CHAPTER 9 – KANSAS SUBBASIN

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SUBBASIN DESCRIPTION

The Kansas Subbasin, lying along the southern edge of the Missouri River Basin, encompasses about 38.9 million acres. As shown in figure 9-1, the subbasin includes all of the land drained from west to east by the Kansas River and its tributaries in Colorado, Kansas, and Nebraska. It has a maximum east-west width of nearly 500 miles and a maximum north-south extent of about 220 miles. Generally, the topography is gently rolling, punctuated by scattered buttes, knobs, and level country. Elevations range from 6,000 feet (mean sea level) in the Colorado high plains downward to about 750 feet at the confluence of the Kansas and Missouri Rivers at Kansas City.

The subbasin is dominated by agricultural land use. Woodlands and forests border the major streams and rivers of the subbasin and provide important habitat for wildlife and birds. The subbasin's numerous manmade reservoirs and farm ponds provide good quality warm water fisheries. Natural wetlands scattered throughout the subbasin provide critical production areas for waterfowl.

In 1975, the total human population of the Kansas Subbasin was estimated to be 1.3 million. Urban residents constituted 62 percent of the total and generally are concentrated toward the eastern third of the subbasin. This component of the population is projected to increase by more than 50 percent before the year 2000. In contrast, rural population is expected to decline due to decreasing farm size and out-migration of rural youth. Nearly half of the subbasin's population resides in the area's two Standard Metropolitan Statistical Areas, Kansas City and Topeka. An estimated 2,200 native American Indians live in the Kansas subbasin.

