

Klamath Project

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The Klamath Project

The Klamath Project encompasses an alternately barren and wooded area of Oregon and California, an area steeped in history. The lucrative beaver pelt market lured trappers to the area in the early nineteenth century. Peter Skene Ogden, a trapper for the Hudson Bay Fur Company, entered the Klamath vicinity in 1826. Captain John C. Fremont led a U.S. military expedition to the area in 1843. In the 1840s, early pioneers set out across the "great American Desert" of the Great Plains to settle the west coast of the young United States. For most the promise of California and Oregon lay ahead. The rugged landscape drew farmers to its fertile valleys for nearly a century. Increased agriculture led to increasing demand for irrigation, culminating in construction of the Klamath Project.¹

Project Location

The Klamath Project covers territory in Klamath County, Oregon, and Siskiyou and Modoc Counties in northern California. Klamath Falls, Merrill, Bonanza, and Malin, Oregon and Tulelake, California, comprise communities on the project. Clear Lake Dam and Reservoir, Tule Lake, and Lower Klamath Lake lie south of the Oregon-California border. Gerber Dam and Reservoir, Upper Klamath Lake, Link River Dam, Lost River, Miller, Malone, and Anderson-Rose Diversion Dams occupy Oregon territory. Temperatures on the project range from -24 to 105 degrees.²

Historic Setting

Settlers carved their niche in Oregon Territory after fur trappers paved the way. In the first century of the United States' history, agriculture remained king here. Most pioneers set

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1. Edward Gray, *An Illustrated History of Early Northern Klamath County, Oregon* (Bend, Oregon: Maverick, 1989), 6-7.
 2. Water and Power Resources Service, *Project Data* (Denver: Government Printing Office, 1981), 567-9, 571.

down roots to begin farming. As in other parts of the western United States, the proximity of whites and Native Americans led to culture clashes, in Oregon, but the advent of the American Civil War took regular army troops from frontier posts to the eastern battlefields.

To protect the Oregon whites against the perceived threat of hostile natives, the Oregon government authorized a volunteer cavalry unit in 1863.³ Recruits, on their way to join the First Oregon Cavalry Regiment, sang,

I'm a raw recruit with a brand new suit.
One hundred dollars bounty.
And I've just come down to Ashland town.
To fight for Jackson County.⁴

The First Oregon paid the cavalry troopers \$31 to \$39 a month. Sergeants received a few dollars more.⁵

Looking for a strategic location to secure major migration routes, the Regiment's officers chose the Wood River Valley, near Upper Klamath Lake, to build Fort Klamath. The present site of Klamath Falls received consideration, but the officers passed it over. The area remained fairly quiet for the volunteers, and the need for the First Oregon Cavalry receded with the end of the Civil War. Troop A of the First U.S. Cavalry replaced the First Oregon in July 1867.⁶

Five years later conflicts between the Klamath and Modoc Indians, placed on the same lands by the United States Government, resulted in the Modoc War. Kientpoos, more commonly known as Captain Jack, led the Modocs to Tule Lake, where they entrenched themselves in the lava beds against 1,000 troops for six months. After fierce and bloody fighting, General Edward Richard Sprigg Canby started negotiations with the Modocs in an effort to convince them to

3. Buena Cobb Stone, *Fort Klamath: Frontier Post in Oregon; 1863-1890* (Dallas: Royal Publishing, 1964), 9-10.

4. *Ibid.*, 11.

5. *Ibid.*, 9-10.

6. *Ibid.*, 11, 27.

return to the reservation. Instead, on April 11, 1873, Captain Jack and his group ambushed Canby, Alfred Meachem, Leroy Dyar, and Reverend Elisar Thomas, killing Canby and Thomas, and wounding Meachem. Captain Jack surrendered to the U.S. Army on June 1, 1873. The Army tried and convicted Captain Jack, Schonchen John, Black Jim, and Boston Charley for the murders of Canby and Thomas. All four were executed at Fort Klamath on October 3, 1873.⁷

In 1882, five years after the Modoc War, farmers introduced irrigation to the Klamath area. Several Linkville residents incorporated the Linkville Water Ditch Company. They dug a low capacity ditch connecting town lots to the Link River, two miles above present day Klamath Falls. William Steele enlarged the ditch and extended it fifteen miles in 1884. The Klamath Falls Irrigation Company took over the ditch after Steele died in 1888. Subsequent enlargements turned the ditch into a high capacity canal, known as the Ankeny-Henley Canal.

The Van Brimmer Brothers also started a small ditch in 1882, to irrigate 4,000 acres near the Oregon-California border on Lost River. Construction took four years, and after completion, the brothers incorporated the Van Brimmer Ditch Company. Then, J. Frank Adams and some neighbors completed a six mile canal from Lost River to Adam's Point in 1886. Originally Adams' canal received water from White Lake through the Van Brimmer canal. Light precipitation in the winter of 1887-88 left Adams' canal dry, forcing him to tap Lower Klamath Lake as a more productive water supply. Adams lengthened the canal to twenty-two miles in 1904. Charles and Rufus Moore excavated a canal on the west side of the Link River rapids in 1877 to furnish power for a saw mill and transport logs from Upper Klamath Lake to the mill. The brothers built another canal, beginning in the same location, to power a flower mill and

7. Walter J. Palmberg, *Copper Paladin: A Modoc Tragedy; A Story of the Two Principal Role-Players of the Modoc Indian War of 1872-73* (Bryn Mawr, Pennsylvania: Dorrance & Co., 1982), ix, 117, 139-40, 159-61.

supply irrigation water for lots and orchards in west Klamath Falls.⁸

Project Authorization

In October 1903, John T. Whistler, Oregon District Engineer of the Reclamation Service, investigated the Klamath region at the request of Chief Engineer, later Reclamation Director, Fredrick H. Newell. Whistler recommended a controlling dam at the lower end of Upper Klamath Lake to retain enough water to irrigate 200,000 acres. Older residents of the area recommended Clear Lake as a Reservoir instead of Upper Klamath Lake. Newell visited Klamath in 1904 to assess the project's possibilities. While there, he addressed a large audience. In his speech, Newell said he believed Secretary of the Interior Ethan Allen Hitchcock would approve construction of the project.⁹

Approval of the Klamath Project rested on adjudication of all vested and conflicting water rights; surrender of rights on Lower Klamath and Tule Lakes; cessation of rights and title to the federal government by Oregon and California for Lower Klamath and Tule Lakes; and Congressional approval allowing Hitchcock to destroy navigability of the two lakes. Hitchcock and Newell received petitions for a Reclamation project beginning in late 1904 and early 1905, as residents of Klamath Falls, Merrill, Bonanza, and the immediate area campaigned for the Project. Reclamation secured rights to land and water from owners of the Little Klamath Ditch, the Ankeny-Henley Canal, and the Jesse D. Carr Land & Livestock Company on April 7, 1905, for a total of \$337,500.¹⁰

Only the Klamath Canal Company threatened project authorization. Three men named Hawkins, Brown, and Gould incorporated the Klamath Canal Co. on May 18, 1904. The

8. Bureau of Reclamation, *Annual Project History, Klamath Project, 1912*, Record Group 115, 12-6. Hereafter Record Group 115 cited as RG 115.

9. *Ibid.*, 4-6, 17.

