

Kirwin & Webster Projects

**Solomon Division
Pick-Sloan Missouri Basin Program**

Wyndham E. Whynot
Bureau of Reclamation
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Kirwin & Webster Projects Pick-Sloan Missouri Basin Program-Solomon Division

As Kansas farmers awaited their next rainfall, the lifeblood of agriculture, they wondered whether or not the rain would be ally or enemy. Kansas often received a fair amount of precipitation over the years, which enabled farmers to grow and harvest their crops. However, at times Kansas suffered from either too much or too little rainfall; resulting in either massive and destructive floods or devastating droughts which ruined agricultural production.

Many Kansans wanted to improve their situation by erecting dams and reservoirs for irrigation and flood control. Although they knew what they needed, it was generally economically unfeasible for the state or local government to build the needed facilities. The Federal Government eventually developed legislation to assist Western states with their water problems.

Congress' decision to include Kansas under the Reclamation Act of 1902, should have been a joyous occasion for Kansans. At last, Federal assistance was available to help state and local authorities construct irrigation projects in Kansas. Numerous plans, envisioning the taming and use of the Kansas, Republic, Solomon, and other rivers were developed by local residents interested in creating gardens of Eden in the state. Unfortunately, few of these schemes, which the Bureau of Reclamation reviewed or investigated, met the repayment requirements to qualify for the Bureau's help.

As decades passed, it appeared only the Army Corps of Engineers would build any dams in Kansas, but these were intended for flood control rather than irrigation. When the Reclamation Act of 1939, was passed, it seemed the variable repayment clause might permit a few Projects to be constructed. Since no project proved feasible, even with variable payments, Kansas still remained without a reclamation project. However, changes were just on the horizon, when Congress decided to pass the Flood Control Acts of 1944 and 1946, to build up a dam and power plant program for the Missouri River Basin. During conferences with the Corps of Engineers, the Bureau pushed to include some projects located along the Saline, Smoky Hill, and

Solomon Rivers.¹

Big plans were in store for the Solomon river, as the Bureau considered three units, the Kirwin on the North Fork, the Webster on the South Fork, and Glen Elder along the main river. Between 1946 and 1952, three Projects were approved for Kansas as part of the Pick-Sloan plan; Cedar Bluff, Kirwin, and Webster. Although the devastating 1951 Kansas River flood played an important role in the approval of these projects, Kirwin residents had actively sought and supported efforts to construct an irrigation project near Kirwin, which provided the Bureau with an additional reason for selecting Kirwin. Shortly after the flood, additional studies indicated the Webster Project could adequately supply irrigation and flood control for the region.²

Location of the Projects

Kansas' Solomon river starts as two forks in the far northwestern edge of the state near Colby, Kansas. Running roughly parallel to each other until they reach north central Kansas, the forks converge about 25 miles east of the Kirwin and Webster Projects. The Solomon river is part of the Smoky Hill, Kansas, and Missouri River Basins. Reclamation built a project on each of the forks of the Solomon River.³

Kirwin dam, of the Kirwin Project, is located on the Solomon River's North Fork near Kirwin, Kansas. The Project area consists of about 11,400 acres running roughly a mile on both sides of the river. It encompasses parts of Phillips, Smith, and Osborne counties.⁴

Irrigated lands for the Webster Project which includes about 8,000 acres lie in an area extending back about one mile from each bank of the Solomon River's South Fork in Rooks and Osborne counties. Webster Dam and reservoir are located on the previous site of Webster, Kansas, roughly eight miles west of Stockton. Woodston diversion dam is located near Woodston, which is about sixteen miles downstream from Webster dam. Both sites are on the

1. U.S. Senate, *Missouri Rive Basin*, Senate Document 191, April 1944, 78th Congress, 2d session, (Washington DC: Government Printing Office, 1944.)

2. *Ibid.*

3. U.S. Senate Document 191, 78th Cong. 2d sess., U.S. Bureau of Reclamation, *Water and Power Resources Service Project Data Book*, (Denver: Government Printing Office, 1981,) pp. 923-5, 1007-9.

4. *Project Data*, pp. 923-6.

Solomon River's South Fork.⁵

History

For a long period of time the Solomon River Valley and an area extending at least fifty miles from the western ends of the North and South Forks was the home of several Native American groups. The Scott County Pueblo Indians, who practiced irrigation, inhabited the region just west of the two forks. It is believed that they arrived from the southwestern regions of the United States. Native American settlement within the Solomon valley itself included the Pawnee, Kansa, and the Omaha.⁶

These tribes, and especially the Pawnee, divided their time within the valley, spending the summer and winter hunting months in the region; while farming further east during the rest of the year. Initial European exploration of the area was conducted by the Coronado expedition in the mid 1500s. Although the Spanish continued making occasional contacts for some time, no permanent settlements were established by the Spanish in the region. After President Thomas Jefferson purchased the Louisiana Territory from Napoleon in 1803, increasingly greater numbers of Americans traversed the area, including Zebulon Pike in 1805-1806, who noted that the Spanish continued seeking assistance and trade with the Indians.⁷

As settlers later attempted to influence Kansas' status as free or slave state, thousands of partisans poured into the state in the mid 1800s. However, few ventured west into the Solomon River Valley for an extended stay until the late 1860s. In 1870, the census showed that fewer than 100 persons lived in Rooks, Phillips, Smith, and Osborne counties. As the demand for lands grew greater in the area during the 1870s, the population grew at a tremendous rate, with approximately 30,000 settled by 1880 and an average of 50,000 reported in the censuses of 1890, 1900, and 1910. However, from 1920 the population showed a steady decrease to about 35,000 persons by 1950.⁸

5. *Ibid.*, 1007-9.

