noted below.

AUTHORIZED OR CONSTRUCTED

Niobrara Relocation Project (COE)
O'Neill Unit (BuRec)
Boyd County Rural Water District #2 (FmHa)

INACTIVE OR TERMINATED

Lavaca Flats Unit (BuRec)
Mirage Flats Project - Supplemental Water (BuRec)

Potential Projects

BOYD COUNTY PUMPED STORAGE POWER PROJECT

Description

The Nebraska Public Power District is responsible for the investigation and design of the 1336 MW pumped storage power plant proposed for construction near the town of Lynch in Boyd County. The hydroelectric generating facility will consist of two reservoirs, connecting waterways, and an underground powerhouse containing eight reversible 167 MW turbine-generators. The upper reservoir will have a total storage capacity of 74,000 acre-feet and the lower reservoir will have a total storage capacity of 60,000 acre-feet. The proposed power plant and lower reservoir are located adjacent to the Missouri River on Sunshine Bottom in northeastern Nebraska, six miles northwest of the town of Lynch. Recreational facilities are planned at both reservoirs, but they will not include water based recreational activities. The total estimated cost of the project is \$616,700,000.

Current Status

An application has been submitted to the Federal Energy Regulatory Commission for a license to construct, operate, and maintain the Boyd County Pumped Storage plant.

SPARKS UNIT

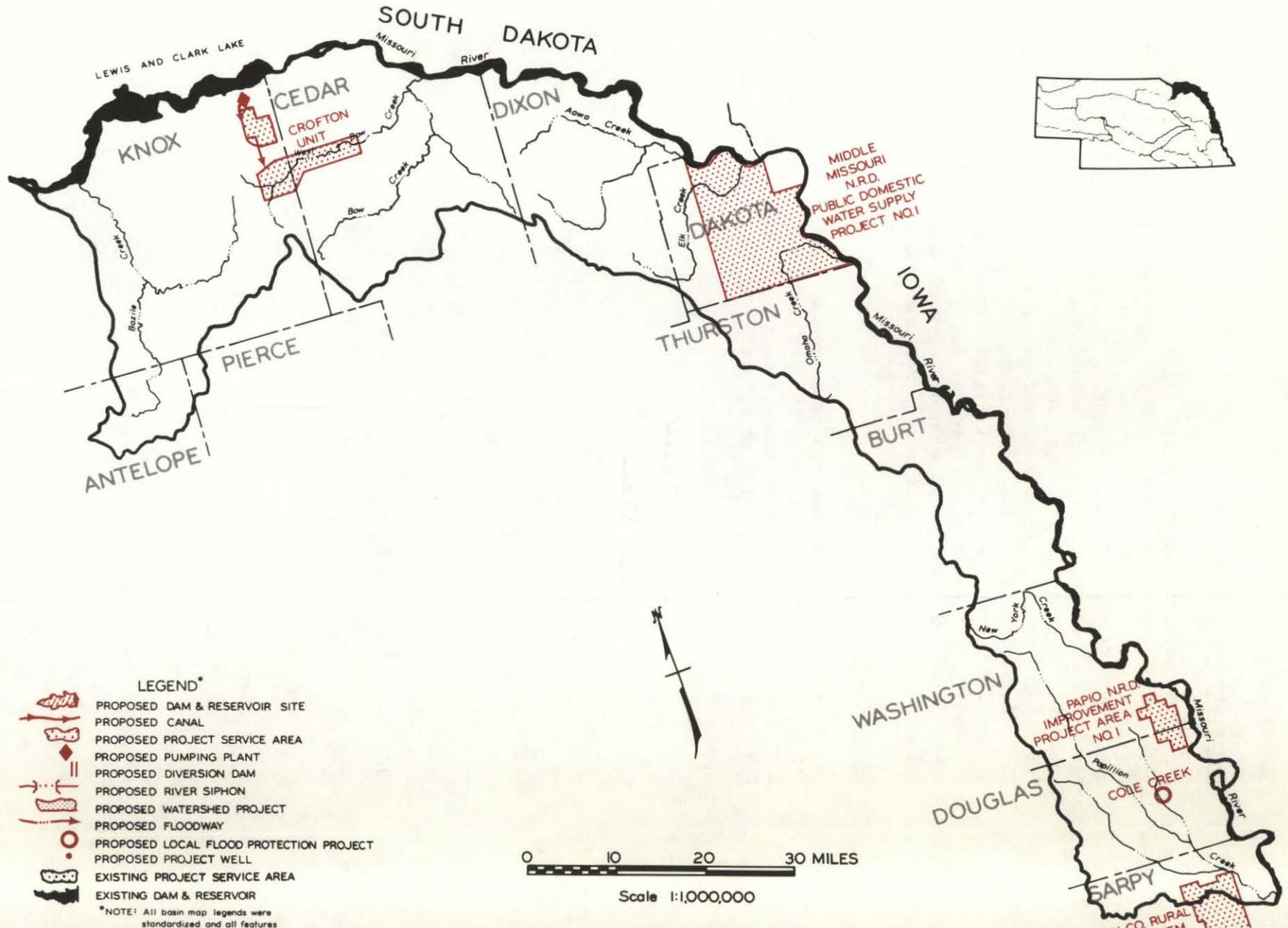
Description

This project, located north of the Niobrara River in Cherry and Keya Paha Counties, was initiated through the efforts of landowners and operators from the Norden-Sparks area. Assistance was requested from the Middle Niobrara Natural Resources District in preparing a project proposal. The project proposal identified areas to be irrigated, a route for the major irrigation canal, and the location of lift stations, forebay and partial off-season storage reservoir. Water from the Niobrara River will be lifted approximately 340 feet into a system of canals, transported to the irrigation sites and applied primarily by center-pivot systems. A total of 35,500 acres of irrigable lands were identified. The local sponsors have requested a study of the potential project by the Bureau of Reclamation.

Current Status

The Bureau of Reclamation is currently conducting an appraisal study, initiated in fiscal year 1978, to analyze the proposal. The final report containing recommendations regarding the potential for feasibility studies will be completed in fiscal year 1981.

MISSOURI TRIBUTARIES RIVER BASIN



LEGEND*

-  PROPOSED DAM & RESERVOIR SITE
-  PROPOSED CANAL
-  PROPOSED PROJECT SERVICE AREA
-  PROPOSED PUMPING PLANT
-  PROPOSED DIVERSION DAM
-  PROPOSED RIVER SIPHON
-  PROPOSED WATERSHED PROJECT
-  PROPOSED FLOODWAY
-  PROPOSED LOCAL FLOOD PROTECTION PROJECT
-  PROPOSED PROJECT WELL
-  EXISTING PROJECT SERVICE AREA
-  EXISTING DAM & RESERVOIR

*NOTE: All basin map legends were standardized and all features

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Scale 1:1,000,000

CHAPTER 3. MISSOURI TRIBUTARIES RIVER BASIN

This Basin occupies a narrow strip of land along the eastern and northeastern borders of the State between the mouths of the Niobrara and Platte Rivers. The Basin, totaling 2,950 square miles, is composed of the drainage areas of a number of small streams directly tributary to the Missouri River and the portions of the Missouri River flood plain which connect these drainage areas.

Status of Former Potential Projects

The status of the following projects included in previous editions has changed as noted below.

AUTHORIZED OR CONSTRUCTED

Papillion Creek Watershed (SCS)
Aowa Creek Watershed (SCS)
Papillion Creek and Tributaries (COE)
Tekamah-Mud Watershed (SCS)

INACTIVE OR TERMINATED

Mud Creek near Bellevue (COE)

Potential Projects

PAPIO NATURAL RESOURCES DISTRICT IMPROVEMENT PROJECT AREA #1

Description

This proposed Papio Natural Resources District project is located in northeastern Douglas and southeastern Washington Counties. It will provide water service to rural users and the village of Fort Calhoun. Project features include a supply system designed to distribute water through 22 miles of pipe ranging in size from 2 to 14 inches in diameter. The source of supply will be the Metropolitan Utilities District. The total estimated project cost is \$1,500,000.

Current Status

An engineering study and report were completed in November 1974 and a supplemental study and report in September 1975. Project funds have been approved by Farmers Home Administration for both the Papio Natural Resources District and the City of Fort Calhoun. Final plans and specifications have been completed and construction is scheduled to start in the spring of 1979.

SARPY COUNTY RURAL WATER SYSTEM

Description

This proposed Papio Natural Resources District rural domestic and livestock water supply project is located within Sarpy County south of the city of Papillion. The city is developing a well field along the Platte River, with a water treatment facility and transmission main to the city. This water source will be used in the development of the proposed project and in the determination of the service areas supplied by the Rural Water System. The project will serve approximately 209 users at an annual project cost of \$55,278 and a monthly cost per user of \$33.62. The total estimated cost of the project is \$463,528.

Current Status

A pre-application for Federal funding assistance has been approved by the Farmers Home Administration.

COLE CREEK BANK STABILIZATION PROJECT

Description

This Papio Natural Resources District project is located within the city limits of Omaha along Cole Creek from Little Papillion Creek to the upstream side of Western Avenue. The project objectives are to control flood damages and to reduce stream bank erosion. The plan selected to control flooding and resulting erosion will involve open channel improvements with minor channel alignment changes. The project installation cost is estimated to be \$1,465,000, and the annual costs at 6 5/8 percent are \$121,550. Estimated annual benefits are \$166,000, producing a 1.3 to 1.0 benefit/cost ratio.

Current Status

The Papio Natural Resources District has budgeted funds for detailed design of the project but the status for funding of construction is unknown at this time.

CROFTON UNIT

Description

This proposed Bureau of Reclamation project is located in northwestern Knox and northern Cedar Counties. Proposed alternatives evaluated include providing water to irrigate from 60,000 to 110,000 acres. The financial feasibility for irrigation development is dependent on securing pumping power through the Pick-Sloan Missouri Basin Program (P-SMBP) at program power rates, and P-SMBP power revenues for assisting in the repayment of that part of the capital costs that would be beyond the ability

of the irrigators to repay. It was assumed most of the irrigation under any of the alternatives would be accomplished by sprinkler application. Project features could include pumping plants, regulating reservoirs, and service canals.

Current Status

This project was first investigated on a subreconnaissance basis in 1957. An appraisal study has been funded and should be completed early in fiscal year 1979. Local interests have requested that the Bureau conduct a feasibility study of the entire area.

MIDDLE MISSOURI NATURAL RESOURCES DISTRICT PUBLIC DOMESTIC WATER
SUPPLY PROJECT #1

Description

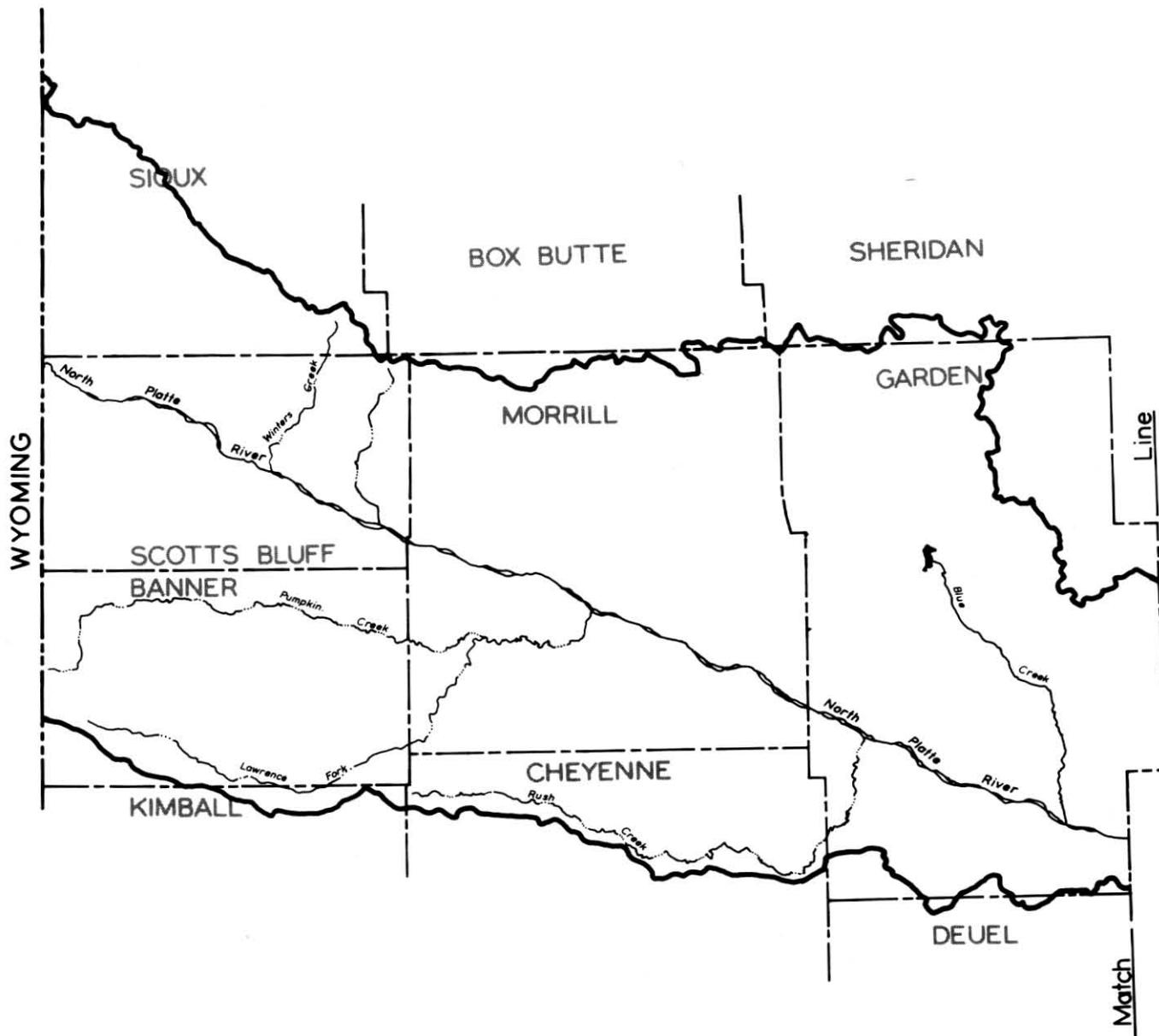
This Middle Missouri Natural Resources District project encompasses about forty percent of eastern Dakota County and will provide service to approximately 275 rural users. Project features include approximately 105 miles of pipe ranging in size from 2 to 12 inches in diameter and an elevated storage tank and a standpipe for pressure control. Water will be purchased from the Dakota City municipal system. The total estimated cost of constructing the project is \$1,600,000.

Current Status

Final design has been completed and easements are being obtained, and construction is scheduled for spring 1979.

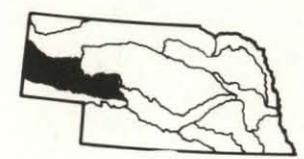
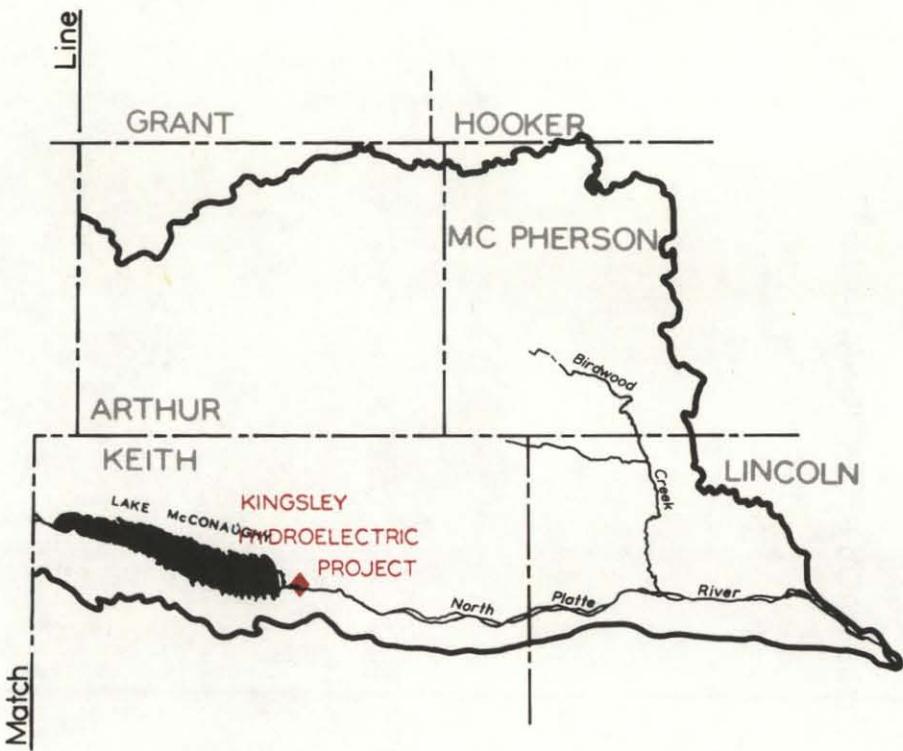
NORTH PLATTE RIVER BASIN

Sheet 1 of 2



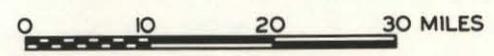
NORTH PLATTE RIVER BASIN

Sheet 2 of 2



- LEGEND***
- PROPOSED DAM & RESERVOIR SITE
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 - PROPOSED PROJECT WELL
 - EXISTING PROJECT SERVICE AREA
 - EXISTING DAM & RESERVOIR

*NOTE: All basin map legends were standardized and all features will not appear on every map.