10. *Ibid.*, 17-20.

company filed on water rights from Upper Klamath Lake in 1904, equaling the total flow of the Link River. Prospects of Reclamation involvement in the area convinced the company's owners to cease construction of the main canal, including a circuitous 7,000 foot tunnel. Reclamation estimated the company spent approximately \$84,000 on construction. The Klamath Canal Co. claimed expenditures of \$175,000 and wanted \$200,000 to transfer its rights and contracts.¹¹

Reclamation filed on the waters of Upper Klamath Lake and Link River in July 1904, when investigations and surveys confirmed the project's feasibility. Reclamation doubted the validity of Klamath Canal Co.'s water filings because they conflicted with federal laws. However under state law, the company's claims preceded those of Reclamation. The government served the company notice to abstain from any water diversion on the grounds of interstate navigability of the waters. The company disregarded the notice and diverted water anyway.¹²

The Justice Department responded by issuing a temporary restraining order. Meanwhile land owners in the Klamath Basin became more insistent that Reclamation start construction of the project, and increased their opposition to operations of the Klamath Canal Co. Finally, in a meeting in Los Angeles on April 25, 1905, Reclamation and the Klamath Canal Co. reached an agreement. Reclamation paid the company \$150,000 for its water rights. At the same meeting Reclamation reached an accord with the Moore Brothers for their rights.¹³

Local farmers unanimously supported the project and organized the Klamath Water Users' Association on March 4, 1905. The Oregon and California legislatures and the United States Congress passed all necessary legislation to begin the project by early 1905. Ethan Hitchcock authorized the Klamath Project for \$4.4 million on May 15, 1905. The government

11. *Ibid.*, 23-4.

12. *Ibid.*, 24.

13. *Ibid.*, 19-20, 24.

allocated \$1 million immediately.¹⁴

Construction History

The Klamath Project incorporated several privately built canals and, Reclamation initially constructed Clear Lake Dam and Reservoir, Lost River Diversion Dam, and the A (Main), B (East Branch), and C (South Branch) Canals on the Project. Clear Lake Dam and Reservoir stored water on the Lost River. Water releases from Clear Lake traveled downstream the diversion facilities at Lost River Diversion Dam which then transferred the water into the canals, including D (Adams) and G (Griffith) Canals. In the 1920s, Reclamation increased the irrigable lands of the Klamath Project. To this end, Reclamation constructed Gerber Dam and Miller Diversion Dam on Miller Creek, and Malone Diversion Dam, on Lost River, to irrigate lands northwest of the original Klamath Project lands through the North and West Canals.

The Lower Lost River (Anderson-Rose) Diversion Dam increased irrigable acreage in the California lands of the Klamath Project. Reclamation added E (North Poe) and F (South Poe) Canals northeast of the original Project lands, and J Canal in the southeast. Following World War II, Reclamation started reclaiming land around Tule Lake for agriculture. Reclamation drained the marsh lands and constructed irrigation facilities necessary for future farms, including M, N, P, Q, and R Canals.

Construction of the Klamath Project started under the direction of Project Engineer D. W. Murphy in 1906, and continued under Walter W. Patch, his 1909, replacement. Mason, Davis & Company of Portland, Oregon, received the first contract for excavating nine miles of the Main Canal, and International Contract Company contracted work on six highway bridges crossing the canal. Mason, Davis & Co. started operations in March 1906. Heavy snowfall and subsequent

14. *Ibid.*, 21-2, 151.

heavy rains impaired work by horse teams on the excavation and caused delays in receiving equipment and supplies. Because the company had to haul equipment forty miles over the mountains, most equipment did not arrive until June.¹⁵

Mason, Davis & Co. could not work on three miles of the Main Canal during the 1906 irrigation season because the location approximated that of the Ankeny-Henley Canal, then in operation, and threatened to interfere with the canal's operation. Despite the problems and delays, the company succeeded in completing most of the four miles available for excavation. The work delayed by the use of the Ankeny-Henley Canal faced further postponement because of ground saturation and the early onset of winter. In addition to wet, winter weather, the company encountered hot springs in the area which resulted in more trouble for Mason and Davis. The company removed material from the canal with a skip and a hoist. The hot springs increased water and ground temperatures to dangerous levels during blasting. Several horses received scalding burns, serious enough to necessitate their destruction.¹⁶

The rain and snow, of winter, made canal excavation a slow and arduous task. The work required three steam pumps to handle water from the canal. Mason and Davis could only use the horse teams on the upper portions of the canal cut. The company received a contract extension and completed two sections of the canal May 20, 1907. Mason and Davis completed enough of the section containing the canal headworks to place it into commission June 27, 1907. They did not fully complete the contract until July.¹⁷

Reclamation invited bids for construction of the East Branch Canal May 12, 1906, with a view toward finishing the contract by the opening of the 1907 irrigation season. Reclamation

15. *Ibid.*, 32, 34-5, 178.

16. *Ibid.*, 34-5.

17. *Ibid.*, 35.

intended to open bids June 21, but no contractors bid on the project. Reclamation officials speculated labor shortages caused the reluctance to bid on the canal, because potential contractors might not feel confident of finishing by the deadline. Reclamation authorized day labor by force account. Project officials hired horse teams for excavation in 1906, until Reclamation shut down the work for the winter of 1906-07. They resumed the following spring using government horse teams on the job. In July 1907, a scarcity of labor forced Reclamation to cease operations on the East Branch Canal in order to concentrate forces on the Keno Power Canal, so-called because its primary role, later on, was to supply the California-Oregon Power Company with water for hydroelectric power generation.¹⁸

Original plans intended the Keno Canal to irrigate 40,000 acres on the west side of Lower Klamath Lake, including reclaimed marsh lands. A board of engineers, consisting of Andrew J. Wiley, D. C. Henny, E. G Hopson, and D. W. Murphy, recommended irrigating the marsh lands directly from the lake and the Klamath River through the California and Northeastern Railway levee, constructed through an agreement between Reclamation and the California and Northeastern Railway in 1907. The California and Northeastern agreed to build a railroad embankment across the north end of Lower Klamath Lake to double as a levee. Further investigations indicated other lands would not justify construction of the full canal. The shortened canal now only needed to satisfy the contract with the Moore brothers and, with some enlargement, supply power for pumping water to the marsh lands.¹⁹

Another board of engineers, consisting of Henny, Hopson, and Murphy, convened in Portland in January 1907, to plan construction and specifications of the Keno Canal. The contract with the Moores required delivery of water through the Keno Canal by October 1, 1907.

18. *Ibid.*, 37.

19. *Ibid.*, 40, 133.

The board recommended dividing the excavation work into small schedules to permit local contractors to bid on the work. Reclamation would accomplish concrete and excavation work above the headworks by force account. They hoped such contingencies would expedite the work's progress.²⁰

The plan went awry as only one company bid on the schedules. Reclamation considered the bid excessive and decided to proceed by force account for the entire canal. Work started in June 1907. Excavation work promptly ran into unexpected dilemmas. The hillside slopes of the canal location proved very steep, with houses and orchards immediately below the site, and a powerplant and wooden pressure pipe nearby, on the Klamath River. These factors prevented any liberal use of explosives for excavating the hard chalk and basalt material. Horse teams handled excavated material where possible. Workers used derricks to remove massive boulders while horse teams dislodged the large rocks with chains. Laborers carried smaller rocks out with wheelbarrows.²¹

The *Project History* complained of having scarce and unsatisfactory laborers, whom Reclamation paid \$3.00 for an eight hour day, for several months. Reclamation finished the canal excavation in October 1908. Upon priming the canal, Reclamation discovered considerable seepage which caused movement of the lower banks. Reclamation lined the right bank and bottom of the canal, with four inches of concrete, for a distance of 267 feet. Workers placed riprap the same distance along the left bank. The lining and riprap reduced the seepage greatly, but Reclamation maintained a force of three to five men for several months to puddle subsequent seepage with soil and manure.²²

20. *Ibid.*, 41.

21. *Ibid.*, 41-2.

22. *Ibid.*, 42-4.

