

Moon Lake Project

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Moon Lake Project

The Moon Lake Project is in northeastern Utah, situated on the north side of the Duchesne River approximately 140 miles east of Salt Lake City. Its primary function is to provide irrigation water to farmlands in the area. Its water provides supplementary irrigation to 75,256 acres of farmland in Duchesne and Uintah Counties. The facilities of the Moon Lake Project include Moon Lake Dam, Yellowstone Feeder Canal, Midview Dam and Dike, Midview Lateral, and the Duchesne Feeder Canal.

Project Location

The Moon Lake Project is located in Duchesne and Uintah Counties in northeastern Utah, in what is referred to as the Uinta Basin. The geography of the area is mostly high plateau and mountainous regions. The highest mountain in the state of Utah, Kings Peak, is located in Duchesne County's Uinta Mountains. At 13,528 feet, Kings Peak, and its surrounding mountains, contain many alpine lakes that feed the rivers of the area, including the Strawberry, Duchesne, Lake Fork, and Yellowstone Rivers. The project itself, which taps several of these rivers, lays mostly in the 5,000 to 7,000 feet above sea level elevation range.¹

The primary feature of the project, Moon Lake Dam, is on the West Fork of the Lake Fork River. The Yellowstone Feeder Canal extends east from the East Fork of the Lake Fork River to Cottonwood Creek, a tributary of the Uinta River. Midview Dam and Dike forms the offstream Midview Reservoir, about twelve miles east of Duchesne, Utah. Midview Lateral connects the Midview Reservoir with the Lake Fork River. The Duchesne Feeder Canal carries water from the Duchesne River to the Midview Reservoir and to the Lake Fork River.

Rain is generally uniform throughout the year in the vicinity of the Moon Lake Project.

1. www.usacitiesonline.com/utduchesnecounty.htm accessed 06/15/00.

Higher elevations, however, do tend to receive slightly more precipitation. The average annual rainfall for the region is generally in the seven to eight inch range. The area produces ordinary temperate climate field crops.²

Lands serviced by the project are all privately owned. The land itself is generally fair to poor quality, with scattered areas of good quality land. No railroad connection exists to the Uintah Basin; because of this, all commodities must be taken by truck to either Price, Utah, or western Colorado cities, where they are loaded on trains. Farming is the principle industry of the region, with the most important crops produced being alfalfa hay and seed, pasture, wheat, oats, corn, and clover.³

Historic Setting

Prehistoric Setting

In comparison to much of the rest of the state of Utah, the Uinta Basin had relatively low prehistoric human settlement. Early and Middle-Archaic Period sites (8,000 B.C.E. - 500 C.E.⁴) in the Uinta Basin are few and far between, especially when compared to the abundance of sites in central, western, and northwestern Utah. It is not known exactly at what point people began to live in the eastern portion of the Great Basin, but it is thought not to have been before 11,000 years ago.

West of the Uinta Basin, on the west side of the Wasatch range, in the area just south of the Great Salt Lake, a culture known as the Black Rock culture was extremely active in the period between 4,000 B.C.E. and 500 C.E. This period experienced a relative explosion of population, and numbers of sites in the area increased by nearly 400 percent from the Wendover

2. "Annual Project History, Moon Lake Project," Volume I, 1936, 75.

3. "Annual Project History, Moon Lake Project," Volume I, 1936, 87-9.

4. B.C.E. = Before Common Era; C.E. = Common Era

Period that had preceded it. Black Rock culture was highly mobile, and was marked by various new hunting and gathering techniques. The most significant of these was use of the bow and arrow, and its eventual replacement of the older atlatl-and-dart weapons system by the end of the period.⁵

The culture that replaced the Black Rock period did, in fact, have some habitation sites in the Uinta Basin, although, again, not to the extent that it did in other regions of the Great Basin. Fremont culture occupied the Uinta Basin from approximately 650 C.E. to 950 C.E. The origins of Fremont culture are not known exactly. Many scholars have debated the issue, and few have come to a consensus. It is agreed, however, that Fremont culture encapsulates both southwestern cultures of the time, such as the Ancestral Puebloans, and Plains Indians of the period. Exactly how and where the influences from the south and east came together remains a mystery.

The new and unique feature of Fremont culture was that it was much more sedentary than the predecessor, Archaic culture, had been. Fremont practiced a pattern of mixed horticulture and hunting and gathering. So, while the Fremont people did often practice hunting and gathering techniques, they also began to cultivate and grow their own foods. However, Fremont culture in the Uinta Basin was likely not as reliant upon horticulture as other Fremont groups to the south and west. This was due to the region's high elevation and short growing season.