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CHAPTER 4. NORTH PLATTE RIVER BASIN

This Basin is located in the western portion of the State near the central part of the Panhandle. It extends from the Wyoming-Nebraska state line to the confluence of the North and South Platte Rivers, encompassing an area of 7,140 square miles.

Status of Former Potential Projects

The status of the following projects included in previous editions has changed as noted below.

AUTHORIZED OR CONSTRUCTED

Winters Creek Watershed (SCS)
Mitchell Irrigation District Rehabilitation and Betterment (BuRec)

INACTIVE OR TERMINATED

Creighton Valley Watershed (SCS)
Ash-Plum Creek Watershed (SCS)
Gering-Fort Laramie Irrigation District Rehabilitation and Betterment (BuRec)
North Platte Local Flood Protection (COE)

Potential Projects

KINGSLEY HYDROELECTRIC PROJECT

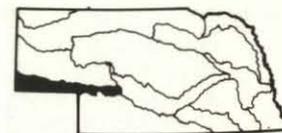
Description

The Central Nebraska Public Power and Irrigation District and the Nebraska Public Power District have applied for a license to construct the Kingsley Hydroelectric Project at the existing Kingsley Dam on the North Platte River in Keith County. This project includes the construction of a 50 megawatt hydroelectric generating plant to gain additional benefit from the irrigation water as it is released from Lake McConaughy. This requires the construction of a penstock inside the existing outlet tunnel, raising Keystone Diversion Dam to increase the storage capacity of Lake Ogallala below Kingsley Dam, and modifying the supply canal gates in the Keystone Dam. The increased storage capacity would allow the water to be stored temporarily in Lake Ogallala or released to meet downstream needs.

Current Status

A joint application by the Central Nebraska Public Power and Irrigation District and the Nebraska Public Power District has been submitted to the Federal Energy Regulatory Commission.

SOUTH PLATTE RIVER BASIN



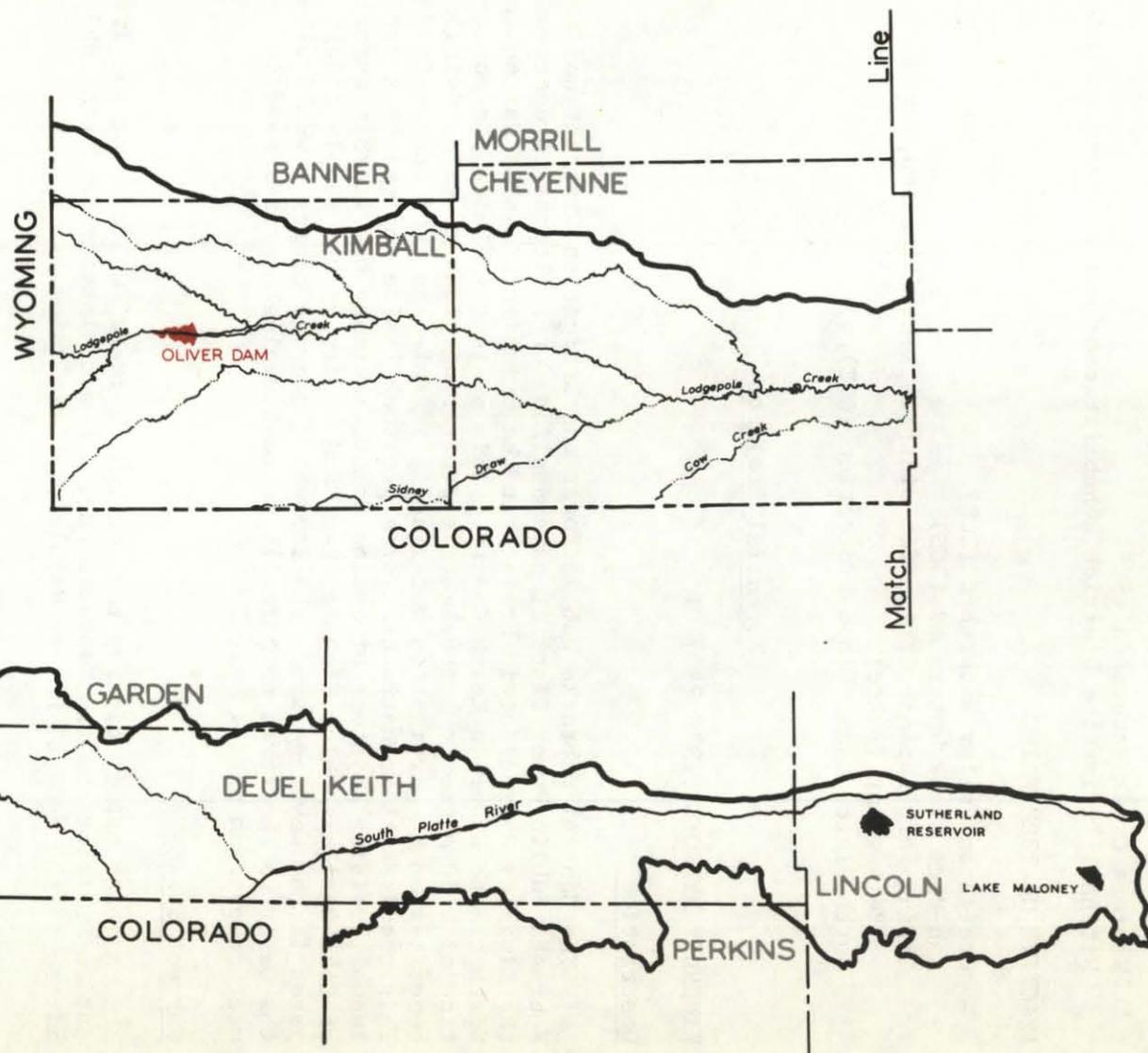
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Scale 1:1,000,000

LEGEND*

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-  PROPOSED CANAL
-  PROPOSED PROJECT SERVICE AREA
-  PROPOSED PUMPING PLANT
-  PROPOSED DIVERSION DAM
-  PROPOSED RIVER SIPHON
-  PROPOSED WATERSHED PROJECT
-  PROPOSED FLOODWAY
-  PROPOSED LOCAL FLOOD PROTECTION PROJECT
-  PROPOSED PROJECT WELL
-  EXISTING PROJECT SERVICE AREA
-  EXISTING DAM & RESERVOIR

*NOTE: All basin map legends were standardized and all features will not appear on every map.



CHAPTER 5. SOUTH PLATTE RIVER BASIN

The South Platte River Basin covers 3,150 square miles in a narrow strip along the southern Panhandle extending from the Wyoming-Nebraska state line to the confluence of the North and South Platte Rivers. Lodgepole Creek is the principal Nebraska tributary to the South Platte River, which originates in Colorado.

Status of Former Potential Projects

The status of the following projects included in previous editions has changed as noted below.

AUTHORIZED OR CONSTRUCTED

Brule Watershed Project (SCS)
Sedgwick-Sand Draws Watershed (SCS)

INACTIVE OR TERMINATED

Ogallala Tributary #6 (Twin Platte NRD)

Potential Projects

OLIVER DAM RECREATION PROJECT

Description

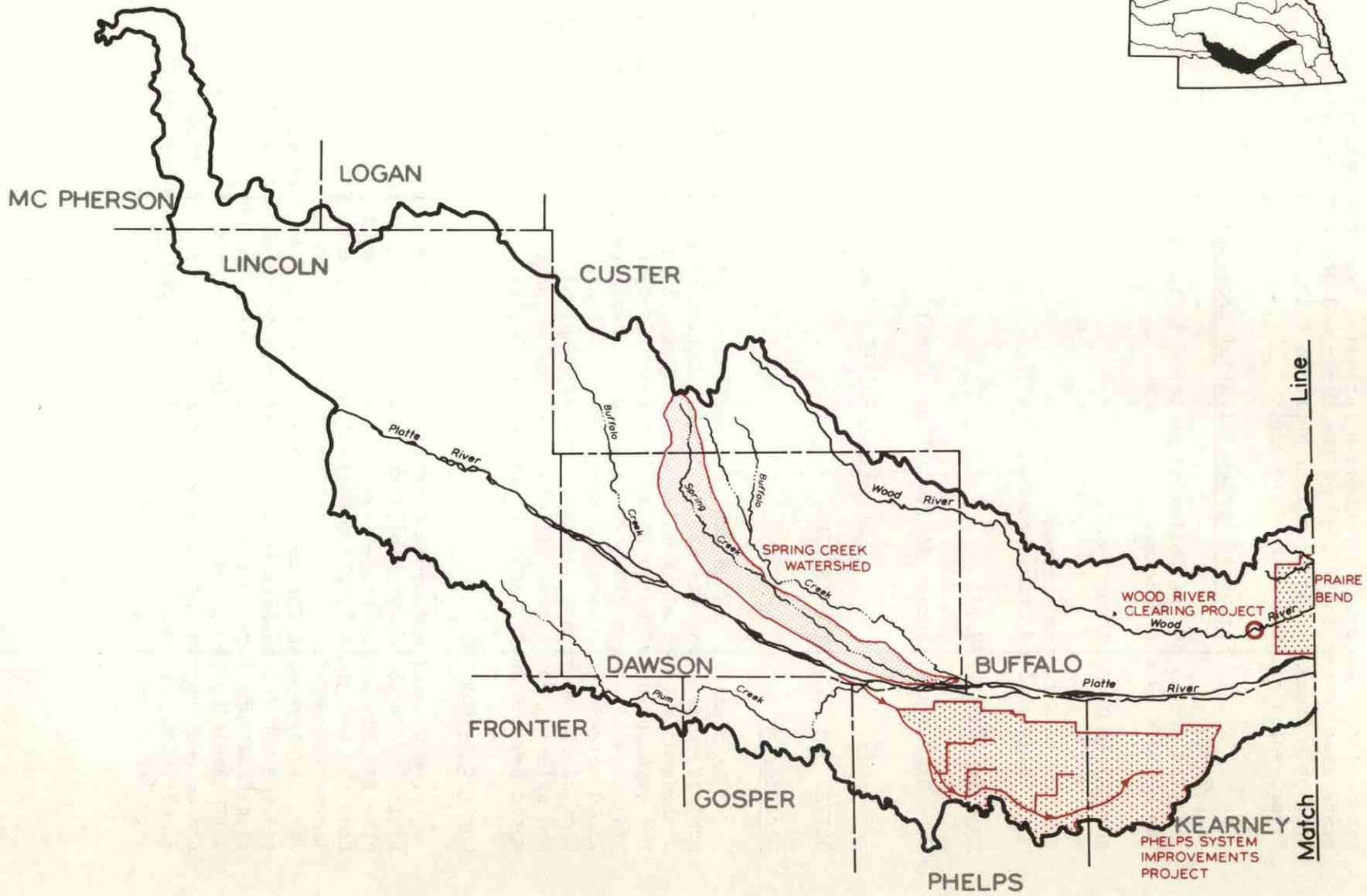
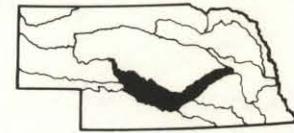
The South Platte Natural Resources District is the sponsor of the project, which consists of the rehabilitation of an existing dam located on Lodgepole Creek eight miles west of Kimball in Kimball County and the development of water based recreation facilities. The completed project will have a 270 acre lake and the capacity to store an additional 2,000 acre-feet between the normal water surface elevation and the elevation of the emergency spillway. Camping, picnicking, boating, fishing and swimming facilities will be developed as part of the project. Estimated project installation costs are \$1,808,412.

Current Status

The Natural Resources District has completed an engineering feasibility study for the rehabilitation of the dam and a recreation concept plan for the entire project area. Approval of funding has been received from the Resources Development Fund and the Heritage Conservation and Recreation Service. Final design of the structure is currently under way. An Agreement for Services has been entered into between the SCS and the NRD for an Architect and Engineering contract on the plans and specifications for the recreation facilities. The Corps of Engineers will condition the issuance of a Section 404 permit, on the subsequent review and approval of the design drawings and specifications. Land acquisition has been completed on 807 of the 980 acres involved. The acquisition of 171 acres is presently involved in litigation.

MIDDLE PLATTE RIVER BASIN

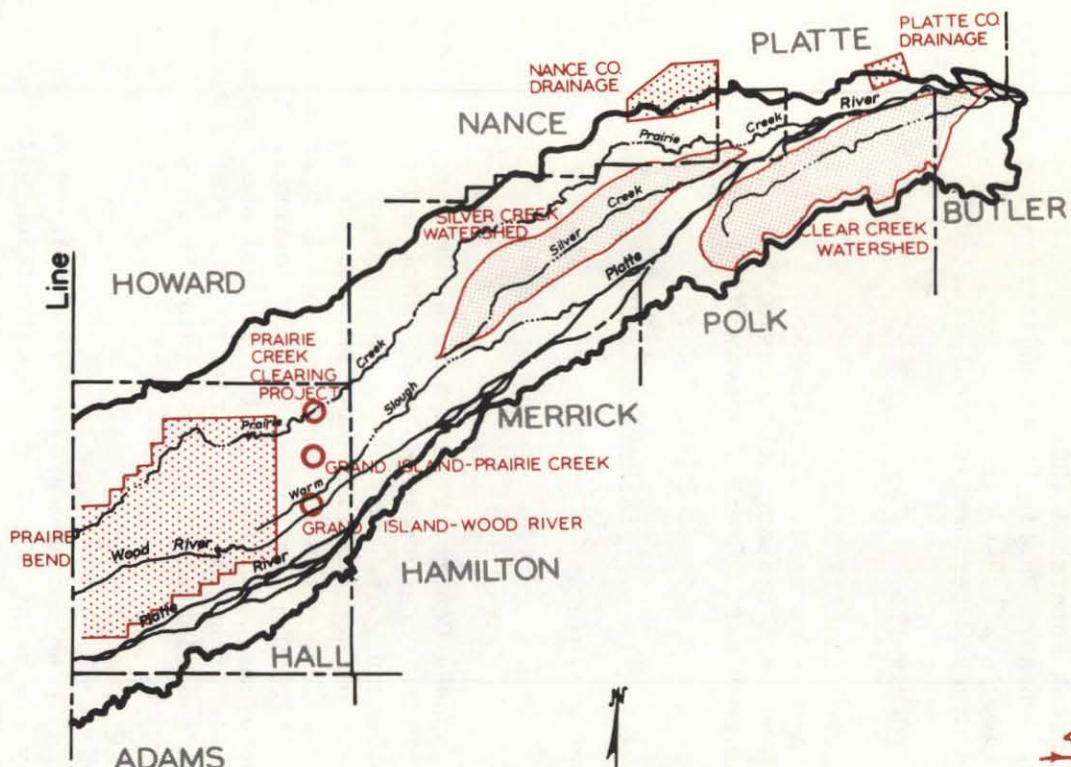
Sheet 1 of 2



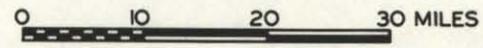
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MIDDLE PLATTE RIVER BASIN

Sheet 2 of 2



-18-



Scale 1:1,000,000

- LEGEND***
- PROPOSED DAM & RESERVOIR SITE
 - PROPOSED CANAL
 - PROPOSED PROJECT SERVICE AREA
 - PROPOSED PUMPING PLANT
 - PROPOSED DIVERSION DAM
 - PROPOSED RIVER SIPHON
 - PROPOSED WATERSHED PROJECT
 - PROPOSED FLOODWAY
 - PROPOSED LOCAL FLOOD PROTECTION PROJECT
 - PROPOSED PROJECT WELL
 - EXISTING PROJECT SERVICE AREA
 - EXISTING DAM & RESERVOIR

*NOTE: All basin map legends were standardized and all features will not appear on every map.

CHAPTER 6. MIDDLE PLATTE RIVER BASIN

This Basin encompasses 5,130 square miles in the south-central part of the State. It includes the drainage areas of the streams tributary to the Platte River between the confluence of the North and South Platte Rivers and the mouth of the Loup River.

Status of Former Potential Projects

The status of the following projects included in previous editions has changed as noted below.