Reclamation awarded the contract for three schedules of the South Branch Canal to Maney Brothers of Saint Louis on May 8, 1908, and they began work five days later. Maney Brothers did all the excavation work with horses and scrapers. Reclamation allowed a contract extension from November 15, 1908, due to harsh winter conditions. Maney Brothers concluded excavation March 25, 1909. Reclamation lined the section, by force account day labor, with red fir planks. The canal lining required 376,000 board-feet of wood. The planks warped some, above the waterline, but the embankment stayed water tight.²³

The South Branch Canal needed a flume across the Lost River Slough, draining from the Klamath River to the Lost River. Reclamation accomplished the work by force account with day labor. Reclamation built the flume of red fir lumber to a length of 4,300 feet. Flume construction used 722,000 feet of wood. Reclamation cut all the wood in the Cascade Range Forest Reserve. Campbell and Huffman of Klamath Falls, contracted the superstructure work on the flume, including a spillway gate for the Lost River Slough controlled by screws and lifting wheels.²⁴

W. H. Mason of Klamath Falls, contracted five schedules of the South Branch Canal. He started work in August 1908. Unspecified delays resulted in an extension of Mason's contract from December 15, 1908 to March 15, 1909. Mason successfully finished the schedules by the new deadline. Reclamation authorized \$61,000 for force account work on the South Branch distribution system, and used the money to hire local farmers to work on the system. James W. Jory, a local farmer, received the contract for the three schedules. The *Project History* reported Jory accomplished satisfactory work.²⁵

23. *Ibid.*, 56.

24. *Ibid.*, 57.

25. *Ibid.*, 57.

J. M. Heizer conducted studies of the proposed Clear Lake Dam site on Lost River with diamond drills in 1905. L. W. Hall conducted further investigations of the dam in 1908. Excavation by force account, for the outlet channel began in September 1908, under I. S. Voorhees. Winter forced a pause in work for the year. A caretaker occupied the construction camp, and Reclamation took the opportunity to cut juniper logs for telephone poles and a trestle.²⁶

Reclamation placed William Sargeant in charge of dam construction. In April 1909, he supervised building of the construction camp, organizing the work, and receiving equipment and supplies. Austrians, Montenegrins, and Serbians formed the majority of the work force. Reportedly the Austrians proved outstanding workers, though supervisors considered all satisfactory. Reclamation bought \$10,000 worth of new equipment for construction, and had to haul the new equipment fifty-five miles, from the railroad to the dam site. The Reclamation Service increased the labor force in June to begin work on the waste channel. Workers used material excavated from the waste channel in the rockfill portion of the dam.²⁷

The outlet conduit from the dam to the waste channel stretched 156 feet when completed. The outlet started as two chambers near the foot of the dam, controlled by cast iron gates. The chambers joined forty feet below the gates, forming the main conduit. Workers excavated an average of eighteen feet deep. They encountered porous lava covering hard basalt ten feet deep. Under the basalt they found "a sticky, red, volcanic mud." The crews excavated cutoff trenches through the muck to the hard rock three feet below and filled them with concrete to stabilize the foundation. The conduit is ten feet in diameter.²⁸

26. *Ibid.*, 71.

27. *Ibid.*, 72.

28. *Ibid.*, 72.

Reclamation used levees built by Jesse Carr to divert Willow Creek into Clear Lake, retaining enough to water livestock and for boilers and sprinkling. A small, earthen cofferdam upstream proved sufficient to dry the foundation of the dam. To prepare the foundation for the dam embankment, Reclamation cut tules and cleaned out several mud holes. Work crews excavated a five foot wide trench down about seven feet, to bedrock. They refilled the trench with the largest rocks available.²⁹

Workers used material excavated from the waste channel for the rockfill. The arrangement limited the placement rate on the fill to the excavation rate of the channel. Reclamation built two sixteen foot high trestles across the valley at the dam site. Crews rolled two yard capacity, side dumping cars onto the trestles and dropped rock from them onto the fill. Horses drew trains of three cars to the dump sites. When they completed dumping from the two trestles, crews used posts from the two to build a third trestle across the center of the site. From here workers dropped rock onto the center of the fill.³⁰

Reclamation crews dug through two feet of tule and marsh grass across the channel to the foundation of the earth embankment. After draining water from the site, the ground surface became impenetrable to the orange-peel excavator acquired for clearing the site. Workers used a plow on the hard material. The material immediately beneath the surface proved too soft to support loaded wagons. Workers rigged up a hoisting engine at one end of the site, attached a plow and slip to it with a cable, and used the combination to excavate the soft material.³¹

Seven feet below the surface lay solid basalt slabs with only a few seams. Crews washed the rock, then cleaned the cracks with wire and grouted them. Work crews discovered lava

29. *Ibid.*, 73.

30. *Ibid.*, 73-4.

31. *Ibid.*, 74-5.

blocks separated by clay seams forming the foundation on the east side of the river. They used gads, steel wedges used to break out loose pieces of rock, and bar drills, small rock drills, to excavate the trench between the lava boulders, afterwards filling the seams with grout or cement, depending on the size of the cracks. On the west side, porous lava seams permeated the foundation. Workers excavated through the lava to the solid rock below. They filled the excavated portions with concrete. A four ton, cast iron roller leveled and compressed the re-fill to four inch layers.³²

Crews filled gaps in the rockfill at the contact point with the earth embankment for a proper foundation. They placed the earth, taken from the east slope of the valley, in six inch layers, watered it, and compressed it with a four ton roller. A nearby borrow pit supplied the stones for the riprap on the upstream slope.³³

Lava encountered in excavation of the waste channel varied in hardness, causing problems for Reclamation crews. They used 40 percent dynamite to "spring" drill holes, then finished blasting with 50 to 500 pounds of "Champion" powder.³⁴ Where water in the excavation site prevented the use of powder, the crews used only the dynamite. Uncertainty of the rock's density often resulted in charges being too light or too heavy. Explosions from light charges dissipated through seams and soft spots. Heavy charges dislodged more material than desired. The resulting excavated material ranged from powdered rock to boulders. The boulders required block-holing, or drilling holes in the rocks for a small charge of explosives to break them for removal.³⁵

32. Sybil B. Parker, ed., *McGraw-Hill Dictionary of Scientific and Technical Terms, 4th Edition* (New York: McGraw-Hill, 1989), 180, 779; Reclamation, *Project History, Klamath Project, 1912*, 75-6.

33. Reclamation, *Project History, Klamath Project, 1912*, 76.

34. *Ibid.*, 77-8.

35. Reclamation, *Project History, Klamath Project, 1912*, 78; Sybil B. Parker, ed., *McGraw-Hill Dictionary of Scientific and Technical Terms, 4th Edition* (New York: McGraw-Hill, 1989), 230.

Labor shortages afflicted construction of Clear Lake Dam in the early months of 1908. As a result, Reclamation officials considered progress in July and August unsatisfactory. Men frequently deserted the dam construction to take advantage of higher wages from local field harvests. Near the end of August 1908, 100 Bulgarians arrived at the Clear Lake Dam site to begin work. From then until the middle of November, Reclamation retained plenty of labor.³⁶

Reclamation identified two saddles to the south of Clear Lake, one below the high water mark of the future reservoir. Reclamation decided to raise dikes on the saddles to prevent water from escaping over them during floods. Workers built a 13 foot high dike stretching 1,600 feet across the lower saddle. The other dike measured 3-4 feet high, with a length of 1,200 feet.³⁷

The labor shortages at Clear Lake Dam stalled construction of the dikes. Reclamation officials prepared to postpone raising the dikes until spring of 1910, but the increase in available workers in September 1909, allowed them to proceed with construction plans. Work started on the dikes October 6, 1909. Crews dug a cutoff trench beneath the embankment sites and filled it with material from the borrow pit. Horses and wheelers hauling earth compacted the embankment sufficiently, eliminating the need for rollers. Austrians worked on the rockfill and proved exceptionally skilled at handling the stones. The Project History said, "the rock embankment was solidly built and presents a first-class appearance."³⁸

Reclamation intended to build Clear Lake Dam and dikes by contract, but events altered the plans. Only two companies bid on the work. Maney Brothers of Winnemucca, Nevada, bid \$188,980, which Reclamation considered too high. Mahoney Brothers of San Francisco, bid \$115,770. Reclamation checked Mahoney Brothers' financial background to discover their poor

36. Reclamation, *Project History, Klamath Project, 1912*, 80.

37. *Ibid.*, 80-1.

