

Bostwick Division: Pick-Sloan Missouri Basin Program:

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Reformatted, reedited, and reprinted by Brit Storey:
December 2009

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Pick-Sloan Missouri Basin Program: Bostwick Division

The Bostwick Project controls the waters of the Republican River, straddling the border of the south-central Nebraska counties of Harlan, Franklin, Webster, and Nuckolls and the north-central Kansas counties of Jewell, Republic, and Cloud. The name *Nebraska* is an Otoe Indian word meaning “flat water” and *Kansas* is a Sioux word meaning “people of the south wind.” Since the 1880s the region’s farmers have had to contend with historically severe droughts every 21 years and occasional severe thunderstorms wreaking havoc with flash floods.¹

Project Location

Located in south-central Nebraska and north-central Kansas, the Bostwick Division extends from Orleans, Nebraska, above Harlan County Lake, to Concordia, Kansas, and includes land on both sides of the Republican River. The Scandia Unit has not been constructed. Bostwick Division’s features include Harlan County Dam and Lake on the Republican River (constructed and operated by the Corps of Engineers), Lovewell Dam and Reservoir on White Rock Creek, one existing and one proposed diversion dam, six pumping plants, and canals, laterals, and drains necessary to serve 104,240 irrigable acres (86,240 with available service and 18,000 potential) in seven counties. The reservoir, lake, and surrounding lands of the division provide benefits for flood control, irrigation, sediment control, fish and wildlife enhancement, and recreation.²

Historic Setting

Geologic Setting

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1. United States Department of the Interior, Bureau of Reclamation. *Kansas Prehistoric Archaeological Preservation Plan*. (Lawrence, Kansas: Office of Archaeological Research, Museum of Anthropology, 1987), III-18.
 2. United States Department of the Interior, Bureau of Reclamation. “1992 Summary Statistics: Water, Land and Related Data.” (U. S. Government Printing Office, 1993); United States Department of the Interior, Bureau of Reclamation. “Pick-Sloan Missouri Basin Program - Bostwick Division, Nebraska and Kansas.” <http://dataweb.usbr.gov/html/bostwick.html>, June 20, 2001.

During the early and middle parts of the Tertiary period of the Cenozoic era, mountain building was taking place in the western United States while erosion was removing the upper rock layers deposited 95 million years ago during the Cretaceous in the Republican River area, the future Bostwick project site. During the Pliocene epoch of the Tertiary period, a broad alluvial plain consisting of rock particles eroded from the Rocky Mountains of Colorado and Wyoming expanded eastward, eventually burying the Republican River area beneath layers of sand and gravel creating the Ogallala formation. Directly overlying this formation in most places are unconsolidated stream sediments, called alluvium, and aeolian, wind deposited silt, deposits laid down in the Pleistocene period beginning about two million years ago. These silt deposits, or loess, formed most of the region's valuable top soil used today for farming. These beds of loess range up to a hundred feet of thickness along the bluffs of the Republican River valley.³

The Republican River valley is characterized by wide, flat flood plains and bench-like alluvial terraces. The climate ranges from dry subhumid in the western region of the project area to wet subhumid to the east with annual precipitation varying sixteen to twenty-five inches, respectively. Blanketed with bluestem-gramma mixed prairie grasses, the rolling landscape is bisected by valleys of flood plain forest and savanna including freshwater marshes. Cottonwoods, junipers (*Juniperus virginiana*) and bur oaks are widely spaced along the region's streams and rivers.⁴

Prehistoric Setting

The available date suggests that North America could have been occupied by human groups anytime during the last 60,000 years, although evidence for possible occupations prior to

3. Pabian, Roger K. *Geology Along the Republican River Valley Near Red Cloud, Nebraska* (Lincoln, Nebraska: University of Nebraska-Lincoln), 3.

4. *Kansas Prehistoric Preservation Plan*, III-16.

13,000 B.C. are not universally accepted. North American anthropologists and archaeologists divide prehistoric Native American cultural periods into three major categories: Paleo-Indian, Archaic Indian, and Historic Indian.⁵

The Paleo-Indian period is placed chronologically from 10,000 B.C. to 6,000 B.C. These people were big game hunters using spears to hunt the great game herds of the last ice age. With the end of ice age the vast game herds began to disappear. With the stabilization of the climate and the seasons some species, such as the mammoths, camels, and horses, became extinct, while others, such as the pronghorn antelope, bison, and mule deer expanded their range. Prehistoric peoples of the High Plains entered into their Archaic Indian Period, 6,000 B.C. to A.D. 1, supplementing their big game diet with small game, such as rabbits, squirrels, and water fowl, and gathering edible roots, berries, seeds, and nuts. Grinding stones became common and the Archaic hunting weapon of choice was the throwing stick, atl-atl, the precursor to the bow and arrow.⁶

The transition from the Archaic Indian Period to the Historical Indian Period, A.D. 1 to A.D. 1800, is marked by the development of the bow and arrow, pottery, and agriculture. During the early Historical Period, A.D. 1 to A.D. 1000, people in the Republican River valley began clustering in small villages and lived in small, oval-shaped, pole frame structures made of mats twigs or grass plastered with mud. Besides hunting and gathering, they began tending small garden plots of maize, or corn.⁷

The Native American cultural period from A.D. 1000 to 1500 in the future Bostwick Division site was termed the Upper Republican Culture. These people construct permanent,

5. *Ibid.*, III-11.

6. Wedel, Waldo. *Prehistoric Man on the Great Plains*, (Norman: University of Oklahoma Press, 1978), 87; *Kansas Prehistoric Preservation Plan*, VIII-1.

7. *Kansas Prehistoric Preservation Plan*, XII-23.

unfortified villages on terraces along smaller tributary streams rather than on the Republican River itself. These were larger settlements than before and composed of several large rectangular pit houses with some as large as thirty feet in diameter. Game hunting continued with small scale agriculture expanding to include with maize cultivation, beans and squash - the “three sisters of agriculture.” Native American semi-horticultural societies harvesting the “three sisters” guaranteed themselves the basic balance diet of nutrients to maintain good health.⁸

Historic Setting

Archaeologists believe the pre-1500 semi-horticultural peoples along the Republican River valley were the ancestors of the Caddoan speaking Pawnee settled into the future site of the Bostwick Division. The name Pawnee was derived from the Caddoan word “pani” meaning “horn.” This was in reference to the Pawnee men’s custom of shaving their heads except for a scalp lock that they stiffened with grease and shaped into what resembled a horn. The Pawnee dwelt in large, permanent, agricultural villages fortified by ditches and walls located on high terraces or bluff tops for protection. Their large, semi-subterranean, earthen, circular lodges could shelter up to forty people.⁹

During the 17th century Europeans made inroads into the trans-Mississippi west. The French explorer René Robert Cavelier, Sieur de La Salle traveled from the Great Lakes down the Mississippi River to its mouth in 1682 and claimed all of the lands, including Kansas and Nebraska, whose waters drained into it as French territory. La Salle named this new land Louisiana in recognition of his monarch, Louis XIV. French fur traders began making inroads up the tributaries of the Missouri River, including the Republican River basin. The first recorded

8. United States Department of the Interior, National Park Service. Missouri River Basin Recreation Survey. “Outline of the Prehistoric and Historic Indian Cultures of Central Nebraska and Kansas,” (U.S. Government Printing Office: 1947), 8; *Kansas Prehistoric Preservation Plan*, XIII-38.

9. *Kansas Prehistoric Preservation Plan*, XVIII–18; “Outline of the Prehistoric and Historic Indian Cultures of Central Nebraska and Kansas,” 18.

European to explore the Republican River basin was French officer Veniard de Bourgmont in 1724. His report noted seeing several Pawnee village in the area. In the mistaken belief that the Pawnee had a republican form of government, since it appeared their villages' inhabitants governed themselves in an egalitarian manner, the French named those along the river the Republican Pawnee, hence the river's name. After establishing amiable relations with the Pawnee, the French began trading muskets and other manufactured goods for furs.¹⁰

In the aftermath of France's 1761 defeat by Great Britain in the Seven Years War, or French and Indian War, the French signed over in 1762 their land claims west of the Mississippi River to their allies Spanish allies rather than lose the territory to the British. In 1799, Napoleonic France coerced the Spanish to return the title to the Louisiana territory. Napoleon had grandiose ideas about resurrecting a North American French colony to supply agricultural goods to feed his burgeoning armies. But, the British Navy ruled the seas and it became apparent to Napoleon that Louisiana's contribution to France's war effort would be minimal.

