

Historical Overview of the North Union Canal

By Sheri Murray Ellis
Certus Environmental Solutions
October 2019

INTRODUCTION

The North Union Canal is a more than 9-mile long irrigation canal located in the communities of Orem, Lindon, and Pleasant Grove in Utah County, Utah. The canal begins at a diversion on the Provo Bench Canal (sometimes referred to as the Big Bench Canal), which draws water from the Provo River near the mouth of Provo Canyon and travels southwest to 1000 East and Palisade Drive in Orem to a diversion structure.¹ The North Union Canal begins at this diversion, crossing through the community of Lindon and continuing north into Pleasant Grove (see **Figure 1**). The Provo Bench Irrigation Company operates and maintains the Provo Bench Canal from the diversion on the river to 800 North in Orem. The North Union Irrigation Company manages the canal north of that point.²

The North Union Canal was constructed during the historical period and was documented first as an archaeological resource in 2006 and assigned the Smithsonian trinomial site number 42UT1333. In 2018, the Lindon City received a federal WaterSMART grant from the U.S. Bureau of Reclamation (BOR) to pipe portions of the open canal channel in their community. The piping project was subject to review under the National Historic Preservation Act and its implementing regulations at 36 CFR 800. During this review, which included consultation between the BOR and the Utah State Historic Preservation Office (SHPO), the canal was determined to be eligible for the National Register of Historic Places as a historical site, and the proposed piping of segments of the open channel was determined to have an adverse effect on the site. Subsequently, the BOR, SHPO, and other parties entered into a Memorandum of Agreement (MOA) to resolve the adverse effects to the site. This MOA outline stipulations for mitigation measures to be carried out in compensation for the effects. The preparation of a historical overview of the North Union Canal was among those stipulations. That history is presented herein.

In preparing this historical overview, the author examined Sanborn maps, historical newspapers, published histories, unpublished manuscripts, canal company records, and other materials related to the canal. Lindon City was instrumental in helping to gather the historical records used to compile this document.

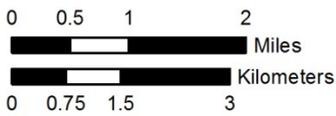
¹ City of Orem. 2009. *North Union Canal Trail Concept Report*. On file at Orem City Hall, Orem.

² *Ibid.*



**Figure 1:
Location of the North Union Canal**

█ Provo Bench Canal
 █ North Union Canal




 NAD 1983
 UTM Zone 12N
 1:100,000

Basemap taken from Utah AGRC
Terrain Imagery



SETTLEMENT AND IRRIGATION IN UTAH VALLEY

Anglo settlement and irrigation went hand-in-hand in Utah. The Utah Valley was no exception. Isolated from the rest of the nation and established supply routes, the first settlers of the 1840s were dependent on themselves to produce the food that would sustain them and allow them to remain in what would soon be known as the “Utah Territory.” While hunting and gathering were necessary in the first months to supplement the livestock the pioneers brought with them, agriculture would soon supplant it as the primary source of food. Within days of arriving in the Salt Lake Valley in July 1847, pioneers began digging small ditches from the valley’s freshwater rivers and streams to bring irrigation water to what was otherwise dry but fertile land. At the same time, they began exploring the mountains and valleys around them for good grazing land and future settlement sites. In 1849, Brigham Young, then-president of the Church of Jesus Christ of Latter-day Saints (or LDS Church), sent a group of church members to the Utah Valley to establish a permanent settlement near the Provo River. The initial camp location proved temporary, and the following year the group moved to the area of what is now North Park in Provo. Other pioneers soon followed and established many settlements nearby, including Lehi, American Fork, and Pleasant Grove—all settled in 1850. A handful of settlers homesteaded along a wagon road between the Pleasant Grove settlement and the area that would later become Orem. This collection of homes, which soon became known, at least informally, as Stringtown, would be considered a separate community in 1861; it was officially incorporated as the Town of Lindon in 1924 and as a city in 1953.