AUTHORIZED OR CONSTRUCTED

Spring Creek Watershed (SCS)
Central Nebraska Public Power and Irrigation District E-65
Improvement (BuRec)
Buffalo Creek Watershed (Central Platte NRD)

INACTIVE OR TERMINATED

Fort Kearny Unit (BuRec)
Nebraska Mid-State Division (BuRec)
North Dry Creek Drainage (Tri-Basin NRD)
Wood River-Prairie Creek Floodway (COE)

Potential Projects

PLATTE COUNTY DRAINAGE

Description

This proposed Central Platte Natural Resources District project is located in Platte County between the Platte and Merrick County line and the town of Duncan. The purpose of the project is to improve drainage on 1,300 acres of agricultural land and provide a limited amount of flood control. The drainage area involved is approximately 2,000 acres including the 1,300 acres which would be improved. The project plan includes improvement of the existing channel and construction of approximately one mile of new channel outlet to the Platte River. Estimated construction and right-of-way costs total \$80,000.

Current Status

The final plan for the project is completed and the easements and right-of-way are being acquired. Construction will begin in the spring of 1979 and will be completed by the end of fiscal year 1980.

NANCE COUNTY DRAINAGE

Description

This Central Platte Natural Resources District project is located principally in the southeastern corner of Nance County with small portions extending into Merrick and Platte Counties. The purpose of the project is to improve drainage on about 3,000 acres of agricultural land and provide a limited amount of flood control. The drainage area consists of approximately 5,000 acres, including the 3,000 acres to be improved. The total estimated cost of constructing the project is \$500,000.

Current Status

The Soil Conservation Service has developed the final plan. Easement and right-of-way acquisition should be completed and construction should start in fiscal year 1980.

SILVER CREEK WATERSHED

Description

This proposed Central Platte Natural Resources District project is located in Merrick County. The purpose of the project is flood control that will be achieved through channel improvements to Silver Creek, channel improvements to Clarks Creek, and construction of local drainways to tributaries of Silver Creek. In addition to the flood control benefits the project will realize considerable benefits due to improved drainage. Estimated annual costs are \$401,520; estimated annual benefits are \$666,095 for a benefit/cost ratio of 1.66 to 1.0. The interest rate used to calculate annual costs is 6 percent. Project installation costs are \$4,321,404.

Current Status

Funds for the Silver Creek Watershed project, including a grant of \$1,954,950 for Silver Creek and Clarks Drain and a loan of \$545,598 for tributary improvement, have been approved by the Resources Development Fund.

CLEAR CREEK WATERSHED

Description

This project is sponsored by the Central Platte Natural Resources District to reduce flood damages in the project area. The project area is located in the northern one-third of Polk County and a portion of Butler County. Construction of six floodwater retarding structures and channel improvements on the Clear Creek main stem are the major project features. Estimated project installation costs are \$456,680.

Current Status

Funds for the Clear Creek Watershed have been approved by the Resources Development Fund. Land acquisition and easements will be obtained in fiscal year 1979. Construction is scheduled to start in fiscal year 1979.

PHELPS SYSTEM IMPROVEMENT PROJECT

Description

The Central Nebraska Public Power and Irrigation District is responsible for the Phelps System Improvement Project. The project area is located south of the Platte River in Phelps and Kearney Counties between Holdrege and Minden.

The plan is to upgrade and rehabilitate the Phelps System. The main canal improvements consist of bank stabilization, silt removal, and bank improvements. The lateral system improvements consist of lining 162 miles of laterals and installing 12 miles of pipeline. It is estimated 225 lateral structures and 166 road crossings will be replaced. Estimated project installation costs are \$12,878,000.

Current Status

The Central Nebraska Public Power and Irrigation District Small Project Loan Application Report for the Phelps System Project Improvements has been submitted to the Bureau of Reclamation for approval of a construction loan under the Small Reclamation Projects Act, P.L. 84-984.

SPRING CREEK

Description

This Central Platte Natural Resources District project covers approximately 172,000 acres in Custer and Dawson Counties. The purpose of the project is to provide flood protection for that part of Spring Creek lying below the flood water retarding structures constructed through the small watersheds (P.L. 566) program.

Current Status

The Central Platte Natural Resources District, in cooperation with the City of Lexington and Dawson County, has hired a private engineering firm to investigate this project. A Prefeasibility Report has been completed with favorable results. A complete feasibility study will be carried out in calendar year 1979 and should be complete by January 1, 1980.

PRAIRIE BEND

Description

This Central Platte Natural Resources District irrigation project covers approximately 135,000 acres in eastern Buffalo and western Hall Counties. It is estimated that approximately 70,000 acres will be supplied with irrigation water within the overall project area. Both the project area and the number of irrigated acres may be adjusted as a more detailed plan develops. Total estimated cost of constructing the project is \$120,000,000.

Current Status

An application for a water right to divert part of the Platte River flows in the off-season and an application for the right to store the diverted water has been filed with the Department of Water Resources.

Planning assistance from the Bureau of Reclamation has been requested, and the Bureau has indicated that an appraisal study will not be required. They are recommending that the initial planning effort be a Feasibility Report due to the extent and detail of data gathered by the Bureau and other agencies while planning the Mid-State Division.

GRAND ISLAND (WOOD RIVER)

Description

The Corps of Engineers is the agency primarily responsible for investigation and design of the selected plan for the project on the Wood River at Grand Island. The project would consist of a floodway to divert all floods up to and including 65 percent of the Standard Project Flood from the Wood River to the Platte River immediately west of Grand Island. The project installation cost is estimated to be \$4,025,000. Based on 6 7/8 percent interest rate the benefit/cost ratio of the project ranges from 1.3:1.0 to 2.4:1.0 over an economic life of 100 years.

Current Status

The investigation of flood problems in the Platte River basin in Nebraska has proceeded to the point of establishing economic feasibility, environmental and social acceptance, local interest, and Federal interest.

GRAND ISLAND (PRAIRIE AND SILVER CREEKS)

Description

The Corps of Engineers is the agency primarily responsible for investigation and design of the selected plan for Prairie and Silver Creeks at Grand Island. Prairie and Silver Creeks border the north edge

of the city of Grand Island. Prairie Creek has its origin north of Kearney and flows northeast to join the Platte River at Columbus. Silver Creek is a tributary of Prairie Creek and has its confluence with Prairie Creek about 5 miles north of Grand Island. The project would consist of channel straightening, a training levee, and bridge modifications on Silver Creek northwest of Grand Island. The project installation cost is estimated to be \$1,734,000. Based on a 6 7/8 percent interest rate The benefit/cost ratio of the project ranges from 1.3:1.0 to 2.4:1.0 over an economic life of 100 years.

Current Status

The investigation of flood problems in the Platte River basin in Nebraska has proceeded to the point of establishing economic feasibility, environmental and social acceptance, local interest, and federal interest. Detailed study of the flood problem on Prairie and Silver Creeks at Grand Island will be completed under provisions of Section 205 of the 1948 Flood Control Act, as amended.

PRAIRIE CREEK CLEARING PROJECT

Description

This Central Platte Natural Resources District project is located in northern Hall County along a 42-mile stretch of Prairie Creek between Shelton and Grand Island. The object of this project is to decrease present flood damages to Grand Island. The plan of improvement consists of the removal of timber, trash, and debris from an area 55 feet on either side of the centerline of Prairie Creek. The total project cost is estimated to be \$325,300.

Current Status

The feasibility report and formal application have been submitted to the Nebraska Resources Development Fund by the Central Platte NRD. Construction is scheduled for fiscal year 1979.

WOOD RIVER CLEARING PROJECT

Description

This Central Platte Natural Resources District project is located in Buffalo County along a 12-mile stretch of Wood River west of Gibbon. The objective of this project is to decrease present flood damages to Grand Island. The plan of improvement consists of the removal of timber, trash, and debris from an area 55 feet on either side of the centerline of Wood River. The total project cost is estimated to be \$116,200.

Current Status

The feasibility report and formal application have been submitted to the Nebraska Resources Development Fund by the Central Platte NRD. Construction is scheduled for fiscal year 1979.

CHAPTER 7. LOUP RIVER BASIN

This Basin, located in the center of Nebraska, contains 15,230 square miles, about one-fifth of the State's total area. It extends from the Sandhills of southern Cherry and Sheridan Counties to the Platte River valley near Columbus.

Status of Former Potential Projects

The status of the following projects included in previous editions has changed as noted below.

AUTHORIZED OR CONSTRUCTED

Loup River at Columbus Local Flood Protection (COE)
North Loup Division (BuRec)
Mud Creek at Broken Bow Local Flood Protection (COE)

INACTIVE OR TERMINATED

Beaver Creek at St. Edward Local Flood Protection (COE)

Potential Projects

CEDAR RAPIDS DIVISION

Description

This proposed Bureau of Reclamation project is located along the Cedar and Loup Rivers in Wheeler, Greeley, Boone, and Nance Counties. The feasibility plan published in 1966 included a multi-purpose dam and reservoir, diversion dam, pumping plant, canals, and an irrigation distribution system to serve 26,800 acres.

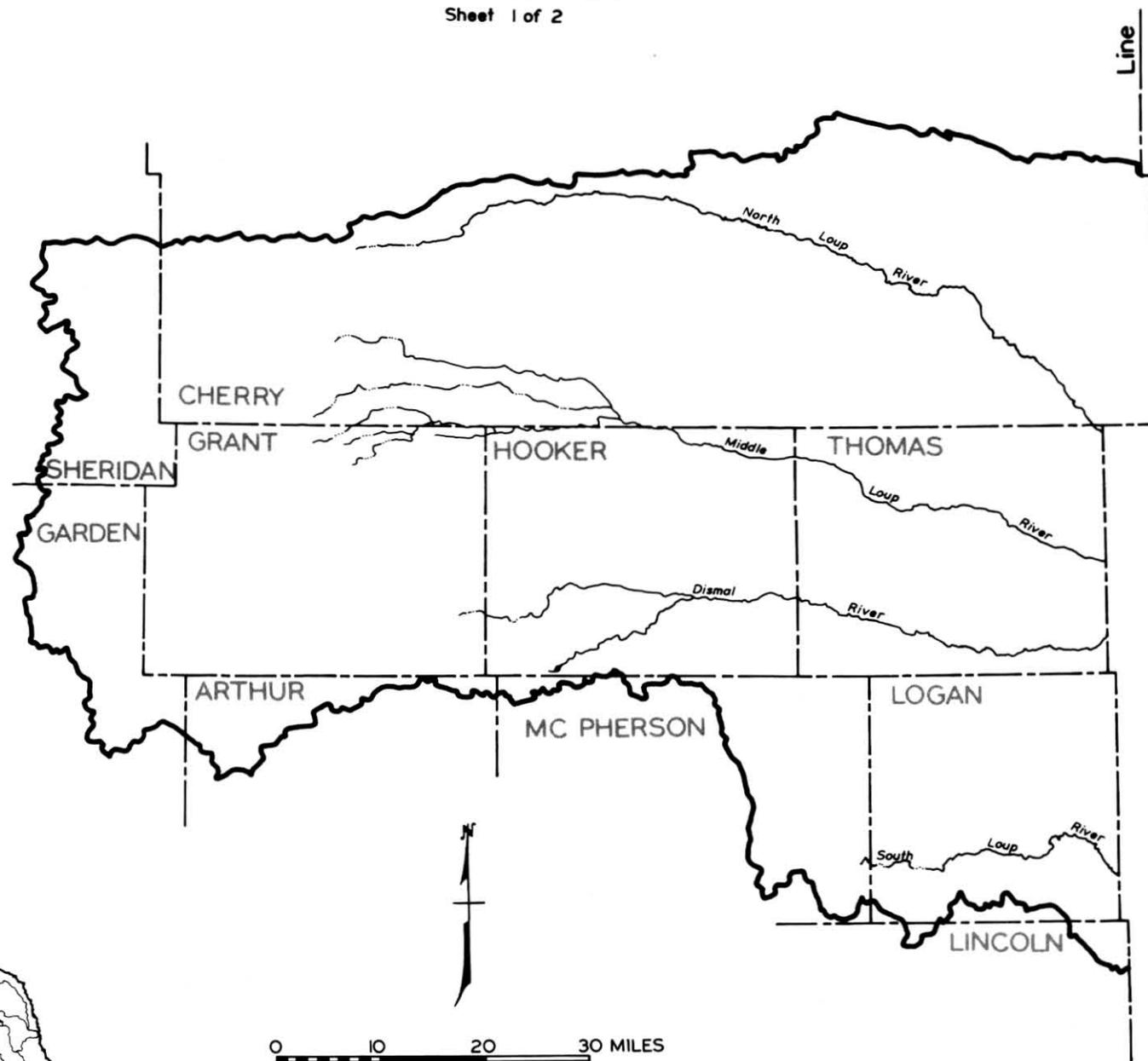
Based on projections made in the Platte Level B Study, it does not appear that an adequate surface water supply would be available to support the previously proposed level of development and the project must now be reevaluated using new planning procedures and current interest rates.

Current Status

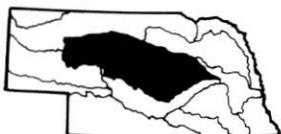
The Bureau of Reclamation initiated a reevaluation of the Division's projected water supplies during fiscal year 1978. The results of this study and other preliminary evaluations scheduled for completion early in fiscal year 1980 will provide a basis for deciding whether further feasibility studies can be justified.

LOUP RIVER BASIN

Sheet 1 of 2



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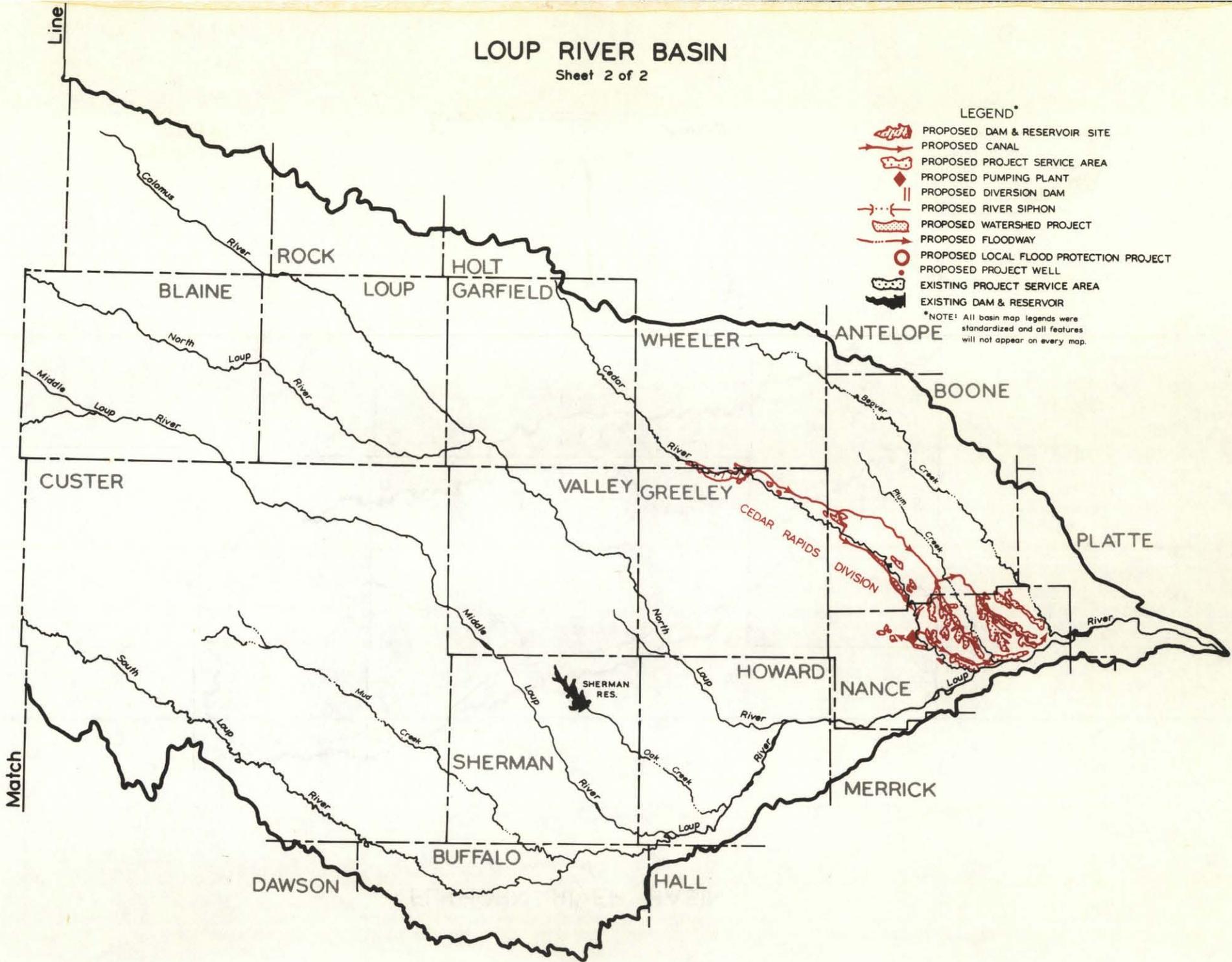