38. *Ibid.*, 81-2.

financial reputation. Reclamation estimated the work would amount to \$151,750. When completed in 1910 Clear Lake Dam and dikes cost Reclamation \$125,350.³⁹

Clear Lake Dam is an earth and rockfill structure stretching 840 feet long at its crest. The dam stands forty-two feet high. The top width measures 20 feet with a maximum bottom width of 177 feet. Clear Lake Reservoir has a capacity of 527,000 acre-feet, increased from its original 460,800 acre-feet prior to raising the dam in 1939.⁴⁰

President William Howard Taft authorized the issuance of bonds against the Reclamation Fund in 1910, for future work on projects including the Klamath Project. Before expenditure of money from the bonds, he ordered a Board of Engineers from the Army Corps of Engineers examine and report on each project using the bonds. The Board of Engineers visited the Klamath Project September 30 through October 2, 1910. The Board reported the water supply was sufficient and the lands, excluding the marsh lands, could support construction costs. The Army engineers recommended caution on developing the Tule Lake Division, and determined the Modoc Division was feasible, but had yet to receive presidential approval. The Board recommended postponement of developing the marsh lands until they could show agricultural productivity. The Army Board recommended the Klamath Project receive \$600,000 from the Reclamation Fund for the years 1911-14.⁴¹

Reclamation engineers decided, in 1910, to put Lost River Diversion Dam at a site called Wilson's Bridge southeast of Klamath Falls. George C. Clark received the contract for construction of the dam. Reclamation supplied cement, gates, gate frames, and structural and reinforcing steel. Clark started construction in March 1911. As winter approached Clark heated

39. *Ibid.*, 82-3.

40. Water and Power Resources, *Project Data*, 571; Reclamation, *Project History, Klamath Project, 1912*, 6.

41. Reclamation, *Project History, Klamath Project, 1912*, 96-9.

the water and sand for mixing the concrete. Later, workers burned fires under the work for ten days at a time. The fires decreased the time required for the concrete to set. Canvas placed over the concrete allowed heat and smoke from the fires to circulate around the work. Clark's precautions paid off as the concrete received no damage from freezing.⁴²

Though it still required some finishing work, Reclamation began storing water behind the Lost River Dam in January 1912. The gatekeeper and a small work force applied the final touches. They built two wing walls at the downstream end of the dam, a garage near the dam, and completed other smaller projects. The Lost River Diversion Dam is a hollow U shaped multiple arch weir, with straight embankment wings. The dam's crest length extends 675 feet with a structural height of 42 feet.⁴³

W. H. Mason of Klamath Falls, contracted excavation work on three schedules of the Lost River Diversion Channel in November 1910. Mason commenced operations in March 1911, establishing a camp and starting a stretch of canal. He discovered the ground beneath was waterlogged. Mason ceased using his horses due to ground saturation. On April 4, Walter Patch, the Project Engineer, sent a message to Mason requesting he put his horse teams back on the excavation work. In the following months Patch sent Mason letters of a similar tone, intending to speed his progress.⁴⁴

Mason waited for the arrival of an excavator to continue canal excavation. The machine arrived in June 1911, but a poor design limited its effectiveness. After moving only 2,000 cubic yards, Mason discarded the excavator in favor of team work. Mason lost valuable time, and Reclamation lost patience. In September 1911 Reclamation suspended the contract schedules

42. Reclamation, *Project History, Klamath Project, 1912*, 107, 111-2, 175.

43. Reclamation, *Project History, Klamath Project, 1912*, 114; Water and Power Resources, *Project Data*, 571-2.

44. Reclamation, *Project History, Klamath Project, 1912*, 115-6.

contract not yet started by Mason, and completed them by force account, finishing December 6, 1911. Mason waited until March 1912, to renew construction. He continued working for twenty-five days after the deadline until Reclamation terminated his remaining schedules on April 30, 1912.⁴⁵

James Jory contracted one schedule on the diversion channel and began in May 1911. Jory started with a small force and repeatedly experienced delays. He made little headway by the end of the year. By March 1912, Jory realized he faced penalties if work did not make the deadline. Jory pushed his work through continuing winter conditions and financial losses, completing the contract on April 1, 1912.⁴⁶

Construction remained light for the next several years. Reclamation built a sixty-four foot truss span by force account, in 1912, to extend the East Branch Canal over the Lost River. Reclamation expanded the Adams Canal in 1913. The Service decided to accomplish the rock work by force account. They separated the canal work into fourteen schedules to give contracts to local farmers. Winter weather extended into spring, preventing work from starting until water was turned out of the canal in fall of 1913. Five schedules remained incomplete at the end of the year. Work finished on the Adams Canal enlargement in May 1914.⁴⁷

Reclamation received authorization to excavate the Poe Valley laterals of the East Branch Canal by force account, in 1906. Work on the laterals came secondary to the main canal work. Operations started on the North and South Poe, Griffith, and Nuss Lake laterals in 1913. Reclamation began expanding the Griffith lateral, just north of the Adams Canal, into a main canal by force account in 1914. Reclamation did not operate any mess halls or mercantile stores

45. *Ibid.*, 116, 119.

46. *Ibid.*, 117.

47. Bureau of Reclamation, *Annual Project History, Klamath Project, 1913*, RG 115, 11, 16-9; Bureau of Reclamation, *Annual Project History, Klamath Project, 1914*, RG 115, 20.

on most project operations, but did on the Griffith Canal work. More often, ranchers and local employees supplied workers with meals charging Reclamation \$.35 for each meal. Reclamation deducted \$.25 per meal from the worker's pay. Laborers received \$2.48 per day on project work. The *Operation and Maintenance Report* reported 95 percent of the canal workers were "American."⁴⁸

Reclamation finished the Griffith Canal work on April 4, 1915. Reclamation completed 65 percent of the work by force account and local farmers accomplished the remaining 35 percent. Reclamation started renaming the Klamath Project canals in 1915. The Main, East Branch, and South Branch Canals became A, B, and C Canals respectively. The Adams, North Poe, South Poe, and Griffith Canals became D, E, F, and G Canals. Reclamation drew up plans for the C-G Cutoff Canal in 1918, connecting the two canals to supply G Canal. Reclamation excavated the cutoff by force account in 1921. The cutoff crossed nine-tenths of a mile between the two canals, supplying water to some of the Tule Lake Division.⁴⁹

Reclamation reached an agreement on February 24, 1917, with the California-Oregon Power Company to lease the Keno Canal for ten years at \$1,000 a year. The contract allowed California-Oregon Power to regulate the outflow of Upper Klamath Lake, subject to existing irrigation rights of the Klamath Project. The power company placed a temporary low-crib dam near the source of the Link River in 1919. They began construction of the Link River Dam on July 29, 1920, just below the crib dam. Senator George E. Chamberlain of Oregon, telegraphed Secretary of the Interior John B. Payne on August 20, 1920, requesting he halt dam construction

48. Reclamation, *Project History Klamath Project, 1912*, 173; Reclamation, *Project History, Klamath Project, 1913*, 13-4; Reclamation, *Project History, Klamath Project, 1914*, 11, 18, 21; Bureau of Reclamation, *Annual Project History, Klamath Project, 1915*, 10; Bureau of Reclamation, *Operation and Maintenance Report, Klamath Project, 1916*, RG 115, 42.