Settlement in the early years of the Utah Territory was largely, though not entirely, controlled by the LDS Church. Church authorities directed congregants where to settle and who would leave the nascent camps. They also dictated the manner in which ownership of land was distributed in those new settlements, which, in turn, influenced the nature of early irrigation systems. As a general rule, bachelor men received a 10-acre parcel of land, while married men with small families received 20 or 30 acres, and “a man with four or five grown-up sons” received 40 or 60 acres.³ This method of distribution resulted in an average lot size of 30 acres across the LDS Church-controlled territory—a pattern of much smaller individual land holdings than occurred in other settlements of the period outside the Utah Territory. Along with this, each land owner owned essentially unquantified rights to available waters to irrigate the land in question. In the early years of settlement, this resulted in myriad small ditches being dug from water sources to individual lots and no collective management of the overall water supply. Ultimately this approach was not sustainable.

Settlers continued to flow into the Utah Valley as more members of the LDS Church arrived in the territory almost daily and others relocated from other existing settlements. Soon enough, competition for irrigation water, coupled with the need to carry that water further and further away from its source to the newly settled lands, made it necessary to combine efforts and form irrigation companies to both construct larger, more far-reaching canals and to help manage the water so that each farmer received their appropriate share. Additionally, land on the east bench of the valley (e.g., the Provo Bench), which had remained largely unsettled due to a lack of easily accessible water, was

³ Utah Irrigation Commission. 1895. *Irrigation in Utah*. Utah Irrigation Commission, Salt Lake City.

starting to fill in with a scattering of homesteads as the lower valley became more populated. Efforts to bring irrigation water to the bench would be more than any individual landowner could tackle.

By 1861, enough settlers were clamoring to move onto the Provo Bench, which would later host the town of Orem, to create sufficient momentum toward a communal effort to bring water to the otherwise dry land. Meanwhile, farmers in Lehi, American Fork, Pleasant Grove, and Stringtown (formed as the Lindon community in 1861 but not incorporated as a town until 1924) were rapidly realizing the need for more irrigation water in their communities and to decrease the number of communities drawing water from some sources, such as American Fork Creek. Community leaders in these towns joined farmers in the Provo Bench/Orem area in the operations of the Provo Canal and Irrigation Company—an organization that had been granted a territorial charter as early as 1853 to bring irrigation water to the bench area but which had made little progress in light of the daunting nature of the task. Within a year, the company would begin one of the most challenging canal projects to be undertaken in the Utah Valley.

THE PROVO BENCH CANAL

Bringing water to the Provo Bench meant overcoming the steep terrain between the primary water source, the Provo River, and the bench area. Constructing a canal into the area would require constructing a dugway that climbed onto the bench but that also had sufficient vertical drop as to allow water to flow through the canal by gravity. A gentlemen's agreement was made between the Provo Canal and Irrigation Company and the communities of Lindon, Pleasant Grove, Lehi, and American Fork to construct the canal from the Provo River near the mouth of Provo Canyon as far north as Lehi. The purpose of this agreement was to allow Pleasant Grove to give up its water rights to American Fork Creek, leaving that to the communities of Lehi and American Fork, and just use the water from the North Union Canal/Provo Bench Canal system.⁴ Work began in earnest to construct the canal in 1862 and was completed in 1864 to its current north terminus at 800 North in Orem.⁵ The canal was reportedly constructed by hand-excavating a small furrow from the Provo River along the desired course and allowing the water then diverting from the river to soak into the furrow and soften the soil,⁶ which would then be excavated by hand and with livestock team pulling plows. Ultimately, a channel measuring 2 feet deep and 6 feet wide had been completed to the bench.⁷

The plan to construct the canal through Pleasant Grove, American Fork, and Lehi had failed, and “a majority of the [water rights] owned by parties in Lehi and American Fork was bought up by other settlers on the Provo Bench, who completed the canal and applied the water to their land.”⁸ Further, the settlers in Pleasant Grove kept their water rights in the canal and formed the North Union Irrigation Company ca. 1865 to extend the canal into their community. In September 1866,

⁴ City of Orem. 2009.

⁵ Mead, Elwood. 1903. *Irrigation Investigations in Utah*. Government Printing Office, Washington, DC.

⁶ Mullins, Daniel. 2005. *A Contextual History and Evaluation Plan for Historic Canals in Orem, Utah County, Utah*. Logan Simpson Design, Inc., Taylorsville.