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LOUP RIVER BASIN

Sheet 2 of 2



LEGEND*

- PROPOSED DAM & RESERVOIR SITE
- PROPOSED CANAL
- PROPOSED PROJECT SERVICE AREA
- PROPOSED PUMPING PLANT
- PROPOSED DIVERSION DAM
- PROPOSED RIVER SIPHON
- PROPOSED WATERSHED PROJECT
- PROPOSED FLOODWAY
- PROPOSED LOCAL FLOOD PROTECTION PROJECT
- PROPOSED PROJECT WELL
- EXISTING PROJECT SERVICE AREA
- EXISTING DAM & RESERVOIR

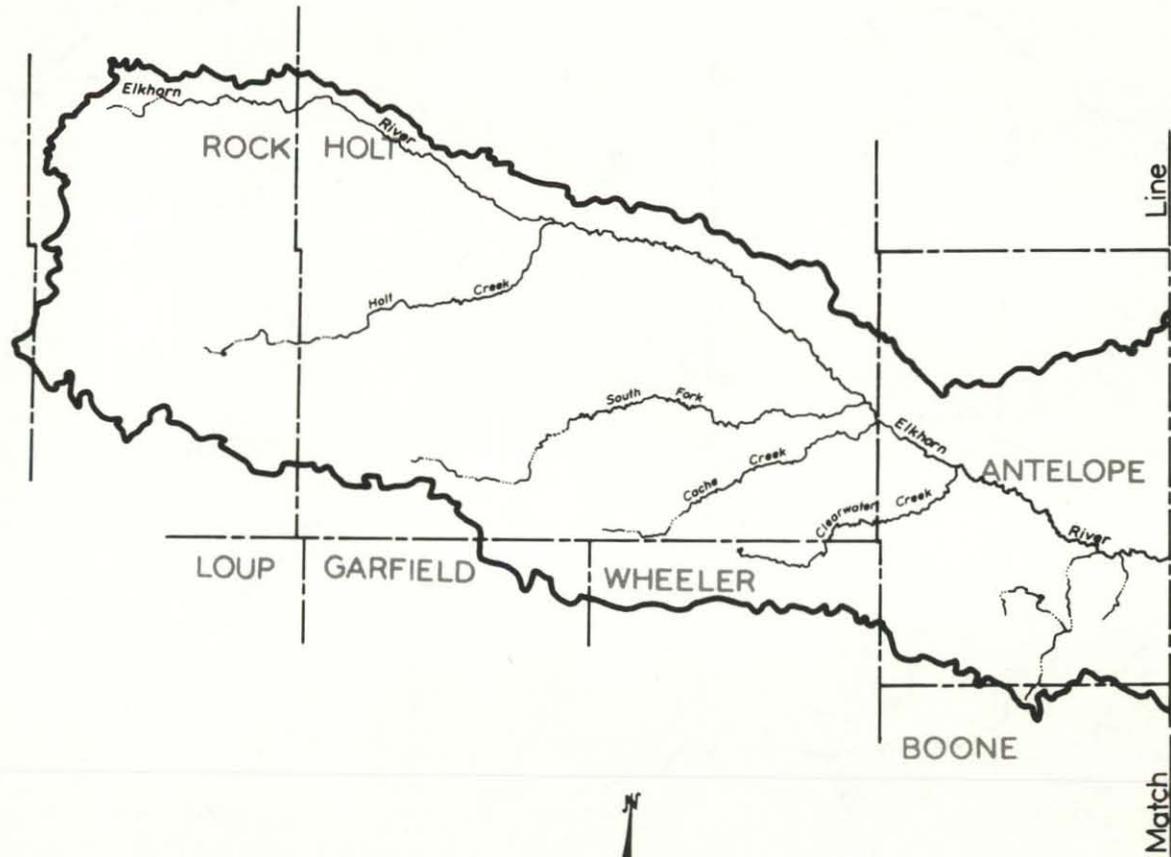
*NOTE: All basin map legends were standardized and all features will not appear on every map.

Match

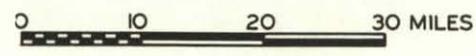
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ELKHORN RIVER BASIN

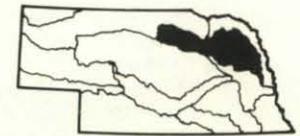
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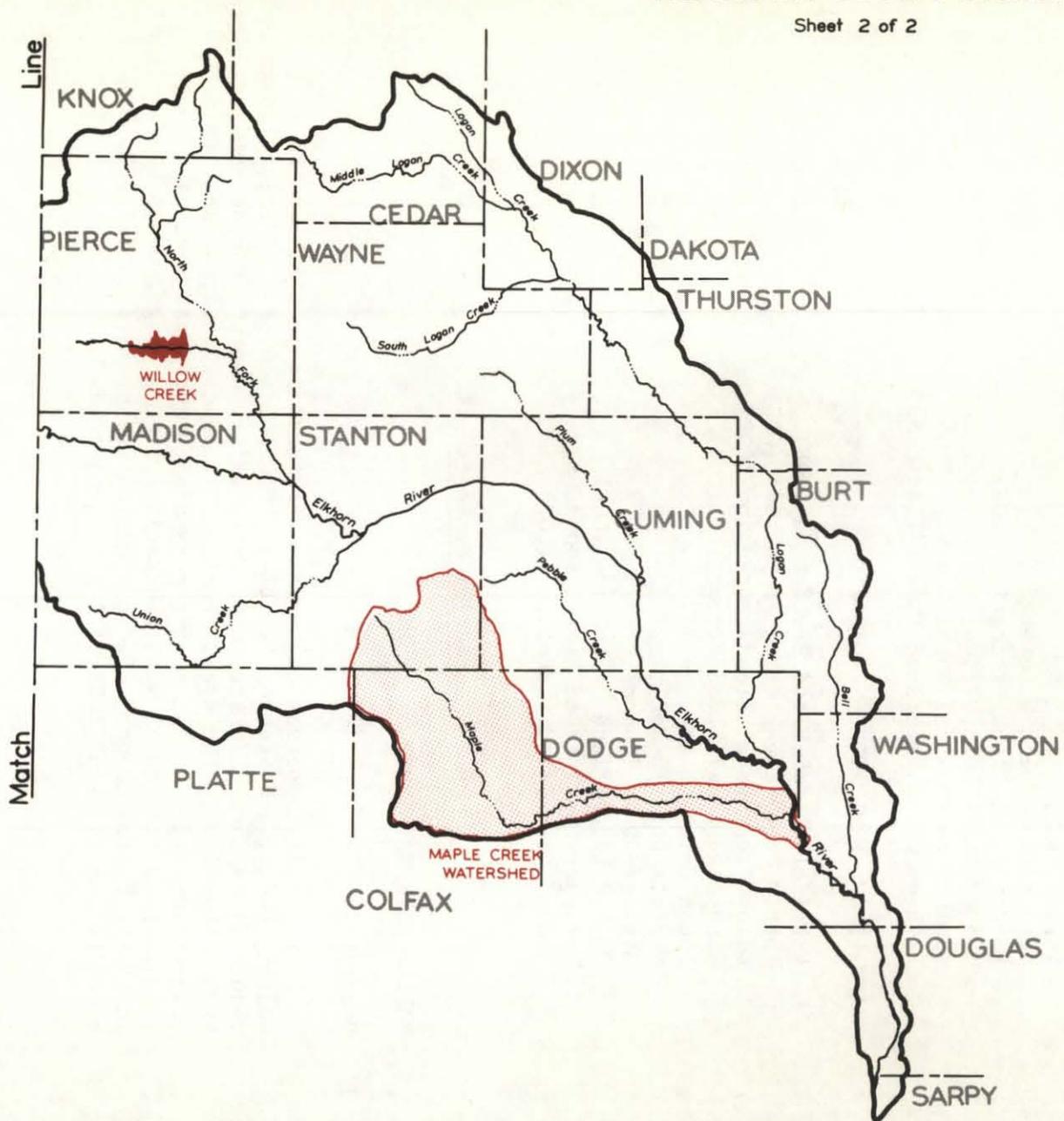


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ELKHORN RIVER BASIN

Sheet 2 of 2



LEGEND*

-  PROPOSED DAM & RESERVOIR SITE
-  PROPOSED CANAL
-  PROPOSED PROJECT SERVICE AREA
-  PROPOSED PUMPING PLANT
-  PROPOSED DIVERSION DAM
-  PROPOSED RIVER SIPHON
-  PROPOSED WATERSHED PROJECT
-  PROPOSED FLOODWAY
-  PROPOSED LOCAL FLOOD PROTECTION PROJECT
-  PROPOSED PROJECT WELL
-  EXISTING PROJECT SERVICE AREA
-  EXISTING DAM & RESERVOIR

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CHAPTER 8. ELKHORN RIVER BASIN

The Elkhorn River rises in the eastern part of the Sandhills in north-central Nebraska and flows southeastward to join the Platte River about 30 miles upstream from its confluence with the Missouri River. The area of the Elkhorn River Basin is about 7,000 square miles, nearly 10 percent of the State's total area.

Status of Former Potential Projects

The status of the following projects included in previous editions has changed as noted below.

AUTHORIZED OR CONSTRUCTED

- Corporation Gulch Watershed (SCS)
- Pender Local Flood Protection (COE)
- Meadow Grove Local Flood Protection (COE)
- Cuming County Rural Water District Phase 2 (FmHa)
- Rawhide Creek Watershed (Lower Platte North NRD)

INACTIVE OR TERMINATED

- Wakefield Local Flood Protection (COE)
- Battle Creek Local Flood Protection (COE)
- Giles Creek Local Flood Protection (COE)
- King Lake Local Flood Protection (COE)
- Logan Unit (BuRec)
- Norfolk Unit (BuRec)
- Highland Unit (BuRec)
- Osmond Local Flood Protection (COE)
- Scribner Local Flood Protection (COE)
- Dodge Local Flood Protection (COE)

Potential Projects

MAPLE CREEK WATERSHED

Description

This Soil Conservation Service watershed project is located in Colfax, Dodge, and Stanton Counties. The purpose of the project is to reduce flood damage in the Maple Creek valley and to provide some recreational benefits to the area. Preliminary investigations indicate a project involving 28 floodwater retarding structures, including three multipurpose structures with recreation water storage, would be feasible. The total estimated cost of constructing the project is \$11,820,800. A benefit/cost ratio of 1.59 to 1.0 is projected.

Current Status

A report on the preliminary investigation was completed in September 1972. Work Plan investigations and the Environmental Impact Statement were completed in 1978.

WILLOW CREEK DAM AND RECREATION AREA

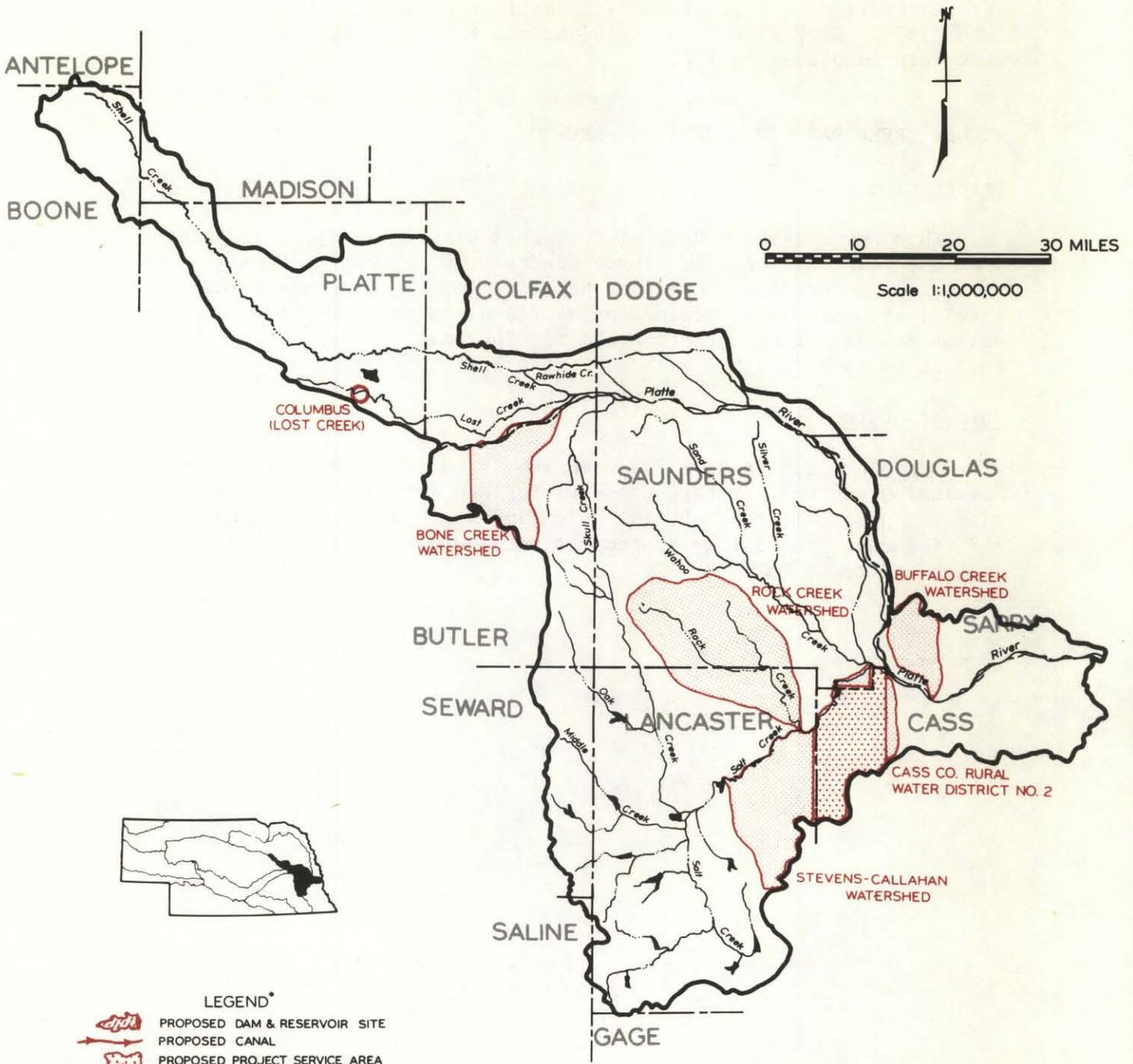
Description

This Lower Elkhorn Natural Resources District project is located near the town of Pierce in Pierce County. The primary purpose of the project is to provide recreation benefits for the surrounding area but it will also provide some incidental flood control benefits. The total estimated cost of constructing the multipurpose dam and recreation facilities is \$5,243,000 with a benefit/cost ratio of 1.84 to 1.0.

Current Status

A project application has been submitted to the Natural Resources Commission and the Heritage Conservation and Recreation Service to determine the possibility of obtaining funding assistance. The economic and financial feasibility statements were completed with the environmental impact statement in 1978.

LOWER PLATTE RIVER BASIN



- LEGEND***
-  PROPOSED DAM & RESERVOIR SITE
 -  PROPOSED CANAL
 -  PROPOSED PROJECT SERVICE AREA
 -  PROPOSED PUMPING PLANT
 -  PROPOSED DIVERSION DAM
 -  PROPOSED RIVER SIPHON
 -  PROPOSED WATERSHED PROJECT
 -  PROPOSED FLOODWAY
 -  PROPOSED LOCAL FLOOD PROTECTION PROJECT
 -  PROPOSED PROJECT WELL
 -  EXISTING PROJECT SERVICE AREA
 -  EXISTING DAM & RESERVOIR

*NOTE: All basin map legends were standardized and all features will not appear on every map.

CHAPTER 9. LOWER PLATTE RIVER BASIN

The Lower Platte River Basin is that part of the Platte River drainage area, exclusive of the Elkhorn River drainage, extending from the mouth of the Loup River to the Missouri River. The 3,110 square miles in the Basin includes the valley of the Platte River, the drainage areas of Shell, Salt, and Wahoo Creeks, and a number of other smaller tributary streams.

Status of Former Potential Projects

The status of the following projects included in previous editions has changed as noted below.

AUTHORIZED OR CONSTRUCTED

Platte River and Lost Creek, Schuyler Local Flood Protection (COE)
Clear Creek Watershed (SCS)

INACTIVE OR TERMINATED

Shell Creek and Tributaries (COE)
Linwood Unit (BuRec)

Potential Projects

BONE CREEK WATERSHED

Description

The Bone Creek watershed located south of the Platte River in Butler County suffers flood and sediment damage on the Platte River valley lands in the lower reaches of the watershed. The preliminary investigation by the Soil Conservation Service indicates a structural program including five floodwater retarding structures may prove feasible. The total drainage area of the watershed is approximately 46,000 acres. The total estimated cost of constructing the project is \$2.5 million with average annual benefits of about \$150,000.

