BUREAU OF RECLAMATION

Technical Memorandum for the Upper Red River Basin Study

Lugert-Altus Reservoir Yield Analysis

FINAL

U.S. Department of the Interior

May 2021

Mission Statements

The Department of the Interior (DOI) conserves and manages the Nation's natural resources and cultural heritage for the benefit and enjoyment of the American people, provides scientific and other information about natural resources and natural hazards to address societal challenges and create opportunities for the American people, and honors the Nation's trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated island communities to help them prosper.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

Table of Content

List of Tables

List of Figures

List of Acronyms and Abbreviations

%	Percent
acre-ft	Acre-feet
acre-ft/yr	Acre-feet per year
cfs	Cubic feet per second
Compact	Red River Compact
DPR	Definite Planning Report
DOI	Department of the Interior
ECS	Elk City Sandstone
EPS	Equal Proportionate Share
EQ	Environmental Quality
EQ Plan	Environmental Quality Plan
ft	Feet
GCMs	Global climate models
ID	Irrigation District
MAY	Maximum Annual Yield
MPMCD	Mountain Park Master Conservancy District
M&I	Municipal and Industrial
NED	National Elevation Dataset
NFRR	North Fork Red River
ODHE	Oklahoma Department of Higher Education
ODWC	Oklahoma Department of Wildlife Conservation
OTAO	Oklahoma-Texas Area Office
OWRB	Oklahoma Water Resources Board
O&M	Operation and Maintenance
POD	Plan of Development
PT	Provisional Temporary
Reclamation	Bureau of Reclamation
Status Quo TM	Impacts of Status Quo Management on Water Availability in the Tom Steed Reservoir Hydrologic Basin

SWAM	Surface Water Allocation Model
URRBS	Upper Red River Basin Study
USACE	United States Army Corp of Engineers
USGS	United States Geological Survey
WMA	Wildlife Management Area

1. EXECUTIVE SUMMARY

Reclamation's Oklahoma-Texas Area Office (OTAO) calculates reservoir yield for planning purposes and decision-support using an excel-based model that simulates reservoir storage on a monthly time step. The planning time frame considered is at the discretion of water resource managers and decision-makers, but 50 to 100 years is common practice for long-term planning purposes. Although multiple variables must be considered, two of the most significant contributing factors to reservoir yield, and also the areas that typically contain the most uncertainty, are inflow and reservoir storage capacity. Accounting for future inflow is largely dependent on the availability of existing flow records, as well as the availability of data related to potential depletions caused by future climatic or anthropogenic (human) factors. Reservoir storage capacity is dependent upon data availability regarding sediment accumulation into the reservoir over time. As new data become available, it is important to update yield estimates so water resource managers can plan accordingly.

Multiple sediment surveys have been completed for Lugert-Altus Reservoir, the two most recent of which occurred in 2007 and 2018. These surveys show that the sediment accumulation rate has generally decreased over time. Between 2010 and 2015, a new drought of record was observed in southwest Oklahoma. The Upper Red River Basin Study (URRBS) was initiated in 2014, a key objective of which was to quantify inflow depletions caused by existing and future ground- and stream- water development in the hydrologic basin containing Lugert-Altus Reservoir. This analysis has been completed at the time of this report. All three of these reasons – the new sediment survey, a new drought of record, and the recently-completed hydrologic analysis of the URRBS, provide an opportunity to update the yield estimates of Lugert-Altus Reservoir.

For the majority of OTAO's reservoirs that are used for municipal and industrial (M&I) purposes, supply yield is calculated on a "firm" basis (i.e., "firm yield"), meaning it is the volume of water the reservoir can reliably deliver during

a repeat of the drought of record. However, Lugert-Altus Reservoir is different than any other reservoir in OTAO's jurisdiction. Two streamwater rights are held for water stored in Lugert-Altus Reservoir, one for irrigation use that is held by Lugert-Altus Irrigation District (ID) and one for M&I use that is held by the United States for the purpose of delivering M&I water to the city of Altus. The Lugert-Altus ID's irrigation water right is far greater than the water right held for city of Altus' M&I water by volume, making irrigation the primary single-purpose benefit of Lugert-Altus Reservoir; but the M&I water right for the city of Altus is senior to Lugert-Altus ID's irrigation water right. The implications of this are two-fold. First, it has a significant impact on reservoir operations because the Lugert-Altus ID operates its system in a way that does not interfere with the city of Altus' senior M&I water right. Second, the Lugert-Altus ID must avoid interference while also trying to maximize the reliability of agricultural water deliveries. Given the importance of water supply reliability to farmers, having an understanding of the frequency distribution of water supply availability over the period of record becomes more important than focusing on the supply which is "firm" during a critical drought, such as in the case of M&I demands which encompasses critical needs for public health and sanitation, health care, industry, manufacturing, etc. The analysis and results included here reflect this reality.

This report describes three yield analyses for Lugert-Altus Reservoir. The first analysis is based on data available prior to reservoir construction as documented in Reclamation's 1937 Project Planning Report for the W.C. Austin Project. This analysis is performed for comparative purposes and to verify the yield model's performance in replicating the pre-construction calculation performed in the late 1930s. The second analysis is based on post-construction storage conditions and new inflow records through the year 2016. The third method was developed in support of the URRBS using new inflow sequences that consider depletions from future ground- and stream- water development scenarios in the Lugert-Altus Reservoir hydrologic basin. The three methods are considered as follows, and a summary of results is provided in Table 1:

Method 1: Pre-Construction Yield Calculation (1907-1936).

The yield model incorporated pre-construction data developed and used by Reclamation in the 1937 Project Planning Report to support initial planning for the W.C. Austin Project for a period of record Jan 1907 through Dec 1936. Operations modeling showed that the **average annual yield** of Lugert-Altus Reservoir totaled **103,600 acre-ft**. This result was verified using the updated firm yield model.

Method 2: Post-Construction Yield Update (1926-2016).

The data and assumptions used to derive the 1937 Project Planning Report yield estimate were updated/revised to reflect post-construction conditions and to account for the best available data between Jan 1926 and Dec 2016. This included multiple sediment surveys, a new and extended flow record, and a new drought of record between 2010 and 2015. The updated analysis also included new reservoir operation assumptions that reflect current practice by the Lugert-Altus ID to ensure compliance with a water rights settlement agreement with the city of Altus. Yield simulations under 2060 sediment conditions showed that Lugert-Altus ID's full permitted irrigation volume of 85,630 acre-ft/yr was available **25 percent** of the time compared to the 4,800 acre-ft/yr of M&I water for the city of Altus which was available **98 percent** of the time. In addition, the analysis showed that **57,600 acre-ft/yr** was available for irrigation **50 percent** of the time, and at least **8,200 acre-ft/yr** was available for irrigation **90 percent** of the time (Figure 23). The overall average annual yield of Lugert-Altus Reservoir available for irrigation was **52,900 acre-ft/yr**.

Method 3: Upper Red River Bain Study Yield Update (1926-2016).

Irrigation water supply dependability was computed based on new simulated inflow depletions derived by Oklahoma Water Resources Board (OWRB) as part of OWRB's analysis of water rights and water availability in the North Fork Red River (NFRR) basin under eight ground- and stream-water

development scenarios. The inflow depletion analysis was performed by OWRB in collaboration with Reclamation using a new Surface Water Allocation Model (SWAM) on the NFRR basin in support of the URRBS.