It was time to dispose of the Louisiana territory at fire sale prices. In 1803, an American delegation sent by U.S. President Thomas Jefferson approached the French about purchasing New Orleans. Napoleon offered the incredulous delegation all of the Louisiana territory, from the Mississippi River west to the Rocky Mountains, for a paltry \$15 million, three cents an acre, to double the geographical size of the young American republic. The delegation quickly consummated the deal and the Republican River basin officially became American territory.

Also, at this time there was an ethnographic shift southward on the Great Plains to the west of the Pawnee. After acquiring horses in the 18th century, the linguistically related Cheyenne and Arapahoe left their traditional homeland west of the Great Lakes and migrated

10. Davis, Kenneth S. *Kansas: A Bicentennial History*, (New York: W.W. Norton & Company, 1976), 36; "Republican City History," <http://www.ci.republican-city.ne.us/history.htm>

south into the Great Plains. The Pawnee retained possession of the Republican River basin, but now they were perpetually at constant war with their new aggressive neighbors to the west.¹¹

The first American military expedition to cross the Republican River basin was led by Zebulon Montgomery Pike, who reached the future site of Scandia, Kansas, on September 25, 1806. Pike found a Spanish flag planted in a pile of stones, and, notwithstanding that the prevailing sentiment among his followers that it looked “prettier” than the American flag, replaced it with an American flag, becoming the first time the stars and stripes had been raised in the Republican River valley. Other American expeditions came through the area en route to the West. The 1819-1820 Stephen Long expedition used the erroneous term in its report of the “Great American Desert” to describe plains. Primarily because of this image, Nebraska and Kansas were considered an unlikely environment for Euro-American agricultural settlement. In the 1840s, John C. Frémont on one of his westward expeditions followed the Republican River to its source in eastern Colorado.¹²

During the early 1850s a band of twenty Mormons en route to Salt Lake City traveling along the Republican River were massacred by Indians near Scandia, Kansas. Their remains were later buried by soldiers on a high bluff overlooking the Republican River. At this time eastern Kansas and Nebraska were opened for white settlement with the removal of many of the regional Missouri River Native American tribes to Indian Territory in Oklahoma. The Pawnee signed a 1857 treaty with the U.S. government moving them to a reservation along the Loup River in Nebraska. The Pawnee retained their traditional hunting privileges along the

11. Wedel, 123.

12. Cutler, William G., “Republic County,” *Andrea’s History of the State of Kansas* (Chicago, Illinois: The Western Historical Company, 1882), 3; Shortridge, James R., “Kansas,” *Lexicon Universal Encyclopedia*, (New York: Lexicon Publications, Inc., 1985), 21; “Norton, Kansas, History,” <http://us36.net/nortonkansas/history1.htm>

Republican River.¹³

Beginning in 1858, gold seekers traversed Kansas and Nebraska on their way to Colorado. For the most part the Republican River valley was bypassed with traffic concentrated on the Platte River to the north and the Smoky Hill trail to the south. As tens of thousands of prospectors rushed for riches in the Rockies, Native Americans on the Great Plains saw the bison herds scatter and the river valleys' grass consumed by the wagon teams of mules, horses, and oxen. The swarms of gold seekers en route to Colorado inevitably led to conflict with the Cheyenne and the Arapahoe, and their allies, the Sioux.

By 1860, settlers began moving into the lower reaches of the Republican River in Kansas. The Pawnee continued to leave their Loup River Reservation on annual hunts in the Republican River valley and generally were tolerant of the settlers. Events to the west in Colorado shattered this peaceful coexistence between Native Americans and the settlers. On November 29, 1864, Major John Chivington led the 3rd Colorado Volunteers into a massacre of peaceful Cheyenne and Arapahoe on their Sand Creek reservation in southeastern Colorado, igniting a major Indian war on the Great Plains for the next five years. Cheyenne, Arapahoe, and Sioux war parties attacked settlers and harassed emigrant trail traffic from the Platte River in Nebraska to the Arkansas River in Kansas. By 1866, dozens of Republican River valley settlers and their families had been slaughtered and the remainder fled east.¹⁴ Cody, William F. "Buffalo Bill"

The Pawnee readily agreed to the U.S. government's offer to help in the war against their traditional enemies. In northeastern Colorado companies of Pawnee scouts under the command

13. "Republic County, Kansas, History," http://www.nckcn.com/homepage/republic_co/hist.htm. Utley, Robert M., *The Indian Frontier of the American West: 1846-1890*, (Albuquerque, New Mexico: University of New Mexico Press, 1984), 127.

14. Cutler, 5-8.

of William F. “Buffalo Bill” Cody slaughtered fleeing Cheyenne and Sioux men, women , and children in the aftermath of the decisive 1869 Battle of Summit Springs. After this crushing defeat, the Indian war generally moved to the north into Wyoming, Montana, and the Dakotas, away from the Republican River valley.¹⁵

During the summer of 1873, the Pawnee, numbering five hundred men, women, and children, ventured out on their annual communal buffalo hunt along the Upper Republican River in Nebraska. On August 5, the Pawnee were attacked by a combined Brule and Ogallala Sioux war party of over 1,000 warriors. The Pawnee were overwhelmed and suffered a crushing defeat at the Battle of Massacre Canyon. At least seventy Pawnee were killed and scores wounded. Forced out of Nebraska by the Sioux, the Pawnee in 1875 agreed to accept a reservation to the south in Indian Territory (presently Oklahoma) along the Arkansas River.¹⁶

A great famine in Sweden combined with discontent bred by a repressive government made the American advertisement of land and freedom attractive to Swedes. In 1868, the Scandinavian Agricultural Society of Chicago was organized and established the colony of New Scandinavia along the Republican River in Kansas. During the 1870s, settlement accelerated along the Republican River valley. A land boom was fueled by easy credit, the development of barbed wire, good soil, postwar mobility, and a “wet” cycle across the Plains providing more than adequate precipitation for crops. Still, there were hardships to be faced homesteading in the Republican River valley. During the summer of 1874 a plague of grasshoppers stripped fields of everything growing - wheat, oats, and corn - and even the leaves off the trees. Faced with starvation, a number of the new settlers left. In 1875, an enormous prairie fire swept in from the

15. Utley, 131.

16. Utley, 137.

north and torched the Republican River valley.¹⁷

Early settlers were hampered by the lack of transportation, but this handicap was removed approximately ten years after the first homesteaders arrived by the rapid extension of railroad lines into the area. The Burlington & Missouri Railroad line in the Republican River valley was completed in 1880 and a new rush of settlers flowed in. The building of railroads was tied up inextricably with settlement of the area. Homesteaders took their teams and helped build rail lines and, in many cases, it was the money so earned that enabled them to hold on rather than return east where crops were more nearly certain. The railroad directly assisted in settlement by sponsoring colonization groups.¹⁸

Previous strains of domestic wheat on the Great Plains fared poorly due to the lack of precipitation and the searing summer heat. German-Russian Mennonite immigrants introduced the hard winter wheat from the Russian steppes that transformed Kansan and Nebraskan agriculture. Planted in the fall, the wheat seeds lie dormant throughout the winter. The spring snows and rains nourish the hardy sprouts, which mature for harvest in June before the onset of the scorching summer heat.¹⁹

The blizzards of the winters of 1885-1886 and 1886-1887 devastated the Great Plains cattle industry, including Nebraska and Kansas. The ensuing onset of a severe drought caught the settlers of the Republican River valley unprepared. Eight of the next ten years of the drought saw crop failures, plus the collapse of agricultural commodity prices during the Depression of 1893, caused many farmers to give up and move away.²⁰

17. Davis, 113, 119; "Webster County, Nebraska, History," <http://www.rootsweb.com/newebste/history.html>; "Franklin County, Nebraska, History," <http://www.nebraskahistory.org/histpres/nebraska/franklin.htm>

18. Denver, Colorado, National Archives and Records Administration: Rocky Mountain Region, Records of Bureau of Reclamation, Record Group 115, "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1945," 7.