49. Reclamation, *Project History, Klamath Project, 1915*, 18, 24-5; Bureau of Reclamation, *Annual Project History, Klamath Project, 1918*, Map, 7, 34; Bureau of Reclamation, *Annual Project History, Klamath Project, 1921*, RG 115, 61, 80.

long enough to determine the legality of the 1917 contract.⁵⁰

Payne listened to arguments and explanations about the contract in a hearing on December 2, 1920. He initiated a supplemental contract on December 10 which did nothing to alter the original contract. California-Oregon Power resumed dam construction May 15, 1921. They completed construction of the dam on October 29 of the same year, concluding the finishing touches on the dam by the end of the November. The Link River Dam is a concrete slab structure with a crest length of 435 feet. The structure stands twenty-two feet high with a seven foot top width. Link River Dam's reservoir, Upper Klamath Lake has a total capacity of 873,000 acre-feet.⁵¹

Construction of the Lower Lost River Diversion Dam coincided with construction of the J Canal, to supply water to the Tule Lake Division. W. D. Miller of Klamath Falls, contracted construction of the Lower Lost River Diversion Dam in 1921. He started work on the dam July 25, 1921, and completed the job on December 11, 1921. The dam and structures consisted of a reinforced concrete Ambursen weir with sluice gates and headworks on the north side, to supply J Canal. The Lower Lost River Diversion Dam, now the Anderson-Rose Dam, stands 23 feet high with a crest length of 324 feet.⁵²

Excavation of J Canal by force account began June 20, 1921, on one section, and August 18, 1921, on another. Reclamation suspended both operations during the winter of 1921-22. Work on the canal continued through 1922. Where bridges crossed J Canal, crews place corrugated iron culverts in the waste ditch under the canal. The canal received a three inch concrete lining extending for fifteen feet on either side of the culverts, to prevent leaking.

50. Bureau of Reclamation, *Annual Project History, Klamath Project, 1917*, RG 115, 30; Reclamation, *Project History, Klamath Project, 1921*, 1, 3.

51. Reclamation, *Project History, Klamath Project, 1921*, 3; Water and Power Resources, *Project Data*, 571.

52. Reclamation, *Project History, Klamath Project, 1921*, 61, 74, 76; Water and Power Resources, *Project Data*, 572.

Reclamation completed 75 percent of the excavation and 85 percent of the structural work by the beginning of 1923. Final completion came with the final raising of sixteen miles of fence, parallel to the canal.⁵³

Reclamation built Malone Diversion Dam, on the upper Lost River, by force account. In preparation for construction in June 1922, Reclamation moved buildings from the C Canal, flume camp, 45 miles to the dam site. Dam construction started in July, with the raising of cofferdams to divert the river and dry the foundation. Crews built the cofferdams out of juniper logs and earth, and they proved remarkably watertight. Reclamation diverted the light flowing river through a wooden flume four feet wide and three feet high.⁵⁴

Lava bedrock comprised the foundation on the south side of the river bed. On the north side lay lava boulders and gravel mixed with clay, ash, and cinders. A "black mucky material," of decomposing vegetation, covered the bed to a depth of about six feet.⁵⁵ Workers removed the material with a stiff leg derrick down to the foundation material. Slip scrapers and laborers' hands took care of the rest. Reclamation started placing the earthen embankment August 17, 1922, immediately following excavation. Workers placed 20,000 cubic yards of material using fresno scrapers, and rolled it with corrugated rollers. They finished laying the embankment October 31, 1922.⁵⁶

Concrete placement started October 15, 1922, and crews laid nearly 80 percent of it by the end of the year. During freezing weather workers heated the mixing water with steam from a derrick boiler. Fires warmed the concrete after pouring. Reclamation built a trestle over the

53. Reclamation, *Project History, Klamath Project, 1921*, 90; Bureau of Reclamation, *Annual Project History, Klamath Project, 1922*, 111; Bureau of Reclamation, *Annual Project History, Klamath Project, 1923*, 81, 83, 86.

54. Reclamation, *Project History, Klamath Project, 1922*, 89-90; "Malone Diversion Dam on Klamath Project Built," *The Reclamation Record*, August 1923, 285.

55. Reclamation, *Project History, Klamath Project, 1922*, 90; "Malone Diversion Dam," 285.

56. Reclamation, *Project History, Klamath Project, 1922*, 90-1; "Malone Diversion Dam," 285.

spillway structure where crews wheeled the concrete or delivered it through chutes. Final concrete placement on the spillway, and riprap placement on the embankment consumed the first four months of 1923. Crews finished the final work in May of the same year.⁵⁷

Reclamation experienced labor shortages in the 1920s, as it had in previous years on the project. The Service experienced a high turnover rate during construction of Malone Dam. Common labor received between \$3.60 and \$4.50 a day. Reclamation paid carpenters \$7.00 a day on the dam construction. Wages in the surrounding area reached \$4.00 to \$5.00 a day for common labor. Malone Diversion Dam consists of a concrete gate structure with a height of 32 feet, and a crest length stretching 515 feet.⁵⁸

Reclamation opened bids for twelve miles of the West Canal of the Langell Valley Division on August 31, 1922. The West Canal would eventually receive water from Miller Creek and the Miller Diversion Dam. Reclamation considered the bids they received too high, and decided to use a dragline to excavate the canal by force account. Excavation began on April 14, 1923, and the machine reached its destination on May 12 after traveling fifty-two miles. Work crews completed excavation of the West Canal by the end of 1923. At the start of 1924, crews only needed to install the pipe line across Lost River and the drainage ditch for Dry Lake. Crews completed the canal in May 1924, in time for the irrigation season. Various contract and force account crews finished all the structural work on the West Canal by December 31, 1923.⁵⁹

W. E. McAboy received a contract to build the checks and wasteway structures on the West Canal, but in October 1923, he left the job. Apparently McAboy used his contract payments to pay off old debts, and paid his workers with checks post-dated thirty to sixty days.

57. Reclamation, *Project History, Klamath Project, 1922*, 91-2; "Malone Diversion Dam," 285-6.

58. "Malone Diversion Dam," 286; Reclamation, *Project History, Klamath Project, 1923*, 14; Water and Power Resources, *Project Data*, 572.

59. Reclamation, *Project History, Klamath Project, 1923*, 81, 93, 104; Bureau of Reclamation, *Annual Project History, Klamath Project, 1924*, RG 115, 24.

McAboy found himself in over his head by October, from writing checks without sufficient funds to back them, and decided to leave the country. Reclamation finished the work by force account after Aetna Casualty and Surety posted the \$1,500 bond.⁶⁰

E. L. Bates, a former carpenter foreman on the Klamath Project, received the contract to build Miller Diversion Dam. He worked quickly, and completed the dam in 1924. Miller Diversion Dam stands ten feet high. It consisted of an earth embankment on the south side of Miller Creek with a concrete spillway in the center of the creek bed. Timber piers and removable flashboards raised the creek five feet, diverting water into the North Canal.⁶¹

W. D. Miller received the contract to build the Gerber Dam, located on Miller Creek; formerly the Horsefly site, on November 1, 1923. The contract made June 30, 1925, the deadline for completion. Miller began construction of Gerber Dam in March 1924, starting excavation of the foundation. Miller discovered lava of varying hardness comprised the foundation material. Tests showed the material watertight enough to suffice. During excavation, Miller's crew discovered the seams and softer material disintegrated when exposed. Workers excavated deeper into the rock to combat the problem. Miller employed techniques to protect the concrete work from freezing, similar to previous dam builders on the project. When not using forms, crews placed plum rock in the concrete to provide a bond in joints between pourings. Miller completed the work for his contract on June 1, 1925, one month before the deadline.⁶²

Gerber Dam is a concrete medium thick arch, 485 feet long at its crest. The dam stands eighty four and one-half feet high with a top width of five feet and a maximum base width of twenty-four feet. The spillway consists of an uncontrolled overflow section at the dam's center.

60. Reclamation, *Project History, Klamath Project, 1923*, 91.

61. Bureau of Reclamation, *Annual Project History, Klamath Project, 1924*, RG 115, 20, 25; Water and Power Resources, *Project Data*, 572.

62. Reclamation, *Project History, Klamath Project, 1923*, 66, 94; A. L. Darr, "Gerber Dam Construction, Klamath Project, Oregon," *New Reclamation Era*, December 1925, 182-4.