Current Status

A preliminary investigation report has been completed. The draft Work Plan and Environmental Impact Statement will be available for informal review in late fiscal year 1979 or early fiscal year 1980.

LOST CREEK AT COLUMBUS

Description

The Corps of Engineers is the agency primarily responsible for investigation and design of the selected plan for Lost Creek at Columbus.

The Lost Creek project area is located north of Columbus. Lost Creek begins 9 miles northwest of Columbus and discharges into the Platte River 20 miles east of Columbus. The project would consist of a channel to divert all floods up to and including the 100-year flood into the Loup Power Canal. The project installation cost is estimated to be \$2,236,000. Based on a 6 7/8 percent interest rate the benefit/cost ratio of the project is 1.6 to 1.0 over an economic life of 100 years.

Current Status

The investigation of flood problems in the Platte River basin in Nebraska has proceeded to the point of establishing economic feasibility, environmental and social acceptance, local interest, and Federal interest. Detailed study of the flood problem on Lost Creek at Columbus will be completed under provisions of Section 205 of the 1948 Flood Control Act, as amended. A resolution to support the implementation of the project was adopted by the City Council of Columbus.

CASS COUNTY RURAL WATER DISTRICT #2

Description

This proposed Cass County Rural Water District project includes an area generally about eight miles wide along the west side of Cass County. The purpose of the project is to provide domestic and livestock water service to approximately 500 rural users. Project features include approximately 230 miles of pipe and two elevated storage tanks with an estimated combined capacity of 450,000 gallons. The source of supply will be two district wells. The total estimated cost of constructing the project is \$2,000,000.

Current Status

A detailed project report has been completed, a source of potable water has been selected, and construction is scheduled for fiscal year 1979.

STEVENS-CALLAHAN WATERSHED

Description

The Soil Conservation Service is the agency responsible for the Stevens-Callahan Watershed Project. The watershed is located on the eastern edge of Lincoln, and extends eastward to the banks of the Platte River. Project objectives are to investigate (1) flood plain zoning, (2) floodwater damage reduction, (3) recreation development, and (4) accelerated land treatment within the watershed. Estimated cost of the project is 3.5 million dollars.

Current Status

A Preliminary Investigation report has been completed. The draft Work Plan and Environmental Impact Statement will be available for informal review in fiscal year 1979.

ROCK CREEK WATERSHED

Description

The Soil Conservation Service is the agency responsible for the Rock Creek Watershed Project. The watershed is located in Lancaster and Saunders Counties and covers an area of about 84,000 acres. Project objectives are to provide maximum flood prevention benefits to flood plain lands and bring about reductions in erosion and stream pollution. A possible major element of the project is a multipurpose structure providing fish and wildlife benefits. Preliminary investigations by SCS indicate that up to eight floodwater retarding structures, including an extensive fish and wildlife development, will be feasible. Estimated cost of project installation is \$8,000,000.

Current Status

Development of the planning portion of the project is a joint venture between SCS and a private planning firm. The design and cost estimate of the potential fish and wildlife site will be completed by SCS and the remaining elements of the plan will be done by the private firm under contract. Contract completion is scheduled for the latter portion of 1979. The draft Work Plan will be available for informal review in fiscal year 1979.

BUFFALO CREEK WATERSHED

Description

The Papio Natural Resources District is responsible for the Buffalo Creek Watershed Project. The watershed, located in the southwest corner of Sarpy County, drains a predominantly agricultural area of 16,400 acres. The recommended work plan includes mechanical and cultural land treatment practices and up to 10 structural measures, including grade stabilization structures and drop structures.

Current Status

A feasibility report and final Recommended Work Plan have been completed and approved by the Nebraska Resources Development Fund. Two of the 10 structures have been funded and construction is scheduled for the summer of 1979.

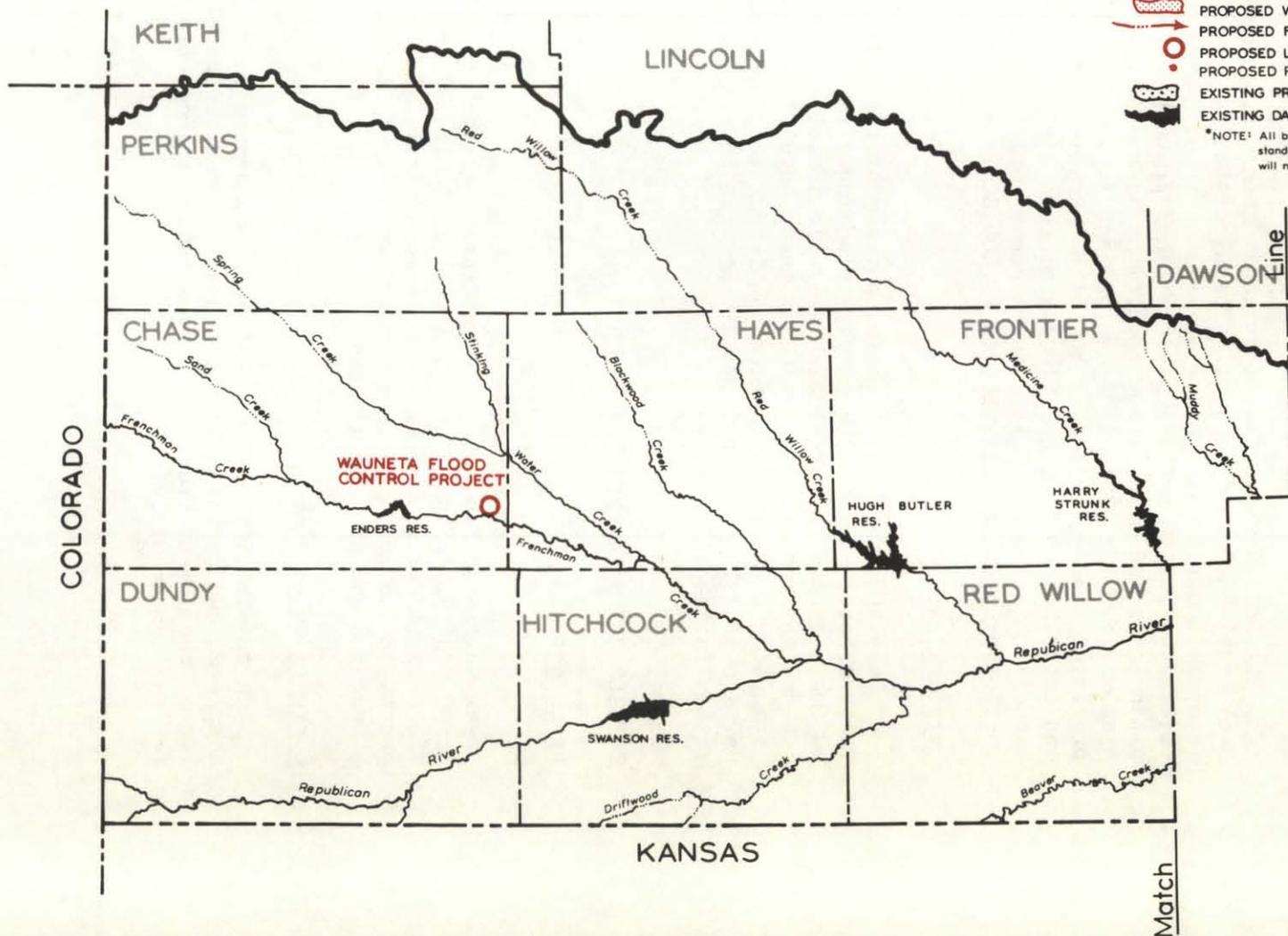
REPUBLICAN RIVER BASIN

Sheet 1 of 2

LEGEND*

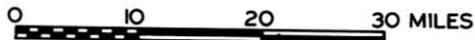
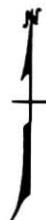
-  PROPOSED DAM & RESERVOIR SITE
-  PROPOSED CANAL
-  PROPOSED PROJECT SERVICE AREA
-  PROPOSED PUMPING PLANT
-  PROPOSED DIVERSION DAM
-  PROPOSED RIVER SIPHON
-  PROPOSED WATERSHED PROJECT
-  PROPOSED FLOODWAY
-  PROPOSED LOCAL FLOOD PROTECTION PROJECT
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-  EXISTING DAM & RESERVOIR

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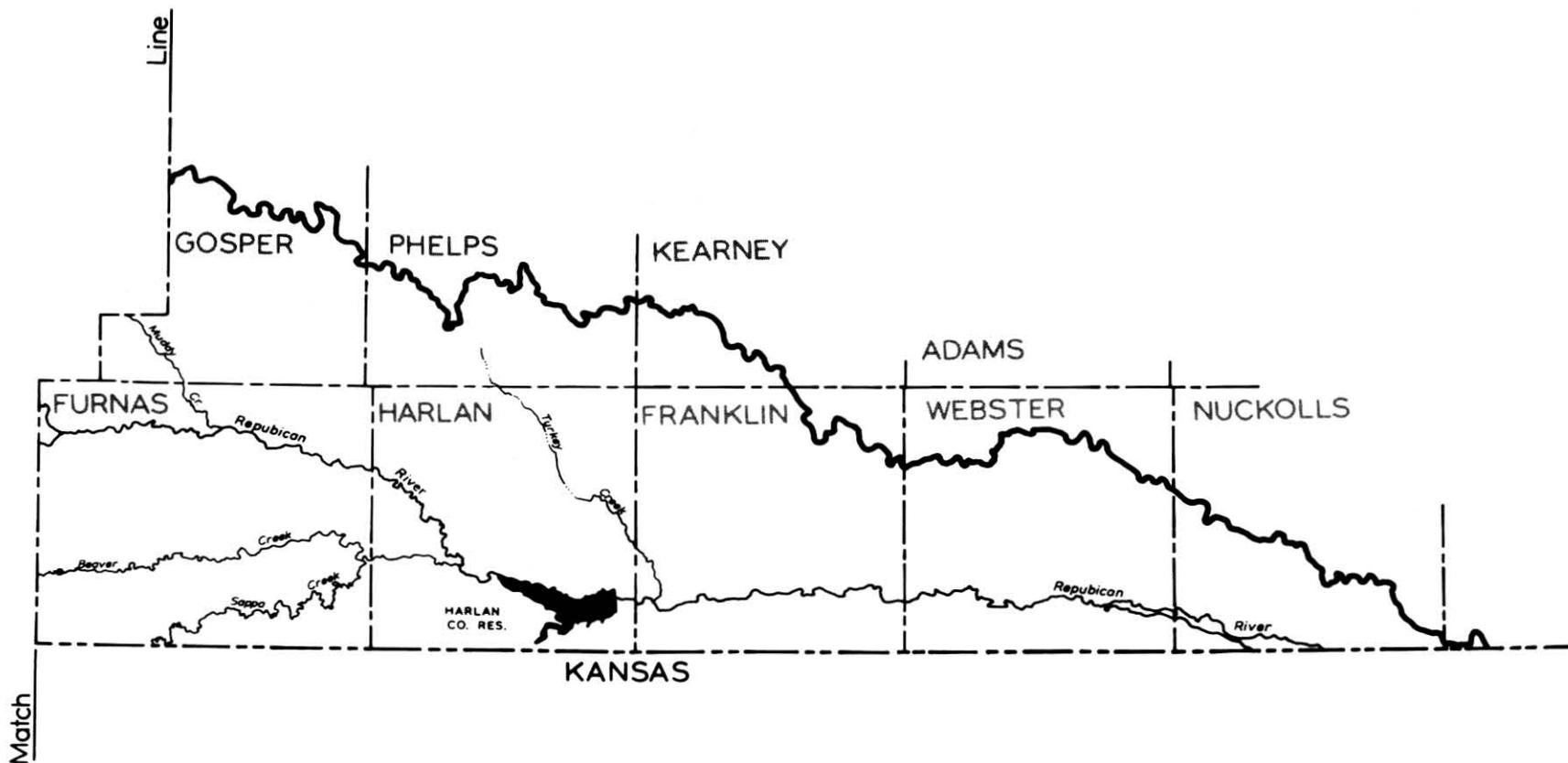
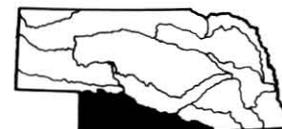


REPUBLICAN RIVER BASIN

Sheet 2 of 2



Scale 1:1,000,000



CHAPTER 10. REPUBLICAN RIVER BASIN

The Republican River Basin lies in the southwest corner of the State and occupies 9,650 square miles, about one-eighth of the State's total area.

Status of Former Potential Projects

The status of the following projects included in previous editions has changed as noted below.

AUTHORIZED OR CONSTRUCTED

Medicine Creek (Upper and Lower) Watershed (SCS)
McCook Flood Control (Middle Republican NRD)
Blackwood Creek Watershed (SCS)
Frenchman-Cambridge Irrigation District Rehabilitation and Betterment (BuRec)

INACTIVE OR TERMINATED

Frenchman-Cambridge Division Supplemental Water Supply Study (BuRec)
H&RW and Frenchman Valley Rehabilitation and Betterment (BuRec)

Potential Projects

WAUNETA FLOOD CONTROL PROJECT

Description

The Upper Republican Natural Resources District is sponsoring the Wauneta Flood Control Project with the cooperation of the Village of Wauneta. The project area is located in the southeastern corner of Chase County between Wauneta and Enders Dam, which is located on Frenchman Creek approximately nine miles west of Wauneta. The project will control flooding from Frenchman Creek caused by local storms on the tributary areas near Wauneta. The selected plan consists of three dams, a levee, and a flood plain park.

The dams will be located on three tributaries which enter Frenchman Creek from the north. The levee will be located north and west of the business and residential area of Wauneta on the south bank of Frenchman Creek. The park will be located north and east of the stream. Project installation costs are estimated to be \$801,900.

Current Status

An application to the Natural Resources Commission for financial aid from the Resources Development Fund was approved in August 1978.

CHAPTER 11. LITTLE BLUE RIVER BASIN

This Basin is located in south-central and southeastern Nebraska between the Republican, Middle Platte, and Big Blue River Basins. It occupies an area of 2,650 square miles, second smallest in the State.

Potential Projects

LITTLE BLUE UNIT

Description

The Bureau of Reclamation is the agency primarily responsible for investigation of the Little Blue Unit, a proposed multipurpose project that could provide flood control, recreation, fish and wildlife, and irrigation benefits. This project would be located on the Little Blue River in Clay, Nuckolls, Thayer and Jefferson Counties.

The project plan published in 1966 included a multipurpose dam and reserovir, three pumping plants, six small relift pumps, a diversion dam, canals, and distribution systems. Angus Dam and Reserovir, located about three miles northwest of the town of Angus, would provide storage for project purposes.

Current Status

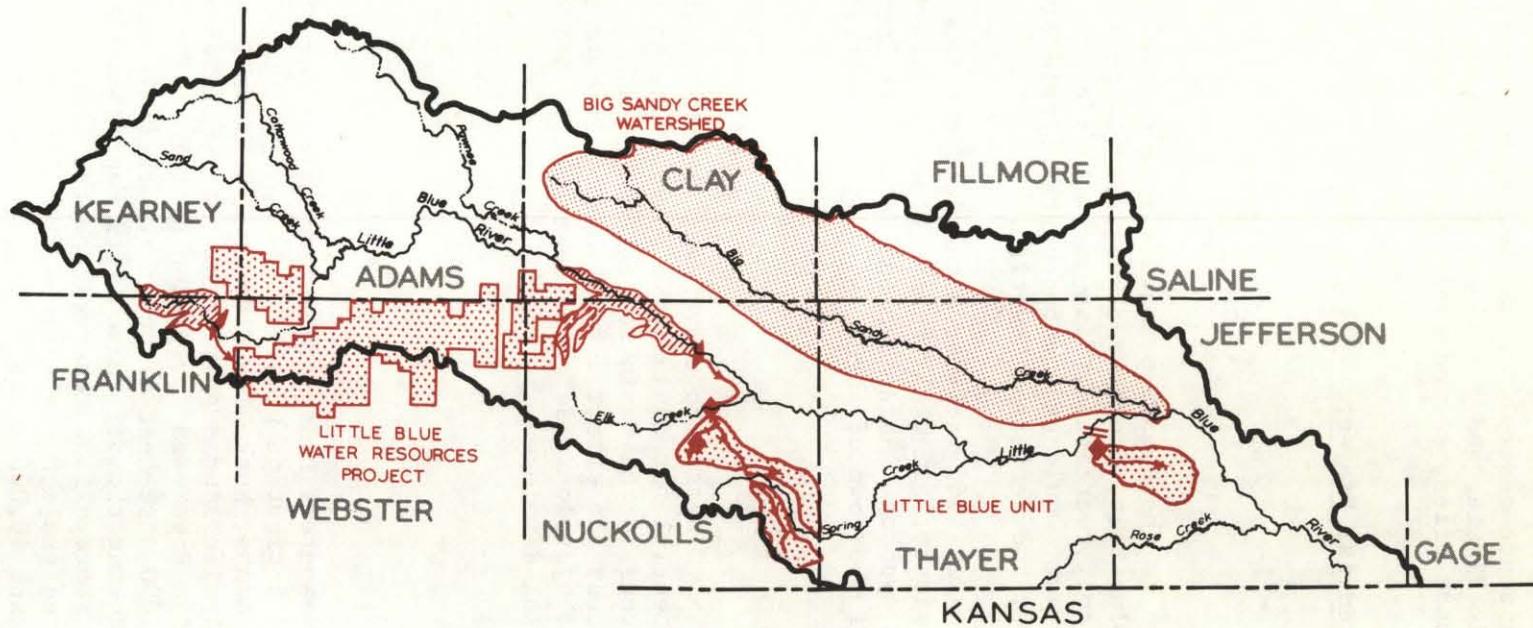
Funds have been provided by Congress to reevaluate the unit. The studies would evaluate the potential for conjunctive development of the surface and groundwater resources in the basin to best manage and utilize the resource and to study the effect development would have on the Blue River Compact. Basic hydrologic data has been updated and a plan of study is currently being developed.

