Form No. 10-300 (Rev. 10-74)

NADB 8608120

Section 106
J175

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

NATIONAL REGISTER OF HISTORIC PLACES INVENTORY

FOR NPS USE ONLY
RECEIVED
ED

FOR FE DETERMINATION OF ELIGILITY

SEE IN ... REGISTER FORMS
TYPE ALL ENTRIES -- COMPLETE APPLICABLE SECTIONS

1 NAME

HISTORIC
High Mountain Dams in Bonneville Unit of Central Utah Project

AND/OR COMMON

2 LOCATION

STREET & NUMBER
multiple locations (see HAER Inventory) __NOT FOR PUBLICATION

CITY, TOWN
CONGRESSIONAL DISTRICT

__ VICINITY OF

STATE
CODE
COUNTY
CODE

3 CLASSIFICATION

CATEGORY	OWNERSHIP	STATUS	PRESENT USE	
__DISTRICT	X PUBLIC	__OCCUPIED	X AGRICULTURE	__MUSEUM
__BUILDING(S)	__PRIVATE	X UNOCCUPIED	__COMMERCIAL	__PARK
__STRUCTURE	__BOTH	__WORK IN PROGRESS	__EDUCATIONAL	__PRIVATE RESIDENCE
__SITE	**PUBLIC ACQUISITION**	**ACCESSIBLE**	__ENTERTAINMENT	__RELIGIOUS
__OBJECT	__IN PROCESS	__YES: RESTRICTED	__GOVERNMENT	__SCIENTIFIC
X thematic group	__BEING CONSIDERED	X YES: UNRESTRICTED	__INDUSTRIAL	__TRANSPORTATION
	x n/a	__NO	__MILITARY	__OTHER:

4 AGENCY

REGIONAL HEADQUARTERS: *(If applicable)*
Bureau of Reclamation, Upper Colorado Regional Office

STREET & NUMBER
125 South State Street

CITY, TOWN
Salt Lake City __ VICINITY OF
STATE
Utah 84147

5 LOCATION OF LEGAL DESCRIPTION (Special Use Permit)

COURTHOUSE, REGISTRY OF DEEDS, ETC.
Kamas District Ranger Office, Wasatch National Forest

STREET & NUMBER
50 East Center Street

CITY, TOWN
Kamas
STATE
Utah 84036

6 REPRESENTATION IN EXISTING SURVEYS

TITLE
Bonneville Unit Historic American Engineering Record Inventory

DATE
February 1986
X FEDERAL __STATE __COUNTY __LOCAL

DEPOSITORY FOR SURVEY RECORDS
National Park Service, Rocky Mountain Regional Office

CITY, TOWN
Denver
STATE
Colorado 80225

7 DESCRIPTION multiple resources (see HAER Inventory Cards)

CONDITION		CHECK ONE	CHECK ONE
__EXCELLENT	__DETERIORATED	__UNALTERED	X_ORIGINAL SITE
__GOOD	__RUINS	__ALTERED	__MOVED DATE_____
__FAIR	__UNEXPOSED		

DESCRIBE THE PRESENT AND ORIGINAL (IF KNOWN) PHYSICAL APPEARANCE

This Determination of Eligibility request culminates an intensive Historic American Engineering Record survey of all high mountain dams in the Bonneville Unit of the Central Utah Project. Conducted in 1985-86 the survey was composed of three components: inventory, synthesis and evaluation. The inventory began with identification of all high mountain dams in the unit. Fifteen dams were encountered in the inventory. All are located in a relatively tight cluster within the Wastach National Forest. The dams and reservoired lakes are situated on Forest Service land and are maintained by the private irrigation companies through special use permits issued by the Forest service. The Bureau of Reclamation has proposed stabilization of most of the dams as part of a program to consolidate water storage in the proposed Jordanelle Reservoir, and the Bureau has been designated the lead agency in this limited-scope cultural resource survey.

Fieldwork - archival research and on-site HAER recordation - was conducted at each of the fifteen sites identified. The research methodology involved the collection of primary and secondary source material from a variety of archives in Utah and Colorado and the National Archive in Washington. The synthesis part of the survey involved preparation of a developmental and administrative overview (part of which has been included as an addendum in Item 8) of irrigation in the Provo River Basin. Irrigation has been linked with settlement and the construction of these dams linked to the irrigation systems. The final component was evaluation. Within the context of the overview, each structure in the inventory has been assessed for historical and/or technological significance for its representation of dam-building trends. In November 1985, the survey findings were presented to a review board made up of representatives of the Bureau of Reclamation, National Forest Service, Utah Historic Preservation Office and the National Park Service (HAER). All agencies attending concurred with the recommendation that all fifteen dams be included in this thematic group.

Fourteen of the fifteen structures in the inventory were built at about the same time, by the same people and under similar circumstances. As such they present a homogenous group: integral and virtually equal parts of a single historically important system. The last structure - Big Elk Lake Dam - was the first high mountain retention structure undertaken in the basin. Its diverse ownership distinguished it as the only dam in the unit not controlled by the Union Reservoir Company. A summary table of the fifteen Bonneville Unit structures is included, as are a HAER Inventory Cards for each. As a point of reference, the following is a list of the dams in the other two units which make up the Central Utah Project. Combined, these three units comprise the south face of the Uinta Mountain range:

UPALCO UNIT DAMS AND TUNNEL

NAME	DATE	BUILDER	STRUCTURE TYPE
Kidney Lake Dam	1918	Farnsworth Canal & Reservoir Co.	Earth fill
Brown Duck Lake Dam	1919	Farnsworth Canal & Reservoir Co.	Earth fill
Island Lake Dam	1919	Farnsworth Canal & Reservoir Co.	Earth fill
Farmers Lake Tunnel	1920	Farmers Irrigation Company	Rock-cut tunnel
Water Lily Lake Dam	1920	Farmers Irrigation Company	Earth fill
Deer Lake Dam	c1925	Farmers Irrigation Company	Earth fill
Clements Lake Dam	1926	Dry Gulch Irrigation Company	Earth fill
White Miller Lake Dam	c1926	Farmers Irrigation Company	Rock & sod fill
Drift Lake Dam	1928	Farmers Irrigation Company	Earth fill
Five Point Lake Dam	1929	Farmers Irrigation Company	Earth fill
Bluebell Lake Dam	1930	Farmers Irrigation Company	Earth fill
Superior Lake Dam	1930	Farmers Irrigation Company	Earth fill
Twin Pots Dam	1931	Farnsworth Canal & Reservoir Co.	Earth fill
Milk Lake Dam	1935	Chester Hartman et al.	Stone masonry
East Timothy Lake Dam	1951	Moon Lake Water Users Assoc.	Earth fill