Water first spilled in 1958. Gerber Reservoir has a total capacity of 94,000 acre-feet.⁶³

Reclamation built the North Canal of the Langell Valley Division by force account, and excavation began in 1924. Workers completed 80 percent of the North Canal by the end of the year. Reclamation made provisions to complete the canal by June 30, 1925. During 1925 work crews successfully completed the laterals and structures, but barely started on the drainage system. Reclamation finished the North Canal in 1926.⁶⁴

New construction on the Tule Lake Division began in 1940 with the creation of the Modoc Unit of the division. Reclamation started excavation on the P and P-1 Canals September 11, 1940, and workers finished excavation in 1941. The Emergency Conservation Works established two Civilian Conservation Corps (CCC) camps on the Klamath Project in 1935; BR-20 and BR-41. A company of the CCC from Camp BR-41 built structures on the P and P-1 Canals until the government disbanded the camp in August 1941. Afterwards Reclamation completed the work by force account, and finished the P-1 Canal in 1942.⁶⁵

Reclamation awarded the contract for the Tule Lake Tunnel to J. A. Terteling & Sons. The tunnel drained water from the Tule Lake sump lands into Lower Klamath Lake. Terteling & Sons started operations in December 1940, completing 359 feet of excavation from the east heading by the end of the year. Terteling commenced excavation from the west heading of the tunnel on January 25, 1941. The contractor holed through on May 25, 1941.⁶⁶

63. Water and Power Resources, *Project Data*, 571; Bureau of Reclamation, *Annual Project History, 1979*, RG 115, p-4.

64. Reclamation, *Project History, Klamath Project, 1924*, 20; Bureau of Reclamation, *Annual Project History, Klamath Project, 1925*, RG 115, 19; Bureau of Reclamation, *Annual Project History, Klamath Project, 1926*, RG 115, 19.

65. Bureau of Reclamation, *Annual Project History, Klamath Project, 1935*, RG 115, 34; Bureau of Reclamation, *Annual Project History, Klamath Project, 1940*, RG 115, 23-4; Bureau of Reclamation, *Annual Project History, Klamath Project, 1941*, RG 115, VIII, 25-6; Bureau of Reclamation, *Annual Project History, Klamath Project, 1942*, RG 115, 15.

66. Reclamation, *Project History, Klamath Project, 1940*, 26; Reclamation, *Project History, Klamath Project, 1941*, 29.

Terteling lined the tunnel with a layer of concrete, measuring a maximum of seven inches and minimum three inches thick. Workers used a pumpcrete machine to inject the concrete into the tunnel forms. Terteling's concreting equipment often failed, due to its age, but the company finished the work on November 12, 1941. The Tule Lake Tunnel is a five foot nine inch diameter horseshoe cross-section, stretching 6,000 feet.⁶⁷

John Gardner of Klamath Falls, received the contract to construct the D Pumping Plant on the Modoc Unit in September 1941. Gardner started work immediately after receiving the notice to proceed. He finished excavating for the pump house and the pipe line before the end of October. Gardner completed the pump house structure to the floor by the end of December 1941, and found himself waiting for the government to deliver more material. Gardner received the rubber water stops for the discharge conduit on January 19, 1942. The government delivered the rest of the materials needing placement in the pump house on February 7 of the same year. After the February shipment, Gardner experienced no more delays in receiving material, but a shortage of adequate labor hindered construction progress. Gardner completed the pumping plant on May 6, 1942, past the March 13 deadline originally specified in the contract.⁶⁸

In the early 1940s, Reclamation instituted plans to convert lands reclaimed from the Tule Lake sump for agriculture. Because Clear Lake Dam captured much of the water which once flooded the lands, they now needed irrigation facilities. Reclamation started excavating the M lateral of the Tule Lake Division in 1942. The M lateral, and later the N lateral, became supply canals for the sump lands. During and after World War II, Reclamation awarded contracts to build a series of small pumping plants on the project to supply the Tule Lake sumps. In the late

67. Reclamation, *Project History, Klamath Project, 1941*, 29-30; Water and Power Resources Service, *Project Data* (Denver: Government Printing Office, 1981), 573.

68. Reclamation, *Project History, Klamath Project, 1941*, 31; Reclamation, *Project History, Klamath Project, 1942*, 17.

1950s and early 1960s, Reclamation excavated two more laterals in the Tule Lake Division, they became the Q and R Canals.⁶⁹

Post-Construction History

Squirrels caused major problems for the Klamath Project early in its history. Squirrel holes in canal embankments caused eleven of twelve breaks in A and C Canals in 1915. Fortunately only three breaks proved serious; two in A Canal and one in C Canal. Reclamation officials deemed the original timber lining in C Canal unsafe in 1919. Reclamation re-lined the canal with concrete starting in fall of 1919, and continuing into 1920. During freezing weather, workers covered the concrete work with canvas and heated it with fires to prevent damage. Working from September 29, 1921, to January 1, 1922, Reclamation crews replaced the timber flume on C Canal with a new concrete flume.⁷⁰

Once again labor shortages hindered Reclamation's progress. Regulations limited the maximum wage paid by Reclamation to \$4.50 per day. Elsewhere employers paid laborers \$5.00. Reclamation received the authority to pay \$5.00 per day, and by the end of 1920, workers on C Canal received \$5.50-\$6.00 per day. Carpenters received \$8.00 per day. Reclamation now deducted \$.50 per meal from the workers' pay. Wages continued to fluctuate in 1921 and 1922. Wages dropped to \$3.60 per day in 1921, and fell to \$3.00-\$3.20 in early 1922. Common laborers' pay rose to \$4.00 per day on August 1, 1922.⁷¹

69. Reclamation, *Project History, Klamath Project, 1942*, 15; Bureau of Reclamation, *Annual Project History, Klamath Project, 1945*, RG 115, 29, 31; Bureau of Reclamation, *Annual Project History, Klamath Project, 1946*, RG 115, 43; Bureau of Reclamation, *Annual Project History, Klamath Project, 1959*, RG 115, 10, Bureau of Reclamation, *Annual Project History, Klamath Project, 1960*, RG 115, 10; Water and Power Resources, *Project Data*, 573.

70. Reclamation, *Project History, Klamath Project, 1915*, 28-9; Bureau of Reclamation, *Annual Project History, Klamath Project, 1919*, RG 115, 46; Reclamation, *Project History, Klamath Project, 1921*, 63.

71. Reclamation, *Project History, Klamath Project, 1919*, 48; Reclamation, *Project History, Klamath Project, 1920*, 13, 55; Reclamation, *Project History, Klamath Project, 1921*, 12; Reclamation, *Project History, Klamath Project, 1922*, 14.

Reclamation advanced from simply lining C Canal to enlarging it. Work crews used an excavator on softer material, but they encountered a layer of hardpan strata requiring heavy blasting. The Oregon State Highway Department undermined the Adams flume across Lost River while building a crossing underneath. A break in the flume resulted from the foundation damage. On May 16, 1923, work crews started excavating G Canal to enlarge it. The work proceeded slowly because most of the excavation took place under water, but crews completed the work November 12, 1923.⁷²

Reclamation lined two sections of A Canal with a two inch layer of Gunite in 1927. On the first schedule, they lined 400 feet of the left bank and 600 feet of the right bank. The lining stretched 1,600 feet on the second schedule. Reclamation deepened the Lost River channel on the Langell Valley Division in 1927, to serve as an outlet drain for the division's lower lands. Crews used a dragline excavator for the river channel. They completed five and one half miles during 1927, and finished the rest in 1928. The machine sat on mats or in water of depths up to one and one half feet. Reclamation enlarged the channel further from May 23 to November 15, 1930.⁷³

CCC recruits on the project concentrated on maintenance and rodent control. Shortly after moving into the Klamath region, CCC enlistees excavated a small drain in A Canal to facilitate the removal of sediment. In 1936, they paved the canal with concrete and rocks. Reclamation worked on enlargement of J Canal from February 3 to December 31, 1936, finishing 80 percent of the job. In 1937, CCC workers started lining J Canal with concrete.