⁷ *Ibid.*

⁸ Mead, 1903.

the *Deseret News* reported that the Provo Bench Irrigation Company, as the Provo Canal and Irrigation Company had come to be known after reincorporating in 1865, and the newly formed North Union Irrigation Company had “united” and intend “this fall and winter to enlarge and complete the canal from the Provo River, which will furnish labor and good farm land for such as desire to locate in [that] vicinity.”⁹ The Provo Bench Irrigation Company appears to have served as the lead organization on the effort and “levied an assessment of \$150 per acre on the land to be benefitted.”¹⁰ Part of the effort to extend the canal included enlarging the initial section, which had been named the Provo Bench Canal (or the Big Bench Canal), to allow for the increased capacity that would be needed to supply a longer and larger irrigation network. It was at this time the canal was expanded to 3 feet deep and 7 feet wide.¹¹ The canal would be expanded again in the early 1880s, possibly in part with direction and funding allocated during the 1870s through a western lands reclamation bill introduced in the U.S. Congress to “aid in the reclamation of desert lands in the Territory of Utah.”¹² This bill called for the “construction of a canal, commencing at or near the point where the Provo River debouches into Utah valley(sic), with a channel not less than twelve feet wide, and not less than four feet deep; thence across the Provo Bench north-westerly, for a distanced estimated at twenty miles.”¹³ ¹⁴At the same time, the Provo Bench Irrigation Company levied an assessment of 50-cents per share of capital stock to help pay for improvements to the canal.¹⁵

The joint effort of the Provo Bench Irrigation Company and North Union Irrigation Company was seemingly successful, as the canal indeed was extended into Pleasant Grove by the 1880s. Together, the canal system is said to have irrigated approximately 4,000 acres by the early-1900s.¹⁶ Managing and maintaining the collective system moving forward would also be a joint effort, though with very specific divisions of responsibility.

THE NORTH UNION CANAL

While water flowing through the Provo Bench Canal and North Union Canal derives from the same initial weir/diversion on the Provo River, they are, technically, two separate canals. The North Union Canal begins at a diversion structure at the north/downstream terminus of the Provo Bench Canal at present-day 800 North in Orem. With the completion of the North Union section of the canal, the North Union Irrigation Company (NUIC) appears to have reincorporated in 1883 to establish the company’s purpose and by-laws for operating and maintaining the system. The Articles of Incorporation for the reincorporated NUIC were signed and executed on April 5, 1883, with the first officers being Robert Thorne as Trustee and President; James Cobley, Jacob Foutz, William M. Frampton, Alfred G. Keetch, William Kirk, and George S. Clark as Trustees (i.e., members of the

⁹ *Deseret News*. 1866. “Correspondence.” September 6, Provo.

¹⁰ *Ibid.*

¹¹ Mullins, 2005.

¹² *Deseret News*. 1870. “Bill to Aid the Redemption of Land in Utah.” June 8, Provo.

¹³ *Ibid.*

¹⁴ The channel of the extended section of the system comprising the North Union Canal was smaller.

¹⁵ *Territorial Enquirer*. 1881. “Provo Bench Canal.” April 2, Provo.

¹⁶ Mead, 1903.

Board of Trustees); Joseph W. Ashe as Secretary, and Fredrick Richards as Treasurer.¹⁷ A total of 61 shareholders were listed in the incorporation papers as the original owners of the water rights in the North Union Canal.¹⁸

At its re-incorporation, the NUIC created 1,600 shares valued at \$25 each for a total capital stock of \$40,000 (see **Figure 2**).¹⁹ The company's holdings included ownership of "a certain irrigation ditch" on the Provo Bench and shares of stock in the Provo Bench Canal and Irrigation Company."²⁰ The daily operations of the North Union Canal over the next several years was, according to the company's Board of Trustees and stockholder meeting notes, one of ironing out the rules of managing the canal and the distribution of water to shareholders. This included such things as determining whether and how to assess fees to landowners who held water rights in the Provo Bench Canal but were located along the North Union Canal system; the water allocated to these landowners by the Provo Bench Irrigation Company had to flow through the North Union Canal system to reach the individual properties. Initially, the NUIC opted not to charge such parties for the "use" of their canal but ultimately began charging a fee to help offset the cost of maintenance of the main canal incurred, in part, by carrying the water of the Provo Bench Canal shareholders. Some stockholders in the Provo Bench Canal turned over their water shares to the NUIC rather than pay the assessment for receiving their water through that system.²¹