The irrigation water supply dependability was evaluated under the full range of future development scenarios (Figure 29). Yield simulations under 2060 sediment conditions showed that Lugert-Altus ID's full permitted irrigation volume of 85,630 acre-ft/yr would be available between **10 percent** and **19 percent** of the time depending on the future development scenario, and the full volume of M&I water permitted to the city of Altus (4,800 acre ft/yr) was found to be available **97 percent** of the time regardless of the scenario. Depending on the development scenario, the analysis also showed that **40,300 acre-ft/yr** to **46,600 acre-ft/yr** would be available **50 percent** of the time, and a minimum of **3,600 acre-ft/yr** to **5,200 acre-ft/yr** would be available **90 percent** of the time. The overall average annual yield of Lugert-Altus Reservoir available for irrigation ranged from **40,300 acre-ft/yr** to **46,300 acre-ft/yr** depending on the development scenario.

Table 1. Summary results from all three methods.

	Method 1	Method 2	Method 3
Average Annual Yield (acre-ft/yr)	103,600[a]	53,000	40,300 - 46,300
Dependability of Full M&I Permit		98%	97%
Dependability of Full Irrigation Permit	-	25%	10% - 19%
	Water Availability for Irrigation (acre-ft/yr)		
10% Dependable	-	85,630[b]	85,630[b]
20% Dependable	-	85,630[b]	80,100 - 85,600
30% Dependable	-	84,600	59,600 - 72,000
40% Dependable	-	65,600	48,900 - 52,700
50% Dependable	-	56,700	40,000 - 46,200
60% Dependable	-	43,400	25,800 - 35,100
70% Dependable	-	34,000	13,400 - 21,300
80% Dependable	-	20,400	5,600 - 10,900
90% Dependable	-	8,900	3,500 - 5,200
100% Dependable	-	0	0

[a] Unlike Methods 2 and 3, Method 1 analysis did not limit the maximum releases in a single year to the permitted amount for irrigation of 85,630 acre-ft/yr, nor did it account for the storage reserve set aside by Lugert-Altus ID to avoid interference with city of Altus' senior M&I permit.

[b] The model was set up to allow a maximum irrigation delivery of 85,630 acre-ft/yr, which is Lugert-Altus ID's permit volume.

1.1. Project Background

The W.C. Austin Project is a water supply project constructed by Reclamation in Greer, Kiowa, and Jackson Counties, Oklahoma. The main project feature, Altus Dam, is located about 18 miles north of the city of Altus (Figure 1). The dam, along with a series of five dikes, impound the natural flows from the NFRR. Lugert-Altus Reservoir provides irrigation water to 48,000 acres of privately-owned land located within the Lugert-Altus ID. The reservoir also provides supplemental M&I water to the city of Altus, as well as flood control, recreation, and fish and wildlife benefits.

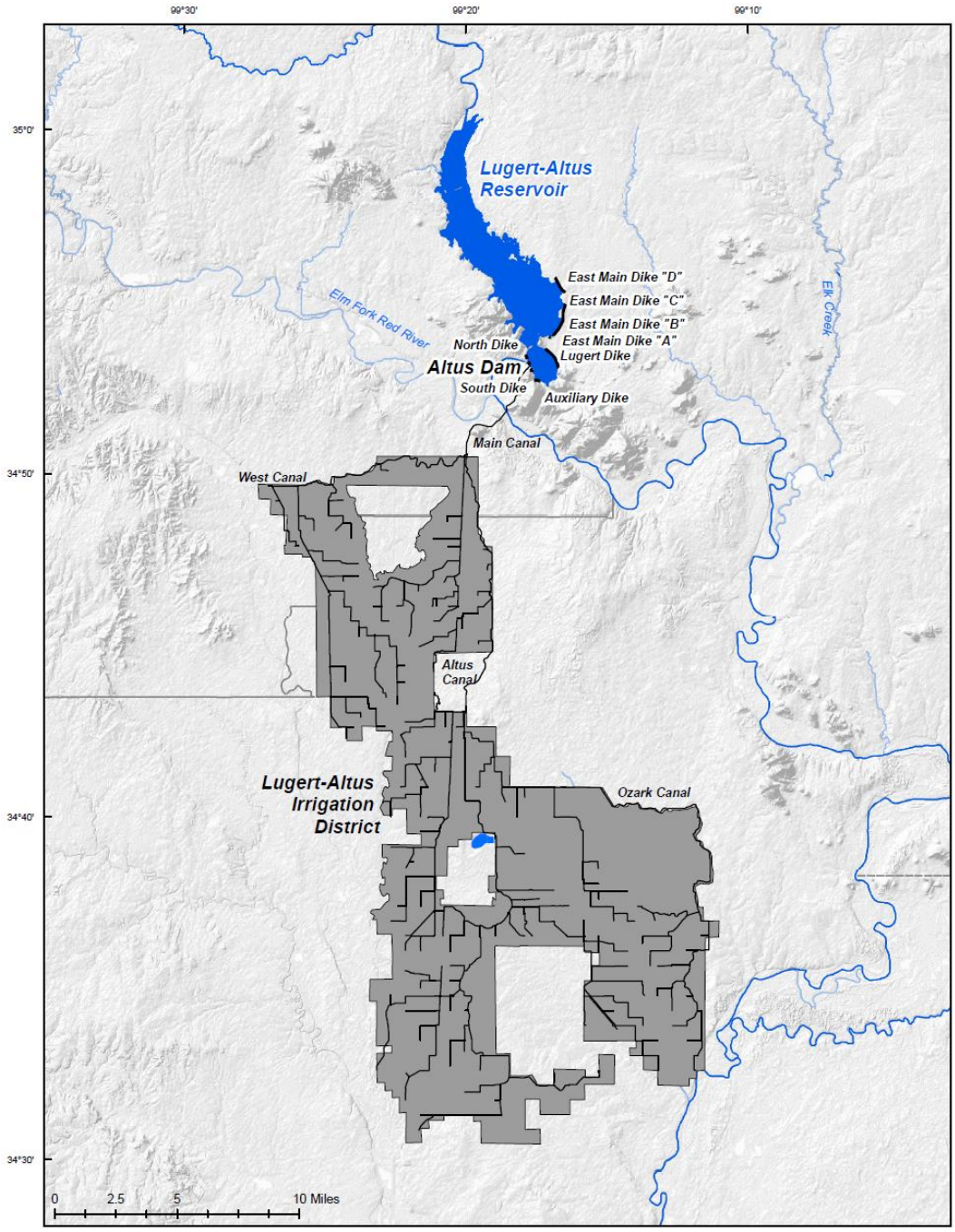


Figure 1. Features of the W.C. Austin Project, Oklahoma.

The W.C. Project was authorized by Public Law 75-761 on June 28, 1938, for the purposes of flood control and irrigation. Reclamation initiated construction in 1941, but activities were interrupted by World War II. Construction resumed in 1944, and Altus Dam was completed in 1946. Irrigation water was first furnished to a small acreage in 1945, but it was not until 1949 that the remaining distribution system was completed to serve the entire project.

The W.C. Austin Project is owned by the U.S. and administered by Reclamation. Operation and maintenance (O&M) responsibility for the project has been transferred to the Lugert-Altus ID through a contract with the U.S. Reclamation reimburses Lugert-Altus ID on an annual basis for the portion of O&M costs that are attributable to flood control benefits. Costs to support single purpose irrigation and municipal water are paid for solely by the Lugert-Altus ID and by the city of Altus, and the city pays the Lugert-Altus ID its share of O&M costs.