The Fremont sites of the Uinta Basin are generally smaller than other Fremont habitation sites. This also due to the higher elevation and short growing season. For its high elevation, the Uinta Basin does not receive substantially larger amounts of precipitation than areas in southern and western Utah. So, while it is colder, and the air is thinner, there is no more actual rainfall in the basin. The mountains trap much of the precipitation - creating the substantial number of

5. Sturtevant, William C., ed. *Handbook of the North American Indians*, Volume 11, *Great Basin*, Warren L. D'Azevedo, ed., Washington D.C., Smithsonian Institution, 1986, 149-60.

rivers and streams in the area. This means that non-irrigated farming is actually more difficult than it is at lower, seemingly drier, areas.

Fremont sites in the Uinta Basin also tended to be seasonal, again a consequence of the area's weather and elevation. Most of the uncovered sites tend to be small hamlets or rancherias with upwards of five or so shallow, circular pit houses. Deposits of material culture tend to be rather thin, indicative of short, seasonal occupations. Most of the habitation sites tend to be located on knolls, buttes, or hillsides above flood plains. Only one kind of ceramic assemblage, known as Uinta Gray, is present in the area. It appears to be the only locally manufactured pottery.

Two sequential cultural phases seem to characterize the Uinta Basin Fremont. The first is known as the Cub Creek phase, and was active in the years 650 - 800 C.E. No surface structures are apparent for this culture's sites, and the only pottery represented is undecorated Uinta Gray. The next phase was the Whiterocks phase, which occurred in the period between 800 - 950 C.E. The basic cultural pattern is the same as that of the Cub Creek, with a few changes, among them adobe structures, decorated Uinta Gray pottery, and small amounts of trade pottery from southern Fremont villages.

Before 1000 C.E., Fremont culture disappeared from the Uinta Basin; this date is several hundred years before the decline of Fremont culture in other areas to the south and west. The exact reasons for this decline are not clear, although a climatic shift may have been involved. It seems that the end of Fremont culture marked a shift back towards hunting and gathering type lifeways. Design of projectile points changed at the end of the period, and fewer horticultural remains are present. It is not known exactly what caused this shift, although it is apparent that by around 1000 C.E., the Uinta Basin had returned to a more Archaic pattern of culture.

There is no definite link between the Ute culture that inhabited northeastern Utah at the time of European contact and the Fremont culture of the first millennium C.E. Some scholars have proposed that the Ute people were merely a cultural follower of the Fremont; a climatic shift, it is thought, caused the Fremont to abandon their horticultural pattern, and return to the Archaic pattern hunting and gathering, which continued until European contact. However, little substantial information exists to substantiate this argument; in fact little information at all on the years between the Fremont's decline and the arrival of the first European colonists is available. Because of this, it is impossible to make a definitive claim in either direction.⁶

Historic Setting

Upon the arrival of European colonists, the Uinta Basin, and central and eastern Utah in general, was occupied by Ute people. Ute people, together with Southern Paiute and Chemehuevi peoples, spoke a language of the Southern Numic branch of the Uto-Aztecan language family. Whereas the Ute, who occupied a sizable area of central-eastern Utah and western Colorado, had regional differences in speech patterns, the dialects were all mutually intelligible. Ute boundaries were roughly the western edge of the Wasatch mountains in Utah, the Front Range of the Rocky Mountains in Colorado, the southern boundary of modern Wyoming, the canyon country of southern Utah, and the northern boundary of modern New Mexico.⁷

In the early part of the nineteenth century, before roughly 1835, Europeans did not exist in any large numbers in Ute territory. With the exception of a limited number of Spanish explorers and missionaries in the late eighteenth and early nineteenth centuries, few non-

6. Sturtevant, William C., ed. *Handbook of the North American Indians*, Volume 11, *Great Basin*, Warren L. D'Azevedo, ed., Washington D.C., Smithsonian Institution, 1986, 161-72.

7. Sturtevant, William C., ed. *Handbook of the North American Indians*, Volume 11, *Great Basin*, Warren L. D'Azevedo, ed., Washington D.C., Smithsonian Institution, 1986, 336-40.

indigenous peoples had had much contact with the Ute. Many of these early Spanish travelers reports comprise the earliest, although somewhat limited, descriptions of Ute culture. Up through 1850, Ute groups were organized into large summer hunting bands. Typically these groups were named either for a geographic feature of the territory they inhabited or for a particular subsistence resource that they exploited.