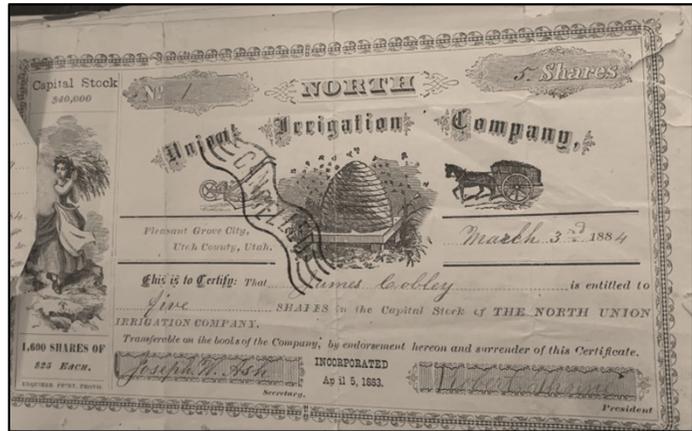


Figure 2. 1884 Water Share Certificate for the North Union Irrigation Company

As part of the reincorporation of the NUIC in 1883 Benjamin Walker was designated as the first watermaster and was to receive \$1.75 per day when executing his duties. Another \$30 annually was allocated to the duties of a "subwatermaster."²² Based on company meeting notes, Walker held the watermaster position for many years. In 1885, the NUIC reorganized internally to divide their system into three districts—the north, the central, and the south.²³ Walker served as the head watermaster over all three districts, and a subwatermaster was appointed to each district. During irrigation season, the watermaster and subwatermasters would monitor the flow of water from the Provo Bench Canal into the North Union Canal and through each district to ensure an adequate

¹⁷ North Union Irrigation Company, 1883-1926. "Agreement of Incorporation of the North Union Irrigation Company." Company records and meeting minutes. Digital document held by Lindon City.

¹⁸ Ibid.

¹⁹ North Union Irrigation Company, 1884. Stock Certificate issued to James Cobley. Digital document held by Lindon City.

²⁰ North Union Irrigation Company, 1883-1926.

²¹ Ibid.

²² Ibid.

²³ Ibid.

flow of water was being received to fulfill the water rights of shareholders in each area. They would also turn water into individual shareholder ditches and monitor the time of the water flow to provide the allocated share and nothing more. This general pattern of watermaster activity remained the same throughout the history of the canal and into the modern era.

The completion of the North Union Canal allowed for the expansion of agricultural activity and, concomitantly, of settlement. Farmers grew all manner of crops, focusing first on subsistence foods for themselves, their families, and their livestock and, later, shifting to commercial products that could be sold for profit. As early as the 1880s vegetable canning factories were established across northern Utah. The industry peaked in the 1920s and 1930s.²⁴ In 1919, the Pleasant Grove Canning Company was established in Utah County. This company would serve as a major purchaser of vegetables—such as tomatoes, corn, and sugar beets²⁵— from farms irrigated from the North Union Canal well into the 1960s.

Within a few years of reincorporating, the NUIC began to face a number of challenges from outside forces. First, the North Union Canal channel was becoming narrower due to an accumulation of sediment flowing into the system through Provo Bench Canal and from the earthen banks of the channel itself. The narrowing of the channel caused the water flow to overtop the banks and flood adjacent properties as well as erode or otherwise weaken the banks such that they leaked and breached routinely. To address this issue, the company hired laborers to widen at least sections of the canal to 8 feet in 1886 and purchased a plow to be used in maintaining it.²⁶ The following year, they executed a contract with a C. Baxter to mow the canal banks and clean the canal channel between May 1 and October 1, 1887.²⁷ Over the years, the NUIC would annually let contracts or otherwise pay for services for two separate cleaning operations along the canal. One was summer mowing of grasses along the canal banks, and the other comprised removing moss during the spring months. In 1890, the company purchased a spring tooth harrow (see **Figure 3**) to help with the removal of the moss.²⁸