In 1987 and 1990, the city of Altus and Lugert-Altus ID fulfilled their repayment obligations, respectively, to the U.S. for the portion of project construction costs attributable to M&I and irrigation supply in accordance with the provisions of their repayment contract. The Lugert-Altus ID and city of Altus have since entered into new contracts with the U.S. (in April and May 2016, respectively) for repayment of costs associated with dam safety modifications that are currently underway.

1.1.1. Altus Dam

Altus Dam is a concrete-gravity type, partially curved structure rising 110 feet above the streambed and has a crest length of 1,104 feet (Figure 2). The dam is faced with granite masonry, except on the downstream side of the overflow section.

Figure 2. Altus Dam, W.C. Austin Project

Incorporated within the dam section are both controlled and uncontrolled overflow-type spillways and an outlet works that delivers water to the canal system. The controlled spillway has a design capacity of 52,200 cfs and is regulated by 9 radial gates. Appurtenant reservoir structures constructed along with the dam include five dikes located at low places on the reservoir perimeter, including the Auxiliary, Lugert, East, North, and South Dikes. The largest, Lugert Dike, is approximately 4,200 feet long and has a maximum height of approximately 45 feet. The crest elevations of these dikes have been raised pursuant to dam safety modifications previously mentioned in order to reduce risks of an overtopping failure and protect public safety.

Lugert-Altus Reservoir is divided into three operational pools, each having a specific purpose. These pools include the active conservation pool, flood control pool, and surcharge pool. The active conservation pool is the largest pool and is used to store water for irrigation and municipal purposes. The flood control and surcharge pools are smaller and temporarily store water from large

rainfall events to reduce downstream impacts from flooding. There is also a small, nonoperational pool referred to as the dead pool that is located beneath the conservation pool, below the irrigation system outlet works elevation.

1.1.2. Project Benefits, W.C. Austin Project

The W.C. Austin Project provides flood control for the NFRR and water for irrigation of approximately 48,000 acres of privately-owned land south of Lugert-Altus Reservoir. In addition to these two original project purposes, the W.C. Austin Project provides a supplemental M&I water supply for the city of Altus, and about 11,000 surface acres for public recreation and fish and wildlife conservation.

Irrigation Benefits and Features

Irrigation benefits are provided through an irrigation water right that was granted to the Lugert-Altus ID by the State of Oklahoma in 1939 (Application No. 39-23). This appropriation allows the Lugert-Altus ID to divert up to 85,630 acre-ft/yr from the NFRR for irrigation purposes. The water is conveyed through a 270-mile long system of canals and laterals (described below), where it is used to support a diverse array of crops. Cotton is the primary crop, although winter wheat, alfalfa, peanuts, grain sorghums, and potatoes also are grown.

Water deliveries for irrigation are made from Altus Dam through the Main Canal. The Main Canal has a design capacity of 1,000 cfs and transports water 4.2 miles to the northern boundary of the irrigation district. At this point, deliveries are separated into the West Canal and the Altus Canal. The West Canal, which has a design capacity of 290 cfs, continues from the end of the Main Canal west about 6 miles, then south for another 5.1 miles. The Altus Canal, which is designed to carry the remaining 710 cfs, continues from the end of the Main Canal south for about 21.7 miles through the city of Altus. About three and a half miles north of the city, the Ozark Canal (design capacity of 180 cfs) separates from the Altus Canal and continues generally south and east for 14.8 miles. The entire irrigation district includes a total of about 52 miles of canals, 218 miles of laterals, and 26 miles of drains. Figure 3 and Figure 4 depict the canal system and Lugert-Altus ID features. Within the Lugert-Altus ID lies Altus Lake, a regulating reservoir constructed by the city of Altus in 1916 and 1937,

which is used to store and regulate M&I water delivered by the Lugert-Altus ID through the canal system. The city of Altus also receives water from Tom Steed Reservoir via deliveries through the Altus Aqueduct directly to the city's water treatment plant.

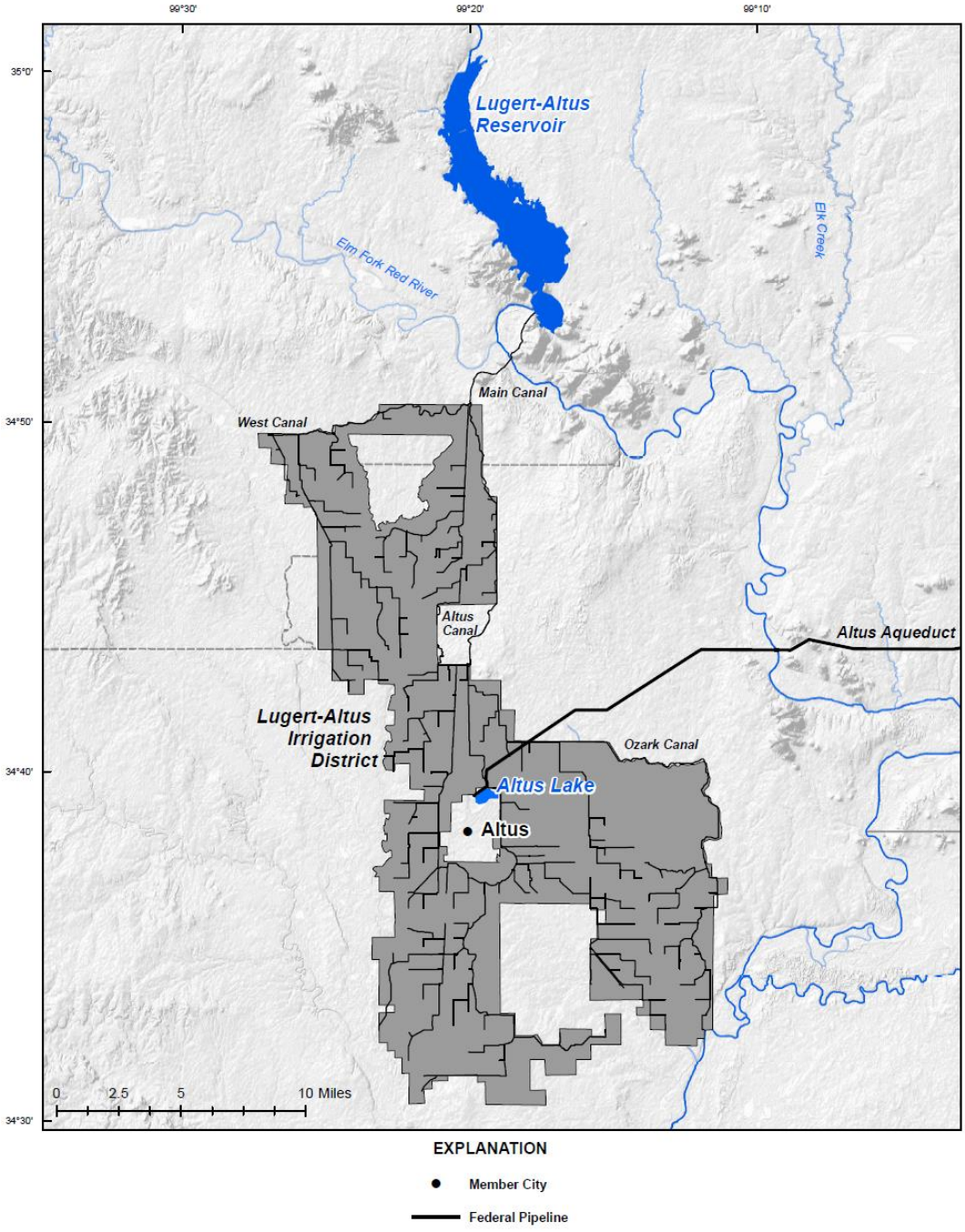


Figure 3. Canal system and features of the Lugert-Altus ID, W.C. Austin Project.