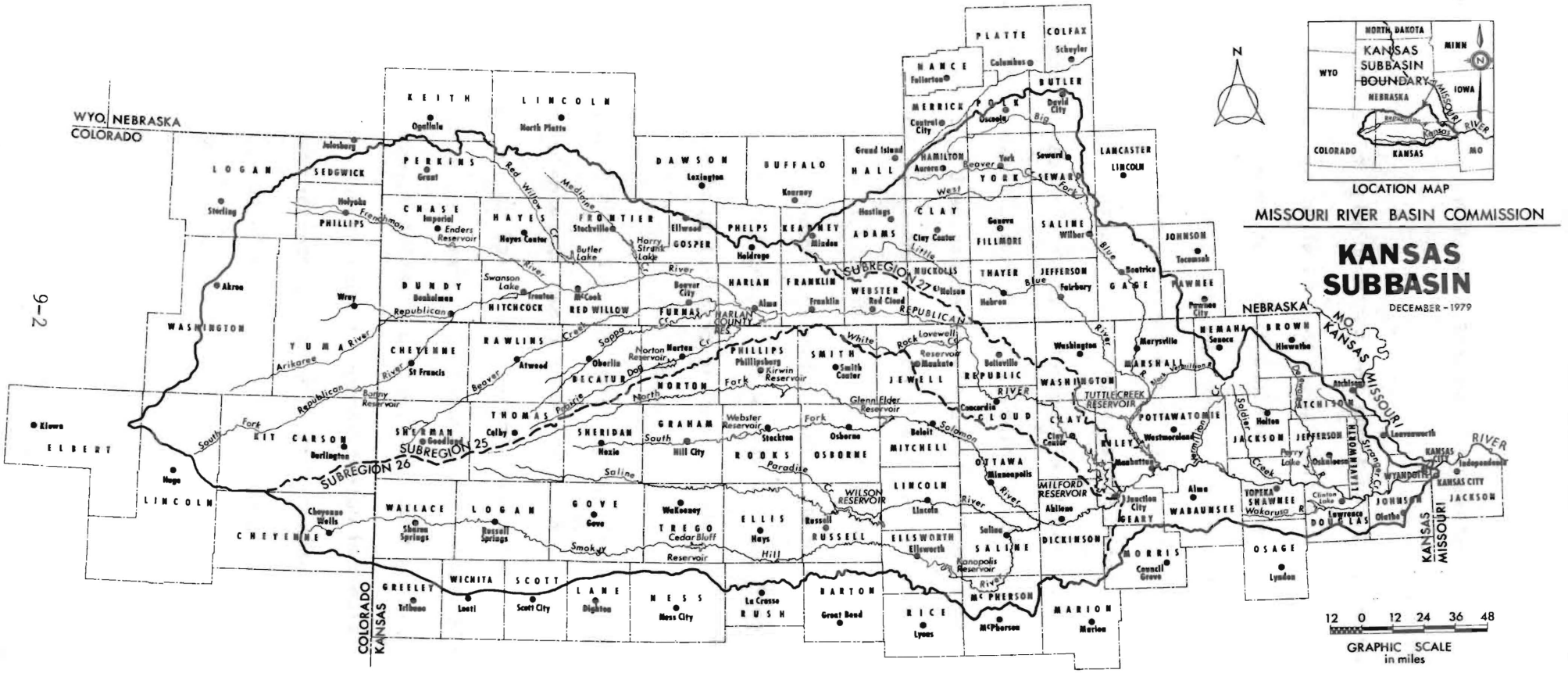

Figure 9-1-Kansas Subbasin

Most of the economic activity is related to agriculture, although refining and processing of fuels is gaining importance in the western areas. Major dryland crops are winter wheat, grain sorghum, and corn; irrigated acreage is mostly in corn, alfalfa, and sugar beets. Beef cattle and hogs are the principal livestock products.

Water availability is highly variable across the Kansas Subbasin. Most streams are subject to severe seasonal fluctuations in flows. Exceptions are stream reaches regulated by reservoir releases and those in the extreme eastern portion of the subbasin, where precipitation is greatest.

Ground water is abundant in most stream alluvia and also in the vast Ogallala aquifer underlying the western third of the area. However, ground water pumping for irrigation is causing severe localized declines of ground water levels.

The major water use is for crop irrigation, comprising over 90 percent of withdrawals and consumptive use. Federal reservoirs play an important role in providing water supplies for irrigation systems and municipalities.

Water quality of the subbasin's streams and rivers is fair. Seasonal degradation occurs due to runoff from agricultural lands and when low flows cause increases in naturally-occurring mineral concentrations. Ground water is generally hard, but the quality is adequate for most uses.

Two of the subbasin's major streams, the Republican River and the Big Blue River, are subject to interstate compacts. The Republican River Interstate Compact allocates waters among Colorado, Kansas, and Nebraska based upon the computed annual supply under natural conditions. Under the Big Blue River compact, Nebraska guarantees specified minimum flows in the Big Blue and Little Blue Rivers entering Kansas.

The three Kansas Subbasin States for the most part adhere to the system of prior appropriation in determining water allocation for beneficial uses.

Beneficial uses are specifically defined in all three States, and generally include domestic, municipal, and agricultural. Colorado further recognizes water use for instream flows for fisheries habitat and recreation, and will issue water rights for such reservations.

Management of ground water in Kansas and Nebraska is limited to the creation of optional ground water management districts in areas of critical concern. Colorado apportions ground water in a manner similar to surface waters, requiring the granting of a water right by the State regulatory agency.

PROBLEMS AND OPPORTUNITIES

The major problems in the Kansas Subbasin involve irrigation water supply, flooding, municipal and rural water supply, erosion, fish and wildlife habitat, and water quality. Important opportunities exist in the subbasin for increased irrigation.

There are two types of problems involving irrigated agriculture--lack of adequate surface water supply and diminishing ground water supplies. Considerable amounts of cropland are irrigated using surface water systems, including a number of large Water and Power Resources Service projects. Irrigators dependent upon water from surface projects in the Republican River drainage in Nebraska face declining water availability caused by upstream ground water pumping. Rapidly increasing development of sprinkler irrigation systems utilizing ground water is diminishing the flows available to Federal surface impoundments and thus to the irrigation districts involved.

In several areas, irrigators using ground water face diminishing supplies, declining water levels, and increasing costs for pumping. The problem of declining water tables is particularly acute in the Ogallala aquifer underlying the western portion of the subbasin including the Upper Republican River Basin. Other areas subject to severe ground water decline are located in the Big and Little Blue basins in Nebraska.

Opportunity for irrigating high quality cropland exists at several areas. In Kansas, irrigable lands below Glen Elder and Kanapolis Reservoirs could be developed for surface water delivery systems. Opportunity also exists for expanding irrigation in eastern Colorado using water impounded in Bonny Reservoir. In Nebraska, suitable lands in the Big Blue and Little Blue basins have potential for development of irrigation systems. Institutional conflicts involving diversion of water from the Platte River for use in the Little Blue Basin have restricted such actions.