UINTAH UNIT DAMS

NAME	DATE	BUILDER	STRUCTURE TYPE
Upper Chain Lakes Dam	1921	Dry Gulch Irrigation Company	Stone masonry
Fox Lake Dam	1922	Dry Gulch Irrigation Company	Earth fill
Middle Chain Lake Dam	1922	Dry Gulch Irrigation Company	Earth fill
Papoose Lake Dam	1923	Whiterocks Irrigation Company	unknown
Wigwam Lake Dam	1923	Whiterocks Irrigation Company	Earth fill
Crescent Lake Dam	1927	Dry Gulch Irrigation Company	unknown
Lower Chain Lake Dam	1929	Dry Gulch Irrigation Company	Stone masonry
Paradise Dam	1943	Whiterocks Irrigation Company	Earth fill
Atwood Lake Dam	1950	Dry Gulch Irrigation Company	Earth fill
Chepeta Lake Dam	1957	Whiterocks Irrigation Company	unknown
Cliff Lake Dam	1957	Ouray Park Irrigation Company	Earth fill
Moccasin Lake Dam	1964	Whiterocks Irrigation Company	Earth fill
Whiterocks Lake Dam	unk.	Ouray Park Irrigation Company	Earth fill

Located in a relatively isolated and remote area, the dams have retained a high degree of contextural integrity. All fifteen retain integrity of location, design, setting, material, workmanship, feeling and association, with only minor maintenance being performed since their initial construction. As modest representatives of engineering and historical trends, they are being considered for potential eligibility on a local basis.

8 SIGNIFICANCE

PERIOD	AREAS OF SIGNIFICANCE -- CHECK AND JUSTIFY BELOW			
__PREHISTORIC	__ARCHEOLOGY-PREHISTORIC	__COMMUNITY PLANNING	__LANDSCAPE ARCHITECTURE	__RELIGION
__1400-1499	__ARCHEOLOGY-HISTORIC	__CONSERVATION	__LAW	__SCIENCE
__1500-1599	X AGRICULTURE	__ECONOMICS	__LITERATURE	__SCULPTURE
__1600-1699	__ARCHITECTURE	__EDUCATION	__MILITARY	__SOCIAL/HUMANITARIAN
__1700-1799	__ART	X ENGINEERING	__MUSIC	__THEATER
__1800-1899	__COMMERCE	__EXPLORATION/SETTLEMENT	__PHILOSOPHY	__TRANSPORTATION
X 1900-	__COMMUNICATIONS	__INDUSTRY	__POLITICS/GOVERNMENT	__OTHER (SPECIFY)
		__INVENTION		

SPECIFIC DATES see HAER Inventory Cards BUILDER/ARCHITECT see HAER Inventory Cards

STATEMENT OF SIGNIFICANCE

Water storage and handling technology in the early 1900s in Utah and the West ranged from the ingenious and sophisticated, as evidenced by the Mountain Dell Dam, to the primitive, as evidenced by the numerous hand-built irrigation ditches and control structures. As relatively simple structures, built for the most part with natural materials using labor-intensive and unsophisticated construction techniques, the fifteen high mountain dams at the headwaters of the Provo River tend more toward the latter than the former. Earth and stone dams in the West are believed to have been first built during the 1849 California Gold Rush. They were commonly constructed throughout the region from the late 1800s until the 1930s. Though technologically rudimentary, the Bonneville Unit dams nevertheless exemplify the two most common types of small-scale dam construction used at remote locations in the West: the rubble masonry dam and the earth-fill dam. As such, they embody the distinctive characteristics of these types, period and methods of construction and qualify as eligible for the National Register under Criterion C.

Though technologically representative, the Bonneville Unit dams are more significant for their representation of an historical theme crucial to western development: water storage and distribution. From the earliest settlement to the present, water has been priceless in the arid West. To the settlers and church leaders in the Provo Basin, it was crucial for successful cultivation of crops and therefore for settlement itself. The irrigation systems in the basin grew organically in response to farmers' needs, eventually intertwining the farms and communities. The last aspect of water flow to be controlled by the irrigators, these high mountain dams marked the culmination of early water husbandry in the basin. Their storage capacity allowed the opening of large new tracts of irrigated farmland, and therefore impacted the region economically, facilitating further settlement. The fourteen structures owned by the Union Reservoir Company helped to consolidate the economic power of Robert Murdock, a locally prominent personnage, in the basin; the last dam, ownded by the Washington Irrigation Company, was the first undertaken in the basin. As such, these fifteen dams are an integral part of an historically significant system which has contributed to the broad patterns of Provo Basin history and qualify as eligible for the National Register under Criterion A.

ADDENDUM

The headwaters of the Provo River originate high on the western slope of the Uinta Mountains at an elevation of about 11,000 feet. Here, rounded peaks tower over glacier-carved basins, which are interspersed among high glacial moraines and drifts. Meadows and coniferous forests occupy the basin floors. The annual precipitation on this face of the range is approximately 40 inches, most of which falls as snow to form the deepest snow packs on the Uinta Mountains. The melting snow, held in numerous alpine lakes, form the primary sources of the Provo River.

The Provo River tumbles from the mountains and through the Utah Valley on its way to Utah Lake, a crescent shaped, 130-square-mile body of water. Between the Wasatch Front and the immense lake on the western edge of the valley lies a strip of land about five miles wide and 40 miles long which slopes gently to the west. The river penetrates the half-moon rim near the center of Provo Canyon and flows in a southwesterly direction to the freshwater lake. Located between the Wasatch Mountains and Utah Lake, to the southeast of the river, lies Provo: the county seat of Utah County, the home of Brigham Young University and a community whose Mormon culture is predated in Utah only by that of Salt Lake City.

Persecuted in the East and hounded in the Midwest for their religious beliefs and the practice of plural marriage, the Mormons had considered possible emigration to Texas, Oregon, California or even Vancouver Island in 1845. When John C. Fremont reported after his 1843 exploration of the area that the Wasatch Front as "of great pastoral promise abounding with fine streams... [and] soil that would produce wheat," the possibility of establishing a Mormon settlement at the foot of the Wasatch Front took hold. Acting upon a prophetic declaration by Joseph Smith that this followers might find a sanctuary in the midst of the Rocky Mountains, Brigham Young declared, "There we will go and in isolation we shall build a new Zion." Given that endorsement of Smith's declaration, the issue was settled when Fremont's report was read to the assembled Mormon quorum.

After great hardship, the Mormons arrived in Salt Lake Valley on July 24, 1847. Within a short time they explored southward into Utah Valley. In fact, within a week, one from their group, Orson Pratt, viewed Utah Lake. That December, Parley P. Pratt led a fishing expedition which sailed along the lake. In March

1849, John S. Higbee, who accompanied Pratt on his tour of exploration, was called by Brigham Young to form a settlement on the Provo River in Utah Valley. Some thirty families, numbering nearly 150 persons, set out under Higbee and on on April 3 commenced building "Fort Utah," the nucleus of Provo City.

From the beginning, Provo's most precious natural resource was her water supply. Although the narrow band of alluvial soil at the base of the Wasatch was fertile, it was the clear water meandering from the mountains which gave it agricultural value. After first driving out the Indians living in the valley in 1850, the Mormon settlers quickly moved from their fortification and onto the land along the Provo River. Frequent floods compelled newcomers to establish their farms on higher ground, however, necessitating the construction of irrigation canals to carry river water to the crops. In the summer of 1849, James Bean and the Clark family tapped the Provo River and dug the first irrigation ditch, later known as the Beanditch. Bean claimed to have grown and harvested the first crop of grain in Utah Valley. In the spring of 1850, the Turner Canal and the East Union Ditch were dug and brought water from the Provo River to the newly allocated farmlands.