Figure 4. Canals within the Lugert-Altus ID, W.C. Austin Project.

Municipal Benefits and Features, W.C. Austin Project

Municipal benefits are provided through a water right that was granted to the city of Altus by the State of Oklahoma in 1926 (Application No. 26-6). This appropriation allows Altus to divert up to 4,800 acre-ft/yr from the NFRR for domestic, municipal, and industrial purposes. The city of Altus originally impounded the river in the 1920s and conveyed water to the city for municipal use, but large amounts of sedimentation rendered the impoundment inoperable over time. When the W.C. Austin Project was constructed in the 1940's, the city of Altus entered into a water supply contract with the U.S. to use Lugert-Altus Reservoir to store and deliver the city of Altus' 4,800 acre-ft/yr. To this end, a settlement agreement was later signed in 1954 between the city of Altus and Lugert-Altus ID which requires the Lugert-Altus ID to manage irrigation withdrawals such that Altus Lake's active conservation storage does not drop below 10,000 acre-feet. Today, Tom Steed Reservoir serves as the primary water supply source for the city of Altus, but when supplemental water is needed from Lugert-Altus Reservoir, it is conveyed from Lugert-Altus Reservoir through the irrigation canals and diverted into Altus Lake.

Recreation/Fish and Wildlife Benefits and Features

Lugert-Altus Reservoir is located within the scenic Wichita Mountains and is surrounded by approximately 11,000 acres of federally-owned land that attract tourism and abundant wildlife. Quartz Mountain State Park, managed by the Oklahoma Tourism and Recreation Department (OTRD),, is situated on the western side of Lugert-Altus Reservoir (Figure 5). The park provides opportunities for camping, swimming, boating, fishing, hiking, picnicking, etc. One of the prominent features within the park is the Quartz Mountain Resort Arts and Conference Center, which contains a lodge-style hotel, an Arts Institute, swimming beaches, cabins, camping and numerous other amenities that support corporate retreats, conferences, workshops, and weddings (Figure 6).

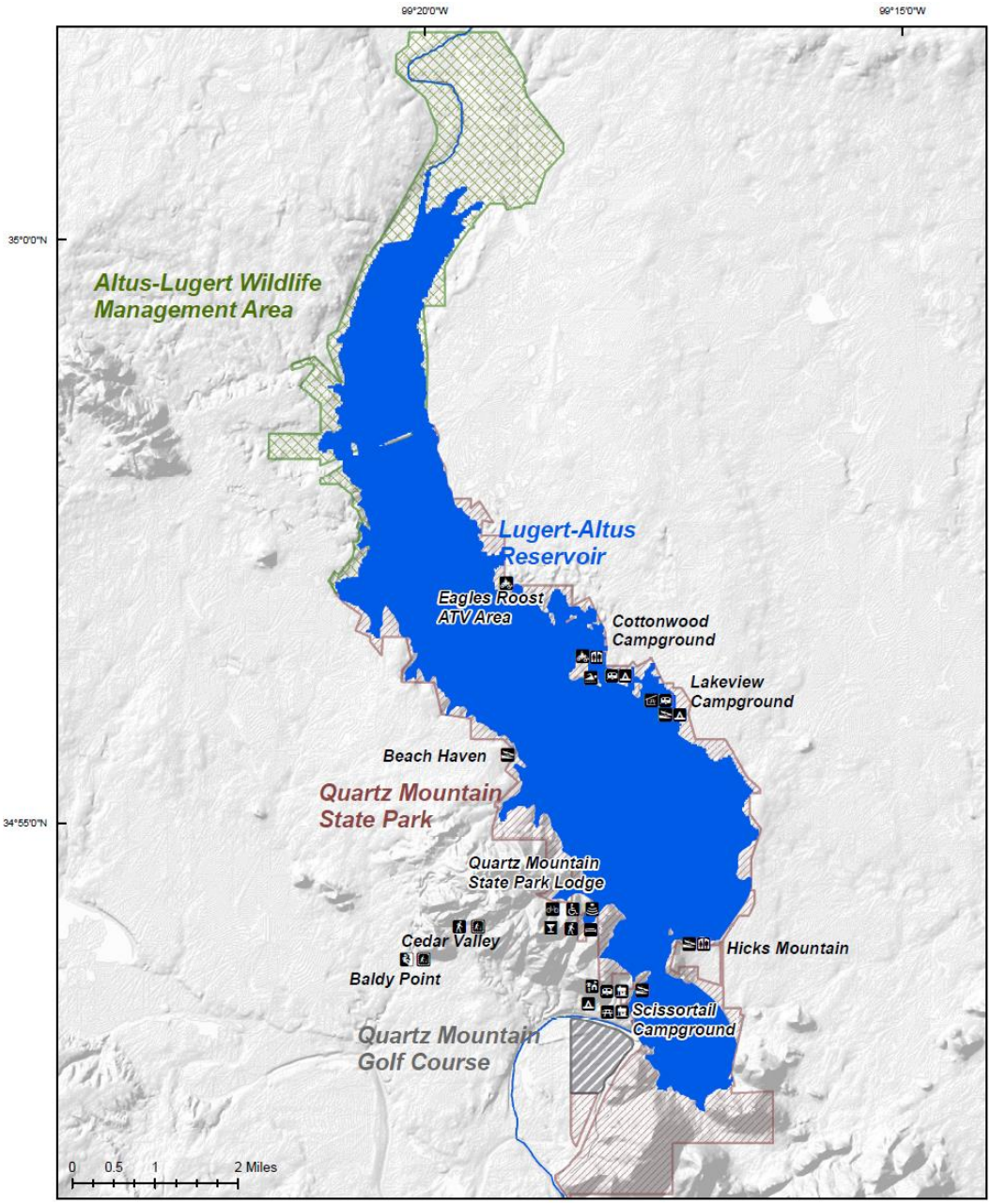


Figure 5. Prominent recreation and fish and wildlife features around Lugert-Altus Reservoir, W.C. Austin Project.

On the north end of Lugert-Altus Reservoir lies the Altus-Lugert Wildlife Management Area (WMA) (Figure 7). The WMA is managed by the Oklahoma Department of Wildlife Conservation (ODWC) and is comprised of 3,600 acres of habitat that supports hunting and wildlife viewing. The WMA consists mainly of river bottom and slough areas with dense vegetation, cattail and other aquatic species. Bottomland areas are heavily wooded with cottonwood, American elm, and willow. A limited amount of mixed/tallgrass prairie interspersed with sandplum lies in the northeast portion of the area. Because the NFRR flows through the area, occasional high lake levels back water into the WMA and create areas of flooded timber, resulting in excellent wetland habitat for waterfowl. Common game include bobcat, coyote, deer, rabbit, turkey, dove, and quail. The WMA supports diverse nongame species, including bald eagles during the winter.