6. William Brady, "Kansas Pioneers in Irrigation," *Reclamation Era*, vol. 34, no. 6, June 1948, pp. 109-12; Kenneth S. Davis, *Kansas: A Bicentennial History*, (New York: W.W. Norton & Company Inc., 1976,) pp. 13-4.

7. Davis, *Kansas: A Bicentennial History*, pp. 13-4, 24.

8. Definite Plan Report Kirwin Unit, vol. 1, General Plan of Development, June 1952, RG 115, Engineering & Research Center Project Reports, Box 468, NARA, Denver, p. 9; *Definite Plan Report Webster Unit*, vol. 1, General
(continued...)

The main reason for declining population was the instability of agricultural production. Except for the grasshopper plague of 1874, crop yields were generally good through the 1880s. However, the weather pattern began shifting between a drought and wet cycle, and yields decreased. The Dust Bowl had a significant impact on agricultural production in Kansas during the late 1920s and the 1930s. Calls by Kansans for irrigation became more frequent and louder.⁹

Mrs. Curtis Fry, the daughter of long-time settler and farmer in Rooks County, wrote a letter to the Rooks County *Record*, asking people to support the construction of a dam across the Solomon River. She believed "Rooks County would be benefitted hundreds of thousands of dollars with but a minimum cost" by erecting a dam. State Senator John Gray and E. Porter Aherns, the National Reclamation Association's Kansas Director, also worked hard to persuade the Bureau of Reclamation to construct irrigation projects in Kansas. Gray especially wanted a dam built on the Solomon River.¹⁰

When World War II broke out in Europe, America slowly began gearing up for war production. As the war cloud loomed even closer on the horizon in 1941, the government and some individuals considered a variety of programs to prepare the United States to meet the oncoming challenges. Since previous pleas to the Bureau of Reclamation to build a project at Kirwin appeared to have fallen on deaf ears, John Gray, President of the Kansas Reclamation Association, as well as a former Kansas state senator, decided to take a new approach to persuade the Bureau to change its mind.¹¹

Gray advocated the construction of Kirwin dam and reservoir as a defense Project. He recommended Commissioner John Page consider using the reservoir as "a mid-continent landing [base] for sea-going bombers." Before Page had time to reply, Gray sent another letter; asking

8. (...continued)

Plan of Development, SEP 1952, pt. 3, RG 115, Engineering & Research Center Project Reports, Box 883, NARA, Denver, p. 7.

9. *Definite Plan Report Webster Unit*, p. 7.

10. Mrs. Curtis Fry to Mr. and Mrs. J.B. Reseley, ltr to editor, 9 OCT 1933, *Rooks County Record*, Stockton, Kansas, 12 OCT 1933, p. 6.

11. Gray to Page, ltr, 19 NOV 41, RG 115, Office of Chief Engineer, Denver, General Correspondence files (Straights), 37-E, Box 572, Straights Preliminary Investigation, Kansas AUG 1941 - DEC 1941, NARA, Denver; Gray to Page, ltr, 2 DEC 1941, *Ibid*.

Reclamation to designate the hoped for Kirwin Project as "major defense Project."¹²

Although Page might sympathize with Gray's desire to construct an irrigation project, Page realized the Kirwin Project was not suitable as a defense facility. He informed Gray "Irrigation and flood control reservoirs" are not ordinarily capable of providing suitable landing sites for sea-planes. The commissioner also noted that designation of Kirwin as a major defense project would have to await an examination of reconnaissance and other reports regarding the feasibility of Kirwin.¹³

By 1942, the National Reclamation Association's Kansas Director, E. Porter Aherns, decided enough was enough. Upset with the Bureau's failure to issue any official preliminary reports, Aherns wanted to know what Reclamation required before a Project could be constructed in Kansas. Officials suggested Aherns and other supporters seek assistance from their congressional delegations, by pushing particular projects. Aherns asked "what projects could they push, because "a Department of Interior map indicating potential and actual Projects in the United States shaded in green ink showed "For the State of Kansas, all the green ink that was on the entire state, a mosquito could have carried it on the end of "his stinger." With such active support from Reclamation, Aherns wanted to know "what projects we might write about."¹⁴

What really bothered Aherns, Gray, and others wanting irrigation projects in Kansas was that while the Bureau of Reclamation seemed to be doing nothing for the state, the Army Corps of Engineers had been developing plans to build dams and reservoirs which either aided Kansas or were located in the state. Aherns believed if Reclamation would cooperate with the Corps, that projects could be developed. Although Aherns was thinking about a proposed site in Harlan County Nebraska which would aid part of Kansas, he believed these efforts should be expanded

12. Gray to Page, ltr, 19 NOV 41, RG 115, Office of Chief Engineer, Denver, General Correspondence files (Straights), 37-E, Box 572, Straights Preliminary Investigation, Kansas AUG 1941 - DEC 1941, NARA, Denver; Gray to Page, ltr, 2 DEC 1941, *Ibid*.

13. Page to Gray, ltr, 4 DEC 1941, RG 115, Office of Chief Engineer, Denver, General Correspondence files (Straights), 37-E, Box 572, Straights Preliminary Investigation, Kansas AUG 1941 - DEC 1941, NARA, Denver.