LITTLE BLUE WATER RESOURCES PROJECT

Description

The Little Blue Natural Resources District is responsible for the investigation of this proposed irrigation project. The project is located in Kearney, Franklin, Adams, Nuckolls, Clay, and Webster Counties. Preliminary plans include a 24-mile long supply canal that would divert from the Central Nebraska Public Power and Irrigation District's Phelps County Canal. As much as 115,000 acre-feet of power return flows normally returned to the Platte River during the off season from September through January could be diverted for storage in a reservoir on the Little Blue River. The total estimated project costs range from \$56,200,000 for a project that would irrigate 40,000 acres to \$81,800,000 for a project that would irrigate 66,500 acres.

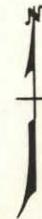
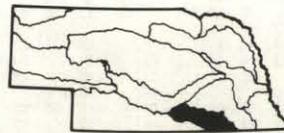
LITTLE BLUE RIVER BASIN



LEGEND*

-  PROPOSED DAM & RESERVOIR SITE
-  PROPOSED CANAL
-  PROPOSED PROJECT SERVICE AREA
-  PROPOSED PUMPING PLANT
-  PROPOSED DIVERSION DAM
-  PROPOSED RIVER SIPHON
-  PROPOSED WATERSHED PROJECT
-  PROPOSED FLOODWAY
-  PROPOSED LOCAL FLOOD PROTECTION PROJECT
-  PROPOSED PROJECT WELL
-  EXISTING PROJECT SERVICE AREA
-  EXISTING DAM & RESERVOIR

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Scale 1:1,000,000

Current Status

A prefeasibility report completed in October, 1976 indicates the project may be feasible. The district is in the process of acquiring a water right for the project.

BIG SANDY CREEK WATERSHED SURFACE WATER PROJECT

Description

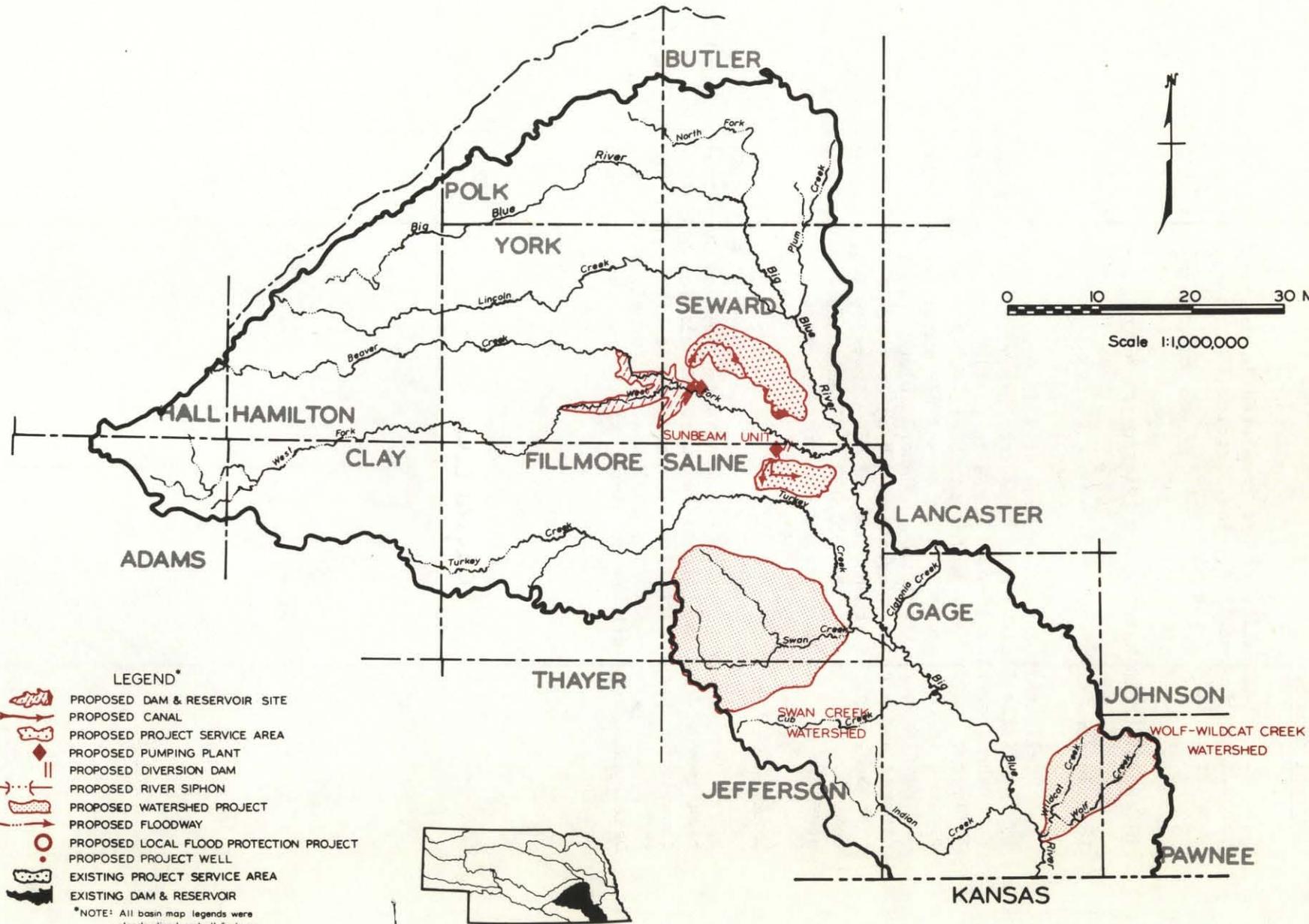
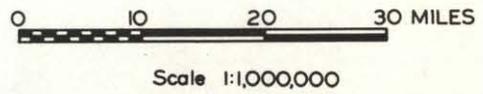
Preliminary investigations of this project are being conducted by the Little Blue Natural Resources District. The Big Sandy Creek Watershed occupies 408,000 acres in portions of Adams, Clay, Nuckolls, Fillmore, Thayer, and Jefferson Counties. The primary purpose of the project is to conserve available surface water for groundwater recharge and supplemental irrigation. Other project purposes are to reduce flood damages and provide recreation. Project features include a structural system of eight earthen dams and one diversion weir. Total estimated cost is approximately \$8,200,000. Flood control and groundwater recharge benefits are estimated to exceed project costs.

Current Status

A project proposal to the Nebraska Resources Development Fund has been approved by the Natural Resources Commission's Advisory Board. A consulting engineering firm retained by the Little Blue NRD is completing the preliminary feasibility analysis. A formal application to the Resources Development Fund will be submitted within the current fiscal year.

BIG BLUE RIVER BASIN

-17-



LEGEND*

- PROPOSED DAM & RESERVOIR SITE
- PROPOSED CANAL
- PROPOSED PROJECT SERVICE AREA
- PROPOSED PUMPING PLANT
- PROPOSED DIVERSION DAM
- PROPOSED RIVER SIPHON
- PROPOSED WATERSHED PROJECT
- PROPOSED FLOODWAY
- PROPOSED LOCAL FLOOD PROTECTION PROJECT
- PROPOSED PROJECT WELL
- EXISTING PROJECT SERVICE AREA
- EXISTING DAM & RESERVOIR

*NOTE: All basin map legends were standardized and all features will not appear on every map.

CHAPTER 12. BIG BLUE RIVER BASIN

This Basin is located in southeastern Nebraska between the Little Blue, Platte, and Nemaha River Basins. It occupies an area of 4,570 square miles.

Status of Former Potential Projects

The status of the following projects included in previous editions has changed as noted below.

AUTHORIZED OR CONSTRUCTED

Clatonia Creek Watershed (SCS)
Walnut Creek Watershed (Lower Big Blue NRD)
Cub Creek Watershed (SCS)

INACTIVE OR TERMINATED

Shestak Reservoir (COE, BuRec)
Seward View Reservoir (COE, BuRec)
Surprise Reservoir (COE, BuRec)
Beatrice Local Flood Protection (COE)
Plum Creek Watershed (Upper Big Blue NRD)

S check ok

Potential Projects

SUNBEAM UNIT

Description

The Bureau of Reclamation is the agency primarily responsible for planning this multipurpose project located in York, Seward, and Saline Counties. Project plans as presented in the 1968 feasibility report included Beaver Crossing Dam and Reservoir with two pumping plants, a diversion dam, and distribution systems to serve 30,000 acres. Beaver Crossing Reservoir would store and regulate the flows of the West Fork of the Big Blue River. The project installation cost is estimated to be \$81,335,000, and the annual costs at 5 3/8 percent are \$5,068,000. The benefit/cost ratio of the project is 1.37 to 1.0 based on an economic life of 100 years.

Current Status

A feasibility report prepared in 1968 recommended authorization for construction of the Beaver Crossing Dam and Reservoir with irrigation deferred to a future date, but changes in interest rates and current planning requirements made reevaluation necessary. A status report published in April 1972 indicated the project would be feasible with initial inclusion of the irrigation function. Further studies, which would include reevaluation in accordance with the Water Resources Council's Principles and Standards, are contingent upon the development of local and State support for the study.

SWAN CREEK WATERSHED

Description

The Soil Conservation Service is the agency primarily responsible for investigation and design of the Swan Creek Watershed project. The principal purposes of the project are to prevent floodwater, erosion and sediment damages.

The watershed is located in south-central Saline County and north-central Jefferson County. It consists of 2 hydrologic units, the Swan Creek Unit and Dry Creek Unit. The watershed consists of 162,300 acres; 76 percent cropland, 17 percent pasture and rangeland and 7 percent devoted to other uses.

The project will consist of land treatment measures, 16 floodwater retarding structures, two grade stabilization structures and one multi-purpose floodwater and recreation structure. Planned project measures will reduce floodwater damages by about 53 percent and erosion and sediment damages by about 43 percent. The project installation cost is estimated to be \$6,033,070. Based on a 6 5/8 percent interest rate the benefit/cost ratio of the project is 2.1 to 1.0 over an economic life of 50 years.

Current Status

A draft Watershed Work Plan for the Swan Creek Watershed has been prepared by the Soil Conservation Service.

WOLF-WILDCAT WATERSHED

Description

The Soil Conservation Service is responsible for investigation of the Wolf-Wildcat Watershed Project. The watershed is located in the southeastern portion of the Big Blue River Basin in Gage and Pawnee Counties. The drainage area is approximately 56,000 acres. Principal damages within the watershed are related to flooding of cropland and the scour or removal of fertile flood plain topsoil. The project will include nine floodwater retarding structures and an accelerated land treatment program. Estimated cost of the project is 2.5 million dollars.

Current Status

Development of the Work Plan and Environmental Impact Statement has been contracted to a private planning firm with an estimated completion date of June, 1980. All phases of the contract will be reviewed and approved by SCS prior to completion of the contract.

CHAPTER 13. NEMAHA RIVER BASIN

This Basin, which encompasses 2,760 square miles in the southeastern corner of the State, includes the drainage area of all streams entering the Missouri River between the mouth of the Platte River and the Kansas-Nebraska state line, with the exception of the portion of the Big Nemaha River drainage lying in Kansas.

Status of Former Potential Projects

The status of the following projects included in previous editions has changed as noted below.

AUTHORIZED OR CONSTRUCTED

Winnebago-Bean Creek Watershed (SCS)
South Fork Watershed (SCS)
Long Branch Watershed (SCS)

INACTIVE OR TERMINATED

Little Nemaha River Levee (COE)

Potential Projects

UPPER LITTLE NEMAHA WATERSHED

Description

The Soil Conservation Service is responsible for the preliminary investigations of the Upper Little Nemaha Watershed project. This proposed project covers approximately 123,500 acres in Otoe, Lancaster, and Cass Counties. Preliminary investigations indicate a flood prevention system of 18 floodwater retarding structures and 35 grade stabilization structures may prove feasible. The total estimated cost of constructing the project is \$8,000,000.

Current Status

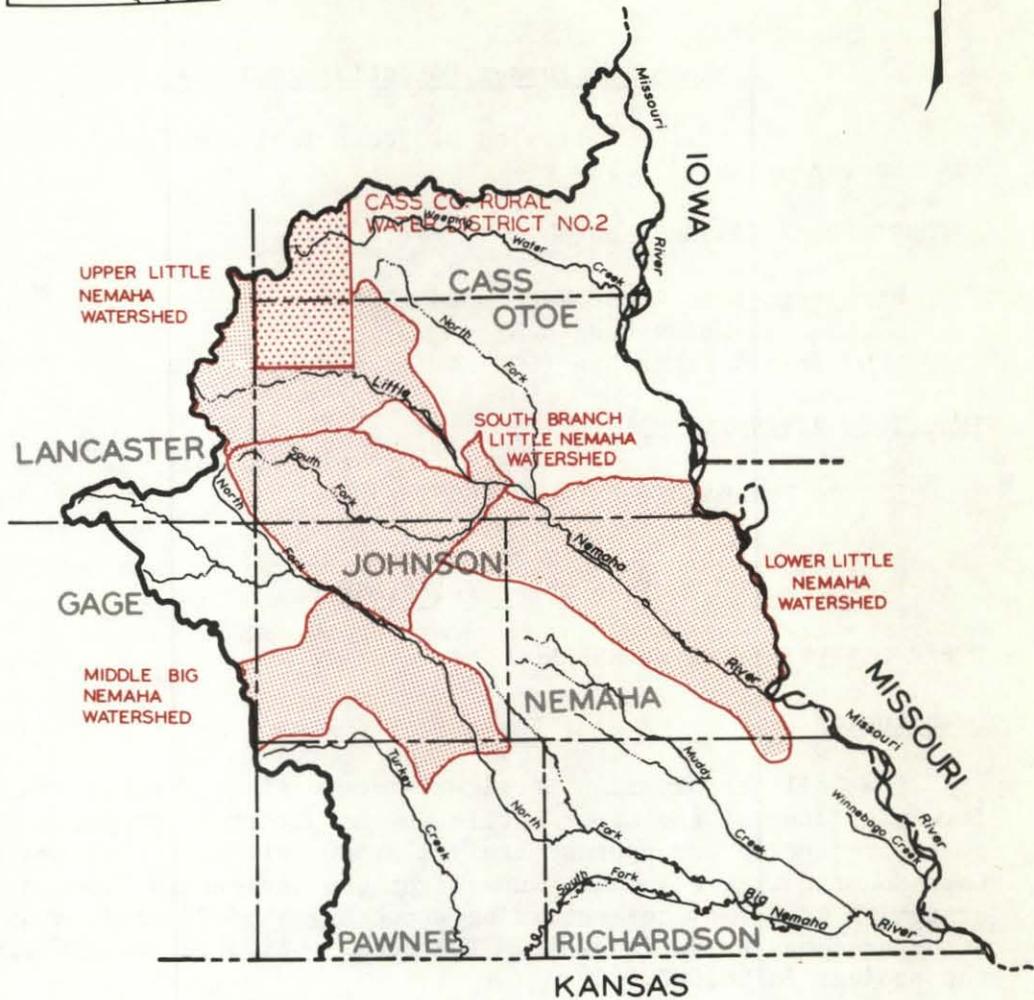
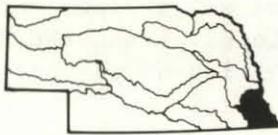
Preliminary investigations were favorable and work plan investigations have been authorized. An environmental impact statement is being prepared by the Soil Conservation Service.