19. Shortridge, 22.

20. Davis, 127.

Times did get better for a while. After the turn of the century the rains came back and farmers' optimism soared. High agricultural commodity prices and readily available credit during World War I encouraged farmers to put more land into cultivation. Farmers became aware during the postwar boom era the bubble of the agriculture boom was going to burst. First, in the 1920s agriculture prices plummeted and many farmers could not make their loan payments and bank foreclosures on farms soared. Another severe drought began and wide spread winds blowing across thousands of acres of nearly unprotected soil produced the infamous Dust Bowl. The economic downturn of the 1930s Depression, coupled with a plague of grasshoppers, compounded the misery and nearly a quarter of the population left the region by 1940.²¹

Elected as president in 1932, Franklin Delano Roosevelt believed the government had an obligation to ease the economic duress the nation's citizenry experienced in the Depression. Previous administrations believed market forces should not be tampered with and relief efforts were best left to private charitable organizations. The severity of economic depression overwhelmed the relief efforts of the private sector and Roosevelt implemented "New Deal" programs of relief, recovery, and reform. Within the U.S. Department of Agriculture, New Deal programs taught farmers dry land farming techniques, crop rotation, and planting of trees as wind breaks for erosion prevention. What the Republican River basin really needed was more water for irrigation, since less than one percent of the region's farms were irrigated.²²

The Corps of Engineers released a report in 1931 (H. Doc. 195, 73d Cong., 2d sess.) which included a description of the Lower Republican Project and outlined a plan of development for irrigation in the Bostwick Division area. This report included a proposal for the irrigation of 107,000 acres lying in the Republican River Valley and on adjacent lands in Kansas

21. United States Department of the Interior, Water and Power Resources Service, *Project Data*, (Denver: U.S. Government Printing Office, 1981), 802.

22. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1948," 3.

between the proposed Harlan County Dam near Republican City, Nebraska, and Concordia, Kansas. Flood control was considered as a secondary issue in this 1931 report.²³

Significant flooding in the Republican River valley had occurred in 1903, 1905, 1915, and 1923. But nothing in the past prepared the valley's residents for the disastrous 1935 flood. Local Native American legends recalled a comparable flood in 1826, which was why they shied away from living on the valley's flood plain, preferring to settle on its terraces. The Republican River through Nebraska into Kansas had a normal water surface of three to four hundred feet across and a depth of little more than a foot. On May 30, 1935, torrential thunderstorms dumped as much as twenty inches of rain at the river's headwaters in eastern Colorado. A raging torrent of water twenty feet deep and as wide as two miles at points roared through the valley. The momentary peak flow of 280,000 cubic feet per second measured at Cambridge, Nebraska, exceeded by 360% any other recorded flood. Homes and buildings were wrenched from their foundations and floated crazily down the valley until shattered by other floating objects. Over 115 people were killed and 12,000 head of livestock drowned. The raging torrent washed out hundreds of miles of highways and tore out miles of railroad track, bending rails like wire. Over two hundred highway and eighty-three railroad bridges were twisted and torn from their abutments. Total property losses from this flood exceeded \$9 million.²⁴

Congressmen and senators from Nebraska, Kansas, and Colorado lobbied for a flood control and irrigation project for the Republican River valley. In 1938, the Bureau of Reclamation released its preliminary report on the project and initiated detailed investigations in 1940. The unprecedented flood of 1935 also prompted further studies by the Corps of Engineers,

23. *Project Data*, 802.

24. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1940," 52-8; "River Recedes With 250 Dead in McCook Area: Flood and Tornado Spread Disaster in Nebraska; Red Cross at Work," *Rocky Mountain News*, June 1, 1935, 1; "10 Lose Lives When Floods Hit 3 States," *Rocky Mountain News*, June 1, 1935, 4.

and its revised report of April 1940 included a revised plan for the development of the lower project. The project's name source came from the town of Bostwick, Nebraska, centrally located in the proposed project area and home of several leading, active proponents of irrigation development in the valley.²⁵

In the West water is everything. While Reclamation and the Corps of Engineers were deciding how to harness and tame the Republican River, three states were determined to settle who should received how much of the river's flow. On March 19, 1941, representatives of Colorado, Nebraska, and Kansas agreed upon and signed a Republican River compact hailed as the first step toward a peaceful settlement of long drawn out and expensive water and controversies between the three states. The compact had the effect of fixing limits to which any of the three states could go in depleting the water supply of the Republican River basin. Its objective was to permit development to go forward in the three states within the limit of the allocated water supplies without danger of future litigation. There had been no litigation among the three states over the Republican River and its tributaries, but there had been considerable discussion in disputes which has risen over allocation of the stream's waters.²⁶

After the compact was ratified by the respective state governors and legislatures it was sent to Congress for approval. On November 18, 1941, the U.S. Senate Irrigation Committee approved a bill (S. 1361) to sanction the Colorado, Nebraska and Kansas compact for use of the Republican River's water, after rejecting amendments by the U.S. Department of the Interior and the Federal Power Commission. The amendments, embodied in a U.S. House of Representatives bill (H.R. 5945) approved by the House Irrigation Committee, declared nothing in the compact could be construed to mean that the river was not navigable. They also provided that the rights

25. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1940," 17; *Project Data*, 807.

26. "Colorado, Nebraska and Kansas Sign Republican River Compact," *The Denver Post*, March 19, 1941, 1.

of the federal government to use the waters would not be impaired. The Senate Irrigation Committee Acting Chairman Alva B. Adams, D-Colorado, Senator Joseph C. O'Mahoney, D-Wyoming, and Senator Edwin C. Johnson, D-Colorado, asserted the amendments endangered Colorado's constitutional provision placing domestic and agricultural water uses above manufacturing purposes. By declaring the river not navigable, the Committee deemed it was removed from any claim of jurisdiction by the Federal Power Commission and the Department of the Interior.²⁷

The compact was passed by Congress, but vetoed by President Franklin D. Roosevelt on April 2, 1942. Roosevelt vetoed it because he believed the compact was flawed with its failure to include Department of the Interior's Bureau of Reclamation amendments relating to the navigability of the stream. The Republican River is a tributary of a navigable river, the Missouri River, and navigation gives rise to interstate commerce and control by the Federal Power Commission and the Department of the Interior. This was a landmark decision of the primacy of federal rights over state rights over western streams.²⁸

Project Authorization

The Bostwick Division was authorized by the Flood Control Act of 1944 (Public Law 534, 78th Congress, 2d Session) as a division of the Pick-Sloan Missouri Basin Program, published as Senate Documents 191 and 475. The Army Corps of Engineers had prepared a plan for the Missouri River Basin emphasizing flood control and navigation, designated the "Pick Plan" after Colonel Lewis A. Pick. The Bureau of Reclamation's William G. Sloan headed a study that stressed irrigation and hydroelectric power. The two proposals were

27. "Republican River Compact is Approved by the Senate Group: Interior Department and Power Board Plans Are Rejected," *The Denver Post*, November 18, 1941, 10; "Carr Pleased by Republican River Decision: House-Senate Action Upholds Pact, Bars Federal Control," *The Rocky Mountain News*, March 4, 1942, 4.