Flooding is a chronic problem on rural lands adjoining the subbasin's streams and at a number of urban and built-up areas. Cities and small towns in the Big Blue and Little Blue basins above Tuttle Creek Reservoir are subject to recurring floods during periods of unseasonably high runoff. Debris-clogged channel conditions often compound the problem.

Rural flooding occurs on streamside lands throughout the basin, particularly on the major tributaries. On the Republican River below Harlan County Dam, diminished channel capacity contributes to overbank flooding problems.

A number of cities in Kansas depend on surface water for their municipal supply. During periods of low flows on the Kansas River, the quality of municipal supplies for Topeka, Manhattan, and Lawrence is degraded because of naturally-occurring saline concentrations. Also, in some instances, existing storage allocations in Federal reservoirs in Kansas restrain the State from marketing water to municipalities.

Most smaller towns and rural inhabitants use ground water for domestic supply. The quality of most supplies is marginally adequate, and many rural areas are in need of upgraded systems.

Erosion of several types affects the subbasin's lands. Streambank erosion is most severe along the Kansas River, but also affects reaches of the Big Blue, Little Blue, Republican, Smoky Hill, Solomon and Saline rivers. High banks at Harlan County Reservoir on the Republican River are severely eroded by wave action.

Soil erosion and resulting sedimentation are a problem in the northeastern portion of the basin where precipitation is greatest and slopes are more prone to such effects. Wind erosion affects agricultural lands on the high plains of western Kansas, eastern Colorado, and southwestern Nebraska.

Preservation of suitable fish and wildlife habitat is a concern throughout the subbasin. Land available for wildlife is being diminished by agricultural practices, including drainage of wetlands and reduction of fencerows, roadside habitat, and other odd acreages. Wetland preservation is particularly important in Nebraska's Rainwater Basin, an important waterfowl propagation area.

PLANNING OBJECTIVES

The three subbasin States differ somewhat in their views of comprehensive water resources planning and in their preparation of State water plans. Colorado has completed two of three phases of a traditional State water plan--a resource inventory and legal framework--both done in cooperation with the Water and Power Resources Service. The State's near-term objective is to prepare phase III, the water resources management plan.

In Kansas, the State water plan is coordinated through the Water Resources Board, and portions are prepared with assistance from Federal agencies. The plan is effected only after legislative enactment and is updated on a regular basis.

Nebraska has abandoned the concept of a State framework plan in favor of a recently enacted State water planning and review process. The process is intended to be issue-oriented, with the near-term objective of providing the basis for wise legislative decisions concerning the State's water resources.

It is an objective of all three States to promote the development of irrigated agriculture. Each recognizes irrigation as a high-priority beneficial use of water necessary for the State's economy. A specific objective of the State of Kansas is to reduce the rapid decline of ground water resources necessary for irrigation in the western part of the State. Colorado wants to provide additional storage for irrigation water on the South Platte River and its tributaries, and promotes system rehabilitation and other water conservation measures. Further, Colorado opposes the conversion of prime agricultural land and water suitable for irrigated agriculture to other uses. In Nebraska, the State legislature has declared the use of water for irrigation "natural want", which illustrates the high priority attached to irrigation in Nebraska.

Each of the three States in the Kansas Subbasin desires to reduce damages caused by floods through a combination of structural and nonstructural measures. Kansas has enacted legislation which defines the specific levels of flood protection to be provided for various types of lands.

Although it is an objective of each State to preserve fish and wildlife resources and habitat, only Colorado officially recognizes the maintenance of instream flows for habitat as a beneficial use.

The three States desire to provide increased quantity and improved quality of municipal, industrial, and rural domestic water. Colorado objectives call for cooperation between Federal, State, and local entities to provide for the water supply needs. The State specifically promotes employment of water conservation measures to reduce per capita use in municipal systems. Kansas

statutes specify the State goal of providing municipal and industrial water in the near term future. Kansas promotes the State marketing of water stored in Federal reservoirs to local entities for municipal and industrial supply.

State objectives concerning the preservation of natural, historic, and cultural resources differ slightly among the Kansas Subbasin States. Colorado calls for an identification of significant natural areas, studies of riparian habitat, and an updated wetlands inventory, leading to restoration of certain wetlands. State policy in Kansas presently does not address preservation of wetlands or river corridors, but historic and cultural features are protected under State laws. Nebraska objectives call for investigation of potential protected streams in upcoming policy issue analyses.