The Utes in the Uinta Basin area were known as the Uintah band. Their general territory extended from Utah Lake east through the Uinta Basin to the Tavaputs Plateau in the Green and Colorado River systems. This particular group in general felt the sting of encroaching white settlers in the mid-nineteenth century, as more and more whites arrived and demanded use of what had been Ute land.⁸

In the 1850s and 1860s, two drawn-out wars found the Uintah band up against the recent Mormon settlers in the area. Mormons had migrated west to Utah in the 1840s, and comprised the majority of the white settlers in the territory. After settling in the vicinity of the Great Salt Lake, Mormons drove the Ute east, out of their ancestral lands. In 1850, Mormon leaders killed several Uintah warriors. In retaliation, Ute leaders Walkara (1853-4) and Black Hawk (1863), fought back at the Mormon attempts to settle their land. This rebellion was all the Mormons needed to request the federal government to step in on their side. In 1861, an executive order issued by Abraham Lincoln, at the request of Mormon settlers, created the Uintah Indian Reservation. Its goal was to keep the Utes out of the way of the development of Utah by Mormons. The reservation's initial location was approximately 150 miles east of Salt Lake City, in much the same region that the Moon Lake Project occupies today. The area was chosen because it was well outside of the territory that the Mormons inhabited at that point. As the

8. Sturtevant, William C., ed. *Handbook of the North American Indians*, Volume 11, *Great Basin*, Warren L. D'Azevedo, ed., Washington D.C., Smithsonian Institution, 1986, 356.

century progressed, Ute people were increasingly limited to the reservation, as Mormon growth continued.⁹

By the 1870s, all Utah Utes had been restricted to the 2,039,400 acre Uintah Reservation. Before the arrival of Mormon settlers, Utes had occupied approximately 23,500,000 acres of land in Utah (about forty-five percent of the state). More relocations would occur in the coming years, as the Uncompahgre band of the Ute were relocated to the Uintah Reservation from their ancestral lands in western Colorado, and the White River band of Ute were relocated there from northern Colorado as white settlers occupied their lands. The already decreased Ute area, with the addition of more people, became even more crowded.¹⁰

In 1887, Congress passed the Dawes General Allotment Act, which sought to break up Indian reservation lands into individual tracts for tribal members. Indian heads of families were to receive 160 acres of land, individual Indians over the age of eighteen would receive eighty acres, and individuals under the age of eighteen would receive forty acres.¹¹ The purpose of the bill was to open up Indian lands to white settlers, farmers, and miners; the remaining reservation lands leftover after the Indian allocations were allocated to homesteaders. Indians not using their own lands could then sell to white settlers as well, thus creating more homestead lands. The result of this at the Uintah Reservation was a substantial reduction in acreage controlled by Utes.

Shortly after the turn of the century, the Uinta Basin became increasingly popular for white settlers. The earlier attempts to open up the Uinta Basin area to white settlers had been largely unsuccessful. In 1852, a Mormon company left Salt Lake City to locate a site for a colony in the Green River Valley. Due to the area's remote nature, in relation to other colonies,

9. <http://www.northernute.com/tribhist.htm> accessed 06/16/00.

10. Sturtevant, William C., ed. *Handbook of the North American Indians*, Volume 11, *Great Basin*, Warren L. D'Azevedo, ed., Washington D.C., Smithsonian Institution, 1986, 355-7.

11. Gates, Paul W., *History of Public Land Law Development*, Washington, Zenger Publishing, 1968, 464-5.

and also due to opposition from Indians, this first colony failed. Again, in 1887, another Mormon attempt to settle the area was undertaken, this time with the name “the Uinta State of Zion.” This attempt, too, was unsuccessful. However, when, by proclamation of the President in 1905, the land was opened up to homestead entry, white settlers began to move there and open up the lands for farming. Although there was not a proportionately large amount of land under the control of the Ute, a sizable amount of the streamflow available for irrigation was controlled by Indians. The result of this was that shortly after opening the land to white settlers, it became apparent that the natural streamflow of the Uintah Basin was not sufficient to irrigate the white settler’s farms after the prior rights of the Indians in the area had been satisfied. With this in mind, an attempt began to investigate solutions to the lack of water for the new farming community. After over fifty years of ignoring the region, and treating it as a wasteland whose only purpose was as a hunting ground for displaced Indians, the Mormon settlers decided that the Uintah Basin might be to their liking.

Project Authorization

Shortly after opening the Uintah Basin to settlement by Mormons, it became clear that there was not a sizable enough natural streamflow in the area to satisfy both their needs and the needs of the Indians that lived there. As the Ute people of the area held prior water rights, it was the Mormon settlers who lacked irrigation water. The areas of land irrigated by the Lake Fork and Uintah Rivers exceeded the water supply of the rivers, leaving some land dry in the summer months. In most years, the supply was sufficient enough to meet the requirements of both Ute and Mormon farmers until July 1. After this date, the water supply dwindled, and the private canals, being junior in right to the Indian canals, received only a partial supply. This generally amounted to roughly one second-foot of water per 1,000 acres of land.

In order to alleviate this shortage of water, Mormon settlers began to look at ways to bring increased irrigation water to the Uintah Basin. From 1922-1925, the Mormon-formed Dry Gulch Company investigated the options of the Uintah Basin water supply. Later, in June of 1927, the Utah Water Storage Commission entered into a cooperative contract with the Bureau of Reclamation for the investigation and planning of what would become known as the Moon Lake Project. Reclamation undertook several investigations, and compiled a report explaining the project and giving estimated costs of construction.