28. "Senate Approves River Compact," *The Rocky Mountain News*, March 14, 1942; "Republican River Compact Vetoed by Roosevelt," *The Denver Post*, April 3, 1942, 1.

reconciled, hence the name “Pick-Sloan.”²⁹

Construction History

Water for the Bostwick Division is stored in the Harlan County Lake and the Lovewell Reservoir. The division is divided into two general areas: the Bostwick in Nebraska, and the Kansas-Bostwick. The Nebraska area contains 22,787 acres divided into two units: Franklin, 14,944 acres; and Superior-Courtland, 7,843 acres. Completed facilities served approximately 22,000 acres of the two units during the 1992 irrigation season. The Franklin Unit is served by the Franklin and Naponee Canals, which diverts directly from the Harlan County Lake, and by the Franklin South Side Pump Canal, which receives water directly from the river through a pumping plant seventeen miles downstream from the dam. The Superior-Courtland Unit is served by the Superior and Courtland Canals, originating at the Superior-Courtland Diversion Dam on the Republican River. The Courtland Canal also serves the Courtland Unit in Kansas. The Kansas-Bostwick area consists of 80,000 irrigable acres; 62,000 in the Courtland Unit and 18,000 acres in the potential Scandia Unit. Water for the Courtland Unit is diverted into the Courtland Canal at the Superior-Courtland Diversion Dam. Several other canals branch off from the Courtland Canal for irrigation. The proposed Scandia Unit, to be located east of the river between Scandia and Concordia, will require its own diversion dam and canal. This unit is scheduled for study, and future construction if authorized.³⁰

The Bostwick Division’s plans provided for irrigation, flood control, silt retention, fish and wildlife benefits, and recreational benefits. Irrigation provided for 90,000 acres dry farmed

29. Robinson, Michael C., *Water for the West: The Bureau of Reclamation: 1902-1977*, (Chicago, Illinois: Public Works Historical Society, 1979), 83; “Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1947,” 2.

30. *Project Data*, 799; United States Department of the Interior, Bureau of Reclamation, *1992 Summary Statistics: Water, Land and Related Data*, 111; “Pick-Sloan Missouri Basin Program - Bostwick Division, Nebraska and Kansas,” <http://dataweb.usbr.gov/html/bostwick.html>, 2.

in 1945. In the Bostwick Division lands only .1% were previously irrigated prior to the project. But the 1945 census readily showed the value of irrigation with the average gross crop value per cropped acre for dry farm crops was \$28.93 and the value of irrigated crops was over double at \$60.51. The 1946 census showed a majority of the farmers were elderly and owned their own farms. Many of the sons of farmers returned home from the armed services after World War II, but only a few were able to rent or purchase a farm. Some were able to start farming with parental assistance, but others worked on the “home farm” or for neighbors. Over half of these young men were forced to go to towns or cities elsewhere to find employment.³¹

On December 13, 1945, Bureau of Reclamation engineer Herbert E. Robinson was appointed to direct work on Reclamation’s priority Republican River basin projects, including the Bostwick Division. A native of Sloan, Iowa, and an engineering graduate from Iowa State College, Robinson had been a field engineer for Reclamation since 1933. In 1942, Robinson was transferred to the army engineers as chief of operations in the construction of Camp Hale for the 10th Mountain Division near Leadville, Colorado.³²

The need for flood control on the Republican River was underscored with a flood on June 21, 1947. Heavy rains on the Republican River watershed in Colorado and Nebraska created the second largest recorded flood. The Bureau of Reclamation’s Superior office was notified by telegram of the oncoming flood and through the united efforts of Reclamation, local Chambers of Commerce and the Lincoln Telephone and Telegraph Company, all inhabitants were notified by organized telephoning and by automobile the extent of the expected flood. This enabled farmers and others to get their livestock, machinery, household goods, and other equipment

31. “Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1946,” 35-6.

32. “Head of Three River Jobs is Designated: Herbert E. Robinson Will Direct Republican Stream Projects,” *The Denver Post*, December 13, 1945, 7.

removed before the flood covered the entire valley. The flood's crest of fifteen feet was well below the 1935 flood's crest of twenty feet, but it still inflicted substantial flood damage from Bloomington, Nebraska, to Clay Center, Kansas. Total agricultural losses stood at a staggering \$6,658,249, but no lives were lost.³³

On October 17, 1947, design data was submitted for the first twelve miles of Superior Canal and the first sixteen miles of Courtland Canal. By the end of 1947 the topographic mapping was nearly completed. The scope of the project was scaled down when the sponsors of the Bostwick Unit in Kansas requested Bureau of Reclamation defer inclusion of Scandia Subunit in the irrigation district organization because of apparent resistance to irrigation in the locality. After review work on Scandia Unit was discontinued. Land acquisitions began in the Bostwick Division in 1948 and continued through 1952.³⁴

The Bostwick Irrigation District in Nebraska was formed April 26, 1948, and a repayment contract with the United States government was executed February 21, 1949. On February 21, 1949, Contract No. 181r-1079 established \$2,260,000 as limit of repayment for distribution works. Amendatory Contract No. 3 dated August 9, 1963, extended development period to 10 years and raised construction repayment limit to \$3,520,000. January 1, 1967, began the forty year repayment period of Part B of the contract. The Nebraska system serves a long narrow river bottom group of farms. It was foreseen that operation and maintenance problems would be complicated by the necessity of operating rather long laterals for a comparatively small acreage. Also, part of the Nebraska area is subjected to side floods rising from the adjacent heavy rolling upland soils.³⁵

33. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1947," viii, 10.

34. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1947," 22; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1952," 2.

35. *Project Data*, 802; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1947," 32; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1965," vii.

The Kansas-Bostwick Irrigation District No. 2 was approved by the Chief Engineer, Division of Water Resources of Kansas, on September 25, 1948. On May 5, 1949, a suit by the Kansas Bostwick Irrigation District No. 2 was brought before the Kansas Supreme Court testing the validity of the Kansas Water Appropriation Act. The Kansas Supreme Court overruled the Act and this decision cleared the way for the Bureau of Reclamation to negotiate with District. A repayment contract, No. I1r-1584, established \$3,500,000 as limit of repayment for distribution works with the United States government was executed April 20, 1951. On April 24, 1957, amendatory Contract No. 2 raised the construction repayment limit to \$5,781,000. The Kansas system's area is much larger and irrigable lands are more compactly located than the Nebraska system. A large percentage of the system's terrain are gently sloping tablelands intercepted occasionally by drains of sufficient size to care for surface runoff losses. This area can be served with a lower mileage of laterals, and operating costs are lower with little or no flood hazards.³⁶

Harlan County Dam and Reservoir

The principal storage feature of the Bostwick Division is the Harlan County Dam and Reservoir located on the Republican River in Harlan County, Nebraska. Groundbreaking ceremonies was on June 13, 1946, and attending dignitaries included Project Engineer H. E. Robinson, Region 7 director E. B. Debler, Corps of Engineers Brigadier General Lewis A. Pick, and Chief Engineer of Corps of Engineers Lt. General R. W. Wheeler. The project was completed by the Corps of Engineers on December 2, 1952. It is an earthfill structure 107 feet high and 11,828 feet long containing 13,400,000 cubic yards of earth in the embankment and 430,000 cubic yards of concrete in the spillway. During construction, provisions were made for

36. *Project Data*, 802; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1947," 32; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1949," 12; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1965," vii.

future installation of a power penstock. The reservoir storage capacity is 840,561 acre-feet, of which 193,060 ace-feet are allocated to irrigation, 508,989 to flood control, and the remainder to inactive and dead capacity.³⁷

On June 10, 1952, the dedication ceremony for Harlan County Dam was held. A twenty-eight float parade in Alma, Nebraska, kicked off the festivities with 8,000 Nebraskans and Kansans in attendance. The Bureau of Reclamation's Superior office's employees entered a float featuring, "The Goddess of Plenty," and conveying the idea, "Food-A-Nation's-Fuel."³⁸

Franklin Unit

Two diversion outlets are installed in the Harlan County Dam to serve the Franklin Unit: The 230 cubic feet per second Franklin Canal with a bottom width of fourteen feet extends forty-eight miles east, paralleling the Republican River to serve the 11,116 acres of the north portion. The thirty cubic feet per second Naponee Canal extends from the dam on the south side of the river eastward and serves 1,737 acres. The forty-five cubic foot per second Franklin South Side Pumping Plant, located seventeen miles downstream from the dam, lifts river water twenty feet to a five mile long canal to supply 2,091 acres. Laterals and drains complete the facilities for the operation of the Franklin Unit.³⁹

On November 1, 1951, Rentlor Company, Inc., was given notice to proceed with work on the Franklin South Side Pumping Plant, Specifications DC-3524, with a targeted completion date of May 25, 1953. The features of the Franklin South Side Pump Canal and Lateral System includes a pumping plant housing three motor driven single shaft propeller pumping units. Construction began on March 25, 1952, but encountered delays due inexperienced workers

37. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1946," 10; *Project Data*, 799.

38. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1952," 2.

39. *Project Data*, 799.

placing reinforcement steel and placing and finishing concrete. Nonetheless, by the end of September earthwork and concrete work was completed in Schedule 1 and 2. The project was completed in March of 1953 and transferred to irrigation district for operation and maintenance on April 15, 1953.

Bids for the construction for the first section of the Franklin Canal were accepted on June 12, 1952, with the low bid of \$1,201,361 accepted from the Bushman Construction Company of St. Joseph, Missouri. On July 3, 1952, the contractor was given the notice to proceed with a target completion date of February 23, 1954. Immediately work was behind schedule due to a nation wide steel strike resulting in the inability to receive delivery of precast concrete pipe.

The initial project plans included the Red Cloud Unit as part of the Franklin Unit. Work was deferred in 1950 after serious damage to its lands by flood waters. Upon reclassification, the land was found unsuitable for irrigation in Units 1 and 2, because of the high water table and flood damage. This left only 280 acres of land suitable for irrigation remaining in Unit 3, and it was decided to leave it for private development.⁴⁰

On July 20, 1953, the first section's lateral construction notice to proceed was given to Bushmen Construction Company of St. Joseph, Missouri. The Franklin Lateral System provides service to irrigable lands under the Franklin Canal. The lateral lengths vary from a few hundred feet to three miles with one mile as the average length. In October of 1953 all 9,400 feet of seventy-eight inch siphon pipe was laid. By November 18, 1953, all concrete work was completed with a total of 2,982 cubic yards placed. By the year's end 1,138,000 cubic yards of material had been removed from the canal prism and drains, 1,970 feet of culvert drainage pipe and 5,600 feet of culvert and drainage pipe had been laid. On March 2, 1954, the Franklin Canal

40. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1951," xiii; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1952," 16, 20, 23; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1962," ii.

and its laterals were inspected and accepted by the construction engineer. Construction of the remaining portions of the Franklin Canal and Laterals were started on March 1, 1955, and were completed November 9, 1955. The four sections of the Franklin Canal were transferred to the irrigation district for operations and maintenance on August 1, 1956.⁴¹

Construction began in November of 1953 on the Naponee Canal and completed in September of 1954. The nine mile canal flows eastward along the south side of the Republican River. It has a diversion capacity of thirty cubic feet per second with a bottom width of six feet and an average water depth of two feet. The project was transferred to the irrigation district for operations and maintenance on November 15, 1954.⁴²

The crop yield benefits of irrigated farm land over dry land farming were apparent immediately. In 1954, the first year water was delivered, irrigated farm lands on the Franklin Canal system crop yields averaged 2.5 times more than dry land crop yields. The success farmers were enjoying with their irrigated fields did not go unobserved by some of their dry neighbors. They, too, decided they wanted to be part of the Bostwick Division irrigation program. On February 11, 1958, Bushmen Construction Company of St. Joseph, Missouri, was awarded the \$189,990 contract to construct the Franklin Floodway Drains and Lateral Extensions. The project was completed and transferred to operations and maintenance on December 17, 1958.⁴³

Superior-Courtland Diversion Dam and Canal System

The Superior-Courtland Diversion Dam is located on the Republican River three miles

41. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1953," 27, 40, 41; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1954," 1; Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1955, v.; *Project Data*, 804; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1955," v; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1962," ii.

42. *Project Data*, 804.

43. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1954," 26; Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1958," 7.

west of Guide Rock, Nebraska. It is a concrete ogee weir structure with a hydraulic height of eight feet and a weir crest length of 420 feet. The diversion dam has a controlled sluiceway, with twelve foot by twenty foot sluiceway gates, and stilling pond at each end of the weir. Embankment wings total more than 4,000 feet and a designed flood capacity of 42,000 cubic feet per second. The Superior Canal begins at the north side of the dam and extends thirty miles eastward to the Nebraska-Kansas state line, terminating one mile west of Hardy, Nebraska. The canal's headworks has a single six foot by ten foot radial gate and has a discharge capacity of 139 cubic feet per second, and supplies water to 5,863 acres north of the river in the Superior-Courtland Unit in Nebraska.⁴⁴

On December 3, 1948, invitation for bids were issued for the construction of Superior-Courtland Diversion dam. When bids were open under Specifications No. 2495 in the City Auditorium at Superior, Nebraska, on February 28, 1949, ten bids were received. Knisely-Moore Company of Douglas, Wyoming, submitted the low bid of \$866,263 and was awarded the contract on February 28, 1949. On March 19, 1949, a notice to proceed with work was issued with a August 1, 1950, date estimate set for completion of the contract. Groundbreaking ceremonies and banquet at the Superior-Courtland Diversion Dam were attended by Bureau of Reclamation representatives on June 22, 1949.⁴⁵

After the first of the year work progressed quickly on the project with 21,000 tons of riprap used on dikes and channel change adjoining the diversion dam. During the spring of 1950, an explosion occurred at the Superior-Courtland Diversion dam while a Knisely-Moore Company employee was capping dynamite preparatory to blasting. The blast killed the

44. *Project Data*, 801; Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1949," 14.

45. *Project Data*, 801; Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1949," xii, 14,15.

employee and the ensuing investigation determined extraneous electricity caused the explosion.

Torrential rainfall occurred in Nebraska's Superior-Red Cloud area on July 8 and 9, 1950, including the site of most of the Bostwick Division's construction. Many structures already constructed and prepared structure sites were either wholly or partially inundated and serious damage was caused by erosion of deposition of silt and debris necessitating costly and timely repairs and cleanup. The virtually completed Superior-Courtland Diversion Dam sustained no serious damage even though the estimated cubic feet per second was 40,000. The following month on August 17, 1950, the Superior-Courtland Diversion Dam was dedicated with a parade of floats and bands in Guide Rock, Nebraska. On October 1, 1950, the Superior-Courtland Diversion Dam was officially transferred to government operation and maintenance status.⁴⁶

An invitation for bids on the construction of the Superior Canal went out on March 8, 1949. On April 14, 1949, eight bids were received under Specifications No. 2598. The low bid of \$597,615 was submitted by Knisely-Moore Company of Douglas, Wyoming. Knisely-Moore Company acknowledged receipt of notice to proceed on the Superior Canal on June 13, 1949.

Work began on excavating the first three sections of the Superior Canal in June of 1949 and on the Nebraska stretch of the Courtland Canal in September of the same year. During the course of 1950 4,280 tons of riprap was used on the canals and a total of 16,211 feet of concrete pipe of various sizes laid. Inspection of First Section of Superior Canal made and accepted February 8, 1951. Throughout 1951, 2,746 cubic yards of riprap was used on the canals and 7,934 feet of concrete pipe of various sizes was placed. On June 19, 1951, transfer from construction to operations and maintenance status (O&M) was recommended by inspection

46. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1950," 2, 3, 45. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1962," ii.

committee for Superior Canal's Stations 75/00 to 659/00. The Stenson Experimental Farm became the first field to be irrigated by the Superior Canal's irrigation facilities on August 3, 1951.⁴⁷

The construction of the Superior Lateral System was awarded to Tom Hellander Company. Due to a delay in acquisition of the title of the Consumer Power's hydroelectric plant it was impossible to close the gates until February 1, 1952. When the gates were closed it was discovered that they did not stop the flow of water completely. The contractor objected constructing thirty inch precast concrete pipe siphon until the water was completely shutoff. The contractor experienced considerable trouble during the year constructing siphons in conformance with Reclamation's standards. Repair work on lateral siphons progressed slowly during the fall and winter of 1952. Most of the siphons had to be dug up and the mortar band replaced. Due to a rise in the water table after a period of subnormal rainfall certain lands within the Superior Lateral System had to be reclassified into Class 5. It became necessary to delete certain laterals and portions of other laterals. The Superior Canal and its laterals were transferred to the irrigation district for operations and maintenance on April 15, 1953.