The success of the Mormon settlers in the Provo River Valley was, to this date, largely due to their single-minded determination to create a "Kingdom of God" in the wilderness. Although Provo was geographically distinct from Salt Lake City, in political, economic and religious matters it was only an extension of the Mormon authority centered in Salt Lake City. There, Brigham Young, President and Prophet to the Mormon Church, was the ultimate decision-making authority. In certain situations, however, Young delegated considerable power to the local leadership. One such area was the allocation of natural resources, particularly land and water. Given the distances and the primitive transportation systems, land and water use questions were thought to be best handled regionally by stake presidents and their councilors, and locally by ward bishops. On March 19, 1851, church leaders formed an ecclesiastic organization in Provo and appointed the settlement's first ward bishop. The Provo Stake was organized soon after. As intermediaries between the wards and the central church leadership, stake leaders played an important role in Provo River water policy.

Although the Treaty of Guadalupe Hidalgo - which ended the Mexican War in 1848 - established United States jurisdiction over the State of Deseret, President Young's aim to establish a self-sustaining economy did not change. Complementing his desire for self-sufficiency was the homogeneity of the Mormon

settlers. This was due, in part, to their geographical isolation and their shared religious commitment. Their common values, coupled with an effective theocratic organization, tended to foster a cooperative ethic and eliminate duplication - as was the case in early irrigation canal construction.

In 1850 an attempt was made to facilitate family self-sufficiency by distibuting allotments of irrigated land large enough to permit each family, regardless of occupation, to raise its own fruit and vegetables. Soon a extensive network of irrigation canals, laterals and branches had grown throughout the community to bring water to these family plots. So pervasive was the quest for water that it was found necessary to "notify the owners of lots on the east side of main street to make their water ditch on the east side of said street as they will not be allowed to take water across main street to irrigate their gardens."

Upon organization as territory in 1851, the territorial legislature delegated authority to control the streams to county governments. On the surface, this move seemed to indicate that Mormon Church had officially abdicated control over Utah's water resources to a secular court system. But these courts were almost exclusively controlled by members of the Mormon hierarchy. Consequently, the decisions of the bishop's courts were essentially always implemented. The amount of water that could be diverted from the Provo River was at first considered unlimited. As Utah Valley's population grew, however, latecomers challenged the right claimed by the early settlers to use as much water as they desired. Accordingly, the value of Provo River water increased as the population increased. This situation led to water regulation and distribution disputes. The role of the Mormon church in these controversies was one of supervision and arbitration.

Latter-Day Saint Church leaders clearly preferred an ecclesiastical solution to any water dispute. In their attempt to combine water of the highlands with the fertile but arid lands below, the Mormons followed the lead of the Indians and Spaniards in North America. They succeeded on the western flank of the Wasatch Front by their ability to cooperate in the communal action, for the construction of even a modest irrigation ditch was a labor-intensive and intimidating undertaking. In addition to planning and constructing canals and laterals, church leaders borrowed features of Hispanic water law - specifically, public ownership of water with a priority right of diversion for users.

During the first two decades of Provo's settlement, centralized control and

communal ownership of Provo River water functioned well as long as the supply was sufficient to meet the needs of a relatively small population. With the completion of the transcontinental railroad in 1869, however, the population of the entire Utah Territory increased markedly. Although the majority of new immigrants in the Utah Valley were at least nominally members of the Mormon Church, the demand on the Provo River's limited water resources created a mandate for change in allocation of those resources. The communitarian ethic that had sustained the Mormons through their "trek into the wilderness" taught that all wealth was to be shared, but there was simply not enough water to go around. Although Brigham Young stressed economic collectivism into the 1870s, the Mormons were out-of-step with the post-Civil War spirit of laissez-faire capitalism. The scarcity of water in the Great Basin, barely admitted by Young in the beginning, became a major issue between established settlers and latecomers. With Young's death in 1877 and the passing of the church founders, Mormons began a process of mainstream "Americanization" that would end in 1896 with Utah's statehood.

In 1880, the growing demands on the water supply finally resulted in a major revision of Utah's system of water rights - a revision that greatly influenced the nature of irrigation development. With increasing disputes and existing legislation unenforced, an all-Morman legislature rescinded the earlier statutes and abandoned Utah's distinctive water-control institutions which were based on the notion of an ecclesiastical brotherhood. The legislature replaced them with the individualistic institutions adopted by the other western states and territories. The new statute provided for a property right in water granted by the state. Gone was the theory of public ownership, but a prospective water user might, by constructing a canal with "diligence" and diverting the stream for "any useful purpose", acquire water rights by seizure. Rights so acquired were claims to the use of water until they were confirmed by county selectmen in a non-judicial determination procedure or, in other words, until they were "proven up." The selectmen were to issue a certificate "for recording upon receipt of satisfactory proof," but this was enforced in only a few counties, and Utah became, like the other western states and territories, "a jungle of uncontrolled appropriations and undetermined water rights."

It was not until 1897, the year that Utah created the office of state engineer, that an attempt was made to sort out the water rights mess. It was not easy. Before 1880 water rights were usually unrecorded. Also, the early devices used to measure water flow were notoriously inaccurate. Few users knew just how much water they used or needed. Further complicating matters was the

long-standing tradition of the original settlers to take as much as they wanted with the common blessing of the community. Newcomers were expected to sort things out among themselves, settling who had the most senior secondary water right. This loose body of unrecorded primary and secondary water rights was referred to as diligence rights. Oldtimers saw little need for specific water allocations as long as the farmers cooperated in keeping the canals in working order and the headgates repaired.

In 1909, Joseph R. Murdock and a number of associates organized the Provo Reservoir Company, and under the amended water laws of the state (1903) made application to appropriate a portion of the unappropriated waters of the Provo River. The company held that a great quantity of water flowed through canals and ditches into Utah Lake. This water was not used for irrigation purposes and was, therefore, subject to appropriation. Provo City and the majority of established irrigation companies would not accept this point of view and refused to arbitrate the matter. In response, the Provo Reservoir Company filed suit in the Fourth District Court against "all other water users on Provo River." The matter finally came to trial before Judge C.W. Morse in June 1916, but because the suit was so stubbornly contested, so many interests were involved and so many measurements had to be taken, the final decree was not handed down until May 2, 1921.