14. Aherns to F.O. Hagie, ltr, 14 JAN 1942, RG 115, General Correspondence Straights, 37-E, Preliminary Investigations, 1942, NARA, Denver, pp. 1-3. Aherns also took the National Reclamation Association to task for its unwillingness to push projects for Kansas.

to other regions like the Smoky Hill Basin.¹⁵

What Aherns did not know was that the Bureau had been investigating potential sites within the Smoky Hill Basin for the Cedar Bluff and Kirwin Projects since 1939. As America fought to contain and overthrow the forces of tyranny, the Bureau continued focusing on projects that would benefit the war effort. Although several projects were constructed during this era, Kansas remained without a Reclamation project. However, a decision by Reclamation, the Corps of Engineers, and Congress to cooperate in an investigation of ways to control, store, and use Missouri River Basin waters was beginning and would have a significant impact in Kansas.¹⁶

General Lewis A. Pick, Divisional Engineer with the Corps, developed a plan to provide flood control dams and reservoirs throughout the Missouri River Basin. About this same time, Reclamation regional engineer William G. Sloan presented a program to use these rivers to irrigate the basin. Although Congress considered developing a Missouri Valley Authority similar to the Tennessee Valley Authority; Congress decided to combine Pick's and Sloan's plan in 1944. This legislation ultimately resulted in the construction of several projects in Kansas, including the Kirwin and Webster units.¹⁷

Project Authorization

General Pick's program for flood control provided for the construction of very few projects in Kansas. In contrast, Sloan's plan recommended at least six additional sites for the state. Three proposed units were on the Solomon river, including Kirwin and Webster. After the Corps presented its proposal to Congress on March 2, 1944, Reclamation advocated the adoption of Sloan's plan on May 5, 1944. Congress decided to combine the programs into the Flood Control Act of 1944 to aid all of the recommended areas. This legislation provided for the cooperation of the Bureau and the Corps in constructing various projects within the Missouri

15. *Ibid.*, p. 1-5.

16. Thompson to Hydraulic Engineer, ltr, 8 December 1941, RG 115, 37-E Preliminary Investigations Kansas, August 1941 - December 1941.

17. Department of Interior, Water & Power Resources Service, *Water and Power Resources Service Project Data*, (Denver: Government Printing Office, 1981,) pp. 777-8; William Warne, *The Bureau of Reclamation*, (Boulder, Colorado: Westview Encore Reprint, 1985,) pp. 161-73.

River Basin. Additionally, Congress appropriated funds to build a number of dams.¹⁸

Realizing the Pick-Sloan program needed additional funds, Congress authorized additional funds under the Flood Control Act of 1946. Although President Truman signed this act, he wanted to limited government spending, so he announced "For some years the majority of these authorized projects must be deferred," and that construction of these projects will be "viewed to save strategic materials and to diminish inflationary pressures. That policy delayed construction of Kirwin and Webster would be delayed for some time."¹⁹

Plans to build the Kirwin Project received several setbacks during the late 1940s. While Truman's decision to defer spending played a significant role in this delay, local problems also contributed. Although enough Kirwin area residents initially agreed to support the Project, several backed out, leaving the local irrigation district with insufficient members and further delaying construction. Although it appeared the Kirwin unit might not be built because of lack of interest, the devastating Kansas river flood of August 1951, turned the tide of government support to construct both the Kirwin and Webster Projects of the future Solomon division.²⁰

Although Congress approved the projects for flood control, the Bureau was unable to construct irrigation facilities until repayment contracts were signed with local authorities. Kirwin area residents first tried forming an irrigation district in 1946, but petition was denied because the percentage of farmers and lands within the proposed district supporting the request failed to meet the minimum requirements. However, the Chief Engineer, Division of Water Resources, approved a second attempt to establish an irrigation district and a water right in 1948. Webster Project residents successfully organized a district and obtained a water right on December 13, 1956. Repayment contracts were finally signed by Kirwin Irrigation District No.

18. *Water and Power Resources Service Project Data*, pp. 777-8; Warne, *The Bureau of Reclamation*, pp. 161-73.

19. U.S. Department of the Interior, *Federal Reclamation and Related Laws Annotated*, (Washington DC: Government Printing Office, 1972,) pp. 833-4, see footnote.

20. George Knapp, *Findings and Order in the Matter of the Proposed Organization of Kirwin Irrigation District No. 1*, 28 DEC 1946, Division of Water Resources' Chief Engineer, Staff Attorney Files, 1940-87, Kansas State Historical Society, Topeka, Kansas.

1 on June 9, 1953 and by Webster Irrigation District No. 4 on April 24, 1957²¹

Construction History

Work on the Kirwin and Webster Projects was divided into several phases. Construction of the Kirwin Project was split into separate contracts for Kirwin Dam, Kirwin Main Canal, Kirwin North Canal, and Kirwin South Canal, with laterals included in the various canal contracts. Contracts for the Webster Project were issued for Webster Dam foundation, completion of Webster Dam, Woodston Diversion, and three separate sections of the Osborne Canal.

Kirwin Project

The 1951 flood played an important role in passage of the *Supplemental Appropriation Act of November 1951*. It "directed the immediate construction of Kirwin Dam and Reservoir for flood control." Kirwin's irrigation aspects were left for future studies. Work on the Kirwin Project was divided into several phases. Advertisements for a 314,550 acre-feet reservoir and a zoned earthfill dam were published during 1952; while bids for the irrigation canals were delayed until 1956.²²

Reclamation decided to split construction of Kirwin Dam into two sections; the foundation and the dam. Cook Construction Company of Jackson, Mississippi, submitted the low bid of 1,122,938 to win the foundation contract. On March 27, 1952, the company commenced excavation operations and during April began placement of embankment materials for Zone 1, 2, and 3. Work proceeded on schedule with no interruptions and the embankment for Zone 2 was completed by October 30, and Zones 1 and 3 was completed on November 8. After an inspection by Reclamation engineers, the government accepted the work on November 14, 1953.²³

21. *Kirwin and Webster Units Solomon Division Project History*, 1970, vol. X, RG 115, Engineering & Research Center Project Histories, Box 94, NARA, Denver, pp. 3-5.

22. *Kirwin Unit Project History*, 1951-4, vol. II, RG 115, Engineering & Research Center Project Histories, Box 57, NARA, Denver, pp. v-vii, 1-2; U.S. Bureau of Reclamation, *Kirwin Dam, Foundation Construction, Solomon Division, Kansas, Missouri River Basin Project*, Specification D-3633-DC, (Denver: Government Printing Office, 31 JAN 52); *Project Data*, pp. 925.