Each of the States wants to provide improved water-based outdoor recreation for its citizens. A goal in Colorado is to expand recreational use of private and public water bodies. The State calls for operational studies to improve recreation opportunities and for local entities to work toward providing recreational access to private reservoirs. In Kansas, recreation is considered a by-product of water resources planning; no reservoir storage is specifically allocated for this purpose. Nebraska encourages local political subdivisions to provide recreational opportunities.

Finally, both Kansas and Colorado promote weather modification for its potential economic benefits. Both States regulate operations involving precipitation augmentation and hail suppression.

PLAN OVERVIEW

The plan for the Kansas Subbasin includes the programs and conclusions and additional recommendations in this chapter, the basinwide recommended programs listed in chapter 2, and the statewide programs recommended for Colorado, Kansas, and Nebraska, also contained in chapter 2.

In order to advance water resources planning in Colorado, the recommended plan calls for the Water and Power Resources Service to provide assistance to the State of Colorado in completing its State water plan (beginning in FY 1982). Water planning in the State of Kansas will benefit from the Water and Power's water management studies in the Solomon and Republican River Basins. The recommendation for continuing the Water and Power Resources Service study in the Republican River Basin should contribute to Nebraska's planning and review process.

A number of projects and programs are recommended to deal with flooding problems in the Kansas Subbasin. The plan contains 33 Soil Conservation Service small watershed projects--23 in Kansas and 10 in Nebraska. Also, it is recommended that the Corps of Engineers complete its study of flooding in the Stranger Creek Basin and construct local flood control works at Onaga Dam and Reservoir on Vermillion Creek in eastern Kansas.

Development of irrigated agriculture is a high priority in the Kansas Subbasin States. The plan recommends a combination of system rehabilitation, new project development, and feasibility studies to enhance irrigation. The Water and Power Resources Service is called upon to complete the Bostwick Division in Kansas and the Frenchman-Cambridge Division in Nebraska. Further, the plan recommends that the Service study the feasibility of a number of irrigation projects including the Little Blue Unit, Nebraska; Glen Elder Unit, Kansas; and Scandia Unit, Kansas. A feasibility study is recommended to investigate diversion of Platte River flows into the Little Blue River Basin in Nebraska to be stored and utilized for irrigation of cropland. The Director of the Nebraska Department of Water Resources has denied a water right for such action at this time.

In an attempt to deal with the problem of rapidly declining ground-water levels in Kansas' Ogallala aquifer, the plan recommends that a pilot recharge project be initiated by the Kansas Water Resources Board and local ground-water management destricts. The plan also calls for State and local investigations of irrigation feasibility utilizing surplus water in Bonny Reservoir, an existing Federal impoundment on the South Fork Republican River in Colorado.

To address the problems of erosion and sedimentation in northeastern Kansas the plan recommends that the Soil Conservation Service conduct the proposed "Northeast Kansas Water Quality Studies." The Department of Agriculture's "Rural Clean Water Program," recommended basinwide, will further aid in control of agricultural nonpoint source pollution.

Supply of adequate municipal, industrial, and rural domestic water is addressed by plan elements recommended both basinwide and specifically for the Kansas Subbasin. The Farmers Home Administration is recommended to participate with State and local entities in carrying out the program "Rural Water Supply and Waste Disposal Systems." Also recommended is construction of the water supply component of the existing Kanapolis Unit, a multipurpose impoundment on the Smoky Hill River. The city of Salina will benefit from the project.