Figure 6. Quartz Mountain Resort, Lugert-Altus Reservoir

Figure 7. Altus-Lugert Wildlife Management Area courtesy from ODWC website: https://www.wildlifedepartment.com/wildlife-management-areas/altus-lugert

1.1.3. Lugert-Altus Reservoir Hydrology

Lugert-Altus Reservoir receives its water from the North Fork Red River (NFRR), which begins in the high plains of the Texas Panhandle near Amarillo, Texas (Figure 8). The NFRR drainage basin encompasses about 2,830 square miles within Texas and Oklahoma. The main tributaries are Sweetwater Creek above Lugert-Altus Reservoir, and the Elm Fork Red River, Elk Creek, and Otter Creek below the reservoir. In The NFRR overlies the NFRR aquifer, which is composed of about 777 square miles of alluvium and terrace deposits along the NFRR and tributaries (Figure 9). Groundwater discharge from the NFRR aquifer sustains streamflow to the NFRR during most of the year (Smith and Wahl, 2003), and overall, the aquifer contributes nearly half of the streamflow in the NFRR upstream of Lugert-Altus Reservoir (Smith et al, 2017).

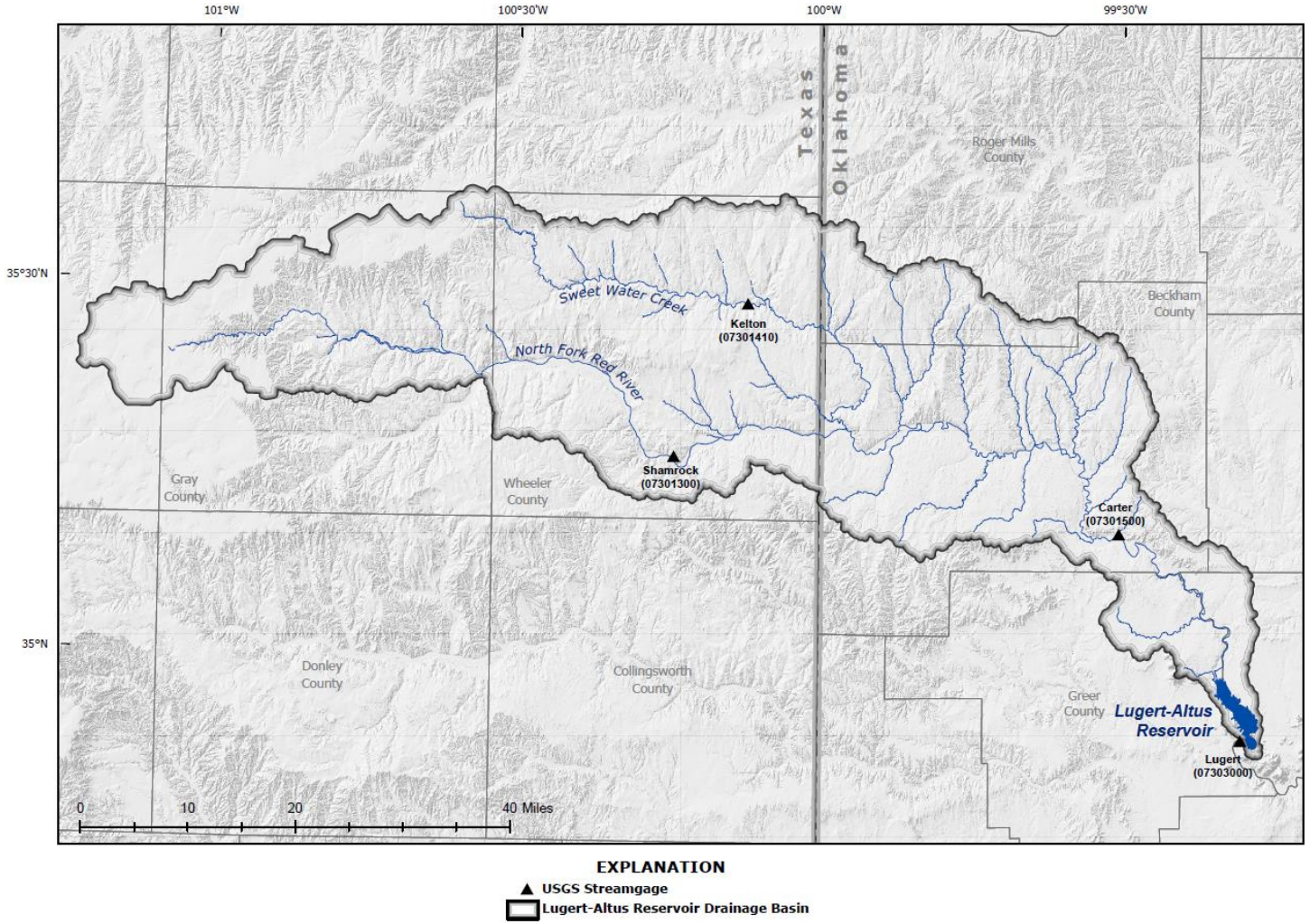


Figure 8. Lugert-Altus Reservoir hydrologic basin.