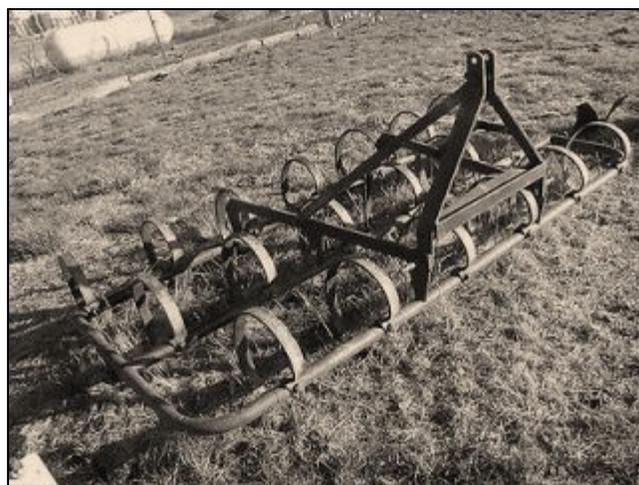


Figure 3. Example of a spring tooth harrow

The second major challenge, which continued well into the modern era, was the encroachment of land and property development along the canal and the use of the canal channel as a dump site for

²⁴ Strack, Don. 2019. "Utah's Canning Industry." Accessed online August 30, 2019 at: https://www.uen.org/utah_history_encyclopedia/c/CANNING.shtml

²⁵ Whiteley, Ron. 2019. Personal communication. Oral history interview with Sheri Ellis of Certus Environmental Solutions on August 22, 2019. Audio recordings on file at Lindon City.

²⁶ North Union Irrigation Company, 1883-1926.

²⁷ Ibid.

²⁸ Ibid.

unwanted refuse. By the turn-of-the-century, the populations of the communities using the North Union Canal had grown substantially from the sleepy roots and sparse rural enclaves. Pleasant Grove, perhaps the primary user of the system, boasted nearly 2,500 residents while Lehi, at the end of the system, claimed just over 3,000 residents; Lindon's population numbers were not separated from Orem's at the time.²⁹ NUIC meeting minutes from the late-1880s through the 1920s routinely describe issues with adjacent landowners building structures into the banks of the canal, extending fences across it, or planting trees along it—all conditions that impinged upon the company's ability to properly maintain the channel. Numerous arguments with landowners apparently occurred, some of which resulted in litigation to assert the rights of one or the other party. It appears, however, that most such disagreements were resolved through combinations of payments made by the NUIC to move or remove offending structures or install gates on fences.

The third major challenge faced by the NUIC, particularly during its first 50 years, was theft of water from their system. This occurred both as individual shareholders taking steps—such as placing boards in the main canal—to force more water than their water rights allowed into their field ditches or through non-shareholders illegally diverting water from the canal. On more than one occasion, the Board of Trustees called a shareholder to the Trustees' meeting to answer to allegations of taking extra turns of water. This challenge existed, too, with the Provo Bench Canal and its users in that these parties would either tamper with gates at the diversion into the North Union Canal to not allow the total amount of water allocated to that system to pass into it or would draw more than their shares of water from the Provo Bench Canal before the water entered the North Union Canal system³⁰, thereby reducing the water flow into that latter system to a point below the total allocated shares of all users.

A final consistent challenge faced by the NUIC in maintaining the North Union Canal from its construction into at least the 1910s was the activity of muskrats and other rodents and lagomorphs burrowing into the earthen banks. The disturbed soils of the canal banks were easy burrowing for these animals and caused periodic localized failures of the downhill bank, which, in some cases, resulted in damage to adjacent property and, in all cases, caused a loss of water from the system. To combat the problem, the NUIC instituted a bounty on the pests, specifically targeting muskrats. Over the years that bounty ranged from 5- to 10-cents each and resulted in the killing of between four and 187 muskrats annually.³¹

The first half of the 20th century brought few changes to the NUIC system. Sections of the canal were straightened in 1914 and 1915 to address difficulties in mowing and cleaning the canal as well as erosion issues created by the bends in the channel.³² Around 1919, the company purchased a “scratcher” (presumably a grader) for use in cleaning the canal and restoring the proper bottom and side slope angles, which had been shallowing up due to inattentiveness to grades during annual

²⁹ Powell, Allan K. 1994. “Population.” In *Utah History Encyclopedia*, Allan K. Powell, editor, pp. 431-438. University of Utah Press, Salt Lake City.

³⁰ North Union Irrigation Company, 1883-1926.