In the interim, Joseph R. Murdock, President of the Provo Reservoir Company and Director of the Timpanogos Irrigation Company, was active in consolidating his company's control on the region. Murdock realized early that, with water crucial to farming, downstream users would soon think not only of diversion of streams, but of storing the waters at or near their sources. Mountain runoff that would otherwise flow through the Basin could be impounded in reservoirs during the abundant weeks of May and early June and released during the dry period in July and August, when irrigation demands were highest. Further, new reservoirs would not have to be constructed in the Uintas, when several existing high mountain lakes could be altered by damming to increase their holding capacities and control the outlet flow. On November 23, 1909, Murdock applied with the state engineer's office for reservoired water in twenty-three lakes located in the Uinta Forest Reserve at the headwaters of the Provo River. Fourteen of these lakes: Marjorie Lake (North fork #1), Weir Lake (North Fork #2), Long Lake (North Fork #3), Island Lake (North Fork #4), Fire Lake (North Fork #5), Duck Lake (North Fork #6), Lost Lake, Teapot Lake (Lost Lake #2), Star Lake, Washington Lake, Crystal Lake, Pot Lake, Trial Lake and Wall Lake,

are currently included in the Bonneville Unit stabilization program. Murdock's move was masterful, all but monopolizing the western slope water sources for the Provo River.

On June 20, 1910, Murdock, acting in behalf of the Provo Reservoir Company, the Sego Irrigation Company, the Wasatch Irrigation company and the Timpanogos Irrigation Company, applied for permission to enter the Uinta Forest Reserve for the purpose of constructing reservoirs on three of the larger lakes: Washington, Trial and Wall. Murdock also requested the privilege "to use rock, earth and timber as may be necessary for cabins, road building, bridges and construction work of dams." The dams were to be constructed of earth, rock and cement. The following day, Acting Supervisor J. Carl Allred gave the Provo Reservoir Company permission to begin construction as soon as a special use permit was received from the forest officer. Allred, himself, approved a special use agreement executed with the company on July 6, 1910, but it was cancelled. Forest Supervisor W.J. Pack then wrote the district forester on October 12, 1910, informing him that the company had applied for the privilege of reservoiring from thirty to forty lakes within the boundaries of the Uinta National Forest, the water from which:

> would go down the natural channels which empty into the Provo River. The water would be used for irrigation proposed on land lying about four miles north of Provo City, and extending northwest along the base of the mountain for a distance of about ten to fifteen miles.

Supervisor Pack passed on Murdock's assurance that the Provo Reservoir Company also proposed to cooperate with the National Forest Service in constructing access roads and telephone lines, "as these improvements should be of much value to the Forest Service."

On August 20, 1913, Acting Supervisor Allred issued five special use permits covering the Lost Lake, North Fork, Knight Meadows, Haystack and Lincoln Meadows drainage systems, in which the majority of lakes were located. However, Allred was premature. The regional office again cancelled the permits, but Joseph Murdock persisted. Acting as reservoir construction manager for the Union Reservoir Company, in October, 1914, he informed Forest Service officials that the Provo, the Timpanogos, the Wasatch and the Sego Irrigation companies planned to work cooperatively to secure a special use permit, consolidating their water rights in the lakes through the Union Reservoir Company.

On September 30, 1915, a somewhat reluctant district forester finally issued a special use permit for the purpose of "constructing and maintaining reservoirs and storing water for irrigation purposes exclusively." Also on the same date a special use permit to construct storage reservoirs on Washington, Star and Wall Lake was issued. These permits were approved on the grounds that the companies' beneficiaries were the general public, and that the issuance of such permits would not affect any projects of the United States Reclamation Service. The Forest Service, struggling to find the middle ground between private use and public gain as well as a proper definition of "multiple use," decided to allow development of the high-country lakes by semi-private irrigation companies.

Joseph Murdock and the nine other individuals who served as the officers or sat on the board of directors of the Provo Reservoir Company were prominent professional men and members of the LDS Church. Murdock, born August 11, 1858, in Salt Lake City, had taught high school for three years after attending Brigham Young Academy. In addition to teaching, he was involved in farming, ranching and commercial interests before turning his attention to politics. He served as a member of the Utah State Constitutional Convention, was elected as Wasatch County's representative in the first two state legislatures, and in November, 1900, became state senator from the Fifth Senatorial District.

In 1901, Murdock was "called" by the church to act as first councilor to William H. Smart, president of the Wasatch Stake. He succeeded Smart as president of the Wasatch Development Company, which served as the corporation for promotion and development of church homesteading in the Uinta Basin, in 1905. Following the incorporation of the Provo Reservoir company on July 5, 1910, Murdock served concurrently as its president of the Provo Water Users Association, and the construction manager of the Union Reservoir Company.

His son, Royal Joseph Murdock, who acted as secretary of the Provo Reservoir Company, had just recently returned from a "mission" to the northern states and was destined to become a bishop of the Provo 4th Ward, Utah Stake. Joseph B. Keeler, vice president of the Provo Reservoir Company was Mormon bishop and author. He served as an early stake president following the redesignation of the Provo Stake to the Utah Stake in 1877.

Members serving on the Provo Reservoir Company's board of directors in 1910 represented a cross section of Utah's power elite. They were: Jesse William Knight, son of the investment magnate, financier and first councilor of the

Utah Stake presidency; Stephen L. Chipman, a member of the Provo school board and city council, and second councilor in the church; Edward D. Clyde, graduate of Brigham Young Academy, prominent orator and second councilor to the presidency of the Wasatch Stake; George H. Brimhall, president of Brigham Young University; Abel J. Evans, high councilor in the Utah Stake, four-time state senator and self-educated attorney; David A Broadbent, bishops' councilor and principal of Heber schools; Earl J. Glade, professor of business at Brigham Young University, Utah's radio pioneer and church elder.

The executive and director positions of the Wasatch, Timpanogos and Sego Irrigation companies were, likewise, filled exclusively by prominent Mormons. Elder James Clover, president of the Sego Irrigation Company, had been one of the first missionaries sent to Scandinavia from Utah. The Vice president of the Timpanogos Irrigation Company, James Heber, was a member of the Willie Handcart Company of 1856. It appears that, from early on, a select LDS Church membership held absolute control on high-country storage rights on the upper Provo River.

By the time the Forest Service finally acceded to creation of the high mountain reservoirs in 1915, Murdock had already constructed retention structures on three of the larger natural lakes near the headwater of the Provo River: Washington, Trial and Wall Lakes. Washington was the largest of the three. A deep body of water with a gently sloping shoreline covered with conifers, it was the largest and most accessible of the fifteen reservoired lakes in the upper Provo River drainage. With a crest length of 700 feet, a maximum height of 42 feet, and a crest width of 18 feet, the Washington Lake Dam consisted of compacted earth fill over a poured-in-place concrete core, with 18" of stone riprap laid over its upstream and downstream faces. The outlet was a 20" diameter, 1/4" riveted steel pipe, with a slide headgate at the pipe inlet and a 20" Ludlow gate valve on the downstream toe. Completion of the dam enlarged the lake size to almost 120 acres, with a 3,035 acre-foot maximum storage capacity and a 32-foot maximum drawdown.