SOUTH BRANCH LITTLE NEMAHA WATERSHED

Description

The Soil Conservation Service is the agency primarily responsible for investigation and design of the South Branch Little Nemaha Watershed

NEMAHA RIVER BASIN



LEGEND*

-  PROPOSED DAM & RESERVOIR SITE
-  PROPOSED CANAL
-  PROPOSED PROJECT SERVICE AREA
-  PROPOSED PUMPING PLANT
-  PROPOSED DIVERSION DAM
-  PROPOSED RIVER SIPHON
-  PROPOSED WATERSHED PROJECT
-  PROPOSED FLOODWAY
-  PROPOSED LOCAL FLOOD PROTECTION PROJECT
-  PROPOSED PROJECT WELL
-  EXISTING PROJECT SERVICE AREA
-  EXISTING DAM & RESERVOIR

*NOTE: All basin map legends were standardized and all features will not appear on every map.

0 10 20 30 MILES

Scale 1:1,000,000

Project. The principal purposes of the project are to prevent floodwater, erosion and sediment damages.

South Branch Little Nemaha Watershed is located in Johnson, Lancaster and Otoe Counties. The watershed area consists of 122,820 acres made up of three hydrologic units identified as South Fork Little Nemaha, Muddy Creek, and an area on the left bank of the Little Nemaha, the Walnut Creek Unit.

The project will consist of land treatment measures, 14 floodwater retarding structures, and 46 grade stabilization structures. Planned project measures will reduce floodwater damages by about 69 percent and sediment damages by about 34 percent. The project installation cost is estimated to be \$6,735,400. Based on a 6 3/8 percent interest rate the benefit/cost ratio of the project is 1.8 to 1.0 over an economic life of 50 years.

Current Status

The South Branch Little Nemaha Watershed Work Plan has been completed and is now awaiting Congressional authorization for construction.

MIDDLE BIG NEMAHA WATERSHED

Description

The Soil Conservation Service is the agency responsible for the preliminary investigation of the Middle Big Nemaha Watershed project. The watershed covers about 131,000 acres, mostly in southwestern Johnson County. Preliminary investigations indicate a flood prevention system of 14 floodwater retarding structures, one multipurpose structure including recreation storage, and 35 grade stabilization structures will be feasible. Principal damages are those related to flooding of cropland and the loss of agricultural land from headward advancement of gullies. Estimated cost of the project is about \$7,000,000.

Current Status

Work Plan investigations are continuing. The informal draft of the Work Plan and Environmental Impact Statement is scheduled for review in 1979.

LOWER LITTLE NEMAHA WATERSHED

Description

The Soil Conservation Service is the agency responsible for the preliminary investigation of the Lower Little Nemaha Watershed project. The watershed covers an area of about 140,000 acres located in Johnson, Otoe, Nemaha, and Richardson Counties. Preliminary investigations by the Soil Conservation Service indicated that a flood prevention system

of six floodwater retarding structures and 40 grade stabilization structures may be feasible. Principal damages are related to flooding of cropland and the loss of production on agricultural lands from active gully erosion. Estimated cost of completing the project is about \$4,000,000.

Current Status

The planning and development of the initial technical review draft of the Work Plan and Environmental Impact Statement are being completed by a private planning firm under a contract that ends November, 1979.

CHAPTER 14. OTHER STUDIES OF POTENTIAL PROJECTS

Inter-State and Regional Studies

There are a number of inter-state and inter-basin projects which have been proposed. These include the R. W. Beck Plan, "A New Water Resource Plan for the Great Plains", the Parsons Company's "North American Water and Power Alliance" known as NAWAPA, and a plan proposed by Lewis G. Smith, "Western States Water Augmentation Concept."

Water needs continue to mount and unless shifts are made between competing uses, inter-state and inter-basin project proposals will become more numerous and more important in the future.

BECK PLAN

The Beck Plan involves the diversion of water from the Missouri River just below Fort Randall Dam and the movement of this water through a series of dams and/or canals 200 miles up the Niobrara River to a point just north of Alliance, Nebraska. From this point, the water would flow by gravity in a major canal through western Nebraska, across the Platte River and south through Colorado, Kansas, Oklahoma, and Texas to a point near Hobbs, New Mexico. The canal would have an estimated capacity of 17,000 c.f.s. and would be approximately 148 feet wide, 22 feet deep, and about 940 miles long.

The total estimated cost of this undertaking, based on 1967 price levels, would be nearly \$3.5 billion.

NAWAPA

The North American Water and Power Alliance Plan involves the collection and distribution of water from rivers in Alaska, the Yukon, and British Columbia to water-deficient areas of Canada, the United States, and northern Mexico. In addition to serving water supply functions, provisions would be included to stabilize the level of the Great Lakes and provide other navigation benefits. Thirty-three states, including Nebraska, would benefit directly from the project.

The proponents of NAWAPA say it would annually deliver 78 million acre-feet of water to the United States, make 30 million kilowatts of power available for sale, and could increase national income from agriculture, mining and manufacturing by \$30 billion.

The total cost of this development, based on 1964 or earlier price levels, is estimated to be as much as \$100 billion.

WESTERN STATES WATER AUGMENTATION CONCEPT

The Western States Water Augmentation concept is similar to NAWAPA, but includes distribution to only the 17 states west of the Iowa-Nebraska boundary.

Water would be collected in the Liard-MacKenzie Basin in Northern Canada and conveyed south within the Rocky Mountain Trench. Distribution of the water would be handled through natural channels, canals and tunnels.

The total cost of this system is estimated to be around \$75 billion based on 1967 price levels.

PLATTE RIVER STUDIES

The Department of the Interior has initiated water management and wildlife habitat technical studies in a large portion of the Upper Platte River Basin. The Governors of Nebraska, Colorado and Wyoming have recently appointed representatives to work with three Interior agencies in this \$2.3 million study effort.

Overall policy coordination rests with the Assistant Secretary for Land and Water. He is working in conjunction with the Assistant Secretary for Fish, Wildlife and Parks and the Assistant Secretary for Energy and Minerals to assure proper policy direction.

A strong desire for effective state-federal coordination in carrying out the study has been expressed by the Missouri River Basin Commission and the Department of the Interior. To accomplish this, a field committee has been established to oversee the coordination of this study. The Chairman (as the Federal Coordinating Officer) of the Missouri River Basin Commission and the Secretary of the Interior's regional representative are co-chairing the committee composed of representatives from each State and the Fish and Wildlife Service, the Bureau of Reclamation, and the Geological Survey.

The study encompasses an overall area extending into Wyoming and Colorado on the North and South Platte Rivers downstream to the Platte River's confluence with the Loup River at Columbus, Nebraska. A primary focus of the technical studies is a 91,000-acre area along the Platte River between Sutherland and Chapman, Nebraska, which is prime habitat for sandhill and whooping cranes.

An important objective of these technical studies is to determine what actions, if any, are needed to provide and maintain adequate habitat for sandhill and whooping cranes and other migratory birds along the Platte River in Nebraska. The study will address issues and conflicts in the concerned area and identify alternatives associated with providing and maintaining adequate wildlife habitat along the Platte River in Nebraska. Other potential needs related to surface and groundwater and associated land resources will be considered. Technical reports from the lead agencies to the Secretary of the Interior are expected by the summer of 1981.

The three technical investigations are needed to provide information for any future comprehensive water planning. The first investigation is an effort led by the Fish and Wildlife Service to define the amount and character of wildlife habitats needed to preserve and enhance the numbers and distribution of migratory birds using the Platte River in Nebraska.

A second investigation, to be conducted by the Geological Survey, will develop a model to simulate the surface and groundwater systems of the Platte River - from Lake McConaughy on the North Platte, and from the Narrows Reservoir site on the South Platte, to where the Loup River enters the Platte at Columbus, Nebraska. The model will be used to estimate the effect of varied Platte River flows on migratory bird habitat in the study area.

The Bureau of Reclamation is responsible for a third technical study that will include a determination of present water use and future water needs within the Upper Platte Basin. The objectives will be to define the present and future availability of water at various locations. It will be concerned with hydrologic, environmental, and economic factors.

HIGH PLAINS REGIONAL AQUIFER SYSTEM ANALYSIS

The United States Geological Survey has planned an extensive study centering on the High Plains and the Ogallala Aquifer. The total project is expected to be completed in five years and will include the development of a computer model of the entire Ogallala Aquifer which underlies varying portions of the states of Texas, Oklahoma, New Mexico, Kansas, Nebraska, Colorado, Wyoming, and South Dakota.

The purposes of the study are to: (1) describe the water resource and the operation of the hydrologic system; (2) develop a regional water resources (and related) data storage and retrieval system; (3) design and develop a digital computer model (or models) of the High Plains aquifer system; and (4) evaluate selected groundwater management alternatives to demonstrate the applicability of the model (or models) and provide a hydrologic basis for the economic evaluation of management alternatives.

HIGH PLAINS - OGALLALA AQUIFER AREA STUDY

The Water Resources Development Act of 1976 provided authorization for the Economic Development Administration to study the natural resources of areas of the States of Colorado, Kansas, New Mexico, Oklahoma, Nebraska, and Texas that are using the water of the Ogallala Aquifer and to develop means of increasing the water supplies of or to those areas.

The main thrust of this EDA study will be the determination of the effect of declining groundwater supplies on the economic growth or stabilization of the areas overlying the Ogallala Aquifer.

The EDA was provided with an initial Congressional appropriation of \$3 million for the first year of study. A total of \$6 million has been appropriated for the study effort.

REPUBLICAN RIVER WATER MANAGEMENT STUDY

The Bureau of Reclamation will study the Republican River Basin with the help of other federal agencies. The determination of a dependable water supply in the Republican River Basin is complicated by several factors including past and future depletions of surface water flows by groundwater use, possible changes in the rainfall patterns, and fulfillment of the Republican River Compact conditions. The States of Colorado, Nebraska, and Kansas support the study.

The study would first assess the surface and groundwater supplies in the basin. The interrelationship between ground and surface water supplies would be determined, which would include an assessment of how groundwater development has affected surface water supplies. Alternative plans would then be developed to maximize the near- and far-term utilization of the existing water resources in the basin.

GREGORY COUNTY PUMPED STORAGE FACILITY WATER SUPPLY CONCEPT STUDY

The West River Conservancy Sub-District in South Dakota is leading an organization comprised of counties and districts from Nebraska and South Dakota in an effort to determine the potential for securing multipurpose water supply from a proposed Corps of Engineers project. In their study of the Missouri River, the Corps recommended construction of a pumped storage hydroelectric generating facility at Lake Francis Case in Gregory County, South Dakota. Authorization for advanced engineering and design of this facility may be received from Congress in the near future.

The local agencies, with the aid of a grant from the Old West Regional Commission, have retained consulting engineers to study potential projects that could utilize water from the Corps project for municipal, industrial, rural domestic, livestock, and irrigation purposes in three counties in South Dakota and two in Nebraska. A number of alternatives for Community Rural Water Supply Systems and several irrigation alternatives, with several variations of each alternative, are being investigated. Preliminary results indicate that several rural water supply alternatives may be feasible, and a limited amount of irrigation could possibly be developed in South Dakota.

NORTH PLATTE PROJECT REHABILITATION AND BETTERMENT PROGRAM

The Bureau of Reclamation initiated the Rehabilitation and Betterment Program in fiscal year 1979 in response to a request by the Pathfinder, Northport, Goshen, and Gering-Fort Laramie Irrigation Districts in Wyoming and Nebraska to seek a long-term solution to the Guernsey Silt Run.

The program will investigate alternatives to the Silt Run. Some of these alternatives will include the use of pipe laterals, canal lining, reuse of return flows, structural improvements, water management studies, and alternative methods of providing silt for the system. Also to be included in this investigation will be a study to evaluate the benefits and impacts of the Guernsey Silt Run.

NIOBRARA RIVER BASIN, NEBRASKA, WYOMING, AND SOUTH DAKOTA REVIEW STUDY

The investigation of this area by the Corps of Engineers is directed primarily toward developing multipurpose storage reservoirs to provide silt detention, erosion control, flood control, recreation, municipal and industrial water supply, and review of other related water resources problems. The study has been deferred.

MISSOURI RIVER, SOUTH DAKOTA, NEBRASKA, NORTH DAKOTA AND MONTANA

A Corps of Engineers report recommending hydropower generating facilities in Montana, North Dakota, and South Dakota; bank stabilization at thirty areas; fish rearing facilities in South Dakota; and designation of the Missouri River from Gavins Point Dam, S. D. to Ponca State Park, Nebraska as a National Recreation River was prepared and submitted to the Chief of Engineers in August 1977 by the Missouri River Division. Public Law 95-625 has since designated the recommended river stretch as a National Recreation River. During review it was determined that authority for bank stabilization exists and there no longer is a need to recommend stabilization in the report. The report currently is under review by the Chief of Engineers prior to forwarding to the Congress.

METROPOLITAN DENVER AND SOUTH PLATTE RIVER AND TRIBUTARIES, COLORADO WYOMING, AND NEBRASKA REVIEW STUDY

The Metro Denver Study is a multidisciplinary investigation by the Corps of Engineers of the flood control, water supply, water quality, and outdoor recreation problems, needs, and opportunities of the South Platte River basin in Colorado and Wyoming. The Nebraska portion of the basin was not included because the Platte Level B Study covered this area. The Metro Denver report does not contain Congressional recommendations for any projects that would affect Nebraska; but it does contain some information, particularly water supply, that is applicable to Nebraska. The report is scheduled for completion in the spring of 1979.

METROPOLITAN SIOUX CITY AND MISSOURI RIVER, IOWA, NEBRASKA, AND SOUTH DAKOTA WATER AND RELATED LAND RESOURCES MANAGEMENT STUDY

This study was initiated by the Corps of Engineers in fiscal year 1977. The study includes analyses of alternative flood control and flood plain management plans in the Sioux City area and on several tributaries to the Missouri River; investigation of water supply problems and needs for the 11-county study area; investigation of Missouri River bed degradation (erosion of the channel bed and subsequent lowering of the water surface); analysis of outdoor recreation needs in the study area; and the development of a water and related land resources management plan for areas bordering the Missouri River from Gavins Point Dam to the confluence of the Little Sioux and Missouri Rivers. This study is scheduled for completion during fiscal year 1980.

Studies in Nebraska

BUREAU OF RECLAMATION

Otoe-Cass Unit. The Bureau of Reclamation is the agency primarily responsible for investigation of the Otoe-Cass Unit, located in Otoe and Cass Counties in southeastern Nebraska. The study will analyze the potential for pumping water from the Missouri River to serve needs in those counties.

Funds were written in to evaluate the potential unit during fiscal year 1979. A Public Involvement Meeting was held on December 4, 1978, in Syracuse, Nebraska, to identify problems and needs such as irrigation, municipal and industrial and rural domestic water, recreation, and fish and wildlife requirements. A plan of study is being developed and the potential project will be defined both as to purposes and potential alternatives. Data developed from land classification and broad engineering and economic parameters will be used to determine if additional studies are warranted. A letter-type status report is scheduled for completion by the end of fiscal year 1979.

SOIL CONSERVATION SERVICE

Preliminary Watershed Studies. Applications for preliminary planning in the following watersheds have been approved.

<u>Watershed</u>	<u>River Basin</u>
South Fork Big Nemaha Tribs	Nemaha
Squaw-Camp Creeks	Nemaha
Peru-Brownville	Nemaha
Turkey Creek	Nemaha
Big Muddy	Nemaha
Lower Big Nemaha	Nemaha
Weeping Water	Nemaha
Wahoo Creek	Lower Platte
Southern Sarpy	Lower Platte
Northeast Cass	Lower Platte
Skull Creek	Lower Platte
Ogallala Tribs	South Platte
Buffalo Elm	Middle Platte
Lower Prairie Creek	Middle Platte
Lower Wood River	Middle Platte
North Branch	Middle Platte
Upper Prairie Creek	Middle Platte
Warm Slough-Silver Creek	Middle Platte
Bell Creek	Elkhorn
North Fork	Elkhorn
Pebble Creek	Elkhorn
Plum Creek	Elkhorn
South Fork Logan Creek	Elkhorn

APPENDIX

PROJECT DEVELOPMENT BY AGENCY

This section summarizes the planning procedures for each of the three major federal agencies involved in water resource planning and development. It is included to provide the reader a basic explanation of the procedures followed in development and implementation of projects.

Development of a Bureau of Reclamation Project

Reclamation projects, except where public lands are involved, must meet the needs of the state and locality. The local people interested in such development must support action to initiate and conduct the investigation of water and related land resource development possibilities. If it is determined that studies are needed and warranted, funds for an appraisal investigation, previously known as a reconnaissance investigation, are requested by the Regional Director. Upon approval by the Commissioner of Reclamation, Secretary of the Interior, and the Office of Management and Budget, funds for this investigation are included in the Department of Interior budget request to Congress. When funds have been appropriated by Congress, the appraisal investigation can begin.