RECOMMENDED PROGRAMS - KANSAS

NAME, LEAD AGENCY, AND FUNCTIONS ADDRESSED	DESCRIPTION
COMPREHENSIVE PLANNING AND SUPPORT ACTIVITIES	
1-SOLOMON RIVER BASIN WATER MANAGEMENT STUDY DOI/Water and Power Resources Service Comprehensive	Ongoing regional water management study to investigate water supply and use and ground/surface conjunctive use in Kansas' Solomon R. basin; completion scheduled FY 83; cost $1.6 million.
2-REPUBLICAN RIVER BASIN WATER MANAGEMENT STUDY DOI/Water and Power Resources Service Comprehensive	Ongoing regional water management study to investigate water supply and use and ground/surface conjunctive use in the 3-State Republican R. basin; completion scheduled FY 83; cost $1.4 million.
3-COLORADO STATE WATER PLAN, PHASE III DOI/Water and Power Resources Service Comprehensive Also in Platte-Niobrara Subbasin	Proposed new start studies to prepare the Phase III development plan; Colorado State agencies will participate; $570,000 programmed for FY 83; $290,000 for FY 84.
4-EAST CENTRAL COLORADO RC&D PROJECT USDA/Soil Conservation Service Comprehensive Also in Platte-Niobrara Subbasin	Ongoing project in Elbert, Lincoln, Kit Carson, & Cheyenne Counties; annual funding requirements are $70,000 through FY 82.
5-OVERLAND TRAILS RC&D PROJECT, COLORADO USDA/Soil Conservation Service Comprehensive Also in Platte-Niobrara Subbasin	Proposed FY 80 project start in Logan, Morgan, Sedgwick, Phillips, Washington & Yuma Counties; annual funding requirements are $70,000 through FY 82.

6-FOUR RIVERS RC&D PROJECT, KANSAS USDA/Soil Conservation Service Comprehensive	Ongoing project in eastern Kansas; annual funding requirements are $50,000 FY 80; $40,000 FY 81; $30,000 FY 82.
7-KANSAS AND OSAGE RIVERS, KANSAS STUDY Army Corps of Engineers Comprehensive Also in Lower Missouri Subbasin	Ongoing special study thru FY 83; streambank stabilization on KS. R. & tribs; mineral pollution control in Ks. R. basin; water supply and distribution in Ks. and Osage; study cost $4,540,000.

FLOODING

8-STRANGER CREEK BASIN, KANSAS STUDY Army Corps of Engineers Flooding, Recreation, Municipal, Industrial & Rural Supply	Ongoing feasibility study of flood control alternatives for Stranger Creek basin in eastern Kansas; structural & nonstruc. considered; study completion FY 82; study cost $590,000.
9-ONAGA LAKE, KANSAS Army Corps of Engineers Flooding, Fish & Wildlife, Recreation, Water Supply	Preconstruction planning of dam and reservoir on Vermillion Creek in E. Kan. to provide flood control, water supply, rec.; project completion not yet determined; cost estimate $69.5 million.
10-CHANNEL GEOMETRY/DISCHARGE CHARACTERISTICS STUDY, KANSAS DOI/Geological Survey Flooding	Ongoing special study to identify channel characteristics of streams having dams; study completion scheduled for FY 80; study cost $150,000; cost-shared with KS. Water Resources Board.

11-CEDAR CREEK WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding, Land Conservation and Management	Project with application approved; planning authorization anticipated FY 86; located in Atchison, Jefferson, and Jackson Cos.; includes 45 grade stab. structures; cost estimated at $3.5 million.
12-SNIPE CREEK WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding, Land Conservation and Management	Project with application approved; planning authorization anticipated FY 90; located in Marshall County; includes 10 grade stabilization structures; cost estimated at $800,000.
13-SPRING CREEK WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding, Land Conservation and Management	Project with application approved; planning authorization anticipated FY 84; located in Marshall county; includes 40 grade stabilization structures; cost estimated to be $1.9 million.
14-SPRING-STRAIGHT WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding, Land Conservation and Management	Project with application approved; planning authorization anticipated FY 84; located in Atchison Jackson, and Nemaha Cos.; includes 39 grade stab. structures; cost estimated at $4.6 million.
15-VERMILLION (ROBIDOUX) WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding, Land Conservation and Management	Project with application approved; planning authorization anticipated FY 92; located in Marshall, Jackson, and Nemaha Cos.; includes 39 grade stab. structures; cost estimated at $2.6 million.
16-LOWER MILL CREEK WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding, Land Conservation and Management	Project with application approved; planning authorization anticipated FY 82; located in Wabaunsee, Jackson, and Nemaha Cos,; includes 4 flood retention structures; cost estimate is $800,000.
17-UPPER MILL CREEK WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding, Land Conservation and Management	Project with application approved; planning authorization anticipated FY 82; located in Geary, Riley, Morris, and Wabaunsee Cos.; includes 15 flood retention structures; cost $3.1 million.