The Provo River originates from Trial Lake, the second largest of the reservoired lakes in the drainage. There, contractors built a pair of medium-scale dams at the natural outlet on the lake's southern end. With a 600-foot long crest, 40-foot maximum height and a crest width of 18 feet, the primary dam, like the Washington Lake Dam, consisted of compacted earth fill over a concrete core, with 18" of stone riprapping on its sloped upstream and downstream faces. The outlet was an 18" diameter, 1/4" riveted steel pipe, with a slide headgate and a 20" Ludlow gate valve on the downstream toe. Trial

Lake was enlarged to a surface area of 98 acres, with a 2,020 acre-foot maximum storage capacity and a 36-foot maximum drawdown.

Wall was the highest (10,160 feet), deepest (115 feet) and northernmost of the three lakes. It was characterized by an irregular shoreline of talus slopes ad scattered conifers. The Wall Lake Dam, an obtuse V-shaped 615-foot structure with a 35-foot height and 16-foot width, was made up of a compacted clay core, covered with earth and rock waste fill and faced with rock riprap on both slopes. Like the others, the outlet consisted of a 20" diameter, 1/4" riveted steel pipe with a sliding headgate and Ludlow gate valve. Wall Lake was enlarged to an 85-acre size, with a 3,533 acre-foot storage capacity and a 35-foot maximum drawdown.

All three dams - and the majority of those that followed - employed typical earth-fill construction. Among the most rudimentary of structural types, earth fill dams typically consisted of a water-barrier central core covered with tons of earth fill for height and ballast and faced with a stone veneer for erosion control. The cores of Washington and Trial Lakes were poured-in-place concrete; Wall Lake used a compacted bentonite clay core. The earth fill which made up the bulk of the dams' weight was scooped from nearby open pit operations, dumped over the cores, compacted and graded using horse or tractor-pulled scrapers and graders. The finish-graded earth fill structure was then covered with large-scale granite stone riprap, typically laid 1 to 2 feet thick. The upstream and downstream surfaces of the dams were generally graded with a 1:1 slope. Trial and Wall Lake Dams both are contoured in this fashion, and the riprap has simply been dumped over the earth walls. The walls of Washington Dam, however, slope at an atypically steep 2:1, necessitating hand placement of the riprap stones to insure proper consolidation of the dam face. Motive power for construction was provided by men, horses (or mules), trucks or tractors, depending upon the accessibility of the dam site.

At the base of the maximum section of each dam, an outlet pipe was placed. A steel, shovel-headed headgate typically covered the upstream face of the outlet pipe. Mounted either vertically or roughly parallel with the inclined surface of the dam on a rigid steel stem guide, the gate was connected via the steel valve stem to a gate wheel at the top of the mechanism. The flow rate through the outlet was controlled by rotating the gate wheel, which raised or lowered the gate by moving threaded stem. Usually on one end of the dam a concrete overflow spillway was poured in place. This spillway functioned as a release valve for the dam in the event of excessive water accumulation in the lake and

served to prevent breaching or overflowing of the retention structure. The flow through this was typically controlled by one or two freeboards, held in place in formed grooves in the spillway walls and raised or lowered by steps.

In September 1915, forest service district engineer E.W. Kramer plotted the point of diversion from the Provo River used by the Provo, Timpanogos, Wasatch and Sego Irrigation Companies. The Timpanogos Company used the conduit of the Heber Light and Power Company which was extended approximately 10 miles in a southeasterly direction to irrigate the higher lands of the Provo Valley. Kramer reported:

> Mr. Murdock, Secretary of Provo Reservoir Co. informed me that the Timpanogos Canal had a capacity of from 4-5 second feet and that the company depended almost entirely on the stored water except during the flood water period... the value of the lands irrigated varied from about $60-$90 per acre, including water. This company's interest amounts to 7/28 of the water stored in the reservoirs applied for jointly by the four companies.

The Wasatch Irrigation Company diverted water from the Provo River at a point about 1-1/2 miles below the diversion of the Heber Power and Light Company and downstream from where the power company returned the water into the river. The irrigation canal was approximately seven miles long and delivered water to 3,000 to 4,000 acres of land near Heber. Kramer determined that the company "depended very little on stored water" and had a low-water right large enough to irrigate almost all of its land which was worth from $100 to $150 per acre.

The Sego Irrigation Company diverted water from the conduit of the Utah Power and Light Company's Olmstead Plant. It had no low-water right and depended entirely upon high water and water stored in the high mountain reservoirs. Kramer estimated that the company irrigated 400 acres on the Provo Bench, worth $100 to $200 per acre.

The Provo Reservoir Company diverted Provo River water below the intake of the Olmstead Plant and above the point of return. Kramer was informed by Murdock that "the Provo Reservoir Company has a prior right to 10 second-feet of the natural flow of the Provo River ahead of the water right of the Olmstead Plant." The reservoir company irrigated land on the Provo Bench, located on the north side of the Provo River between the Wasatch Mountains and Utah Lake. The approximate value of the land was from $100 to $200 per acre.

The Provo Reservoir Company first turned water through its canal in 1910. It was not until the company had secured an adequate and dependable supply of late-summer water by the construction of the three storage reservoirs that the canal was extended to the large bench on the west side of the Provo River. From the point of diversion, the canal stretched northward through Utah Valley, skirting the foothills of the Jordan Narrows near the point of the mountain. Here, the canal crossed the Jordan River in 48-inch concrete and 40-inch steel pipes and discharged into two canals. One branch ran south to Salt Lake County to a point west of Murray. The enlargement of the Provo Reservoir canal was designated the "Jordan Extension."

In April 1915, water was first turned into the siphon which carried it across the canyon at the Jordan Narrows. After the opening, a banquet was held at the Roberts Hotel in Provo. The notable guests feasting on mountain trout and delivering speeches included: John R. Murdock, president of the company; George S. McAllister, representing the manufacturers of Utah; W.E. Hubbard, president of Salt Lake Real Estate Association; J.W. McHenry, president of the United Commercial Clubs of Salt Lake County; Oskar F. Hunter, bishop of the Eighth Ward of the LDS Church in Salt Lake; George O. Rief, general manager of the Hotel Utah; O.C. Beebe, cashier of the Zion's Saving Bank and Trust Company; Jesse Knight, financial mogul who had backed the enterprise from the beginning; and W.C. Orem, president of the Salt Lake and Utah Railroad Company.

On July 7, 1921, Murdock, other officers and directors of the Provo Irrigation Company and prominent state and county officials were present when the switch was thrown on the new pumping station located at the Jordan Narrows. The plant was built to augment the flow of water brought down from the mouth of Provo Canyon to the fertile lands lying to the west and south of Salt Lake City - a distance of 40 miles. The twin pumps acted in conjunction with the mountain storage reservoirs to prevent mid-season depletion of the river's waterflow. According to Murdock, the Jordan Extension Canal and the pumping station received no federal, state or church aid, but was financed by "Uncle Jesse" Knight. While Murdock admitted that the company had been involved in litigation with more than six hundred individual irrigation companies and corporations since the $2 million project began, he maintained that 90 percent of the suits were compromised. Referring to court rulings, Murdock stated, "We were so successful that we have sustained decrees in every instance."