The Utah Water Storage Commission submitted this report on the Moon Lake Project to the Federal Emergency Administration of Public Works in 1933. The result of this was an allotment of 1,500,000 dollars made on November 29, 1933, for the construction of the project.¹² Under the provisions of the National Industrial Recovery Act of 1933, under which Moon Lake funding was appropriated, construction of a public works project could begin without congressional approval.¹³

Various canal companies on the Lake Fork and Uintah Rivers then began investigating the options for a water district in the area. After considerable preliminary work, the companies finally organized the Moon Lake Water Users Association in June of 1934. The new organization executed a contract with the United States, on July 17, for construction of the Moon Lake Project. In the contract, it was agreed that the project costs would be paid off by the Moon Lake Water Users Association over a period of forty years.¹⁴

In 1935, the U.S. Supreme Court declared the National Industrial Recovery Act of 1933 unconstitutional. The result was that federal projects appropriated under the act had to be

12. "Annual Project History, Moon Lake Project," Volume I, 1936, 70-4.

13. United States Department of the Interior, Water and Power Resources Service, *Project Data*, (Denver, U.S. Government Printing Office, 1981), 664.

14. "Annual Project History, Moon Lake Project," Volume I, 1936, 74.

officially authorized. To this end, President Franklin Delano Roosevelt approved the Moon Lake Project on November 6, 1935.

Construction History

For construction purposes, the Moon Lake project was divided into two sections for construction - Moon Lake Dam, and Moon Lake Canal System. The first section consisted of Moon Lake Dam. The second section, Moon Lake Canal System, included the Yellowstone Feeder Canal, Midview Dam, Midview Lateral, and Duchesne Feeder Canal.

The Moon Lake Canal System saw the first construction. The Civilian Conservation Corps (CCC) did the actual construction of the canal system on the project. On February 15, 1934, preliminary surveys of Yellowstone Feeder Canal and Duchesne Feeder Canal were begun. The canals stretched from the Lake Fork River to the Uinta River, and from the Duchesne River to Lake Fork River, respectively. In March and April of that year, cost estimates for the canals were prepared. On July 17, the Moon Lake Water Users Association signed a repayment contract for project construction, which was then executed by the Secretary of the Interior. Final location surveys of the Duchesne Feeder Canal started on September 27, 1934, and in October, an appraisal board inspected the right of way of the lands along the canal. By the end of that month, on October 21, Reclamation had established Camp BR-11 in Bridgeland, Utah. Two days after this, on October 23, 1934, Reclamation, through the CCC, began construction on the Duchesne Feeder Canal.

By the following spring the first nine mile section of the Duchesne Feeder Canal was finished. Reclamation diverted water from the Duchesne River through the feeder canal on May 6, 1935,. The next major work on the canal system that year came in August. On the 21st of that month, construction work on Midview Dam began. In November, construction work on

Midview Lateral began. On December 7, 1935, the Moon Lake Water Users Association and the United States Government executed a supplemental contract for canal systems.

At ten a.m. on February 4, 1935, in Salt Lake City, E. O. Larson, chief engineer on the Moon Lake Project opened the bids for the construction of Moon Lake Dam. On April 5, the contract was officially awarded to T. E. Connolly, contractor. Twenty days later, Connolly was notified that his construction crews could proceed with construction. On May 1, Reclamation assigned the project a new construction engineer, E. J. Westerhouse. Actual construction on the dam began on May 7.

Earlier in that month, Reclamation made arrangements with Mr. Lee Alger, Moon Lake resort concessionaire, for the erection of twelve cottages to be set aside for the optional use of government employees with families. The plan involved no obligations on the part of the government; under the agreement with Alger, the cottages were reserved for government employees during the time of the construction at the rate of fifteen dollars per month. Also, on May 3, government forces started construction on laboratory buildings. Construction on the first building began on May 3, and by the tenth of the month was occupied temporarily by headquarters staff pending construction of the second building, which was not finished until July.

In June, a glacial deposit of sand and gravel was uncovered on a nearby mountain slope, and throughout the month it was explored as a possible aggregate site. By July 20, the contractor found a suitable site, began gravel pit operations, and installed a processing plant for production of concrete aggregate. On August 7 and 8, a conference was held in the Denver office of Reclamation with T. E. Connolly, the dam contractor, and E. J. Westerhouse, the construction engineer. The parties agreed on terminology of specifications and the procedure for production

of concrete aggregate.

The official groundbreaking ceremony for Moon Lake Dam, the primary feature of the Moon Lake project, occurred on June 28, 1935. The formal ceremony was attended by public, as well as by state, county, and local dignitaries, including Utah Governor Henry H. Blood. Even though the project really began more than a month before, the ceremony marked the official beginning of the Moon Lake Dam project.