Although each study is tailored to meet the needs and opportunities of the particular area, the investigation normally follows certain general steps. First, an appraisal is made analyzing the problems and needs of the area, then the various resource potentials and means for developing them as a solution are investigated, and a report is prepared. This is carried out with a minimum of funds and field work, using available data and considerable judgment. The appraisal study is conducted to determine promising alternatives and to assess the engineering and economic feasibility, environmental aspects, and local interest in such alternatives, but only to the extent that a determination can be made as to whether expenditure of the funds necessary to accomplish a feasibility investigation and report are warranted.

Where an appraisal investigation has shown that a potential project warrants further study and state and local interests have endorsed the potential plan, a request for authorization to make a feasibility investigation is made to Congress. This request is made through the appropriate committees and subcommittees of both the Senate and House of Representatives. If the investigation is authorized and money is made available by Congress, studies are undertaken in cooperation with interested and affected government agencies, local area representatives, and the public. Public involvement programs will be initiated as required to provide liaison between the general public and the planning and technical personnel. Depending on the complexity of the investigations, planning teams and technical task forces may be organized to collect and assess resource data and to formulate and evaluate alternative plans. The feasibility investigation develops a detailed, multiple-objective plan following procedures established by the Water Resources Council that includes appraisal evaluations of alternate plans as well as an examination of possible environmental impacts and the financial feasibility and economic justification for the project.

The feasibility report, after receiving departmental approval, is submitted to other federal agencies and to the governors of affected states for formal review and comment. A report for any unit of the Pick-Sloan Missouri Basin Program is also sent to all of the states in the Basin for review and comment. Following this formal review, the report is then transmitted to the Office of Management and Budget (OMB) for review. After clearance by the OMB, the Secretary of the Interior transmits the report to Congress for consideration of the proposed project for authorization. The feasibility report must proceed through the same Congressional committees which recommend authorization of the feasibility investigation.

Environmental impact statements are prepared for all project feasibility reports. A final environmental impact statement must be filed with the Council on Environmental Quality 30 days prior to any major Federal action. After a project is authorized, any significant changes in the project plan or purposes are reported through supplements to the final environmental impact statement.

Following Congressional hearings and enactment of project construction authorization, a definite plan report which includes specific engineering and operation plans is prepared. The Bureau of Reclamation through the Department of Interior then requests that Congress appropriate funds to permit the start of construction. At this time, or even in the earlier feasibility review process, additional planning may be necessary to update the plan and estimates if considerable time has elapsed between the project construction authorization and the request for appropriation of funds. Any changes in the updated plan must also be reflected in a final updated environmental impact statement or supplement and public hearings must be held before construction begins if any of the environmental aspects of the project have changed.

After execution of suitable repayment contracts, certification of the irrigability of lands, filing final environmental impact statements, and Congressional appropriation of necessary funds, project construction can proceed. Designs and specifications are prepared by the Bureau of Reclamation. Practically all construction is accomplished by private contractors chosen on the basis of competitive bids. However, inspection and control of construction to assure conformance with specifications is accomplished by the Bureau.

As soon as practicable after completion of construction, the operation, maintenance, and general management of a project's distribution system is turned over to the local sponsor. Annual or periodic joint inspections help assure adequate attention to proper operation and maintenance. Normally, multipurpose reservoirs with power facilities, dedicated flood control capacity, or municipal and industrial water supply will remain under the operating control of the government.

The Small Reclamation Projects Act of 1956, and amendments thereto, and the Rehabilitation and Betterment Act make it possible for certain types of organizations to obtain interest-free loans for

small reclamation projects. Grants are also made, along with the loans, for those portions of the projects that are non-reimbursable. The project may be a completely new undertaking, or it may be a rehabilitation of an existing project. The maximum cost of projects under the Small Reclamation Projects Act can be no more than \$27,200,000 with the Federal Government providing a loan and/or grant combination totaling no more than \$18,100,000. There is no limit on the total cost of programs under the Rehabilitation and Betterment Act, but it must be within the ability of the water users to repay within a reasonable period of time.

Development of a Corps of Engineers Project

Corps of Engineers projects in Nebraska are mainly of two types, major flood control or multipurpose projects and small local flood protection projects.

Major project studies of survey scope originate with a request from individuals or organizations to their Senator or Congressman for assistance with a flood threat, water supply program, recreation need, or some other type of water problem. The member of Congress may request that the Public Works Committee authorize a survey study of the situation, usually through adoption of a resolution but sometimes by inclusion in a river and harbor and flood control act.

After the study has been authorized, it is assigned by the Chief of Engineers through the Division Engineer to the proper District Office. Then funds must be requested in the Department budget and provided by Congress before the study can be started.

When funds become available, the District Office makes a study, initiated by a public hearing, to determine the extent of the problem and possible solutions. An engineering survey is made to develop the general plan, and estimate is made of the cost and the expected public and private benefits from the project. If the proposed project is for local protection, or it is a multipurpose project including local water supply, general agreement of the responsible local officials with the requirements for local cooperation must be obtained.

Upon completion of the District Engineer's survey report and development of an Environmental Statement, they are submitted for review by state and federal agencies at several different levels. After all comments are received, the survey report is forwarded to the Office of Management and Budget by the Secretary of the Army. After approval by this office, it is transmitted to the Public Works Committee to fulfill the original directive which started to the Council on Environmental Quality.

Ordinarily if the proposed project is feasible the report is then printed as a public document, and may be included in a flood control bill for consideration by the Congress. If the bill is passed by Congress and signed by the President, the project becomes authorized for construction. On receipt of authorization, the District Office secures

assurance of local cooperation, and funds for construction are requested in the Department's budget, which is reviewed by the Office of Management and Budget before it is transmitted to Congress.

Under special authority given to the Chief of Engineers, the Corps, without specific Congressional approval, can undertake small localized projects if they meet certain limitations. These projects include small flood control projects, bank protection works, clearing of channels, small boat harbors, flood plain delineations, and the repair of existing flood control works which were not constructed by the Federal Government.

A study of a potential local project may be initiated by the District Engineer at the request of local citizens. If a reconnaissance study indicates a project could provide sufficient benefits, funds for a detailed project study are requested from the Chief of Engineers. The detailed project report, containing the results of engineering and economic analyses of the project, must be reviewed by state and federal agencies and approved by the Chief of Engineers. Then, if assurances of local cooperation are provided and other statutory limitations are met, funds for construction may be allocated by the Chief of Engineers without specific Congressional action.

After appropriation of construction funds by Congress or the Chief of Engineers, the District Engineer prepares plans, specifications, cost estimates, and secures evidence of local willingness to accept right-of-way and maintenance provisions. Awarding of the construction contracts is made through bidding.

Upon completion of construction, local protection projects are turned over to the local sponsor for operation and maintenance. Major multi-purpose projects are maintained by the Corps or other cooperating federal agencies.

Development of a Small Watershed Project Under the Administration of the Soil Conservation Service

Public Law 566 provides for federal assistance in solving flood, drainage, erosion, sediment and irrigation problems which are beyond the scope of an individual effort, and in development of facilities for recreation, fish and wildlife, and municipal or rural water supplies.

The Natural Resources Districts created by the Legislature in July, 1972 can initiate and sponsor small watershed projects. Formal application must be made to the Nebraska Natural Resources Commission to obtain planning assistance from the Soil Conservation Service.

After an application is submitted, a field review is held with representatives of the Soil Conservation Service, Natural Resources Commission, Fish and Wildlife Service, Nebraska Game and Parks Commission, other interested state and federal agency personnel, and the Natural Resources District board to examine the watershed problems and determine

if the proposed project is potentially feasible. Following the field review the application and recommendations are forwarded to the Natural Resources Commission. If a need for watershed development is apparent and a project appears potentially feasible, the Commission approves the application and forwards it to the Soil Conservation Service.

After the application is approved by the Soil Conservation Service, priorities will be issued by the Natural Resources Commission for planning assistance. As technical assistance and planning funds become available, the Soil Conservation Service will conduct a Preliminary Investigation. If the Preliminary Investigation Report indicates a feasible project and, after public informational meetings are held to determine the most socially acceptable alternative and the proposed plan is accepted by the sponsoring board, the State Conservationist will request planning authorization from the Administrator of the Soil Conservation Service.

After receipt of this authorization and allocation of funds by the Administrator, a detailed watershed plan is formulated and an environmental assessment is conducted by the local sponsors with technical assistance from the Soil Conservation Service and the Natural Resources Commission. The sponsors then initiate a public informational meeting and invite local residents and interested state and federal agencies. After this meeting, the local sponsors determine if the plan is acceptable. If acceptable, preliminary drafts of a Watershed Work Plan and Environmental Statement are prepared for technical review by USDA specialists. These documents are forwarded to interested federal and state agencies for review and comment. After review, another public meeting similar to the other two will be held. If the watershed plan is still acceptable to the local sponsors after this meeting, they sign the Work Plan Agreement.

After these reviews, the work plan and environmental impact statements are submitted by the State Conservationist to the Administrator of the Soil Conservation Service for review by federal agencies at the Washington level and for formal review by the Governor. Projects in which the federal share of construction is less than \$250,000 may be approved by the State Conservationist. For projects in which the federal share exceeds \$250,000, the work plan is transmitted through the Office of Management and Budget to the appropriate House and Senate Committees for authorization.

Federal funds for watershed construction are budgeted annually by Congress and allocated by the Administrator to the State Conservationist. Before construction can begin on any structure, the local sponsoring organization must obtain needed land rights, water rights, a construction permit, and enter into the construction contract, except that the Federal Government may, upon request of the local sponsor, enter into contracts for construction of structures.

Operation and maintenance of the completed structural works is the responsibility of the local sponsor.

DEFINITIONS

The following definitions are provided to reduce repetition and to define many of the terms used in this summary. Included in this glossary are explanations covering such subjects as direct benefits, indirect benefits, state and federal cost, and Missouri River basin power revenues.

Definitions and terms used in this publication and all State Water Plan publications conform, where possible, to those adopted by the Missouri Basin Interagency Committee in April, 1968.

Acre-Foot - (abbr. ac. ft.) A unit for measuring volume of water equal to the quantity required to cover one acre to a depth of one foot and is equal to 325,851 gallons or 43,560 cubic feet.

Activity Day - Participation by an individual in a specific outdoor recreation activity during any part of a day.

Ad Valorem Tax - A tax authorized by the state for use by small subdivisions of government. A tax on all tangible property within the subdivision boundary.

Aquifer - A rock formation, bed, or zone containing water that is available to wells. May be referred to as a water-bearing formation or bed.

Arable Lands - Lands which are capable of being cultivated using presently accepted practices.

Average Annual Damages - Estimated flood and related damages computed as a uniform annual series. Average annual flood damages are computed on the basis of expectancy in any one year of the various amounts of flood damages that would result from floods throughout the full range of potential magnitude.

Conservation Storage - Storage of water for useful purposes such as irrigation, municipal water supply, power, recreation, water quality, or fish and wildlife.

Consumptive Use Requirement - The annual quantity of water in acre-feet per acre absorbed by the crop and transpired or used directly in the building of plant tissue, together with that evaporated from the cropped area.

Crop Irrigation Requirement - The amount of irrigation water in acre-feet per acre required by the crop; it is the difference between crop consumptive use requirement and effective precipitation.

Cubic Feet Per Second - (abbr. c.f.s.) A term used in measuring the rate of flow of water past a given point. One c.f.s. flowing for 24 hours equals 1.98 acre-feet.

Cutoff - Channel straightening procedure whereby a stream loop or meander is eliminated.

Direct Benefit - Those estimated benefits which are derived as a direct result of the project features such as providing irrigation water for increased crop production.

Diversion Requirement - The amount of water in acre-feet per acre that is diverted from a stream to irrigate a given area of land, including an allowance for evaporation, seepage and farm waste.

Drainage Area - The land area above a given point on a stream which contributes surface water drainage.

Economic Life - The number of years used for economic analysis.

Farm Delivery Requirement - The amount of water in acre-feet per acre required to serve an area from a canal turnout. It is the crop irrigation requirement plus farm waste and deep percolation losses.

Fisherman Day - Any part of a day spent fishing by an individual.

Flood Frequency - The probability of occurrence of a flood expressed as a percent or as a recurrence interval based on its ratio to the mean annual flood. Thus, a two percent chance flood would be essentially a 50-year flood when expressed on a recurrence interval.

Flood Plain - The portion of a river valley covered with water when the river overflows its banks at flood stage, usually built up of sediment deposited by the stream.

Flood Storage - The volume of water in acre-feet which can be stored in a reservoir to reduce the flow of flood waters downstream from the reservoir. It is usually an increment of storage above the conservation pool.

Headworks - The initial canal section and diversion control features which permit or control passage of water.

Hunter Day - Any part of a day spent hunting by an individual.

Indirect Benefits - Indirect benefits are those estimated benefits which are not derived directly from operation of project features but are realized from increased profits by local businesses, increased settlement opportunity, and increased economic growth by reason of the direct production.

Initial Storage - The amount of water in acre-feet that a newly constructed reservoir is capable of storing, including an allowance for sediment.

Interest Rate - The rate of interest used in plan formulation and evaluation for discounting future benefits and computing costs, or otherwise converting benefits and costs to a common time basis.

Intermittent Stream - A stream that flows only part of the time or through only part of its course.

Irrigation Depletion - The amount of diverted water consumptively used in serving an area, including wasted water not returning to the stream system. It is the gross diversion minus the return flow.

Irrigable Lands - Lands that are capable of being irrigated and are in an area where water can be made available at costs presently conducive to private or public development.

Land Treatment - The application of conservation practices to the land, such as terracing, contour farming, planting of grass, etc. It includes all types of management, vegetation, and mechanical practices.

Lateral - A small waterway or canal which usually branches from a larger canal and brings irrigation water to the fields which are to be irrigated.

Local Cost - Costs which are borne by a local unit or entity. On Bureau of Reclamation projects it generally is that portion of the project cost allocated to irrigation which is reimbursable and will be paid by a local body such as an irrigation district.

Maximum Water Surface - The highest water surface elevation for which the dam is designed.

Missouri River Basin Power Revenues - (abbr. Mo. R. Basin Power) - Money which is derived from the generation and sale of power from federally-owned hydroelectric power plants located within the Missouri Basin over and above that needed to cover the costs of repayment, operation and maintenance of the power facilities.

Multiple-Purpose Reservoir - A reservoir planned to be used for more than one purpose.

Non-Federal Costs - Project costs borne by a state or local body. May include recreation; irrigation; fish and wildlife; operation, maintenance, and replacement; and land and right-of-way. For this report, it includes all non-federal costs except those associated with an irrigation project.

Operation, Maintenance, and Replacement - (abbr. O.M.&R.) - Average Annual costs of project operation and normal maintenance, with allowance for replacement of worn-out parts of facilities.

Pick-Sloan Missouri Basin Program - The multiple-purpose plan of development consolidated from plans of the Corps of Engineers and Bureau of Reclamation and approved by the second session of the 78th Congress in the Flood Control Act of December 22, 1944.

Project Installation Cost - The total cost of Soil Conservation Service projects; includes the cost of land treatment, land rights, structural measures, and engineering and administrative costs.

Recreation Day - A visit by an individual to a recreation area for a significant portion of a 24-hour day. A recreation day is assumed to consist of 2.5 activity days.

Return Flow - That part of irrigation water not consumed by evaporation, stored in the soil, or used by plants, which returns to either its source or another body of water.

Revetment - A river channel control structure usually built of stone and either extending out into the river to deflect the flow or extending along the bank to protect the bank.

Sediment Capacity - The amount of reservoir capacity allowed for the deposition of sediment.

Separable Cost - The cost associated with a function of a multipurpose project computed as the difference between the project cost with and without the function.

Side Channel Basin - Low depression areas along a river channel which can be used to store flood water to reduce the flow in the river channel.

Spillway Capacity - The rate of flow in cubic feet per second that a spillway can discharge under maximum water surface conditions.

Spoil Bank Levees - A levee constructed from material excavated at the site from the channel for the purpose of preventing floodwater encroachment beyond this levee.

State Costs - Costs assigned to the State, which usually include, but are not limited to, one half of the separable cost of providing land and facilities for the enhancement of recreation, fish and wildlife, and associated functions during construction.

Storm Event - The runoff producing storm usually expressed as a frequency or percent chance of occurrence in any given year.

Streamflow Depletion - Decrease in the amount of water within a certain stream reach. It is the inflow minus the outflow.

Surcharge Storage - Temporary reservoir storage from the maximum water surface elevation down to the highest of the following elevations:

- a. Top of exclusive flood control capacity,
- b. Top of joint use capacity, or
- c. Top of active conservation capacity.