The Morse Decree of the preceding May - touted as the first litigation made on the physical unity of the stream from its headwaters to its mouth - adjudicated

a generous allotment of Provo River water to the Provo Reservoir Company. The decree stipulated that the flow of water be measured in second-feet for irrigation purposes, with each second-foot have a "duty" capable of irrigating a certain number of acres. For example, "Duty 60" indicated that a flow of water of one cubic foot per second was sufficient to irrigate sixty acres of land. The Provo Reservoir Company was allocated sufficient "duty" to service 7,000 acres on which "some of the finest homes, schools and church buildings have been built," via its canal, siphon and 'deluxe farming system.'"

In November 1923, W.M. Green, engineer for the U.S. Bureau of Reclamation, and the Utah Water Commission, the corresponding state agency, discussed a jointly funded project with Murdock, also a member of the state water commission. On July 3, 1924, the Provo Reservoir Water Users Association, the largest capitalized company to date in Utah County, filed articles of incorporation with the county clerk. Joseph Murdock headed the corporation; his son Royal was the secretary-treasurer; Abel John Evans, J.W. Gillman, Parley Austin, James N. Anderson, R. D. Wadley, Ben C. Lott and A.O. McMullin were directors.

The property of the corporation consisted of 15.7598 cubic feet per second of class A water rights as defined in civil action No. 2883 in the Fourth District Court; 11.6234 cfs from applications No. 1828 and No. 3134 for appropriated water filed with the state engineer's office; and 78.2739 cfs of high water, water rights applications. The corporation's capital stock was divided into 30,000 shares of water stock and the irrigation system was divided into two divisions, the Provo and the Jordan. The Provo division was, in turn, divided into the Alpine and Orem districts with the reservoirs in the Alpine district.

In light of the anticipated federal assistance, the corporation proposed to extend the Provo Reservoir Canal from the point of the mountain to the Fort Douglas Military Reservation, thus furnishing water to the eastern part of Salt Lake Valley. The canal would be thirty-three miles long and capable of irrigating 50,000 acres in Utah and Salt Lake counties. In reality, the canal extension died on the planning table.

Although the Bureau of Reclamation's Provo River Project would deliver more water into the Utah Valley, it was not approved by the Secretary of the Interior until 1935, and actual construction commenced in 1938. In the interim, the Provo Reservoir Company, along with the various other companies owning water in the high-country lakes, busied themselves with damming and enlarging them as storage reservoirs.

In addition to those built on Washington, Wall and Trial lakes, the Provo Reservoir Company had constructed dams on Crystal, Star, Teapot and Lost lakes by May 1923. Long Lake and Island Lake had only small rock and dirt dams. That year, a dam was constructed on Long Lake for the purpose of storing irrigation water. The Long Lake Dam and secondary dike were situated across the lake's natural drainage at its southern tip. Like the three dams built in 1914, both structures at Long Lake featured typical earth fill construction, with compacted clay cores, earth fill over and rock riprap on the sloping upstream and downstream faces. The 342-foot-long, 26-foot-high dam increased the surface area of Long Lake to 55 acres. The outlet works consisted of a 24-inch diameter corrugated iron ingot pipe with 4 inches of concrete sheathing. An inclined 18" Hardesty sliding headgate was fitted at the outlet's upstream end. Workers poured a double-gated concrete overflow spillway on the eastern end of the dam, to which was attached 4-foot freeboards.

In 1926, the Provo Reservoir Company constructed a new dam on Lost Lake to replace a small rock-and-earth dam built by 1923. The reservoir company contracted with the Clyde and Whiting Company of Springville, Utah, to erect a large earth-fill dam and dike across the lake's south and east drainages. Using more than 60 men, 8 teams and several large trucks, the construction firm built the retention structures for approximately $26,000. The dam and dike were built with compacted clay cores, covered with earth fill which was graded to a 1:1 slope and faced with hand-placed stone riprap three feet thick. With a total crest length of 1,820 feet, a maximum height of 25 feet, a maximum base thickness of 88 feet and a crest width of 16 feet, the Lost Lake dam and dike were the largest of the earth-fill structures built over the natural lakes in the upper Provo River drainage. They represented a considerable investment by the reservoir company and substantially increased the holding capacity of the lake.

No other dams were built until a drought in 1931 sparked a renewed interest in high-country reservoir construction. As the larger lakes had already been dammed, attention was now turned to the smaller, more marginal mountain lakes for storage capacity. The Timpanogos Irrigation company was particularly hard-pressed to provide water to its downstream users and required additional high mountain storage capacity. In the spring of 1932, the company sent a number men and horse teams to Island Lake for the purpose of constructing a dam. They were warned by the Forest Service not to begin until they were issued a special use permit, as the stipulations of the 1915 permits had not been complied with, thus the old permits were invalid.

In September, 1934, the Provo Reservoir Company applied for National Forest special use permits on Teapot and Island lakes. Applications for water rights (No. 2077G and No. 2077B) for the two lakes had been filed with the Utah State Engineer in 1909, and approved on December 24. Specifications for dam construction were submitted to the Forest Service in July, 1934. Acting Regional Forester Dana Parkinson wrote the forest supervisor on October 1, 1934, informing him that Island and Teapot lakes should not be approved for reservoirs, as they had far higher values for recreation:

> No. 4, Island, never had an outflow - It would seem foolish to reservoir that lake when there is no water running out under present conditions. If this is a sample of the type of lake they [Provo Reservoir Company] plan on reservoiring, it would seem that they would be more justified to making more thorough examinations before going ahead.

Both lakes were reservoired in 1934. Located at the head of the North Fork of the Provo River above Duck and Fire Lakes, Island Lake is characterized by shorelines of rocky cliffs, grassy meadows and stands of timber. The lake in its natural state overflowed into a smaller pond, the outlet of which was dammed by the reservoir company. Island Lake was both lowered below the natural level by a ditch and raised by a dam to increase its storage capacity and control the water flow. The dam typified small-scale earth-fill construction, with stone riprap placed on the sloping upstream and downstream faces. A 12" Hardesty Model 112 circular headgate regulated water through the corrugated steel outlet pipe, and a poured-in-place concrete spillway drained the overflow. The dam increased the lake's storage capacity to 460 acre-feet.

The fifth smallest among the fifteen reservoired lakes, Teapot Lake is characterized by a gently sloping shoreline with grassy meadows and coniferous forests. The lake was impounded by two small dams across the natural outlets on the east and southeast corners. With an aggregate length of 120 feet, the dams were composed of a compacted earth core, covered with 18" stone riprap facing on the sloped dam walls. The northern dam contained the outlet: a 12" diameter corrugated steel pipe with a Hardesty No. 100 headgate.