Notice to proceed was given June 7, 1952, to Winslow Construction of Englewood, Colorado, for their low bid of \$13,234 to partially demolish the Consumers' Power District Diversion Dam, earthwork for the relocation of Lost Creek and removal of existing timber bridge. The Ideal Cement Company of Superior, Nebraska, had been drawing water from the water diverted by the dam and protested the lowering of the dam. Bureau of Reclamation notified it did not accept liability. It took four days to remove the Consumers' Dam in two sections. The south section was removed first by diverting the river over the north section and a dragline and cable was used to dismantle the dam. Then, the river's flow was changes to the

47. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1950," 45.

south side and the north side dismantled with a bulldozer.⁴⁸

The Courtland Canal System originates at the south side of Superior-Courtland Diversion Dam and its headworks possesses five six foot by ten foot radial gates capable of discharging 751 cubic feet per second. The system serves 1,980 acres in Nebraska and 62,000 acres in Kansas. About midway along its length, the canal discharges into Lovewell Reservoir, which regulates the combined flows of the canal and White Rock Creek. The lower end of the system diverts from Lovewell Reservoir and extends southwestward to the vicinity of Courtland, Kansas, terminating three miles north of Kackley, Kansas. The system and its components total 114 miles in length. In addition to the Courtland Canal, some of the more important features are the five main laterals of North, Ridge, White Rock, Miller, White Rock Extension, and Courtland West Canals. Other facilities of importance are the Pump Canals Nos. 1, 2, 3, and 4, and the associated pumping plants.

On June 14, 1949, an invitation for bids on the construction of the Courtland Canal in the Nebraska portion of the project went out. Eleven bids were submitted under Specifications No. 2707 on July 14, 1949. A low bid of \$1,266,056 was accepted from J. A. Terteling & Sons, Inc. of Boise, Idaho. Work began in September 1949, with a completion date was set for August 13, 1951.⁴⁹

Preliminary investigation of the topography along the Nebraska portions of the Bostwick Division had raised concerns of the probability of future flash floods. The high rolling plains drain into numerous dry gulches and arroyos that funnel directly into the Republican River. Heavy rains of from three to four inches intensity on June 1 and June 6, 1951, near Guide Rock, Nebraska, made these concerns a reality when it created a flash flood condition damaging the

48. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1949," xii, 23, 25.

49. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1962," ii.

Superior Canal, Courtland Canal, and private property. Ferman Creek overflowed its banks near the outlet of the Station 55 siphon on Courtland Canal. One hundred feet along the south bank was washed into the canal and the north bank nearly cut through. At Section 120 a section of the south canal bank washed out. The west abutment of the timber bridge spanning the wasteway at the Rankin Creek Siphon Site was damaged as most of the piling under the abutment was washed away. Damage was caused by high water in Simpson Creek when backfill around the headwalls of the Station 64 siphon of the Superior canal washed out. Continued flooding caused a channel to be eroded from a point on the Superior Canal Terminal Wasteway back into private property resulting in an increasingly bad erosion problem.

During the growing seasons of 1950 and 1951 considerable flooding occurred on the lands to be served by the Courtland Lateral System in Nebraska. These damages on the Superior and Courtland Canals resulted in a decision to repair everything necessary by separate contract. This led to the deferment of the construction of laterals designed to serve the land which had flooded until a new design could be prepared and until the Consumers Power Dam at Superior, Nebraska, could be removed thus lowering the badly silted river channel in the critical area and minimizing flooding. To correct these problems a contract, No. 12r-19484, was awarded June 27, 1951, to the Pecos Valley Construction Company. Before the contractor could start work another flood occurred cutting a new river channel across the lower portion of this lateral system necessitating new design work to complete the laterals or deletion of the severed portion of the contract. A stop order was issued July 27, 1951, pending further study. On August 1, 1951, schedules 4 and 5 Courtland Canal, Specifications No. 2707, transferred from construction to operations and maintenance status (O&M) with some exceptions. Part of Lateral C-13.9, all of C-13.9-1.9, and all of C-13.9-0.2 with its sublaterals, deleted from Courtland Lateral contract with Pecos Valley Construction Company on August 30, 1951. On October 31, 1951, the

construction engineer inspected and accepted Schedule 9 of the Courtland Canal contract under Specs. 2707, completing acceptance of the entire feature.⁵⁰

Tragedy struck the Courtland Canal on September 10, 1951, when a bulldozer operator was manipulating his machine on top of a sixteen foot embankment pushing dirt from a stockpile over the edge on an embankment where two men operating tampers below were compacting the material against the concrete structure. The operation was conducted in a safe manner as a flagman was stationed on top on the embankment to warn the men to stand clear whenever the machine approached the edge. It is believed that when the operator threw the bulldozer into gear, the flagman informed the men to return to their work. Apparently, the operator accidentally threw his machine into forward gear instead of reverse, and by the time he had realized what he had done, it was too late and the bulldozer was over the embankment's edge. The two men below were killed and the operator seriously injured.⁵¹

The first water of the 1952 season was delivered on June 9. Problems arose immediately in the Courtland Canal. The first section was experiencing seepage and had a pronounced effect on the groundwater table in the area below the entire reach of the canal. Damage from seepage varied from slight to severe, and in some areas the crops actually received a benefit in the form of "sub-irrigation." From the ponding test it was determined the canal was losing water at the rate of 1.2 cubic feet per square foot of wetted area per twenty-four hours in this area.

Additional seepage tests were planned for the spring of 1953 after a test section was rebuilt with dirt lining in order to determine the most economical solution to the seepage problem. Also, certain sections of the Courtland and Superior Canal were sloughing away and specifications were issued to lace riprap along the side slopes and bottom to protect the canals from future

50. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1951," xi, xii, xiii, 35, 40, 48.

51. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1951," 33.

damage. Problems in securing timber for bridges due to a West coast lumber strike delayed nine timber farm bridges being built. The Nebraska portion of the Courtland Canal was completed in August of 1952 and transferred to the irrigation district on October 1, 1952.

At nine locations landowners requested detention dams substituting for cross-drainage culverts. Bureau of Reclamation approved the changes. On December 18, 1952, bids were received for earthwork, concrete canal lining and structures for the nine detentions in the second section. The contract was awarded to Platte Valley Construction Company of Grand Island, Nebraska, for its low bid of \$269,518.⁵²

The seepage problem along Nebraska's Courtland Canal continued in 1953. On September 5, 1953, a notice to proceed was given to Ray Millis of Omaha to correct seepage problem. The general plan of the contractor was unique for this type of work. The inside of the canals were stripped of weeds and grass. Each side of the bank was cut with a bulldozer until a berm had been made that would permit ponding of that portion of the canal banks that were to be excavated. The banks and bottom were conditioned by ponding until the moisture content of the soil was near or a little above optimum. Next the sides and bottom of a 300 foot section of canal was excavated and the material wasted. The next 300 feet was then excavated and the material used to build the section from which the material was wasted. Thus the work continued progressively down the canal. This system worked very smoothly until cold weather caused a shut down for the winter.⁵³

On May 12, 1952, Second Section of Courtland Canal notice to proceed given to J. A. Terteling & Sons and 5,915 cubic yards of concrete lining was placed by the end of the year. Platte Valley Construction Company of Grand Island, Nebraska, was given notice to proceed on

52. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1952," xi, 13, 23-7, 37, 40, 42-3; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1962," ii.

53. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1953," 53-56.

January 16, 1953, for the low bid of \$269,518 on a contract involving earthwork, concrete canal lining, and structures for nine detention dams in Courtland Canal's Second Section. The completed sections of Courtland Canal above Lovewell received its first irrigation water in August of 1954. On May 23, 1956, the last link of the Courtland Canal before it enters into Lovewell Reservoir was completed. This last section consumed 460,000 cubic yards of earthwork and 800 cubic yards of reinforced concrete. The final cost was \$231,715, nearly \$38,000 under the engineer's original estimate.