Reoccurring slides in early August above the spillway during excavation prompted the switch to an open channel type of spillway to be located on the right abutment of the dam. September saw the installation of a one-inch diameter water supply line, from the end of a forest service water supply line that was approximately one-mile away, to the project headquarters.

On October 5, the contractor started sand and gravel screening plant and crusher operations. The aggregate product that was produced at the plant, however, was found to be unacceptable due to the presence of organic matter, debris, and flaky coarse particles in both sand and coarse aggregate. Because of this, a meeting was held in the Denver office, once again, between T. E. Connolly and E. J. Westerhouse. At this meeting, a work order for the production of concrete aggregates was redrafted and reissued, this time in terms more acceptable to the contractor.

Following this, after an extended period of suspended activities, the contractor again began operations at the concrete aggregate processing plant on November 13. However, on December 27, the contractor again discontinued the use of both gravel pit and screening plant processing plant, without any expression of future plans. Large amounts of satisfactory material remained to be excavated in the pit, as defined in the work order agreed to by the parties involved.

The contractor completed liner plate and structural steel installation in the outlet tunnel by the middle of December. On December 30, the contractor placed the first concrete on the Moon Lake Project in the dam outlet tunnel.

The Duchesne Feeder Canal was finished in June of 1936. The total length of the canal stretched seventeen miles.

The next feature of the Moon Lake Canal System to be constructed was the Midview reservoir, which essentially consisted of the Midview Dam, Midview Dike, the outlet works and the spillway. The CCC began construction of the reservoir in June of 1935, with the stripping of the foundation for the dike, which was completed in August. From that point, the embankment of the dike was constructed, until November of 1935, when freezing temperatures caused work to cease. Work began again in April 1936, and the embankment was finished by July. The rockfill section of the upstream face of the dike was placed during November and December of 1936, to essentially complete the structure.

Construction on Midview Dam, a fifty-four foot high earthfill, rock-faced, offstream structure, began in November 1935. First, the damsite area and nearby pits were stripped and access road constructed, which was finished by December 30. In February of 1936, a one-half cubic yard dragline was used to dig a drain channel for draining the damsite. In March of 1936, concrete work on the outlet conduit and cutoff wall was begun; the conduit was complete by June, the cutoff wall done by August. Embankment material of the dam was placed from August to November 1936, when work had to stop because of freezing temperatures in the area. The drain tile in the toe drain area under the downstream rock fill section was also complete by November. By December 31, 1936, Midview Dam and appurtenant structures were sixty-six percent complete.

In December of 1935, construction of Midview Lateral commenced. It was worked on until November 1936, when, as it had with other project features, freezing temperatures caused the CCC work crews to halt construction. At the end of the year, the Midview Lateral was seventy-five percent complete.

On February 13, 1936, the Moon Lake Dam contractor, T. E. Connolly, served formal notice that all construction work on the dam would be suspended as of that date for the duration of the winter. The reason was poor weather. On April 29, the contractor again began construction, though weather had been hospitable to building since at least the tenth of April. Concrete aggregate production began again on June 22, 1936; this time, the contractor rented more excavation and crushing machines in order to keep aggregate production running continuously at high volume. That summer, the outlet tunnel of Moon Lake Dam was completed, and on August 4, the West Fork of the Lake Fork River was rerouted temporarily through the outlet tunnel so that dam construction could begin, unimpeded by the river's flow. A large assemblage of local residents and water users gathered to watch the event and mark the occasion. On August 11, placement of materials in the impervious section of the dam embankment began. The placing of concrete continued until October 30, when a sudden drop in temperatures to sub-freezing conditions necessitated its halt. No more concrete would be placed in 1936. By November 7, the contractor had halted all construction on the dam because of the weather. By the end of 1936, work on Moon Lake Dam was fifty-nine percent complete. However, the estimated construction time was seventy-six percent elapsed.¹⁵

After the winter shut down, T. E. Connolly was ordered by Reclamation to begin work on Moon Lake Dam on April 27, 1937. However, on May 14, the seasonal high streamflow

15. "Annual Project History, Moon Lake Project," Volume I, 1936, 16-9.

threatened to top the low portion of the dam embankment. In order to meet the emergency and avert a possible disaster, the contractor worked all available labor on a 48-hour week basis. These increased workmen hours let the contractor stem the tide of the possible dam collapse, and the partially completed dam was raised to an elevation that could withstand the water.

Weather problems in July, slowed down construction even more. Bad weather in that month greatly retarded placement of both earthfill and concrete. Almost four inches of rain fell that month - more than half the annual average - for a total of eighteen rainy days.