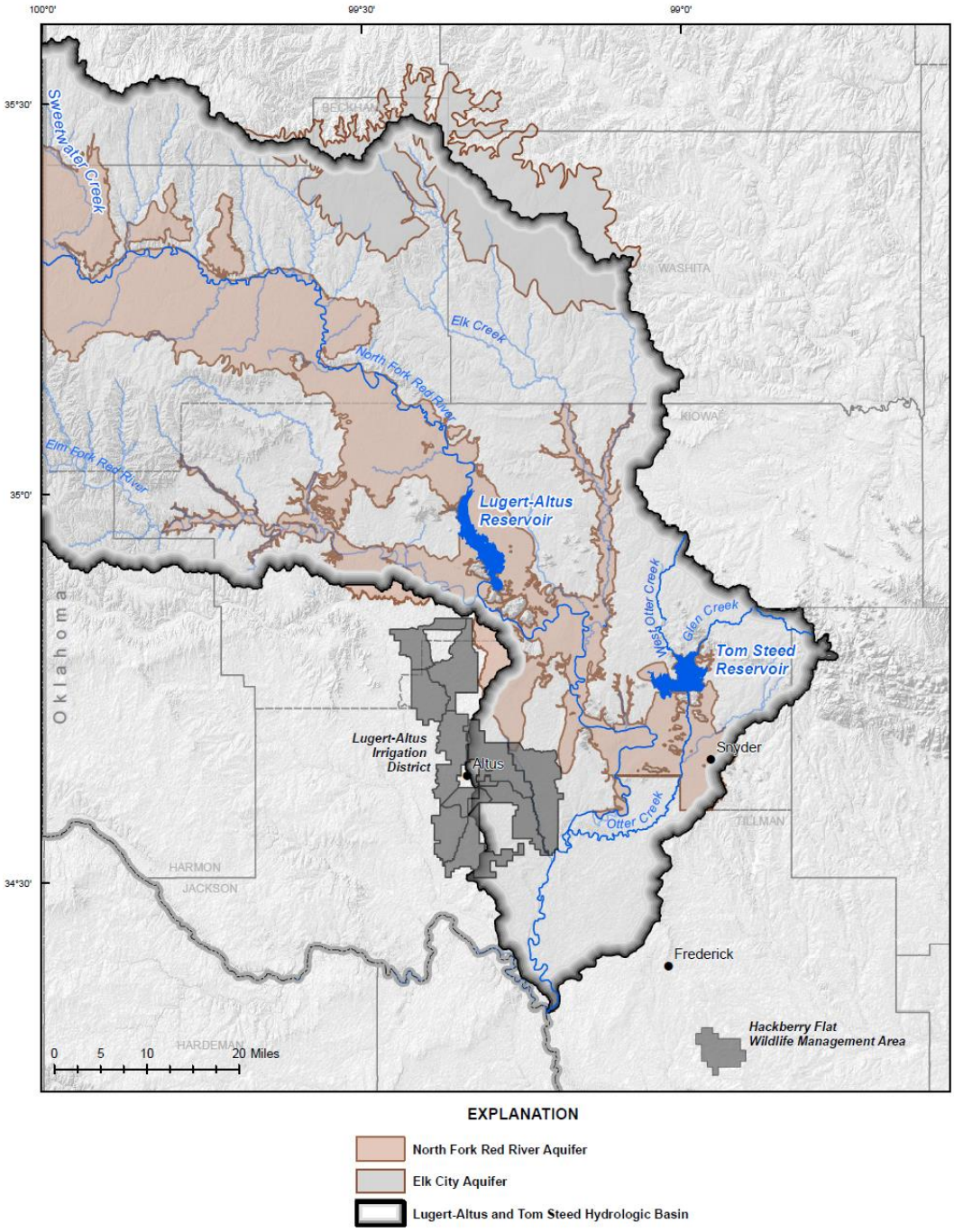


Figure 9. Prominent groundwater resources within the URRBS study area.

Red River Compact

The surface waters shared between Texas and Oklahoma are governed by the Red River Compact (Compact). The Compact was signed by member states in 1978 to resolve and prevent disputes over waters of the Red River Basin that are shared between the neighboring states of Arkansas, Louisiana, Oklahoma and Texas, and to assure the receipt by member states of adequate surface flows and releases. While provisions of the Compact specifically state how much water each state is allowed to develop or store on an interstate stream, the Compact generally provides a means of working out problems between member states in an orderly manner, thus preventing the likelihood of litigation in most cases. As part of the Compact, the Red River is divided into "Reaches" both above and below Lake Texoma (Figure 10). Reach I, upstream of Lake Texoma, is further divided into three subbasins, with Subbasin I containing the NFRR which flows across the Texas state border into Lugert-Altus Reservoir in Oklahoma. According to Section 4 of the Compact, 60 percent of the surface waters in Subbasin I are apportioned to Texas and 40 percent to Oklahoma. In so far as the development of the apportioned water resources in Texas could affect inflow to Lugert-Altus Reservoir, projected growth and planned development of water resource activities within Subbasin I were assessed. According to the Texas Region A Water Plan (Texas Water Development Board, 2016), which encompasses Subbasin I, little to no growth is projected in this area, water supplies are provided almost exclusively by groundwater, and development of surface water supplies are not anticipated. Therefore, it is assumed that no impacts would occur from Texas-based development upstream of Lugert-Altus Reservoir, and no further collaboration with Texas-based entities was required for this firm yield update. With that said, surface water flow data were included where applicable for the purposes of hydrologic modeling.

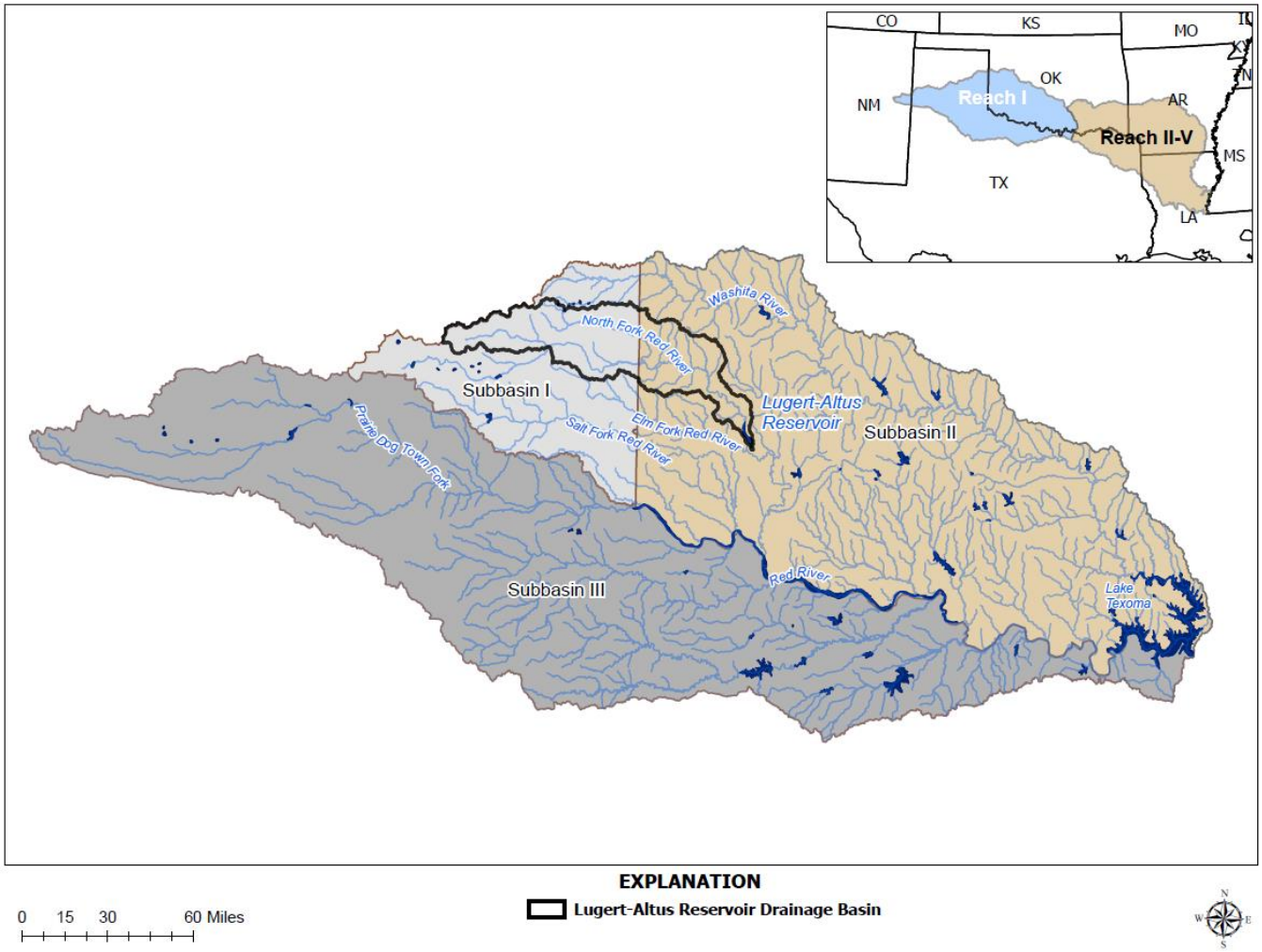


Figure 10. Subbasins I-III of Reach I of the Red River Compact.