72. Reclamation, *Project History, Klamath Project, 1922*, 108, 137; Reclamation, *Project History, Klamath Project, 1923*, 111.

73. Bureau of Reclamation, *Annual Project History, Klamath Project, 1927*, RG 115, 17, 28; Bureau of Reclamation, *Annual Project History, Klamath Project, 1928*, RG 115, 18; Bureau of Reclamation, *Annual Project History, Klamath Project, 1930*, RG 115, 33.

Crews from BR-41 constructed minor roads and drains, and placed riprap in 1937.⁷⁴

Reclamation added three foot high flashboard supports to Clear Lake Dam's spillway in 1938, increasing the reservoir's capacity by about 60,000 acre-feet. The CCC raised Clear Lake Dam in 1939, and built a ninety-four foot bridge over the spillway. Reclamation engineers changed the slope of the dam from 3:1 to 2:1, to maintain the dam's structural integrity after its enlargement. The spillway bridge consisted of a sixty-four foot wood truss span with ten and twenty-three foot shore spans. Enlargement and lining of J Canal continued through 1939.⁷⁵

On April 24, 1939, the hillside supporting B Canal became saturated and slid. CCC crews put in four days to repair the damage. C Canal broke in the same year, and Reclamation's Operation and Maintenance crews and CCC enlistees repaired the break by working four, 3 shift days. Water flooded three acres of George Grizzle's potatoes, but caused no damage. Another break in C Canal in 1939, damaged four acres of Martin Winter's potatoes because the water drained off the land so slowly. In 1941 C Canal broke on the Balin farm, washing out 100 cubic yards of embankment, damaging a farm road, drain crossing, five acres of potatoes, and five tons of baled hay.⁷⁶

The outbreak of World War II brought many changes to the Klamath Project. Reclamation placed armed guards at major project facilities. Army engineers began inspecting possible sites for a relocation camp on the Klamath Project March 28, 1942. They located a site at Tule Lake, near Newell, California, and the War Relocation Authority (WRA) started construction on April 18 of the same year. Construction of sufficient housing for 10,000

74. Bureau of Reclamation, *Annual Project History, Klamath Project, 1936*, RG 115, 26, 42-3; Bureau of Reclamation, *Annual Project History, Klamath Project, 1937*, RG 115, 24-5.

75. Bureau of Reclamation, *Annual Project History, Klamath Project, 1938*, RG 115, 26-7; Bureau of Reclamation, *Annual Project History, Klamath Project, 1939*, RG 115, 22-4.

76. Reclamation, *Project History, Klamath Project, 1939*, 36-7; Reclamation, *Project History, Klamath Project, 1941*, 43.

Japanese finished on May 31, 1942, and the WRA started increasing camp facilities to house 6,000 more.⁷⁷

The Interior Department signed an agreement with WRA Director Dillon Myer on June 22, 1942, giving the WRA 800 acres of Klamath Project land for the relocation camp and another 35,000 acres for agricultural production. An agreement the following December 14, added 683 acres to the camp site and 1,845 acres for agriculture. Construction of the Tule Lake Relocation Camp affected work on the Klamath Project, because it drew off all available labor and once again raised wages.⁷⁸

The WRA announced on July 23, 1943, it would segregate and house all "disloyal" Japanese evacuees at the Tule Lake camp.⁷⁹ On November 5, 1943, disturbances at the Tule Lake camp occurred. In response, the Army took over operation of the camp. The Navy announced the takeover of the Klamath Falls airport on October 28, 1943. Reclamation employed about thirty German prisoners of war on the project for removing moss and some maintenance work. In 1945, Japanese-American evacuees lined .86 miles of the M canal running through Tule Lake camp.⁸⁰

The N-16 lateral in the Tule Lake Division received a pre-fabricated asphalt lining in 1949. High winds during placement operations, damaged the lining in a narrow section of the lateral. Reclamation suspected the section was the source of excessive seepage during testing, so the engineers segregated the section. However, in tests, the wide section lost more water, through seepage, than the narrow section. Engineers determined lower water levels reduced the

77. Reclamation, *Project History, Klamath Project, 1942*, 28-9.

78. Reclamation, *Project History, Klamath Project, 1942*, VI, 3-4, 18, 37; Masie and Richard Conrat, *Executive Order 9066: The Internment of 110,000 Japanese Americans* (Sacramento/Los Angeles: California Historical Society, 1972), 22.

79. Reclamation, *Project History, Klamath Project, 1943*, VI.

80. Reclamation, *Project History, Klamath Project, 1943*, VII; Reclamation, *Project History, Klamath Project, 1945*, 38, 62.

amount of seepage.⁸¹

Gerber Dam began showing seepage in its horizontal and vertical construction joints in early 1951, apparently caused by improper cleanup of the joints during construction. Engineers recommended a liquid neoprene (synthetic rubber) lining to seal the joints. Reclamation scheduled repairs to start on October 1, 1951, when Gerber Reservoir reached its lowest point, with 25.4 feet of the dam exposed. Crews chipped out the disintegrated concrete, wider on the inside than outside, and put new concrete in. They brushed the neoprene over the seams, extending it six inches on either side of the joints.⁸²

Secretary of the Interior Stewart L. Udall approved a contract with Pacific Power and Light Company (California-Oregon Power) for development of the Keno Canal in June 1967. In May 1970, the Tulelake Irrigation District held a public dedication changing the name of the Lower Lost River Diversion Dam. They renamed it the Anderson-Rose Dam in honor of the founders of the irrigation district; Sam Anderson and Ivan Rose.⁸³

Settlement of the Project

The Klamath Water Users' Association (KWUA) ratified the contract with the Department of the Interior on November 3, 1905. Original estimates placed the cost of the project to water users at \$20 a month. In 1908, Reclamation announced it would charge the water users \$30 per month, but the water users denied liability for the extra \$10. On January 25, 1909, Secretary of the Interior Richard A. Ballinger ordered construction on the Klamath Project suspended. The KWUA gave in, agreeing to pay the additional charge, and construction

81. Bureau of Reclamation, "Report on the Seepage Test of the Experimental Buried Prefabricated Asphalt Membrane Lining Test Section in the N-16 Lateral of the Klamath Project," compiled by Brooks O. Custer, edited by Mark D. Taylor, Jr., January 1951, *Project Reports*, RG 115, box 473, 1, 3-4.

82. Bureau of Reclamation, "Report on Repair of Gerber Dam with Neoprene Membrane," *Project Reports*, RG 115, box 473, 1-3.

83. Bureau of Reclamation, *Annual Project History, Klamath Project, 1979*, RG 115, p-4.

resumed.⁸⁴

The Klamath Project attracted people of varying national origins to work on farms or the project. The *Project History* of 1913, recorded three families each of Russians and Swiss moved onto project lands. Many farmers found themselves hard pressed to make payments on their bills. A group of Russian families, living near Lost River Dam, left after selling in 1916; not able to keep pace with their expenses. Despite such financial difficulties J. B. Bond; the Project Manager in 1917, remained optimistic. He wrote, "The procedure of foreclosing mortgaged property under the project is becoming unknown, and it is a safe prediction that it will soon be spoken of as 'a lost art'."⁸⁵

Potential farmers also remained optimistic. In a public drawing during the spring of 1917, 175 filed for 42 tracts of land. Surrounding communities, especially Klamath Falls, Oregon, grew along with the rural population (see Table I.). Merrill, Malin, and Midland, the other project towns grew less rapidly, and in some cases decreased. Construction of Malone Dam allowed the irrigation of 6,040 acres of the Langell Valley Division's west side, and 4,532 near Bonanza, Oregon, making that town of 300 part of the project. The Horsefly and Langell Valley Irrigation Districts formed by 1925, and the Sunnyside Irrigation District in 1926. The Malin and Shasta View Pumping Districts formed about the same time, and 8,000 acres of their land received water from the enlargement of the Adams Canal. Klamath Falls reached a population of 10,000 people in 1926.⁸⁶

Reclamation opened land entries in the Klamath Project, to World War I veterans, between November 1922 and January 27, 1923. Afterward, Reclamation opened the entries to

84. Reclamation, *Project History, Klamath Project, 1912*, 151-2.

85. Reclamation, *Project History, Klamath Project, 1913*, 22; Reclamation, *Project History, Klamath Project, 1916*, 30; Reclamation, *Project History, Klamath Project, 1917*, 42.