18-UPPER DELAWARE AND TRIBUTARIES WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flood, Land Conservation and Management	Project with application approved; planning authorization anticipated FY 94; located in Atchison, Brown, Jackson, and Nemaha Cos.; includes 120 grade stab. structures; cost $12 million.
19-DRY CREEK WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding	Active planning underway; installation authorization scheduled for FY 80; located in Clay, Cloud, Republic, and Washington Cos.; features 3 flood retention structures; cost $300,000.
20-ELK CREEK WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding and Recreation	Active planning underway; installation authorization scheduled for FY 80; located in Atchison, Jackson, and Nemaha Cos.; features 70 grade stabilization struc,; 1 multipurpose struc.; cost $7.7 mill.
21-GRASSHOPPER-COAL CREEK WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding	Active planning underway; installation authorization scheduled for FY 80; located in Atchison, Brown, and Jefferson Cos.; features 39 grade stabilization structures; cost $2.6 million.
22-WOLF-WILDCAT CREEK WATERSHED PROJECT, NEBRASKA USDA/Soil Conservation Service Flooding, Land Conservation and Management	Active planning underway; installation authorization scheduled for FY 80; located in Saline Co.; features 9 flood reten. structures; 12 grade stab.; cost $1.7 million.
23-SWAN CREEK WATERSHED PROJECT, NEBRASKA USDA/Soil Conservation Service Flooding, Land Conservation & Management, and Recreation	Active planning underway; installation authorization scheduled for FY 80; located in Pawnee, and Gage Cos.; features 16 flood retention struc.; cost $4 million.
24-CROSS CREEK WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding	Project under construction; completion scheduled FY 83; located in Jackson, Shawnee, and Pottawatomie Counties; features 15 flood retention structures; cost $4 million.

25-IRISH CREEK WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding and Land Conservation and Management	Project under construction; completion scheduled FY 79; located in Pottawatomie and Marshall Cos.; features 8 flood retention; 8 grad stabilization structures; cost $2,100.000.
26-LYONS CREEK WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding, Recreation	Project under construction; completion scheduled post-FY 84; located in Dickinson, Geary, Marion, & Morris Cos.; features 20 flood retention, 1 multi-purpose structure; cost $4.9 million.
27-SPILLMAN CREEK WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding, Land Conservation and Management	Project under construction; completion scheduled FY 83; located in north-central Kan.; features 21 flood retention, 2 grade stabilization structures; cost $4 million.
28-TURKEY CREEK WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding	Project under construction; completion scheduled FY 82; located in Dickinson and Marion Counties; features 15 flood retention structures; cost $3.4 million.
29-UPPER BLACK VERMILLION WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding, Land Conservation and Management, Recreation	Project under construction; completion scheduled post-FY 84; located in Marshall and Nemaha Cos.; features 12 flood retention, 25 grade stab., and one multipurpose structure; cost $6.2 million.
30-NORTH BLACK VERMILLION WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding, Land Conservation and Management, Recreation	Project under construction; completion scheduled post-FY 84; located in Marshall and Nemaha Cos.; features 22 flood retention, 35 grade stab.; and one multipurpose structure; cost $7.8 million.
31-UPPER SALT CREEK WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding	Project under constructin; completion scheduled post-FY 83; located in Lincoln and Mitchell Cos.; features 39 flood retention structures; cost $7.9 million.

32-LOWER SALT CREEK WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding	Project under construction; completion scheduled FY 81; located in Lincoln, Mitchell and Ottawa Cos.; features 5 flood retention structures; cost $1.3 million.
33-UPPER WAKARUSA WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding, Recreation	Project under construction; completion scheduled FY 83; located in eastern Kansas; features 21 flood retention and 2 multipurpose structures; cost $6.6 million.
34-LOWER WAKARUSA WATERSHED PROJECT, KANSAS USDA/Soil Conservation Service Flooding	Project under construction; completion scheduled FY 80; located in Douglas County; features 8 flood retention structures; 1.8 miles floodway; cost $2.5 million.
35-BIG INDIAN WATERSHED PROJECT, NEBRASKA USDA/Soil Conservation Service Flooding, Land Conservation and Management, Recreation	Operational project in Gage & Jefferson Counties; scheduled completion FY 80; features 2 grade stab.; 31 flood retention, and 1 multipurpose structure; cost $4.2 million.
36-BLACKWOOD CREEK WATERSHED PROJECT, NEBRASKA USDA/Soil Conservation Service Flooding	Operational project in Hayes & Hitchcock Counties; Republican R. drainage; scheduled FY 88 completion; features 13 flood retention structures; cost $4.3 million.
37-CLATONIA CREEK WATERSHED PROJECT, NEBRASKA USDA/Soil Conservation Service Flooding	Operational project in Gage & Lancaster Counties; Big Blue drainage; scheduled completion FY 82; features 8 flood retention structures; cost $1.2 million.
38-BEAR-PIERCE-CEDAR WATERSHED PROJECT, NEBRASKA USDA/Soil Conservation Service Flooding, Land Conservation and Management	Operational project in Gage County; scheduled completion FY 82; features 6 grade stab., and 27 flood retention structures; cost $3.7 million.