2. RESERVOIR YIELD OVERVIEW

A significant challenge facing water resource managers is preparing for and responding to drought. Complicating matters is the reality that no two droughts are the same. This causes vulnerabilities in reservoir supplies to manifest differently every time. Water resource managers are charged with considering this as they make decisions that could determine whether a reservoir they are managing has sufficient supply to meet demands. For the majority of OTAO's reservoirs that are used for municipal and industrial (M&I) purposes, reservoir yield is calculated on a "firm" basis (i.e., "firm yield"), meaning it is the volume of water the reservoir can reliably deliver during a repeat of the drought of record. However, Lugert-Altus Reservoir is different than any other reservoir in OTAO's jurisdiction. Two streamwater rights are held for water stored in Lugert-Altus Reservoir, one for irrigation use that is held by Lugert-Altus Irrigation District (ID) and one for M&I use that is held by the United States for the purpose of delivering water to city of Altus. The Lugert-Altus ID's irrigation water right is far greater than the M&I water right for the city of Altus by volume, making irrigation the primary single-purpose benefit of Lugert-Altus Reservoir; but the M&I water right for the city of Altus is senior to Lugert-Altus ID's irrigation water right. The implications of this are two-fold. First, it has a significant impact on reservoir operations because the Lugert-Altus ID operates its system in a way that does not interfere with the senior M&I water right for the city of Altus. Second, the Lugert-Altus ID must avoid interference while also trying to maximize supply reliability of agricultural deliveries. Given the importance of water supply reliability to farmers, having an understanding of the frequency distribution of water supply availability over the period of record becomes more important than focusing on the supply which is "firm" during a critical drought, such as in the case of M&I demands, which encompasses critical needs for public health and sanitation, health care, industry, manufacturing, etc. The analysis and results included here reflect this reality.

Whatever the case may be, determining how to best manage water to prepare for drought requires assessing risks and having a better understanding of the reservoir's yield (firm or otherwise). From a historical context, reservoir yield is important because it represented the amount of water rights an entity could secure from the State prior to reservoir construction and prior to entering into a repayment contract with the United States. Looking towards the future, reservoir yield is important because it represents the amount of water that is "expected" to be available, whether as a firm dependable supply during the most critical drought or as an average dependable supply over a longer time frame. Whatever the case may be, the yield calculation should provide a foundation by which local officials may either react during a drought or plan for future droughts. If the estimate is too low, investments could be made in supplemental supplies to withstand a drought that may never come to fruition. If the estimate is too high, it could lead to a false sense of security or inaction, meaning that investments that should have been made in order to withstand a critical drought are overlooked. Resource managers planning ahead must determine what assumptions they are comfortable with, what is an acceptable level of risk, and how these variables inform their willingness to make investments into the future.

Reclamation's Oklahoma-Texas Area Office calculates reservoir yield using an excel-based model that simulates reservoir volume on a monthly time step based on a mass balance equation comprised of inputs into and losses from the reservoir (Figure 11). This report describes three yield calculations for Lugert-Altus Reservoir as follows:

1. Pre-Construction Yield Calculation (1907-1936): the firm yield model incorporates pre-construction data developed and used by Reclamation in the December 1937 Report to support initial planning for the W.C. Austin Project for a period of record Jan 1907 through Dec 1936.
2. Post-Construction Yield Update (1926-2016): the data and assumptions used to derive the pre-construction firm yield calculations are updated/revised to

reflect post-construction conditions and to account for the best available data through Dec 2016.

3. Upper Red River Bain Study Yield Update (1926-2016): the firm yield model is used to simulate future inflow depletions derived by OWRB as part of OWRB's analysis of water rights and water availability in the NFRR basin. The analysis was performed by OWRB in collaboration with Reclamation using a new SWAM on the NFRR basin in support of the URRBS.

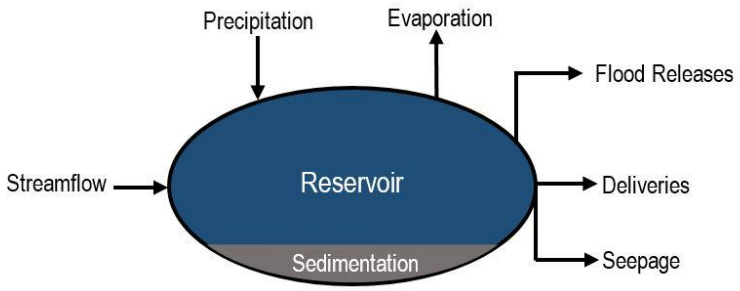


Figure 11. Schematic of Reservoir Firm Yield Model.

Firm Yield Mass Balance Equation:

[**Starting Reservoir Volume** (includes sedimentation)] + [**Inflow** (Streamflow + Precipitation)] – [**Losses/Uses** (Evaporation + Seepage + Flood Releases + Downstream Releases + M&I Deliveries)] = **Ending Reservoir Volume**

2.1. Method 1. Pre-Construction Yield Calculation (1907-1936)

The functionality of the yield model was first tested by replicating the approach used by Reclamation in the 1937 Project Planning Report (1937 Project Report).

Available Flow and Precipitation Data

The 1937 Project Report used data recorded from multiple streamgages across the region, including Texas, with records falling within the 1906 to 1936 period, as listed in the table on Page 55 of the 1937 Project Report. The flows recorded at the Granite streamgage (Jan 1906[1] to Mar 1908) and Lugert Dam streamgage (Mar 1930 to Sept 1932) were identified as representative of that which would be available to Lugert-Altus Reservoir and were selected for the long-term operational analysis and yield simulation.

Precipitation data were available from three weather stations at Erick and Hobart, Oklahoma and Miami, Texas. These stations recorded rainfall between 1906 and 1936; these data were used to extend the streamflow record for the yield analysis per the discussion below, *Extension of Streamflow Record*.

Determining the Period of Record

Little discussion was included in the Project Report on how the period of record was determined. The two streamgages cited above provided only limited data; however, recorded rainfall data were available since Jan 1906. These rainfall data were used to extend flow records to 1936 using methods briefly described below and on Pages 56-59 of the 1937 Project Report. A critical period of 1931-1936 was noted in the 1937 Project Report, and as such, a period between Jan 1907 to Dec 1936 was selected to ensure that the critical period was accounted for in the yield estimate.

[1] The Granite streamgage recorded flow beginning in Oct 1903; however, the 1937 report only used data beginning in Jan 1906. This is likely because data between Oct 1903 and Dec 1905 are largely incomplete.

Extension of Streamflow Records

As previously stated, flows recorded at the Granite streamgage (Jan 1906 to Mar 1908) and Lugert Dam streamgage (Mar 1930 to Sept 1932) were identified as representative of flows that would be available to Lugert-Altus Reservoir, and thus were selected for a long-term analysis that required the extension of flows recorded at the two gages. This was done by correlating recorded streamflow with rainfall data recorded at three weather stations (at Erick, Hobart, and Miami) between 1906 and 1936, and then developing seasonal extended flow estimates over the extended period, as described on Pages 56-59 of the 1937 Project Report. Table 2 in the 1937 Project Report provides the extended flow record between Jan 1906 and Dec 1936 for the NFRR drainage area[2]. These data indicated an average annual flow of 150,000 acre-ft (Page 71, 1937 Project Report).

Water Rights and Inflow Depletions

The 1937 Project Report did not include any discussion on water rights and inflow depletions.