When it became apparent that the drilling equipment used by the contractor to drill grout holes on the dam was not sufficient to reach the required depth of thirty feet, a diamond drill rig was procured by the contractor. The holes were then drilled through the rolled earth-fill and contact shale of the left abutment and a portion of the floor of the dam embankment. This concluded grouting operations that were undertaken to arrest seepage through leaky zones of crushed shale within the dam foundation.

Work on installation of high pressure gates in the gate chamber of Moon Lake Dam was begun in the fall of 1937, and finally completed on December 7. At this point, the dam was almost entirely finished.

In June, Reclamation awarded a contract in the amount of \$24,662 for clearing the area that would become Moon Lake Reservoir to Sayles Construction Co. of St. Joseph Missouri. Work began on this task on June 15, 1937. By November 6 of that year, 254 acres of timber and 164 acres of sagebrush around the reservoir were cleared.¹⁶

Construction of the Moon Lake Canal System was underway throughout 1937 by CCC forces from camp BR-11. In January and February, temperatures in the twenty-to-forty degrees

16. "Annual Project History, Moon Lake Project," Volume II, 1937, 13-5.

below zero range halted construction. Midview Dike and emergency spillway were completed early in the year, permitting a concentration of forces and equipment for the placing of embankment materials in Midview Dam. This feature was finished in October. The Midview Reservoir site was cleared in October and November; its operations roads were also cleared and graveled.

Considerable work was done on Midview Lateral in 1937. The principle feature of this work consisted of the construction of a reinforceable concrete siphon beneath the streambed of the Lake Fork River.

Construction of the Duchesne Feeder Canal was mostly finished during 1937. Dry rock paving of curves of the canal and necessary rip-rap protection were finished, along with the accompanying structures. The small 1,800-foot dike required in the diversion of the Duchesne River into the canal began in 1937. The Yellowstone Feeder Canal, the project feature that had yet to begin construction, had its final location surveys completed in the end of 1937.¹⁷

On January 4, 1938, the newly installed high pressure gates on Moon Lake Dam were closed, thereby impounding the entire runoff of the West Fork of the Lake Fork River. This facilitated the installation of forty-two inch diameter outlet pipes, balanced needle valves, and outlet works control mechanisms. These final additions in the spring of 1938 essentially completed Moon Lake Dam, although a few small additions would be made in coming years. The dam's final inspection and acceptance came on April 19, 1938. Two days after this, the water users of the area called for a release of 75-second-feet of water in order to inaugurate the 1938 irrigation season. After this point, water was released as needed by the Moon Lake Water Users Association. Officially, all contract work was accepted as complete on May 29, 1938. On

17. "Annual Project History, Moon Lake Project," Volume II, 1937, 16-9.

the seventeenth of June, Moon Lake Reservoir filled to capacity. Its total capacity is 49,500 acre-feet, but its active capacity is 35,800 acre-feet.

On July 9, a large gathering of the Moon Lake Project's water-using families spent the day at Moon Lake Reservoir celebrating the project's completion. A short open-air program was sponsored by the Moon Lake Water Users Association, in which addresses were made by B. O. Collins, the water commissioner, and E. J. Westerhouse, the construction engineer.

Extra Work Order number thirteen, dated July 30, 1937, provided for the installation of 12,000 pound capacity hoist and appurtenances on the bridge over the spillway gate structure of Moon Lake Dam. Even though it was signed the following year, the materials for the project did not arrive until April 25, 1938. The hoist was then installed by government forces, and finished by July of that year.

At the beginning of 1938, laboratory work was discontinued at the Moon Lake Project, and the earth and concrete testing lab was moved to the Provo River Project, Utah. In October, when all construction work was done, the Moon Lake construction headquarters were closed and all records and equipment were moved to Reclamation's Provo office.¹⁸

Prior to 1938, most of the work on the Midview Lateral was complete. Excavation of nearly 1,000 cubic yards of fill was carried on throughout January and February, and this portion of project was done by March.

Settlement points were installed in Midview Dam in June of 1938. By August, the observed data indicated that significant settlement had taken place. Excavation for the parapet and curb began in August, and concrete work was completed by December 1. Backfilling about the walls was finished on December 23, 1938. By the end of 1938, the only remaining work on

18. "Annual Project History, Moon Lake Project," Volume III, 1938, 11-3.

Midview Dam and Dike consisted of the installing a gate house on the crest of the dam.

The entirety of excavation work on Duchesne Feeder Canal was finished prior to 1938. During January and February construction on the canal's small dike was underway, and it was finished in March. Construction of a concrete check and turnout structure on the Duchesne Feeder Canal to regulate canal flows and to provide a wasteway for Midview Reservoir was begun in April and finished in July. During August, excavation for diversion works in the Duchesne River at the head of the Duchesne Feeder Canal was begun. By the end of the year, timber pilings had been driven in the cutoff under the canal headworks structure, and construction of concrete forms was well underway. Exploratory test pits were dug on hills near the canal in search of a supply of rip-rap for both the up and downstream side of the diversion structure.