³¹ *Ibid.*

³² *Ibid.*

cleaning of the canal. This grader appears to be similar to if not the same one used during the 1950s by the NUIC to maintain the canal (see **Figure 4**). The grader was horse drawn with two to four horses. It would be driven into the canal channel during the irrigation season and pulled along by the horses through the belly-deep water.³³ A helper, usually a younger male, would ride along in front of the grader, opening gates along the canal to let the horse and grader team pass.³⁴ An operator would ride on top of the grader operating a series of gears and wheels to raise, lower, and change the angle of the grader blade as needed. The team would travel one direction along the canal cleaning and grading either the east or west half. When the designated end point was reached, the crew would stop to eat lunch and feed and rest the horses, after which they would return along the same section of the canal, this time cleaning and grading the other half.³⁵ This equipment was used until the canal channel was lined with concrete, and modern heavy equipment, such as a skid steer, became a more appropriate tool for the job. While the grader team was clearing the main canal, shareholders would service their individual ditches as well. This effort was a communal one in which individual irrigators joined together to clear one property owner's ditch(es) then moved on to the next and the next until everyone's ditches were ready for the season.³⁶



Figure 4. Horse-drawn grader used on the North Union Canal. Photo courtesy of Ron Whiteley.

By the mid-1920s, a period of federal water reclamation projects was in full swing across the western United States. These included the beginnings of many large-scale projects in Utah, such as the Ogden River Project, the Central Utah Project, the Strawberry River Project, and the Provo River Project. As early as 1926, the Bureau of Reclamation (BOR), which administered the funding for and

³³ Whiteley, 2019.

³⁴ *Ibid.*

³⁵ *Ibid.*

³⁶ Lott, Alex. 2019. Personal communication. Oral history interview with Sheri Ellis of Certus Environmental Solutions on August 22, 2019. Audio recordings on file at Lindon City.

oversaw such projects, began approaching municipalities and large volume water users, such as canal companies, in the Utah Valley about their buying water from the planned reclamation systems. That year, the NUIC Board of Trustees commenced discussions of whether to participate in what they referred to in their meeting notes as the “Provo Echo Government Project” to supplement their water shares from the Provo River, particularly in low water years. This name appears to refer to the Weber-Provo Diversion Canal portion of the Weber River Project.

The Weber-Provo Diversion Canal was constructed between 1930 and 1931.³⁷ The canal redistributes water from the Weber River near the community of Kamas to the Provo River. From here, the water shares can flow into the irrigation systems that purchase those shares. In 1926, when water in the planned system was offered to the NUIC by the BOR, the cost per acre foot was indicated in NUIC notes as \$40.53.³⁸ A vote was put to shareholders by the NUIC Board of Trustees in February 1926 as to whether the company should agree to purchase water from the BOR system. The vote was in favor of the purchase, though records are unclear as to whether any action was taken on this purchase during the historical period.

The Provo River Project, which also was constructed by the BOR during this period (between 1938 and 1958), was not an immediate factor in the operations of the North Union Canal but would later become a contributor to the system.³⁹ The project was designed to provide both supplemental irrigation water and culinary water to communities in Salt Lake, Wasatch, and Utah counties.⁴⁰ The project comprises several major features, including Deer Creek Dam and Reservoir, the Deer Creek power plant, the Salt Lake Aqueduct and Terminal Reservoir, the Murdock Canal (also known as the Provo Reservoir Canal), the Weber-Provo Diversion Canal, and the Duchesne Tunnel, among others. Of these features, the Salt Lake Aqueduct is the most germane to the history of the North Union Canal. It is from this pipeline that the NUIC would be offered supplemental irrigation water in the 1990s. The 42-mile long aqueduct emerges from Provo Canyon along the Provo River then turns north to follow the foothills of the Wasatch Range. Construction began in 1938 but was not completed until 1950 due to metal and labor shortages during World War II and periodic extreme winters. The location on the foothills placed the aqueduct above the North Union Canal system.

The government reclamation projects of the 1930s and early-1940s were as much about providing work during the years of the Great Depression as they were about reclaiming water. Much of the construction on these grand efforts was carried out by the Public Works Administration (PWA)—a New Deal program that focused on projects sufficiently large as to be prohibitive to most municipalities. The PWA was supplemented by laborers from another New Deal program, the Civilian Conservation Corps. In 1935, two years after the PWA was established and during a period of the agency’s accepting applications from communities across the country for potential projects,

³⁷ McCune, Christopher J. 2000. *Weber River Project*. U.S. Bureau of Reclamation. Accessed online August 1, 2019 at: <https://www.usbr.gov/projects/pdf.php?id=210>

³⁸ North Union Irrigation Company, 1883-1926.