23. *Kirwin Unit Project History*, 1951-4, vol. II, RG 115, Engineer & Research Center Project Histories, Box 57, NARA, Denver, pp. v-vii, 1-2.

The Texas Construction Company of Dallas, Texas received the dam completion contract with a low bid of \$6,729,670.80. Although work began on March 11, 1953, excavation and embankment operations did not commence until March 17. By April 6, the spillway and outlet works were being excavated. Construction progressed at a satisfactory rate throughout the year. Concrete was placed in the grout cap by June and in the outlet works during July. The company began pouring concrete "in the overflow section of the spillway crest" in September and in the river stilling basin in November. Except for the borrow pits, excavation and embankment operations were suspended during November. Steel outlet pipe was installed on November 20 and completed on December 15.²⁴

Construction continued during the winter, with excavation and embankment work resuming in the spring. Some temporary delays occurred during 1954. A significant earth slide, of roughly 25,000 cubic yards, occurred in the cut-off trench and forced the contractor to re-excavate the area. Discovery of a mastodon skeleton while excavating the cut-off trench caused a minor delay as the company waited for representatives of the University of Kansas to study the mastodon.²⁵

Texas Construction Company and one of their subcontractors, E. C. Schroeder Company, Inc., of McGregor, Iowa, suffered three fatal accidents during the year. Two Texas Construction Company workers died. A Euclid driver for the Texas Construction Company ran off the road and overturned in a drainage ditch in June and in August another died while "clearing the lower idler rollers of a Euclid." An E. C. Schroeder Company employee was electrocuted when he "came in contact with a transmission line at a transformer station" in November.²⁶

Although these deaths and delays were unexpected, the company remained ahead of its projected work schedule. The contractor completed the spillway crest structure in July of 1954 and finished placing concrete in the outlet works in early August. Excavation and embankment work continued throughout the year and until August 26, 1955, when the dam was completed

24. *Ibid.*, pp. viii-xii.

25. *Ibid.*, pp. xiii-xiv.

26. *Ibid.*, pp. xiv-xv.

and accepted by the Bureau of Reclamation five months ahead of schedule. Final costs for the dam, including the change orders, amounted to \$6,536,630.47. Although flood control facilities were now available and water was stored for the first time on October 5, 1955, the irrigation structures still were not built.²⁷

St. Joseph, Missouri's Bushman Construction Company submitted a winning bid of \$959,182.14 for the Kirwin Main Canal, laterals, and other facilities. After signing the contract on October 10, 1955, the company began excavation and embankment operations on November 9. The contractor maintained a steady, rapid pace of operations throughout 1955 and 1956. By December 24, 1956, the company had completely excavated and finished the 13.4 miles of the main canal, almost 10 miles of laterals, and erected the necessary turnouts for the laterals, thus finishing the contract in 76.3% of the allotted time.²⁸

However, before water could be provided to all of the Project lands, the North and South canals remained to be constructed. Bids for construction of the Kirwin North Canal were received during late 1955. The contract was awarded to a joint venture between Korshoj Construction Company of Blair, Nebraska, and Claussen-Olsen-Benner, Inc. of Holdrege, Nebraska, on their low bid of \$914,438.50, on February 14, 1956. Because the government failed to obtain sufficient right-of-way in time, the notice to proceed came only on April 18, 1956.²⁹

Excavation of the Kirwin North Canal began in April 1956 and generally continued until mid-September 1957. The contractor used DW-10 tractor scrapers and draglines on the canal and laterals; with a Brisco ditching machine also being used to dig laterals. Work progressed somewhat slowly during 1956, the contractor had finished about 50% of the work with 47% of the total time remaining till the completion date. During 1957, work proceeded at a steady pace until September when it began to slowly wind down. Laterals and the canal were

27. *Ibid.*, pp. xiv-xv; *Kirwin Unit Project History*, 1955, vol. III, RG 115, Engineering & Research Center Project Histories, Box 40, NARA, Denver, p. iii, 1-2.

28. *Kirwin Unit Project History*, 1956, vol. IV., RG 115, Engineering & Research Center Project Histories, Box 40, Nara, Denver, p. 3.

29. *Kirwin Unit Project History*, 1956, vol. IV, RG 115 Engineering & Research Center Project Histories, Box 40, Kirwin, NARA, Denver, p. 3; *Kirwin Unit Project History*, 1957, vol. V, RG 115 Engr & Res Ctr Project Histories, Box 40, Kirwin, NARA, Denver, p. 3.

essentially complete at this time, with basically only fine grading operations remaining. The contractor required about three months to finish grading the Project³⁰.

In contrast to the delay in completing the Kirwin North Canal, Kirwin South Canal was finished ahead of schedule. On December 11, 1956, Bushman Construction Company successfully bid on the South Canal contract. The contract called for a 16.3 mile canal which started at the terminus of the main canal and went under the river to the south side and 9.7 miles of laterals. Although the government accepted their bid of \$990,261.30, the company began moving equipment to the site prior to notification of the award or notice to proceed. The contractor began earthwork operations in late January and gradually picked up the construction pace by March 1957, when the company averaged 10% of the work per month until November.³¹

Excavation of the Kirwin South Canal laterals commenced March 18, 1957, with embankment construction starting shortly afterward continuing until July, when work was temporarily suspended when the contractor shifted his employees to work on the Kirwin South Canal. Work on the laterals continued in September and continued until the laterals were completed in December. The contractor began placing the rolled embankment in the canal in April and continued this operation until it was essentially finished in September, except for the final dressing. Compacting of Zone 1 material started in March and was completed by December. Pipe laying operations, including the siphon under the river began March 19 and continued until completion on November 15.³²

Once again, the company finished several months ahead of schedule, even though the government failed to obtain all the right-of ways on time, forcing the contractor to shift work to other areas. Unlike work on the Main Canal, the contractor suffered no fatalities while constructing the South Canal. By December 29, 1957, Bushman Construction Company had finished all of the required work except for seeding, which was done on January 2, 1958. Water

30. *Kirwin Unit Project History*, 1956, pp. 2-3; *Kirwin Unit Project History*, 1957, vol. V, RG 115, Engineering & Research Center Project Histories, Box 40, NARA, Denver, pp. 3-8.