39-CUB CREEK WATERSHED PROJECT, NEBRASKA USDA/Soil Conservation Service Flooding, Land Conservation and Management	Operational project in Gage and Jefferson Co., Big Blue drainage; scheduled FY 82 completion; features 12 grade stabilization, 17 flood retention structures; cost $3 million.
40-LOWER MEDICINE CREEK WATERSHED PROJECT, NEBRASKA USDA/Soil Conservation Service Flooding	Operational project in Lincoln and Frontier Cos., upper Republican R. drainage; scheduled completion FY 84; features 3 flood retention structures; cost $3 million.
41-UPPER MEDICINE CREEK WATERSHED PROJECT, NEBRASKA USDA/Soil Conservation Service Flooding	Operational project in Hayes and Frontier Counties; scheduled completion FY 84; features 6 flood retention structures; cost $2.8 million.
42-MISSION CREEK WATERSHED PROJECT, NEBRASKA, KANSAS USDA/Soil Conservation Service Flooding, Land Conservation and Management	Operational project on the Nebraska-Kansas border; Big Blue basin; scheduled completion FY 80; features 4 grade stab., 12 flood retention structures; cost $2.5 million.
43-MUD CREEK WATERSHED PROJECT, NEBRASKA USDA/Soil Conservation Service Flooding, Land Conservation & Management, and Recreation	Operational project in Gage County; scheduled completion FY 80; features one multipurpose, 20 grade stab., 10 flood retention structures; cost $2.2 million.
FISH AND WILDLIFE	
IRRIGATION	
44-LITTLE BLUE UNIT FEASIBILITY STUDY, NEBRASKA DOI/Water and Power Resources Service Irrigation, Flooding, Fish & Wildlife, Recreation	Ongoing feasibility study for multipurpose project on the L. Blue R.; completion scheduled for FY 82; features may include reservoirs, pumping plants, and distribution system; study cost $778,000.

45-BOSTWICK DIVISION, NEBRASKA, REHABILITATION & BETTERMENT DOI/Water and Power Resources Service Irrigation	Proposed new start rehab. & betterment project on Republican R. in south-central Nebraska; will replace open laterals with pipe; cost to be determined.
46-BOSTWICK DIVISION, KANSAS, CONSTRUCTION DOI/Water and Power Resources Service Irrigation, Fish & Wildlife, Flooding	Completion of ongoing, operating irrigation project; remaining program consists of drainage works; on 75,000 acres; Republican R. in Kan and Neb; total project cost $57 million; $4 million remaining.
47-FRENCHMAN-CAMBRIDGE DIVISION, NEBRASKA, CONSTRUCTION DOI/Water and Power Resources Service Irrigation	Completion of irrigation project in Nebraska's Republican River basin; remaining program is subsurface drains; total project cost $83 million; balance to complete $170,000.
48-FRENCHMAN-CAMBRIDGE DIVISION, NEBRASKA, REHAB. & BETTERMENT DOI/Water and Power Resources Service Irrigation	Ongoing construction to replace open laterals with pipe in Frenchman Unit to stabilize water supply; completion scheduled FY 83; total cost $4.4 million.
49-GLEN ELDER UNIT, KANSAS FEASIBILITY STUDY DOI/Water and Power Resources Service Irrigation, M&I Supply, F&W, Rec, Water Quality	Resumption of feasibility study for irrigation unit using existing Waconda Lake; study will begin FY 82; completed FY 85; will study construction of canals; laterals & drains; study cost $865,000.
50-SCANDIA UNIT, KANSAS, FEASIBILITY STUDY DOI/Water and Power Resources Service Irrigation, M&I Supply, F&W, Rec, Water Quality	Resumption of feas. study to begin in FY 83 for irrigation on Republican R. and water supply for Belleville, Kan; involves diversion dam, pumping plants, canals, laterials; study cost $820,000.
51-LITTLE BLUE WATER RESOURCES PROJECT STUDY, NEBRASKA Little Blue Natural Resources District Irrigation Also in Platte-Niobrara Subbasin	Proposed feasibility study for a project to divert 115,000 AF of Platte R. flows to storage and delivery system in the Little Blue basin, to irrigate 40-60,000 acres; study cost $240,000; 5 yrs.