³⁹ Bell, Tina Marie. Undated. *Provo River Project*. U.S. Bureau of Reclamation. Accessed online August 1, 2019 at: <https://www.usbr.gov/projects/pdf.php?id=156>

⁴⁰ Ibid.

city leaders in Pleasant Grove petitioned to have concrete lining installed in the irrigation ditches in their community.⁴¹ The city desired to reduce water loss through seepage and leaking across these systems. Among the ditches proposed for lining was the portion of the North Union Canal from “the Mill” south to the city boundary with Lindon. There are no further records to indicate if this project was accepted by the PWA or if the concrete lining was installed at that time. Other sources indicate the North Union Canal was lined with concrete during the 1940s or 1950s⁴² while Ron Whiteley, a former watermaster and president of the NUIC, recalled the lining being installed during his youth in the late-1950s or early-1960s.⁴³

Lining of the North Union Canal with concrete was, perhaps, the last major physical change to the system during the historical period (i.e., more than 50 years ago) (see **Figure 5**). The lining fundamentally shifted maintenance of the system from horse-drawn graders to heavy equipment and reduced water loss through seepage. It also changed the appearance of the system from its once-rural nature of an earthen channel to a more urban-

appearing concrete structure. At the same time, it created new challenges for maintaining the system. As the concrete deteriorated along sections of the canal, water would leak through the cracks. To address this, a new slip of concrete would be poured over the damaged sections. But, with each new slip atop another, the width of the canal would



Figure 5. Example of concrete lining in 2018.

decrease slightly.⁴⁴ This would change the capacity of the canal at that location and contribute to over-topping and flooding of adjacent lands. When a critical threshold of capacity was reached and could not be decreased any further without forcing the water over the banks of the canal, the concrete lining along that section would be removed in its entirety, and new concrete matching the original dimensions would be poured.⁴⁵

While the concrete lining was one of the most notable physical changes to the North Union Canal in its more than 100-year history, the changes to the function of the system that would occur during the modern era would be even more dramatic. These changes would see the time of flood irrigation largely disappear from the North Union Canal.

⁴¹ *Pleasant Grove Review*. 1935. “Pleasant Grove Asks for P.W.A. Project.” July 26, 1935, Pleasant Grove.

⁴² Lindon City. 2017. WaterSMART Grant Application. On file at Lindon City.

⁴³ Whiteley. 2019.

⁴⁴ *Ibid.*

⁴⁵ *Ibid.*

A NEW ERA OF USE

Beginning in the late-1970s or early-1980s, the municipal government of Lindon (Lindon City) began studying the possibility of establishing a municipal grey water system to reduce water waste through evaporation from open canal channels and address the realities of functional incompatibility between the safety and sanitation issues associated with open ditches passing through rapidly developing new residential subdivisions. On more than one occasion across its history, the open channel of the North Union Canal had seen the death of children who had either fallen in accidentally or drowned while swimming in the canal, and, in the modern era, this had led to difficulty for the NUIC in obtaining liability insurance to operate the canal.⁴⁶

The City's planning came at a time when many of Lindon's farmers and other irrigators began selling off their larger plots of land for residential and commercial development. As such, use of water shares from open canal systems was decreasing. During the late-1980s, Lindon City began planning for the municipal grey water, or secondary irrigation, system. To accomplish such a system, the City would need a reliable and consistent supply of water. Thus, the City started acquiring water shares from shareholders in the North Union Canal through outright purchase or in exchange for installing the grey water piping to the individual's property, though the property owner would have to pay a monthly fee to receive water through the system.^{47 48} In a few cases, residents of Lindon who held water shares in the North Union Canal sold those shares to other cities further along the system (i.e., Pleasant Grove, American Fork, or Lehi).⁴⁹