31. *Kirwin Unit Project History*, 1957, 9-11; *Kirwin Unit Project History*, 1956, pp. 3-4.

32. *Kirwin Unit Project History*, 1957, pp. 11-5.

was available for all Project lands as of the 1958 irrigation season.³³

Webster Project

Just as Congress responded to the 1951 Kansas river flood by funding the Kirwin Project, Congress also authorized construction of Webster Dam to provided flood control benefits for the region. Funding for irrigation was delayed until the Bureau could work out an agreement with farmers in the Webster Project lands. To speed up construction of Webster Dam, the government decided to issue separate advertisements for the dam and its foundation. The government awarded the foundation contract to H. N. Rodgers and Sons of Memphis, Tennessee, whose bid of \$993,870 beat out offers from eight other companies, on November 5, 1952. Although the company received a notice to proceed on December 12, the contractor did not begin any major work until March 2, when they began establishing a construction camp. Stripping operations for the foundation started March 14, with excavation of the cutoff trench beginning March 18.³⁴

During this same time, excavated material was placed in zones 1 and 3; zone 2 material was placed beginning on March 24. By the end of the month clearing operations for the foundation had been finished and on April 23, foundation stripping was completed. An unexpected problem arose when Bureau funds for construction were exhausted by May 29, 1953. Instead of completely shutting down activities, the contractor decided to reduce the work week to five days between June 9 and July 20. On September 17, the government informed the company that sufficient funds to cover the estimated remaining work had been obtained.³⁵

H. N. Rodgers and Sons resumed their 2 nine hour shifts per day schedule after being notified funds were available. Embankment placement of zone 2 & 3 material was essentially completed by the end of September, with only fine grading remaining. Zone 1 material placement was roughly finished by November 4. It appeared the contractor would be able to

33. *Ibid.*, pp. 10, 15-16; *Kirwin Unit Project History*, 1958, vol. VI, RG 115, Engineering and Research Center Project Histories, Box 94, NARA, Denver, pp. 1.

34. *Unit Record of Construction of Webster Dam Foundation Construction*, RG 115, Engineering & Research Center Project Reports 1910-1955, Box 884, NARA, Denver, pp. 5-6.

35. *Ibid.*, p. 16.

complete the job by November 20, the planned completion date. Unfortunately, heavy snows and rains during the first week in November resulted in the suspension of operations until November 30. After briefly resuming work, additional adverse weather prevented the company from completing the contract. The government informed H. N. Rodgers and Sons that they would consider the contract complete, if the company agreed to reimburse the government for costs necessary to finish the remaining work.³⁶

While work on the foundation continued, the Bureau issued invitations on September 23, 1953, for the second phase of construction the completion of Webster Dam. Although H. N. Rodgers and Sons presented a joint bid with Clark and Farrell, their \$6,248,158.50 offer was not the low bid. Edward E. Morgan Company, Inc., and Jones and Gilles, Inc., both from Jackson, Mississippi, jointly submitted the low bid of \$6,148,683.50. Although awarded the contract on December 11, 1953, the government decided to delay sending a notice to proceed until the weather would permit relatively continuous operations.³⁷

Although receiving their notice to proceed on March 15, 1954, Morgan, Jones and Gilles began stripping for grout holes on February 25. Their completion date was set for May 23, 1956. The contractor also agreed to complete the remaining foundation work for an additional payment. Initially only one shift worked on stripping and excavation operations, but on April 15, 2 nine hours shifts began working on the earthworks. Grouting work was subcontracted to the Empire Diamond Drilling Company in Kirwin and L.A. Tvedt, Contractor of Memphis, Tennessee, received a subcontract for concrete. A joint venture by Texas Construction Company of Dallas and Hyde Construction Company of Jackson, Mississippi, received a subcontract for earthwork operations.³⁸

Placement of zone 1, 2, & 3 materials continued throughout the year. During November, the contractor employed an average of 269 persons, the largest amount for any month.

36. *Ibid.*, pp. 7-8, 16-7.

37. *Webster Unit Project History*, 1953, RG 115, Engineering & Research Center Project Histories, Box 212, NARA, Denver, pp. 17-8.

38. *Webster Unit Project History*, 1955, vol. IV, RG 115, Engineering & Research Center Project Histories, Box 235, NARA, Denver, pp. 10-11; *Webster Unit Project History*, 1954, vol. III, RG 115, Engr & Res Ctr Project Histories, Box 212, NARA, Denver, pp. 10-1.