In 1934, the Provo Reservoir Company dammed the outlets of Weir and Fire lakes. Built from similar designs and specifications, they are distinguished from the other dams in the upper Provo drainage in their construction technique. Unlike the rudimentary earth-fill structures on the other lakes, the Weir Lake and Fire Lake dams were built using fieldstone rubble masonry for the upstream

faces. The granite stone on the vertical walls of these were fitted and laid with Portland cement joinery. The downstream faces of the two dams featured a more conventional sloped earth configuration and were covered with hand-placed stone riprap. The larger of the two reservoirs with a surface area of 12.4 acres, Fire Lake was a scenic water body with a steep, rocky shoreline dotted by conifers. The 240-foot-long dam was picturesquely placed over the southeast outlet on smooth sloping glaciated bedrock with its downstream toe almost on the lip of a ledge. The dam outlet consisted of a reinforced concrete box culvert; the outlet gate was a standard Hardesty cast iron sliding gate secured to the culvert by a twelve-gauge pipe embedded in the concrete. A double-gate concrete spillway on the dam's west edge was situated on quartzite ledge rock.

The second smallest among the dammed lakes in the upper Provo River drainage, Weir Lake was an irregularly shaped natural body of water with a steeply sloped and timbered, rocky shoreline. The small stream that drained Long Lake flowed into Weir through a marsh at its northern end. The Weir Lake Dam was built with a crest length of 248 feet, a maximum height of 15 feet, a crest width of 3 feet and a base thickness of 27 feet. Like the Fire Lake Dam, the outlet gate on Weir was a standard Hardesty cast iron slide gate secured by a twelve-gauge pipe embedded in the concrete outlet culvert. Log barricades were constructed upstream from the concrete overflow spillways of the two dams to protect them from floating logs. The dam increased the surface area of Weir Lake to 14 acres; its maximum capacity was increased to 110 acre-feet.

Although the gain in storage capacity was negligible, the Provo Reservoir Company also dammed diminutive Pot Lake in 1934. A picturesque body of water with a rocky shoreline dotted by scattered timber, Pot Lake is the smallest of the fifteen reservoired mountain lakes. Sixty feet long and only 8 feet high, the Pot Lake Dam consisted of the typical clay core, covered with compacted earth fill graded to a 1:1 slope and faced with handplaced rock riprap. The outlet was a 12" diameter corrugated iron pipe with an inclined Hardesty sliding headgate.

Creating the last privately-built reservoirs on the upper Provo River drainage, the Timpanogos Irrigation Company built dams on Marjorie and Duck lakes in 1935. The two used similar construction specifications. Both dams had center cores of selected clay and earth, upon which was placed a compact mixture of earth, clay and gravel and the faces were covered with rock riprap. Because the upstream and downstream faces sloped at a 2:1 angle, the riprap was "carefully placed by hand so as to insure the greatest density and stability

for the structure; the largest stones being kept near the outer faces and the smaller fragments along the inner faces." The longer of the two retention structures, the Marjorie Lake Dam more than doubled the surface area of the shallow lake to 27.3 acres. It was shaped like an obtuse V and had a crest length of 940 feet, a maximum height of 25 feet and a crest width of 13 feet. The Duck Lake Dam was 560 feet long, 19 feet high and 11 feet wide at crest. It increased the size of the lake to 32.6 acres, with a 353 acre-foot capacity and a 16-foot vertical maximum drawdown. Embedded at the maximum section of each dam was a 15-inch-diameter, standard reinforced concrete bell and spigot outlet pipe, with a spillway located upon quartzite ledge rock. To each outlet was attached a 15-inch standard cast-iron Hardesty slide headgate, placed at the upper end of the outlet culvert and embedded in concrete. On the north end of the Duck Lake dam and the east end of the Marjorie Lake Dam, the contractors poured concrete overflow spillways, each fitted with a two-foot freeboard.

Despite the irrigation network of reservoirs and irrigation canals built on the Provo River drainage by private interests, the natural streamflow eventually proved insufficient to satisfy demand. On May 2, 1935, the Provo Water Users Association contracted with the U.S. Bureau of Reclamation for project repayment of a proposed storage reservoir on Provo River, which was to be fed by diversions from other watersheds. Deer Creek Dam, the key feature of the Provo River Project completed in 1953, is located 17 miles northeast of Provo City and reservoirs 2,809,796 cubic yards of water. The Provo River Water Users Association was assessed $11,400,000, payable in forty annual installments, for their subscription of 16,000 acre feet in Deer Creek Reservoir's total volume. Water provided by the Provo River Project increased irrigable lands from 26,000 acres in 1940 to 41,000 acres in 1951. During that period, crop values more than tripled from $1.5 million to $5 million. Furthermore, an assurance of a dependable water supply figured prominently in the decision by the United States Steel Company to locate its Geneva Plant on the east shore of Utah Lake.

Much had changed since 1849 when the first Mormon settlers in Utah Valley harvested a limited crop of grain, potatoes and vegetables. As of 1953, canning crops, fruits and vegetables constituted the chief revenue on lands serviced by the expanded network of reservoirs and irrigation canals. These three crops accounted for more than half of the total farm income during most years. The production of fourteen crops, livestock and livestock products were classified in order of importance as: pears, cherries, eggs, turkeys, chickens, plums, sugar beets, peas, strawberries, alfalfa, onions, apples, wool, sheep and lamb and tomatoes.

Due to increased water demand, the Bonneville Unit of the Central Utah Project was authorized by Congress in 1956. The plan for the Bonneville Unit included construction of Jordanelle Reservoir and Powerplant on the Provo River, completion of two aqueducts and modification of the Provo River headwater reservoirs. The primary goal would be to provide 90,000 acre-feet of water annually for munincipal and industrial use in Salt Lake County and northern Utah County. As approved, the project would also provide 14,100 acre-feet of water for supplemental irrigation of 22,740 acres of presently irrigate irrigated land in the Heber-Francis area of Summit and Wasatch counties, generate hydroelectric power, provide flood control, improve recreational opportunities and some aesthetic values, and include measures to mitigate fishery and wildlife losses.

A portion of the water proposed for storage in Jordanelle Reservoir would be derived by stabilizing thirteen of the fifteen reservoired lakes located at the headwaters of the Provo river in the Wasatch National Forest. As planned, the storage will be transferred downstream to the proposed Joradanelle Reservoir in exchange for fisheries and wildlife benefits realized upstream. With stabilization, both the lake levels and the streamflow of the Provo River in the first ten miles below the lakes would revert essentially to natural conditions, since the irrigation storage and release occurring at the thirteen lakes would be eliminated and this stretch has no significant diversions.

The thirteen reservoired lakes scheduled for stabilization are: Big Elk, Crystal, Duck, Fire, Island, Long, Lost, Marjorie, Pot, Star, Teapot, Washington and Weir. They have a combined storage capacity of about 12,000 acre-feet. The proposed Jordanelle Reservoir will have an active storage capacity of 320,000 acre-feet. The dams on Trial and Washington lakes are slated for reconstruction to meet state standards; the two reservoired lakes will then provide water storage for users above the Jordanelle Reservoir.