Over the next several years, the City became a major shareholder in the North Union Canal. Sufficient shares, coupled with rights to other water sources, such as the aforementioned Salt Lake Aqueduct, had been amassed by the early 1990s, and the pressurized irrigation system was constructed in 1993.⁵⁰ The system included new storage reservoirs and tanks to impound water for use over the course of year. As of 2017, Lindon City held just over 771 water shares in the North Union Canal through a combination of outright purchase, trade with Orem City, and renting shares for other parties. This total amounts to 57.6 percent of the total shares (1340.37) available in North Union Canal.⁵¹ While the City is the majority shareholder that has rights to the water flowing through the system, the NUIC retains ownership of the physical assets. Today, very few property owners continue to irrigate their lands directly from the North Union Canal through open flow. Rather, the canal's primary purpose is now to carry water for the City's secondary irrigation system from one impoundment or storage location to another for use in the pressurized distribution system.⁵² Plans by the City to pipe the open canal channel signal the demise of the last visible

⁴⁶ *Pleasant Grove Review*. 1987. "Lindon prepares for battle over secondary water." May 20, Pleasant Grove.

⁴⁷ Peterson, Don. 2019. Personal communication. Oral history interview with Sheri Ellis of Certus Environmental Solutions on August 22, 2019. Audio recordings on file at Lindon City.

⁴⁸ *Pleasant Grove Review*. 1987.

⁴⁹ *Pleasant Grove Review*. 1988. "Lindon council wants to keep water in town." March 9, Pleasant Grove.

⁵⁰ Peterson. 2019.

⁵¹ Lindon City. 2017.

⁵² Peterson. 2019.

reminder of the North Union Canal's long history in this community. Other communities along the canal, including Orem and Pleasant Grove, also plan to pipe the canal through their communities.

REFERENCES

- Bell, Tina Marie. Undated. *Provo River Project*. U.S. Bureau of Reclamation. Accessed online August 1, 2019 at: <https://www.usbr.gov/projects/pdf.php?id=156>
- City of Orem. 2009. *North Union Canal Trail Concept Report*. Orem, Utah.
- Deseret News*. 1866. "Correspondence." September 6, Provo.
_____. 1870. "Bill to Aid the Redemption of Land in Utah." June 8, Provo.
- Lindon City. 2017. WaterSMART Grant Application. On file at Lindon City.
- Lott, Alex. 2019. Personal communication. Oral history interview with Sheri Ellis of Certus Environmental Solutions on August 22, 2019. Audio recordings on file at Lindon City.
- McCune, Christopher J. 2000. *Weber River Project*. U.S. Bureau of Reclamation. Accessed online August 1, 2019 at: <https://www.usbr.gov/projects/pdf.php?id=210>
- Mead, Elwood. 1903. *Irrigation Investigations in Utah*. Government Printing Office, Washington, DC.
- Mullins, Daniel. 2005. *A Contextual History and Evaluation Plan for Historic Canals in Orem, Utah County, Utah*. Logan Simpson Design, Inc., Taylorsville.
- North Union Irrigation Company. 1883-1926. "Agreement of Incorporation of the North Union Irrigation Company." Company records and meeting minutes. Digital document held by Lindon City.
- North Union Irrigation Company. 1884. Stock Certificate issued to James Cobley. Digital document held by Lindon City.
- Peterson, Don. 2019. Personal communication. Oral history interview with Sheri Ellis of Certus Environmental Solutions on August 22, 2019. Audio recordings on file at Lindon City.
- Pleasant Grove Review*. 1935. "Pleasant Grove Asks for P.W.A. Project." July 26, 1935, Pleasant Grove.
_____. 1987. "Lindon prepares for battle over secondary water." May 20, Pleasant Grove.
_____. 1988. "Lindon council wants to keep water in town." March 9, Pleasant Grove.
- Powell, Allan K. 1994. "Population." In *Utah History Encyclopedia*, Allan K. Powell, editor, pp. 431-438. University of Utah Press, Salt Lake City.
- Strack, Don. 2019. "Utah's Canning Industry." Accessed online August 30, 2019 at: https://www.uen.org/utah_history_encyclopedia/c/CANNING.shtml
- Territorial Enquirer*. 1881. "Provo Bench Canal." April 2, Provo.
- Utah Irrigation Commission. 1895. *Irrigation in Utah*. Utah Irrigation Commission, Salt Lake City.

Whiteley, Ron. 2019. Personal communication. Oral history interview with Sheri Ellis of Certus Environmental Solutions on August 22, 2019. Audio recordings on file at Lindon City.