Embankment placement was suspended in December due to the cold weather. Grouting operations were suspended on May 21, when the company complete all the work it could. Work resumed August 4 and was finished on September 12. Although some concrete was placed during April, major operations were delayed until a batching and mixing plant were completed. Concrete for the outlet works was first placed during July, with one shift working on forms and two on placing concrete. Realizing he was behind schedule, the subcontractor began working 7-day weeks to catch up.³⁹

During the winter of 1954-1955, operations were temporarily suspended due to adverse weather conditions. One change was that the earthwork subcontractors purchased the prime contracting companies, and continued work under the name Texas Construction Company. By March 1955, zone 1 embankment placement resumed, with additional zone material placing occurring in the following weeks. During May workers laid riprap and poured concrete for the stilling basin structures. Although the work was 4.9% behind schedule, the contractor's progress was considered satisfactory and it was believed a little bit of extra effort during the spring of 1956 would ensure completion of the dam by May 23.⁴⁰

Once again, freezing weather and snow caused temporary work stoppages during the winter. Zone 1 embankment placement resumed in March 1956, and essentially was completed on May 23. Additional operations finished during the month included the laying of riprap and placement of concrete. Water storage began on May 3, with some water being "siphoned over the intake structure" to provide farmers with water. By June 26, the gates for the dam had been installed and were capable of being operated. Although the contractor missed the target date, the government granted an extension of 34 days because of changes requested for the spillway. The final transfer from "construction to Operation and Maintenance status" became official September 1, 1956.⁴¹

With the completion of Webster Dam, the Webster Project was now capable of providing

39. *Webster Unit Project History*, 1954, pp. 11-2.

40. *Ibid.*, pp. 11-3.

41. *Webster Unit Project History*, 1956, vol. V, RG 115, Engineering & Research Center Project Histories, Box 235, NARA, Denver, pp. 2-3.

flood control benefits along the South Fork and Solomon river. However, irrigation benefits were delayed until local residents formed an irrigation district, construction of Woodston Diversion Dam, and construction of the necessary carriage facilities. After Webster Irrigation District #4 was formed and signed a repayment contract, the government advertised for bids on the needed diversion dam. Omaha, Nebraska's Ace Construction Company and M & A Construction Company's submitted a joint low bid of \$541,956.50 for the diversion dam, which the government accepted.⁴²

After receiving notice to proceed on June 15, 1957, the contractor had until October 8, 1958, to complete the facilities. The Bureau of Reclamation decided the diversion dam would be an "uncontrolled concrete overflow spillway 17 feet high and 151 feet long." Concrete structures, earthwork, riprap, and electrical installation was subcontracted to various companies by the prime contractor. Work proceeded at a satisfactory rate, with more than half of the work finished in less than half the time.⁴³

Construction began during late July, when Rentlor Co., Inc., of Grand Island, Nebraska, which subcontracted for concrete structures, began stripping work areas. Noble & Fuller, of Republic, Kansas, subcontracted for earthwork and the Osborne Canal's first section of 2000 feet, started a week later when they diverted the river. They began contract work in August 1957. During the month Noble & Fuller finished clearing the earthwork area, initiated sand fill construction, and Zone 2 embankment. During September, Noble & Fuller started canal prism excavation and continued throughout the rest of the year, as well as "rolling and placing Zone 1 material."⁴⁴

Rentlor Co., Inc., commenced concrete placement September 29, 1957, and by the end of the year the contractor completed the "overflow weir and right abutment walls." They also worked on the sluiceway, base slab, and the toe trench of the upstream retaining wall. E.C. Schroeder Company of McGregor, Iowa, which obtained the riprap and crushed rock blanket

42. *Webster Unit Project History*, 1957, vol. VI, RG 115, Engineering & Research Center Project Histories, Box 235, NARA, Denver, "Construction Chapter," p. 2.

43. *Ibid.*, "Construction chapter," p. 2.

44. *Ibid.*, p. 3.

subcontract, started stockpiling rock near the site between August and November 1957. Riprap placement began November 13 and the rock blanket placement during December. The contractor continued this work throughout early 1958.⁴⁵

Although it appeared the company would meet the completion date, events during the year prevented the prime contractor from finishing on time. Although a severe winter reduced and even halted construction, an inadequate dewatering system in the channel relocation area and the failure of Noble & Fuller to maintain their schedule kept the Project from being completed by October. The Rentlor Co. concluded concrete operations by July 1958. E. C. Schroeder Company progressed at a satisfactory rate, but was unable to maintain its schedule because earthworks were not finished.⁴⁶

Problems with the earthworks began as early as January 1958, when the subcontractor went looking for another company to finish its work. Martinson and Almquist of Wahoo, Nebraska, agreed to assume responsibility for earthworks on April 16, 1958, but the company decided to shut down its operations on July 11. Noble & Fuller then worked out an agreement with M & A Construction Company to do the work. Although M & A started work on August 4, their lack of equipment slowed down work and increased costs of the work for the prime contractors.⁴⁷

Although excavation of Osborne Canal's first section began in January 1958, operations were suspended until August, when they continued for the rest of the year, by which time the initial 2000 feet of the Osborne Canal was almost complete. Additional work on earthworks continued throughout 1958, with the greatest amount of work being accomplished during the latter half of the year. By December, only four percent of Woodston Diversion Dam remained to complete and that boded well for providing water to Project lands during the 1959 irrigation season.⁴⁸

45. *Ibid.*, pp. 3-6.

46. *Webster Unit Project History*, 1958, vol. VII, RG 115, Engineering & Research Center Project Histories, Box 154, NARA, Denver, pp. 3, 9, 10.

47. *Ibid.*, p. 3.

48. *Ibid.*, pp. 4-5.