86. Reclamation, *Project History, Klamath Project, 1917*, 30; Reclamation, *Project History, Klamath Project, 1925*, 17, 78; Reclamation, *Project History, Klamath Project, 1926*, 3, 5, 72.

any applicants. Secretary of the Interior Hubert Work issued Public Order no. 19 in 1927, opening 145 farm units in the Tule Lake Division. Klamath Falls had a population of 15,000 by the end of the decade. The project's farm population grew to 2,833 by 1934.⁸⁷

Table I. Klamath Project Populations, 1918, 1922, and 1946. Source: Reclamation, *Project History, Klamath Project, 1918*, 141; Reclamation, *Project History, Klamath Project, 1922*, 199; Reclamation, *Project History, Klamath Project, 1946*, 140.

<u>City</u>	<u>Year</u>	<u>Population</u>
Klamath Falls	1918	5,000
	1922	7,000
	1946	30,951
Bonanza	1946	262
Malin	1918	100
	1922	200
	1946	570
Merrill	1918	600
	1922	500
	1946	776
Midland	1918	25
	1922	25
	1946	--
Tulelake	1946	915
Project Farms	1918	1,480
	1922	1,300
	1946	860

Klamath Falls boomed with the advent of World War II, reaching 25,968 people in 1945, but the farm population dropped 2,812 people from 1934. Klamath Falls started declining by 1950, though the other project towns continued to increase. The farm population reached 4,255 in 1951. The Klamath Project's population declined more heavily in the late twentieth century. The farm population fell to 1,825 by 1979. Klamath Falls

87. "Oregon-California Farms Open to Entry," *The Reclamation Record*, November 1922, 285; Reclamation, *Project History, Klamath Project, 1927*, VI; Reclamation, *Project History, Klamath Project, 1928*, 85; Bureau of Reclamation, *Annual Project History, Klamath Project, 1929*, RG 115, 96; Bureau of Reclamation, *Annual Project History, Klamath Project, 1934*, RG 115, 92; Reclamation, *Project History, Klamath Project, 1935*, 81.

retained only 17,737 of its boom population by 1990. Merrill, Malin, Bonanza, and Tulelake had a combined population of 2,862 in the 1990 census. Midland did not even appear.⁸⁸

Reclamation regained control of relocation center lands in 1946, including Tulelake. During the same year the Bureau opened land entries to veterans returning from World War II. Surplus farm equipment and abandoned barracks buildings greatly aided in the veterans' settlement. Reclamation separated the barracks into smaller structures, and the buildings provided temporary housing for the new settlers. The veteran settlers on Klamath included Eleanor Jane Bolesta, a former WAVE who became the first woman homesteader on a Reclamation project. Bolesta's husband, Charles, a Marine during the war; received debilitating wounds while fighting on Guam.⁸⁹

Uses of Project Water

The Klamath Project primarily supplied irrigation water for local agriculture. The project irrigates over 200,000 acres on about 1,400 farms. Farms on the project grow a wide variety of crops (see Table II.). Forage crops for livestock comprised the majority grown in the early years of the project. Early reports showed alfalfa lands valued at twenty to thirty dollars an acre at the time of Klamath's authorization. By 1910, the value increased to \$50 an acre, rising to \$100 by 1912.⁹⁰

88. Reclamation, *Project History, Klamath Project, 1943*, 71, 77; Reclamation, *Project History, Klamath Project, 1945*, 71; Bureau of Reclamation, *Annual Project History, Klamath Project, 1950*, RG 115, 68, 74-75; Reclamation, *Annual Project History, 1951*, RG 115, 74-5; Reclamation, *Project History, Klamath Project, 1979*, w-1, w-5; Department of Commerce, Bureau of the Census, *Twenty-First Census of the United States, 1990: Population and Housing*, 1990, CD-ROM.

89. "War Relocation Centers Acquired," *The Reclamation Era*, September 1946, 195; "Tule Lake Lands Opened to Veterans," *The Reclamation Era*, September 1946, 202; Carl J. Thye, "The Bureau Reclaims Its Own," *The Reclamation Era*, April 1947, 90-2; A.D. Harvey & Orin Cassmore, "Golden Harvest at Klamath," *The Reclamation Era*, February 1948, 30-3, 40.

90. Reclamation, *Project History, Klamath Project, 1925*, 45; Reclamation, *Project History, Klamath Project, 1926*, 28.

Potatoes moved up in value on the Main Division during the 1920s. Acreage devoted to potatoes increased by almost 600 from 1925-26. The monetary return increased from \$127,254 to \$266,850 during the same year. At the same time alfalfa yields on the Tule Lake Division increased by 20 percent. The project further supports a large livestock business. Cattle, sheep, and hogs comprise most of the project's livestock.⁹¹

The Klamath Project provides many activities for people interested in water sports and outdoor recreation. The area is ripe for swimming, boating, water skiing, camping, and

Table II. Crops grown on the Klamath Project, 1979. * indicates crops listed in 1960, but not 1979. Source: Reclamation, *Project History, Klamath Project, 1960*, 22; Reclamation, *Project History, Klamath Project, 1979*, w-2-w-4.

<u>Cereals</u>	<u>Forage</u>	<u>Field</u>
Barley Oats Rye Wheat	Alfalfa Hay Pasture Hay Silage/Ensilage Alsike Clover*	Spearmint
<u>Fruits</u>	<u>Nuts</u>	<u>Vegetables</u>
None	None	Onions Potatoes

hunting. The Fish and Wildlife Service operates recreational facilities at Lower and Upper Klamath, and Tule Lakes. The Fish and Wildlife Service manages the Clear Lake National Wildlife Refuge which includes Clear Lake Reservoir. The Bureau of Land Management administrates the facilities at Gerber Reservoir. Reclamation operates facilities at Malone Dam.⁹²

Reclamation established experimental farms in the marsh lands near Lower Klamath

91. Reclamation, *Project History, Klamath Project, 1926*, 28; E. H. Thomas, "Livestock at the Klamath County Fair," *The Reclamation Record*, December 1921, 548-9.

92. Water and Power Resources, *Project Data*, 570.

Lake in 1912. They drained water from the marsh and attempted to reclaim the land. The tulle in the marsh became difficult to till after it dried, limiting Reclamation to one acre of land on the farm. Reclamation tried to grow a variety of crops on the farms, but many died. Grains and grasses survived, but did not reach normal growth. The Army Board of Engineers, of 1910, reported the experimental farms were not self-supporting, and operated at the expense of project farmers. The Army recommended the Department of Agriculture assume control. Reclamation turned the farms over to the Klamath County Agriculturalist in 1914.⁹³

Conclusion

Events on the Klamath Project mirrored events in the western United States. The project witnessed labor fluctuations and home front activities during war. The agreement between Reclamation and California-Oregon Power, leading to construction of the Link River Dam, created an unusual circumstance in Reclamation projects. A power company building and operating a dam on a project, did not often occur. Most important the Klamath Project participated in the ongoing quest for water, indigenous to the American west, and answered the increasing demand for irrigation. Facilities on the Klamath Project continue to provide a large population with a variety of services.

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