Bids were open in February of 1956 for the section of the Courtland Canal and laterals extending from Lovewell Reservoir to four miles east and south of Lovewell, Kansas. Bushman Construction of St. Joseph, Missouri was awarded the contract for Section B of Courtland Canal, laterals, wasteways, and drains for the low bid of \$391,801. Construction began on the three sections below Lovewell Reservoir in February of 1956 and completed in July of 1959. The Courtland Canal below Lovewell Reservoir received its first irrigation water in August of 1959.⁵⁴

The North Canal runs on the west side of the Republican River, runs west to east for over six miles, northwest of Republic, Kansas. Its diversion capacity is fifty cubic feet per second with a bottom width of eight feet and an average water depth of under three feet. Construction started on the North Canal in 1954 and it and its laterals were completed on May 3, 1955.⁵⁵

Ridge Canal is located on the west side of the Republican River directly west of Republic, Kansas, and runs west to east for six miles. The canal has a diversion capacity of ninety cubic square feet per second with a bottom width of twelve feet and an average water depth of over three feet. Construction began in 1954 and completed in 1955. On June 15, 1955,

54. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1955," v; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1958," 6; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1962," ii.

55. *Project Data*, 805; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1955," v; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1962," ii.

the first delivery of water was made to the Ridge Canal and it and its laterals' construction was completed on August 25, 1955.⁵⁶

The Courtland West Canal is located on the west side of the Republican River and runs over ten miles north to south directly west of Courtland, Kansas. Its diversion capacity is 200 cubic feet per second with a bottom width of twelve feet and an average water depth of five feet. Construction began on the Courtland West Canal in September of 1957 and was completed in December of 1958. Portions of the completed canal received its first irrigation water in May of 1958. It was transferred to the irrigation district on December 18, 1958.⁵⁷

The Miller Canal is over eight miles long and located on the west side of the Republican River, northwest of Scandia, Kansas. Its diversion capacity is 190 cubic feet per second with a bottom width of sixteen feet and an average water depth of over four feet. The canal's construction began in February 1956 and was completed July of 1959. It was transferred to the irrigation district for operations and maintenance on July 23, 1959.⁵⁸

The White Rock Canal construction began on November 19, 1958, and completed in 1961. Bushman Construction Company of St. Joseph, Missouri, was awarded the contract with a low bid of \$273,270. Located on both west and east sides of the Republican River it runs for fourteen miles directly north and slightly west of Scandia, Kansas. The canal's diversion capacity is one hundred cubic square feet per second with a bottom width of twelve feet and an average water depth of four feet. The White Rock Creek Gauging Station was completed on September 24, 1957. The completed portions of the White Rock Canal received its first irrigation water in May of 1960, and was completed in December of 1959. The White Rock

56. *Project Data*, 806; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1955," v.

57. *Project Data*, 805, "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1965," ix; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1962," ii.

58. *Project Data*, 805; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1965," ii.

Canal was transferred to the government for operations and maintenance on August 16, 1960.

Construction began on the White Rock Extension Canal in April of 1960 and was completed in January of 1961. It was transferred to the government on March 15, 1961.⁵⁹

Lovewell Dam

Lovewell Dam is on the White Rock Creek three miles northwest of Lovewell, Kansas. The dam is a three million cubic yard earthfill structure, 8,500 feet long, with a height of embankment eighty-one feet above the streambed. The total capacity of the reservoir is 92,150 acre-feet, of which 24,930 is allocated for conservation, 50,460 acre-feet for flood control, and the remainder for inactive and dead capacity. Lovewell Dam's spillway, located in the right abutment, is a chute-type structure controlled by two counter weighted radial gates for automatic operation. The automatic float operation of the radial gates begin to open when the reservoir reaches elevation 1,598.8 feet. The gates can also be manually opened by controlling hoisting equipment or controlling bypass valves to operate the floats. The inlet channel to the spillway is partially combined with the inlet channel to the outlet works. The ogee spillway crest is located at elevation 1,575.3 and consists of two bays with crest widths of twenty-five feet. The discharge capacity is 35,000 cubic feet per second at reservoir elevation 1,610.3.

The outlet works is located adjacent to the south end of the spillway in the right abutment. The outlet works consists of an inlet channel with trashrack, gate chamber, stilling basin, and canal entrance. The chamber structure is fifty-eight feet high, extends to the crest of the dam, and houses an eight foot by ten foot emergency fixed wheel gate, an eight foot by ten foot top seal regulating radial gate, and controls for both gates. The discharge capacity is 3,200

59. *Project Data*, 806; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1955," v; "Annual Project History, Bostwick Division, Pick-Sloan Project Missouri Basin Program, 1957," 9; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1958," 6; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1962," ii, iii; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1965," ix.

cubic feet per second at reservoir elevation 1,610.3.

Lovewell Reservoir stores water from White Rock Creek and diversions from the Republican River by way of the Courtland Canal. The drainage area above the dam is 345 square miles, ranging from elevation 1,571.7 at the top of the inactive pool, to over elevation 2,100 along the western boundary of the drainage basin. The reservoir length at elevation is seven and a half miles with an the average width of just over one half of a mile.⁶⁰

On October 21, 1954, bids were open in Superior, Nebraska, for Lovewell Dam under Specifications No. DC-4253. Cook Construction Company of Jackson, Mississippi, received notice to proceed. Construction started on January 27, 1955, on Lovewell Dam. Excavation operations started in March of 1955 with embankment placement operation following in April. Excavation started in May for the outlet works spillway, and inlet channel. Time was lost in June when heavy rains washed out the contractor's road crossing White Rock Creek, but by the end of June installation of toe drain was completed. Work started in September of 1955 on the reservoir's inlet structure and White Rock Creek was diverted to a new channel. The Atchison, Topeka and Santa Fe Railroad had to relocate a portion of their track because the track was in the area to be inundated by the reservoir, as did a portion of State Highway 14.⁶¹

Throughout 1956 concrete work in the spillway structure carried on. Beginning in August, work crews started concrete work in the outlet works structure. While construction of Lovewell Dam and Reservoir progressed smoothly throughout the summer of 1956, the contractor did have a distraction to contend with. A farm house used by the contractor for field headquarters was struck by lightning on August 5 and burnt down. On May 29, 1957, closure of White Rock Creek started. The concrete placement on September 24, 1957, and was accepted as

60. *Project Data*, 801; United States Department of the Interior, Bureau of Reclamation, *Lovewell Reservoir: 1995 Sedimentation Survey*. (Denver: U.S. Government Printing Office, 1996), 1.

61. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1955," v, 4, 5.

substantially complete three days later, seventy-seven days behind schedule. The filling of Lovewell Reservoir from the Courtland Canal began on October 1, 1957, and the dam and reservoir was transferred to operations and maintenance status on October 15. On June 5, 1958, the Lovewell Dam and Reservoir was dedicated. The Kansas-Bostwick headquarters was established at Courtland, Kansas.⁶²

Post Construction History

The various operating agencies of the Bostwick Division are: Harlan County Dam is operated by the Corps of Engineers; Lovewell Dam by the Bureau of Reclamation; and the Superior-Courtland Diversion Dam, as well as its distribution system, by the Kansas-Bostwick Irrigation District. The Franklin, Naponee, Franklin Pump, and Superior Canals, with associated laterals and drains, and the laterals from the Courtland Canal in Nebraska, are operated and maintained by the Bostwick Irrigation District in Nebraska.⁶³

On June 16 and 17, 1957, heavy rainstorms in south central Nebraska caused a flash flood. Damage to the Bostwick Division was heaviest at the Franklin Canal siphon when one hundred feet of twenty-four inch precast concrete pipe was displaced and washed out. Repairs began immediately and completed work accepted by Bureau of Reclamation on October 18, 1957.⁶⁴

On February 29, 1996, the Bureau of Reclamation filed with the Council on Environmental Quality a Notice of Intent to prepare an environmental impact statement (EIS) on the proposed renewal of long term water service contracts in the Republican River Basin in

62. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1956," 5; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1957," 4, 5, 17; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1958," 1.