In 1938, Yellowstone Feeder Canal construction began. Because of the remote nature of the canal's location, the contractor established a spike camp two miles north of Altunah, Utah. Excavation of the canal began in April, and carried on throughout the year. The CCC builders encountered considerable difficulty in excavating the greater part of the canal because of the nature of the material being excavated and the shortage of suitable equipment. The canal, which was in total twenty-nine miles long, was broken into two sections for construction. By the end of 1938, only ten miles of the first seventeen mile stretch was complete.¹⁹

Post-Construction History

In 1938, Reclamation transferred the operation and maintenance of the Moon Lake Project to the Moon Lake Water Users Association. From this point, Moon Lake Dam and Reservoir, Yellowstone Feeder Canal and conveyance canals, Duchesne Feeder Canal, Midview

19. "Annual Project History, Moon Lake Project," Volume III, 1938, 14-5.

Dam and Dike, and Midview Lateral would all be operated and maintained by the water users association.

Moon Lake Dam had been completed on May 29, 1938. However, it was planned to construct a parapet and curb walls during the summer of 1939. The work was to be undertaken by CCC workers from camp BR-11. On May 16, 1939, a site camp was established at the dam for this purpose. However, due to a lack of funds, and a reduction in enrollee personnel, work at the dam was discontinued on July 22, 1939. The only work accomplished at the dam thereafter was the placing of additional backfill materials along the right side of the spillway where settlement had occurred. Also, the concrete aggregate intended to be used in the eventual construction of the parapet and curb walls was moved from the stockpiles in the reservoir area to the west end of the dam. In November of 1939, the CCC completed the installation of hydrostatic pressure indicators on the dam.²⁰

Midview Lateral was in operation throughout 1939. The only work done on it was installation of a measuring flume at station 8-87 on May 4, 1939. This officially marked the completion of lateral work.

Work on Duchesne Feeder Canal continued throughout year, and finished on September 28, 1939. The last feature to be completed was a timber measuring flume that was installed at station 464-22 on the canal.

The Yellowstone Feeder Canal was under construction throughout the year. The first seventeen mile section was completed in August of 1939. The last twelve mile section was started in October of that same year, and continued to the end of the year, at which point it was

20. "Annual Project History, Moon Lake Project," Volume IV, 1939, 13-4.

ninety-five percent complete.²¹

The work on the parapet and curb walls of Moon Lake Dam that had been discontinued in 1939, was begun by CCC forces in 1940. By the end of the year, the parapet wall was complete, and only short sections of the curb wall were not finished. Also, in 1940, a series of gaging stations and venturi flumes were constructed around Moon Lake Dam. The two gaging stations were situated on the West Fork of the Lake Fork River, and the five-foot reinforced venturi flumes were constructed to measure inflow of two tributaries - Brown Duck Creek and Fish Creek.²²

On April 10, 1940, Midview Reservoir filled to a maximum capacity for the first time. Its total and active capacity is 5,800 acre-feet. By the end of the 1940, a concrete hoist house over the gate chamber was essentially complete.

Duchesne Feeder Canal was in operation all year. During November and December, the contractor constructed a ten-foot reinforced concrete venturi flume at station 21-00 with the purpose of measuring canal flow.

The final stretch of the last section of the Yellowstone Feeder Canal reached completion in July of 1940. However, on July 18, a canal break necessitated repairs. Later that year, in December, the contractor constructed a six-foot reinforced concrete venturi flume at station 0-50 to measure the amount of water diverted from the East Fork of the Lake Fork River.²³

During the summer and fall of 1941, the Moon Lake Water Users Association constructed a two-and-a-half mile extension to the Yellowstone Feeder Canal. The extension stretches the canal to a total length of thirty-one-and-a-half miles. The extension picks up canal

21. "Annual Project History, Moon Lake Project," Volume IV, 1939, 14-6.

22. "Annual Project History, Moon Lake Project," Volume V, 1940, 13-5.

23. "Annual Project History, Moon Lake Project," Volume V, 1940, 15.

water from Cottonwood Creek, below the terminal point of Yellowstone Feeder Canal, and carries water eastward to Neola, Utah, distributing to users along the way.²⁴

In 1949, Reclamation initiated a review and maintenance program for the Moon Lake Project. The goal of this was to provide, every other year, an account of the condition of the maintenance of the project's features. It also provides some documented history for the project. The first of these examinations began on June 16, 1949.

On July 13, 1951, the counterweight for the Moon Lake Dam East Spillway gate started collapsing. It began to fall to the west, towards the West Spillway gate. Complete collapse was arrested by the gate's settling against the concrete pier which separates the two gates. Movement was caused when the bottom iron plate of the saddle bent away from the concrete and the gate arm twisted on the west side. By October 22, a repair contract had been issued, and repair and reinforcement of the gates began.