Bushman Construction Company, which previously constructed part of the Kirwin Project canals, successfully bid for construction of the second section of Osborne Canal. Their experience played a significant part in the rapid pace of construction of the Osborne Canal. After receiving a notice to proceed on March 10, 1958, the company commenced operations June 3. Excavation progressed somewhat ahead of schedule, averaging 13% of the total work per month, with 28% of the work being completed during September. Although it is likely the contractor could have finished before the end of the year, they had to wait until the Rolfsmeier Construction Company of Seward, Nebraska, which subcontracted earthworks on the canal's section, finished earthwork operations in the structural areas. Still, Bushman Construction Company completed 95% of the contract by December.⁴⁹

Woodston Diversion Dam and the first section of Osborne Canal were essentially completed on March 18, 1959. Although the government agreed to extend the date by 97 days due to severe weather, the contract was still 34 days late. In contrast, Construction Complete Section 2 Osborne Canal Bushman Construction Company substantially completed its contract for work on the Osborne Canal's section 2 by February 2, 1959, the completion date. During March and November, the government awarded Bushman Construction Company contracts for the third and fourth section of Osborne Canal and various laterals.⁵⁰

Once again the company continued its excellent work on canals. By December 1959, 91% of the third section had been completed, with 39% of the contract time remaining. Although a severe winter slowed down excavation, the company essentially finished its work on June 29, 1960. During 1960, the company also erected the Butler pump buildings in January for the four pumping plants to irrigate areas which could not be serviced by gravity. Work was temporarily delayed between February and late April while the company awaited the arrival of pumps and motors. Work then resumed and was completed in June, with the first water being

49. *Webster Unit Project History*, 1958, vol. VII, RG 115, Engineering & Research Center Project Histories, Box 154, NARA, Denver, pp. 13-4.

50. *Webster Unit Project History*, 1959, vol. VIII, RG 115, Engineering & Research Center Project Histories, Box 154, NARA, Denver, pp. 4-5, 13.

pumped on July 19, 1960.⁵¹

Severe weather during early 1960, delayed excavation of the Osborne canal's fourth section until April 6. The contractor and his subcontractors continued their excellent work. By the end of the year, 98% of the canals, laterals, and pipes had been excavated or laid, with 23% of the available time remaining. Cold weather for the contractor to suspend operations on December 23 until the spring. Excavation continued February 20, 1961, until March 29, when dragline excavation operations finished. By April 22, 1961, the contractor complete fine grading, installation of cattle guards, and clean-up operations. The canal was then turned over to the government, with water being available for the Project area. With the completion of the Webster Project's canals and laterals, the second unit of the Solomon Division was in operation, leaving only the Glen Elder unit for future construction.⁵²

Post-Construction History

In an attempt to reduce managerial and administrative expenditures, Kirwin Irrigation District and Webster Irrigation District decided in December 1959 to operate their headquarters jointly. Each district maintained responsibility for repairs and repayment costs, while other expenses such as heavy equipment and certain personnel costs, such as the district supervisor, were shared. This arrangement has worked quite well during the ensuing years, reducing costs and allowing the districts to obtain equipment which might not have been possible if they operated separately.⁵³

Both Projects initially underwent a development period to avoid financial hardships, being responsible only for operations and maintenance costs. Kirwin received a five year period, which ended in 1964; while Webster requested the Bureau extend its five year grace period for an additional five years which ended in 1970. Although irrigation facilities were turned over to their respective districts, Webster and Kirwin reservoirs are operated and maintained by the

51. *Webster Unit Project History*, 1960, vol. IX, RG 115, Engineering & Research Center Project Histories, Box 154, NARA, Denver, pp. 5-6.

52. *Ibid.*, pp. 8-9, 15-6; *Project History, Kirwin & Webster Units, Solomon Division*, 1961, vol. I, RG 115, Engineering & Research Center Project Histories, Box 144, NARA, Denver, pp. ii, 7-8.

53. *Kirwin Unit Solomon Division Project History*, 1960, vol. VIII, RG 115, Engineering & Research Center Project Histories, Box 94, NARA, Denver, p. 1.

Federal Government for flood control and irrigation.⁵⁴

The water supply for project lands has varied greatly since the facilities were built. At times, when rainfall reaches normal levels, there is generally sufficient water to fully irrigate all of the land. However, at other times, such as 1970, when precipitation was roughly three-fourths of its annual average, water deliveries were reduced or even eliminated as in 1972 for the Webster Project. During this period and into the 1980s a number of junior water right holders above the reservoirs have been pumping out an enormous amount of groundwater, which has decreased the amount of water available for irrigation below the projects. Attempts to get the state engineer to enforce the Districts' rights have failed because the amount of acreage taken out of production by enforcing these rights would not be equaled by the amount of land irrigated by the junior water right holders.⁵⁵

Canals on both Projects seeped. To offset water losses, the districts contracted to have the canals lined or relined. The repairs seemed to work fairly well. The Webster Project suffered greater than expected seepage problems at Webster Dam and Woodston Diversion Dam which interfered with the districts ability to meets its requirements. The district asked Reclamation to examine the situation and to help find a solution.⁵⁶

Additional problems affecting both facilities included weeds and black cane, livestock grazing near and at the canals and laterals, and the build up of silt at the reservoirs. Both districts have continued an aggressive weed fighting program and erected cattle guards to keep out cattle and other livestock.⁵⁷

Settlement

Investigation of lands within the Kirwin and Webster units indicated the majority of land was already inhabited and being farmed. Prospects for attracting additional settlement in the

54. *Kirwin and Webster Units Solomon Division Project History*, 1970, p. 10.

55. *Ibid.*, p. 9; *Kirwin, Webster, and Glen Elder Units Solomon Division Project History*, 1972, vol. I, RG 115, Engineering & Research Center Project Histories, Box 172, NARA, Denver, p. 4; U.S. Bureau of Reclamation, *Solomon River Basin Water Management Study Kansas: Special Report*, (Denver: Government Printing Office, 1984,) pp. 31-2, 44, 64.

56. *Kirwin and Webster Units Solomon Division*, 1970, p. 9; *Kirwin, Webster, and Glen Elder Units Solomon Division Project History*, 1972, vol. I, RG 115, Engineering & Research Center Project Histories, Box 172, NARA, Denver, p. 4.