In the early 1960s, Forest Service personnel discovered that no copy of the special use permit for the fifteenth Bonneville Unit high-country reservoir, Big Elk Lake, was in the possession of the Forest Service district ranger or of the permittee, the Washington Irrigation Company. The Washington Irrigation Company had been incorporated in 1906, with Donald C. Pack as president and Bryann J. Mitchell, secretary. After an extensive search, an application for a right-of-way in the Uinta National Forest signed on October 22, 1906, by Byram J. Mitchell, secretary, and Don L. Pack, president of the irrigation company, was found. As the Uinta National Forest Reserve (Utah's first) had been in existence for only nine years in 1906, and storage dam construction was

essentially a twentieth century phenomenon, no special use permits had, as yet, been issued. The Forest Reserve Supervisor, in accordance with the amendatory regulations of the U.S. Department of Interior approved by the Secretary on April 25, 1906, concerning rights-of-way for railroads, canals and reservoirs, approved the company's request after Pack signed a "stipulation." The regulations provided that "whenever a right of way is located upon a forest or timber-land Reserve, the applicant must enter into such stipulation and execute such bond as the Secretary of Agriculture may require for the protection of such Reserve. This was the first such right-of-way granted for a reservoir in the Uinta Forest Preserve. In compliance with preserve requirements, the Washington Irrigation Company agreed to "maintain the waters of Reservoir No. 1 (known as Big Elk Lake) at or above the normal level of the lake."

The sixth largest and second deepest of the fifteen reservoired high mountain lakes in the Bonneville Unit, Big Elk is characterized by a shoreline of rocky escarpments dotted with timber. Unlike the other lakes it drains not into the Provo River, but into Boulder Creek, from which the Washington Irrigation Company drew water for its canals.

By 1914, the irrigation company had spent $8,000 reservoiring Big Elk Lake and estimated it would spend $4,000 more before it finished the project. Dam construction was completed in 1918. Situated picturesquely 10 feet from a precipitous rock ledge, the 300-foot-long dam was 29 feet high and 16 feet wide at its crest. It features typical earth-fill construction, with handplaced rock riprap on its sloped faces and a 18" by 24" concrete box outlet with an inclined headgate. An overflow spillway has been blasted in the stone at the dam's southern end. The lake was increased to 43 acres, with 2,062 acre-feet maximum storage capacity and a 25-foot maximum drawdown. Although completed four years after Robert Murdock's first three dams, the Big Elk Dam was the first high mountain retention structure undertaken in the Provo River drainage.

Addendum, Item 9: Major Bibliographic References (see also HAER Inventory Cards)

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9 MAJOR BIBLIOGRAPHICAL REFERENCES

See Addendum, Item 9

10 GEOGRAPHICAL DATA

ACREAGE OF NOMINATED PROPERTY less than 1

UTM REFERENCES multiple resources (see HAER Inventory Cards)

	ZONE	EASTING	NORTHING		ZONE	EASTING	NORTHING
A				B			
C				D			

VERBAL BOUNDARY DESCRIPTION

This nomination consists of a series of noncontiguous sites, each covering less than one acre. The boundary for each site is defined as the dam only, both above and below the water line. For sites which include both a primary dam and a secondary dike (indicated by the HAER Inventory Cards), the nominated boundaries include both dam and dike, both above and below the water line.

LIST ALL STATES AND COUNTIES FOR PROPERTIES OVERLAPPING STATE OR COUNTY BOUNDARIES
(only one of the nominated sites overlaps county boundaries: Lost Lake Dam)

STATE	CODE	COUNTY	CODE
Utah	049	Wasatch	051
Utah	049	Summit	043

11 FORM PREPARED BY

NAME / TITLE
Clayton B. Fraser, Principal

ORGANIZATION
Fraserdesign

DATE
12 February 1986

STREET & NUMBER
1269 Cleveland Avenue

TELEPHONE
303-669-7969

CITY OR TOWN
Loveland

STATE
Colorado 80537

12 CERTIFICATION OF NOMINATION

STATE HISTORIC PRESERVATION OFFICER RECOMMENDATION

YES____ NO____ NONE____

STATE HISTORIC PRESERVATION OFFICER SIGNATURE

In compliance with Executive Order 11593, I hereby nominate this property to the National Register, certifying that the State Historic Preservation Officer has been allowed 90 days in which to present the nomination to the State Review Board and to evaluate its significance. The evaluated level of significance is ____National ____State _X_Local.

FEDERAL REPRESENTATIVE SIGNATURE

TITLE

DATE

FOR NPS USE ONLY

I HEREBY CERTIFY THAT THIS PROPERTY IS INCLUDED IN THE NATIONAL REGISTER

DATE

DIRECTOR, OFFICE OF ARCHEOLOGY AND HISTORIC PRESERVATION

ATTEST:

DATE

KEEPER OF THE NATIONAL REGISTER

Summary Table BONNEVILLE UNIT DAMS

DAM NAME	DATE	BUILDER	DAM TYPE	LENGTH	HEIGHT	WIDTH	COMMENTS
Trial Lake Dam HAER No. UT-41-L	1914	Provo Reservoir Company et al.	Earth fill	600'	40'	18'	NRHP eligible under criteria B and C
Wall Lake Dam HAER No. UT-41-M	1914	Provo Reservoir Company et al.	Earth fill	615'	35'	16'	NRHP eligible under criteria B and C
Washington Lake Dam HAER No. UT-41-N	1914	Provo Reservoir Company et al.	Earth fill	700'	42'	18'	NRHP eligible under criteria B and C
Crystal Lake Dam HAER No. UT-41-B	1916	Provo Reservoir Company et al.	Earth fill	70'	6'	12'	NRHP eligible under criteria B and C
Big Elk Lake Dam HAER No. UT-41-A	1918	Washington Irrigation Company	Earth fill	300'	29'	16'	NRHP eligible under criteria B and C
Long Lake Dam HAER No. UT-41-F	1923	Provo Reservoir Company	Earth fill	342'	26'	16'	NRHP eligible under criteria B and C
Lost Lake Dam HAER No. UT-41-G	1926	Provo Reservoir Company	Earth fill	950"	25'	13'	NRHP eligible under criteria B and C
Star Lake Dam HAER No. UT-41-J	1926	Provo Reservoir Company	Earth fill	300'	17'	13'	NRHP eligible under criteria B and C
Island Lake Dam HAER No. UT-41-E	1932	Provo Reservoir Company	Earth fill	163'	8'	12'	NRHP eligible under criteria B and C
Fire Lake Dam HAER No. UT-41-D	1934	Provo Reservoir Company	Grouted stone masonry	240'	12'	3'	NRHP eligible under criteria B and C
Pot Lake Dam HAER No. UT-41-I	1934	Provo Reservoir Company	Earth fill	60'	8'	12'	NRHP eligible under criteria B and C
Teapot Lake Dam HAER No. UT-41-K	1934	Provo Reservoir Company	Earth fill	120'	8'	6'	NRHP eligible under criteria B and C
Weir Lake Dam HAER No. UT-41-O	1934	Provo Reservoir Company et al.	Grouted stone masonry	248'	15'	27'	NRHP eligible under criteria B and C
Duck Lake Dam HAER No. UT-41-C	1935	Timanogos Irrigation Company	Earth fill	560'	19'	11'	NRHP eligible under criteria B and C
Marjorie Lake Dam HAER No. UT-41-H	1935	Timanogos Irrigation Company	Earth fill	940'	25'	13'	NRHP eligible under criteria B and C