52-GROUND WATER RECHARGE-PILOT PROJECTS, KANSAS
Kansas Water Resources Board
Irrigation, M&I Rural Supply

New start implementation to recharge aquifers in western Kansas; program to begin in FY 80; end FY 84; funded through ground water mgmt. districts; total state funding $1 million.

LAND CONSERVATION AND MANAGEMENT

53-NORTHEAST KANSAS WATER QUALITY STUDIES
USDA/Soil Conservation Service
Land Conservation and Management, Water Quality
Also in Middle Missouri Subbasin

New start special study in FY 80 of sediment, land treatment, and water quality in Kansas' Delaware, Nemaha & Blue Rivers and Mo. R. tribs; study cost $205,000; 5 year duration.

MUNICIPAL, INDUSTRIAL AND RURAL DOMESTOC WATER SUPPLY

54-KANOPOLIS UNIT, KANSAS, CONSTRUCTION
DOI/Water and Power Resources Service & Army Corps of Eng.
M&I, Rural Water supply

Proposed construction of M&I component of Kanapolis Unit; will provide water for Salina, Kan.; scheduled to begin post-1985; cost estimated at $31 million.

NATURAL, HISTORIC, AND CULTURAL RESOURCES

POWER AND ENERGY

WATER-ASSOCIATED OUTDOOR RECREATION

55-RESERVOIR ROAD IMPROVEMENT FOR RECREATION, TUTTLE CR. RES., KS.
Army Corps of Engineers
Recreation

New start detailed planning studies of improved improved access roads for recreation areas at Tuttle Creek Reservoir, Kansas; scheduled FY 80-82; cost $1.1 million.

56-BONNY RESERVOIR WATER PURCHASE, COLORADO
Colorado Dept. of Natural Resources/Div of Wildlife
Recreation, Fish & Wildlife

Ongoing program wherein Colorado is proposing purchasing conservation pool at Bonny Res. on S. Fork Republican R. from DOI for fish & wildlife, rec., and other uses; total cost $1,750,000 through FY 82.

TRANSPORTATION

57-KANSAS RIVER NAVIGATION PROJECT
Army Corps of Engineers
Transportation

New start construction project to extend harbor-type navigation channel 9 miles up the Kansas R. from the mouth; schedule not determined; cost estimate $5.4 million.

WATER QUALITY

LEGAL AND INSTITUTIONAL FACTORS

INSTREAM FLOWS

WEATHER MODIFICATION

58-MUDDY ROAD PROGRAM, KANSAS
Western Kansas Ground Water Mgmt. Dist. No. 1
Weather Modification

Ongoing State/Federal/local program of cloud seeding to augment rainfall and suppress hail in SW Kansas; total annual funding is approx. $600,000.

CONCLUSIONS AND ADDITIONAL RECOMMENDATIONS

A. Bonny Reservoir, a Federal impoundment on the South Fork Republican River in Colorado, has surplus water available for irrigation. Irrigable lands above and below the reservoir are in need of a water supply. It is recommended that a feasibility study be conducted by the State and local interests for developing an irrigation project.

B. Urban flooding is a recurring problem on the Big Blue River at Beatrice, Nebraska. Structural measures are not economically justified. The city is currently conducting a program of limited relocation and flood plain acquisition in cooperation with the Department of Housing and Urban Development to alleviate some damages. The Corps of Engineers local protection project should be deauthorized.

C. Several ongoing and recently completed planning activities deal with the Kansas Subbasin. These efforts need coordination and evaluation of their recommendations for cumulative effects. It is recommended that a level B study of the Kansas Subbasin be initiated in 1982 by Missouri River Basin Commission and affected Federal and State agencies to develop a comprehensive water resources plan for the subbasin.