Review of maintenance exams continued in the coming years. 1952, 1954, 1956, 1958, 1960, and 1962 all saw these examinations take place in October.

Brown Duck Lake is an irrigation reservoir on the West Fork of the Lake Fork River, above Moon Lake Reservoir. It is not a feature of the Moon Lake Project, and was constructed by private interests in 1922. Private interests continued to own and operate the reservoir through the 1960s. However, a partial failure was spotted at the dam on August 10, 1967. By August 15, the dam had been breached, and was no longer operable. This, however, had little impact on the Moon Lake Project.

On November 16, 1967, the operation and maintenance of the Midview Dam project was transferred from the Moon Lake Water Users Association to the Bureau of Indian Affairs (BIA).

24. "Annual Project History, Moon Lake Project," Volume VI, 1941, 17.

Since 1967, the BIA has operated and maintained the Midview Dam and Dike, Midview Lateral, and Duchesne Feeder Canal.²⁵

Settlement of the Project

The Moon Lake Project provides supplemental irrigation water for farmland in the Uintah Basin of northeastern Utah. As of 1992, the project provided for an irrigable area of approximately 77,666 acres. In 1995, the project actually provided supplemental irrigation water for 77,116 acres. The crops grown on these acres, in 1995, created a total revenue of \$11,201,554.

The total population of the area served by the Moon Lake Project was, in 1992, 6,855 people. Of these, 2,370 were farmers. The other residents use Moon Lake Project water for residential or industrial use.²⁶ This number is just slightly higher than the entire population of the area just prior to the project's construction, in 1930. The population at that point was 2,350 people.

Uses of Project Water

The Moon Lake Project was constructed in order to provide irrigation water for farmlands in the Uintah Basin. Currently, just over 77,000 acres of farmland receive supplemental irrigation from the project. The primary crops grown with this water are wheat, alfalfa, oats, barley, and pasture. Much of these crops are used as feed for livestock, which include beef cattle, sheep, and dairy cattle. Water from the Moon Lake Project's features provides for a late season supply; once the early water supply runs dry, Moon Lake Project flows

25. "Annual Project History, Moon Lake Project," Volume VIII, 1942-67, 5, 53-5.

26. <http://dataweb.usbr.gov/html/moonlake.html> Accessed 6/22/00.

irrigate the crops in the later summer months.²⁷

Both Moon Lake Reservoir and Midview Reservoir are used extensively for recreation. Moon Lake Reservoir is one of the state of Utah's most popular manmade lakes. Its accommodations include a privately operated lodge with cabins. Camping, picnicking, and boating facilities are also available. Trout fishing and seasonal big game hunting are also available on adjacent lands. The United States Forest Service administers the land surrounding Moon Lake Reservoir. In 1995, the reservoir had approximately 300,000 visitors. Midview Reservoir is used locally for picnicking, swimming, boating, and fishing.

The Moon Lake Project has no formal flood control benefits. No specific features were planned in its design for this purpose. However, it is common practice for the Moon Lake Water Users Association to adjust flows in the river at Moon Lake Dam in order to protect downstream bridges and diversion structures during periods of high flows. So, although there was no official flood control program, the project accumulated an estimated \$53,000 in flood control benefits between 1950 and 1999.²⁸

Conclusion

The Moon Lake Project helps to provide irrigation water for the driest months of the growing season in the Uintah Basin, Utah. Although natural streamflows could satisfy the irrigation needs of the Ute people of the area, and they satisfy the early season needs of the Mormon farmers of the area, they could not provide the amount of water needed to grow crops of the Mormon farmers in the late summer. The arid climate of the environment is harsh on crops, and farming would not be possible without manipulation of the water supply. Although

27. *Project Data*, 665.

28. <http://dataweb.usbr.gov/html/moonlake.html> Accessed 6/22/00.

an unlikely place for large-scale agriculture, the Moon Lake Project has turned part of the Uintah Basin into cropland.

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Bibliography

Archival Collections

Denver Colorado. National Archives and Records Administration: Rocky Mountain Region. Records of the Bureau of Reclamation. Record Group 115.

“Annual Project History, Moon Lake Project,” Volume I-VII, 1936-67.

Government Documents

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

Books

Sturtevant, William C., ed. *Handbook of the North American Indians*, Volume 11, *Great Basin*, Warren L. D’Azevedo, ed., Washington D.C., Smithsonian Institution, 1986.

Gates, Paul W., *History of Public Land Law Development*, Washington, Zenger Publishing, 1968, 464-5.

Web Sites

www.usacitiesonline.com/utduchesnecounty.htm accessed 6/15/00.

<http://www.northernute.com/tribhist.htm> accessed 6/16/00.

<http://dataweb.usbr.gov/html/moonlake.html> accessed 6/22/00.

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