57. *Ibid.*, 3-6, *Kirwin and Webster Units Solomon Division*, 1970, pp. 9, 12.

region were dim, and Reclamation personnel believed little new settlement would occur. Although some new farms were established, the population and number of farms generally remained at existing levels. The Projects were somewhat responsible for stabilizing the economic system which prevented even greater population declines from occurring along the North and South Forks. However, drought and water shortages have contributed to a decrease in population in the Kirwin and Webster Project areas.⁵⁸

Water Usage

As part of the Pick-Sloan Missouri Basin Program, the Kirwin and Webster facilities were designed as multi-purpose Projects. The two most important uses were irrigation and flood control. Water from these reservoirs was also utilized for recreation, as well as fish and wildlife conservation and propagation. Webster Dam also provided a supplemental water source for municipalities.⁵⁹

Prior to the completion the Kirwin and Webster Projects, area farmers relied extensively on dry farming. Although some enterprising individuals located near the Solomon river tried small scale irrigation and pumping, these efforts were not usually successful. While major crops raised within the Kirwin Project lands included wheat, corn, sorghums, forage, other grains, sugar beets, potatoes, and other vegetables; farmers in the Webster region concentrated almost solely on grains and forage. Pre-irrigation crop values in both areas averaged about \$12 per acre. Reclamation investigators believed agricultural yields would roughly double and estimated Webster crop values around \$31 per acre and \$38 on Kirwin lands.⁶⁰

Reclamation's report indicated increases in forage, alfalfa, and corn would be offset by decreases in the winter wheat crop on irrigated lands. Since winter wheat required only minor irrigation at worst, investigators believed farmers would shift wheat to the non-irrigable lands. It

58. U.S. Bureau of Reclamation, *Solomon River Basin Water Management Study Kansas: Special Report*, pp. 11-6.

59. *Project History Webster Unit Kansas*, FEB 1947, vol. 1, RG 115, Engineering and Research Center Project Histories, Box 212, Webster, NARA, Denver, p. 6; Bureau of Reclamation, *Project Planning Report No. 7-11.5-1*, 2 NOV 1945, RG 115, Engr & Res. Ctr Project Reports 1910-1955, Box 468, Kirwin Project Kansas fldr, NARA, Denver, p. 7.

60. *Project History Webster Unit Kansas*, pp. 26-9; Bureau of Reclamation, *Project Planning Report No. 7-11.5-1*, 2 NOV 1945, Denver, pp. iii, 3-4.

was also hoped that livestock production would also increase by 25%, since most of the lands would provide feed, rather than being turned into irrigated pastures. Although livestock raised in the region consisted of sheep, horses and mules, farmers primarily focused on cattle, hogs, and fowl. Since 1960, overall livestock in the four counties served by Kirwin and Webster has shown a significant increase for cattle and hogs, but sheep and chickens have declined, with a sharp drop in chicken production.⁶¹

Since both Projects began irrigation operations, agricultural production has exceeded hoped for goals. During the late 1950s and early 1960s, crop values averaged about \$75 per acre and resulted in yields approximately double those of non-irrigated lands. By 1975, crop values ranged around \$255 per acre, which can be partially attributed to inflation, but also increased yields.⁶²

Kirwin's and Webster's contribution to flood control proved to be of immense value for the Smoky Hill River Basin. Between 1915 and July 1945, flood damage within the Solomon River basin was estimated to be \$5,131,375, or approximately \$165,500 per year. The devastating 1951 flood resulted in the construction of Kirwin and Webster Dam. Although flood damage has occurred within the Solomon river basin since these Projects were completed, it would have been even worse had Kirwin and Webster reservoirs not been built.⁶³

Besides fulfilling two of Pick-Sloan's main objectives, irrigation and flood control, additional benefits arose at both Projects. The reservoirs provided ample space and opportunity for recreation. Visitors at Webster, Kirwin, and Woodstock dams frequently enjoyed swimming, boating, water skiing, fishing, and other water activities. Lands surrounding the reservoirs were capable of supporting camping, picnicking, and hunting at various times of the year. These

61. *Project History Webster Unit Kansas*, FEB 1947, vol. 1, pp. 28-9; Bureau of Reclamation, *Project Planning Report No. 7-11.5-1*, 2 NOV 1945, p. 4. Also see biennial Kansas State Board of Agriculture Reports, Appended livestock statistics for 1960-1, 1965-6, 1970-1, and 1974-5.

62. *Kirwin Project History* 1958, vol. VII, RG 115, Engineering & Research Center Project Histories, Box 94, NARA, Denver, p. 8; *Kirwin Project History* 1960, vol. VIII, RG 115, Engr. & Res. Ctr Project Histories, Box 94, Denver, NARA, p. 7; *Kirwin & Webster Units Project History* 1970, vol. X, RG 115, RG 115, Engr. & Res. Ctr Project Histories, Box 94, Denver, NARA, p. 6; *Kirwin, Webster, & Glen Elder Units Project History* 1975, RG 115, RG 115, Engr. & Res. Ctr Project Histories, Box 94, Denver, NARA, p. 3.

63. Bureau of Reclamation, *Kirwin Unit of Missouri River Basin Plan: Project Planning Report No. __*, Appendix F, *Flood Control Studies*, DEC 1946, RG 115, Engineering & Research Center Project Reports 1910-1955, Box 468, NARA, Denver, p. 17.

Project areas have also significantly contributed to the development of wildlife within the area, providing a migratory birds with a "feeding and resting area during their migrations and the winter months."⁶⁴

Conclusion

After years of battling the forces of bureaucracy, Kansas began receiving federal assistance to build reclamation projects. Although the Kirwin and Webster Projects have played a significant role in stabilizing and improving agricultural production along the Solomon river, the primary importance of these Projects remains their flood control aspects. Had part of the costs not been assigned for flood control and other non-irrigation aspects, it is likely that neither facility would have been constructed. The irrigation aspects of both divisions have successfully increased agricultural output and allowed farmers to reclaim at least part of their lands, but upstream groundwater pumping still threatens the viability of the Kirwin and Webster Projects .

64. *Project Data Book*, pp. 925-6.

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