63. "Pick-Sloan Missouri Basin Program - Bostwick Division, Nebraska and Kansas," <http://dataweb.usbr.gov/html/bostwick.html>, 3.

64. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1957," 11.

Nebraska and Kansas. Reclamation started work in 1995 on a Resource Management Assessment (RMA). The RMA is designed to describe existing water-related resources in the basin, develop goals and objectives for management of water related resources in the basin, and begin to consider ways to meet those goals. Reclamation considered a range of potential future management scenarios or “what-if” scenarios. In other words, what would be the results if water was managed to emphasize historic irrigation? What if fisheries were emphasized? What if recreation was the emphasis of water management in the basin? What if reservoir levels could be managed to maximize public benefit? The purpose of evaluating RMA what-if scenarios was to measure how potential changes in the available flows in the river and/or storage in the reservoirs would affect various beneficial uses of water in the basin. Reclamation develop a range of reasonable alternatives and provided a comparison of the social, economic, and environmental effects of the alternatives.⁶⁵

Test pumping has begun on a landmark study of regional interaction between groundwater and surface water in the Republican River valley. Conducted by University of Nebraska-Lincoln and the Conservation and Survey Division in a contract with the Department of Water Resources, researchers, the study promises to add substance to implementation of Nebraska’s integrated management water law, LB 108, passed in 2000 by the state legislature. It should also yield information of fundamental value to the debate about streamflow in the Republican River, water that Kansas says it is owed because of an agreement made with Nebraska in 1942.

The law will first be applied in the Republican River valley and consolidates statutes on groundwater control areas, groundwater quality management areas and special groundwater

65. United States Department of the Interior, Bureau of Reclamation, Nebraska-Kansas Office. “Republican River “What If” Scenarios,” March 1996, <http://www.gp.usbr.gov/whatif2.htm>

quality protection areas into a single category-an integrated management area, emphasizing the consolidated regulation, if such is necessary, of groundwater and surface water use.

The intent behind the law was to legally recognize the relationship between groundwater and surface water, especially the effect of groundwater pumping on stream flow. This need was prompted, at least partially, by the threat of a lawsuit from Kansas, which the Kansas attorney general has recommended that the state file. Some groundwater in the basin may be challenged, due largely to the later development of sophisticated pumping technology, such as center pivot systems. Since the mid-1980s, Kansas has called for a re-investigation of the flows coming across the border from Nebraska, charging that Nebraska, and groundwater irrigators in particular, may be taking water destined for the stream. Now, the state of Kansas is challenging Nebraska's right to the water it has historically taken from the river. While surface water irrigators will have more senior rights if water allocation measures are administered in the Republican basin, it is groundwater irrigators near the region's rivers who may be metered and asked to limit their water use.⁶⁶

In 2001, a major water case was still pending in the U.S. Supreme Court between Colorado and Nebraska. Nebraska claims Colorado shortchanged it on water it was due on the Republican River. The claim states the state of Colorado has been lax in monitoring Colorado Republican River basin farmers pumping groundwater and diverting streamflows into the Republican River. A special master was appointed by the Court to look at that dispute.⁶⁷

Settlement of the Project

The Republican River basin was settled by homesteaders in the 1870s and 1880s. Due to

66. Flowerday, Charles. "Test Pumping Begins in Important Republican Basin Study: Tracing and Modeling of Groundwater-Surface Water Interaction Key," <http://csd.unl.edu/csd/resource/vol-11/testpump.htm>, 1-5.

67. Sanko, John. "Budge Over Trouble Water: High Court Trims \$20 Million From Damages Owed to Kansas in Decades-Old River Dispute." *Rocky Mountain News*, June 12, 2001, 7A.

the existing settlement, no new lands were developed in conjunction with the project.

Project Benefits

Irrigation

Principal crops include corn, alfalfa, silage, and wheat. Beef production is the principal livestock enterprise, with dairy products also serving as an important source of income. Crop failure from drought on irrigated land has been virtually eliminated as a result of the Bostwick Division construction, and agriculture has been stabilized. Acres actually irrigated in Nebraska Bostwick Irrigation District rose from 18,194 acres in 1960 to 19,826 acres in 1965. In 1992, total irrigable acres in Nebraska Bostwick grew to 22,787. Corn accounted for 14,729 acres, followed by 2,760 acres of soybeans. The rest of the irrigable acres raised modest amounts of sorghums, alfalfa, and silage. That same year the crop value per acre averaged \$333.08 on 184 full time farms and thirty-four part time farms. Average operations and maintenance costs (O&M) per acre was \$21.47.

Acres actually irrigated in Kansas Bostwick Irrigation District rose from 19,955 in 1960 to 24,149 acres in 1965. In 1992, total irrigable acres in Kansas Bostwick grew to 41,910. Corn accounted for 23,086 acres, followed by 6,799 acres of soybeans. The rest of the irrigable acres raised modest amounts of alfalfa, sorghums, and silage. That same year the crop value per acre averaged \$331.10 on 488 full time farms. Average operations and maintenance (O&M) cost per irrigated acre in 1992 was \$31.44.⁶⁸

Flood Control

Harlan County Lake and Lovewell Reservoir provide effective flood control to the valleys immediately downstream of these impoundments as well as to cities, towns, farms, and

68. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1965," viii, ix; United States Department of the Interior, Bureau of Reclamation, *1992 Summary Statistics: Water, Land and Related Data*, 50, 301, 305.

lands located far downstream. Since construction of the Bostwick Division, time and time again thunderstorms have deluged torrents of rain into the Republican River basin and the dams have prevented a deadly flood like the one experienced in 1935. Harlan County Reservoir has an exclusive flood control allocation of 498,001 acre feet and, as of 1998, has saved \$139 million in flood damages. Lovewell Reservoir has an exclusive flood control capacity of 50,460 acre feet and a surcharge capacity of 144,500 acre feet and, as of 1998 has saved \$142 million in flood damages.⁶⁹

Recreation

Lovewell Reservoir and Harlan County Reservoir provide excellent facilities for outdoor recreation and fish and wildlife activities. Thousands of persons visit the facilities each year. Principal recreational activities include camping, fishing, swimming, boating, and water skiing.

Lovewell Reservoir water surface and major portion of reservoir lands are administered by the Kansas Forestry, Fish and Game Commission, and Kansas State Park and Resources Authority in accordance with Memorandum of Understanding executed March 2, 1959, and Amendment to the Memorandum dated January 11, 1965. Of the 6,576 acres of land acquired for the dam and reservoir, the Commission administers 5,015 acres for wildlife purposes and the Authority administers 1,126 acres for recreational purposes.

Recreational activities proved to be an immediate popular draw to Lovewell Dam and Reservoir. Bird watchers at the reservoir can see Baltimore Orioles and five species of woodpeckers. In 1958, 78,000 fisherman caught 195,000 fish. The reservoir contains walleye, white bass, wiper (white bass-striped bass hybrid), crappie, and channel catfish. Waterfowl was attracted to the reservoir's waters with as many as 120,000 ducks resting in its waters at one

69. "Pick-Sloan Missouri Basin Project - Bostwick Division, Nebraska and Kansas," <http://dataweb.usbr.gov/html/bostwick.html> , 5.

time. During the fall of 1958, 3,500 hunters bagged 6,300 ducks.⁷⁰

Conclusion

The Bostwick Division of the Pick-Sloan Missouri Basin Program has changed the economic well-being of south central Nebraska and north central Kansas. Participating farmers in the division's irrigation district enjoy today the benefits of a guaranteed source of dependable water enabling them to more than double their crop yields. The terror of deadly and destructive flash floods is but a memory today with the construction of dams throughout the Republican River basin. Recreational activities centered on the reservoirs has enhanced the quality of life for this rural region's residents. Even though the Bostwick Division does not rate in the top tier of the Bureau of Reclamation's projects, it has had an immense positive impact on this region.

About the Author

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70. "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1965," ix; "Annual Project History, Bostwick Division, Pick-Sloan Missouri Basin Program, 1958," 2; *1992 Summary Statistics*.

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