Sedimentation and Storage Allocations

The 1937 Project Report (Page 70) estimated a 1,070 acre-ft/yr sedimentation rate into Lugert-Altus Reservoir prior to construction. This was based on comparing capacity of the original dam constructed in the 1920s by city of Altus near the town of Lugert (Lake Altus, current location of the W.C. Austin Project) using topographic maps between a nine-year period (1927 to 1937). An allowance of 43,000 acre-ft was made over a 40-year period for the reservoir dead pool. The active storage capacity was estimated to be 120,000 acre-ft (Page 73, 1937 Project Report), yielding a total reservoir capacity of 163,000 acre-ft. An Area-capacity figure and table are provided on Page 76 and 77, respectively, in the 1937 Project Report.

[2] Flows were actually extended to July 1937, but the yield simulation extended only to December 1936.

Reservoir Evaporation

The Project Report estimated net evaporation to be four feet (48 inches) per year. This was derived using pan evaporation and precipitation records (1912-1932) from Texas Agricultural Experiment Station in Chillicothe, Texas, which shared similar precipitation and temperature as Altus and is only 30 miles away. Net evaporation was calculated by reducing total annual evaporation (five feet) by precipitation (2.14 feet/yr) and seepage (1.14 feet/yr). Monthly net evaporation was distributed in accordance with the table on Page 69 of the Project Report.

Reservoir Seepage

The Project Report assumed an annual seepage rate of 1.14 feet that was accounted for in the net evaporation calculation. This is described on Page 68 of the Project Report.

Monthly Distribution of Demands

The 1937 Project Report assumed an irrigation requirement of 39 inches (3.25 feet) per year. This requirement was based on irrigation records obtained from the Carlsbad Project in New Mexico, which shared similar temperature with the Altus area, as well as crop types expected to be irrigated by Lugert-Altus Reservoir (Page 62, Project Report). Data also were taken from the Texas Agricultural Experiment Station to confirm the 39-inch annual requirement. The monthly distribution of this annual requirement is cited on Page 62 of the 1937 Project Report; the distribution was based on monthly temperatures and on consumptive use data obtained from the Boise Project in Idaho and Middle Rio Grande in New Mexico, albeit with some slight modifications to account for small seasonal differences in expected crop activity. Canal and lateral losses were assumed to average 30 percent, resulting in a maximum delivery rate of 0.24 inches per day. Precipitation can offset the monthly irrigation diversion demands and delivery system losses to a certain extent depending on soil moisture content. Daily precipitation data were used from the Mangum Weather Station from

Jan 1907 to Mar 1913 and the Altus Weather Station from Apr 1913 to Dec 1936. Based on these assumptions, a daily soil reservoir operation study was used to determine monthly irrigation diversion demands between 1907 and 1936. These demands are summarized as "primary" (Table 3, Page 66, 1937 Project Report) and "secondary" (Table 4, Page 67, 1937 Project Report). The average annual diversion demand was calculated to be 2.3 acre-ft/acre (Page 71, 1937 Project Report).

In addition to irrigation demands, the Project Report accounted for a senior water right permit (dated 1926) held by the city of Altus for municipal, industrial, and recreational use. At the time of the Project Report, the city was using 3,600 acre-ft/yr. Future demands were estimated to be 4,800 acre-ft/yr. The 1937 Project Report assumed that 4,800 acre-ft/yr would be distributed uniformly each month throughout the year (Page 70, 1937 Project Report).

Yield Results

Reservoir operations modeling and results are described in Pages 65-74 of the 1937 Project Report. Analyses for the period between 1907 and 1936 showed a critical period between 1931 and 1936. Based on storage and delivery simulations, 20,000 acres were identified as primary and 50,000 acres were identified as secondary, yielding a total project acreage of 70,000 acres. For the 20,000 acres identified as primary, simulated shortages would occur for 1931-1933, but not for 1934-1936. Operations modeling showed that the average annual reservoir yield totaled 103,600 acre-ft[3], of which 45,300 acre-ft was allocated as primary rights and 58,300 acre-ft as secondary rights. Primary rights were assumed to be fully met for all years except three, and shortages were small. The secondary rights were assumed to be met after primary demands have been met, resulting in frequent shortages and some years with no water availability. The operations modeling results, including estimated streamflow, demands, and flood releases are provided in Table 5 on Page 74 of the 1937 Project Report.

[3] This result was verified based on similar assumptions using the updated firm yield model.

2.2. Method 2. Post-Construction Yield Update (1926-2016)

In Section 2.1.1, the yield model was used to replicate the average annual yield estimate of Lugert-Altus Reservoir based on assumptions and calculations included in the 1937 Project Report. In this section, the yield calculation was updated to reflect post-construction conditions and to account for the best available data since Altus Dam was constructed in 1946 through Dec 2016. Because Lugert-Altus Reservoir is permitted for both agricultural and M&I beneficial uses, its supply was evaluated in terms of average annual yield (for agricultural purposes) and firm yield (for M&I purposes).

Available Flow and Precipitation Data

NFRR Flow into Lugert-Altus Reservoir

Monthly streamflow for the pre-construction period between Jan 1907 and Jul 1937 were taken directly from the 1937 Project Report, Table No. 2 on page 61 (Appendix Table 5). Recall that these pre-construction flows were derived by correlating recorded streamflow at the Granite and Lugert Dam streamgages with rainfall data recorded at three weather stations between 1906 and 1936. Between Oct 1937 and Sep 1944, USGS Granite streamgage (07302000) data were available, and these were adjusted to the Altus dam location using methods described below under *Extension of Streamflow Records*. Just prior to the completion of Altus Dam construction in 1946, the Carter streamgage (USGS 07301500) was installed on NFRR near Carter, OK. The Carter streamgage is located downstream of the other two streamgages in the Lugert-Altus Reservoir drainage area [Shamrock streamgage (USGS 07301300) on the NFRR and Kelton streamgage (USGS 07301410) on Sweetwater Creek], so the Carter streamgage is the preferred streamgage. As such, recorded flows at the Carter streamgage were selected for this analysis. However, only a portion of the Carter streamgage data were used (Oct 1944 to Dec 1946) because Lugert-Altus Reservoir storage data

were available after reservoir construction. For the 27-month period between Oct 1944 and Dec 1946, flows were derived through a correlation analysis of post-construction Cater gage data with computed post-construction inflows using methods described below under *Extension of Streamflow Records*. Beginning in Jan 1947, reservoir elevation data recorded by HydroMet[4] (Reclamation, 2020) are used to calculate NFRR flow for the post-construction period.

Precipitation

Precipitation is not measured directly for the purposes of calculating firm yield; rather, it is incorporated indirectly through the measurement of "Net Evaporation" which is discussed later in this report. That said, recorded rainfall data from the Erick, Hobart, and Miami stations were used to calculate pre-construction NFRR flow as part of the 1937 Project Report as discussed above. Regional precipitation data also were used to identify the critical drought period and period of record as described below.

Determining the Period and Drought of Record

The precipitation and temperature data for Oklahoma Climate Division 4 (Vose et al, 2014), as well as NFRR flow, were evaluated to determine the presence of historical critical drought periods needed for the yield analysis. Recall that Lugert-Altus Reservoir beneficial uses include both agricultural irrigation and M&I use, so it is important to consider reservoir supply reliability in terms of both average annual yield and firm yield, respectively. Based off precipitation and temperature, the 1930s critical period identified by the 1937 Project Report was confirmed as some of the driest and warmest years on record (Figure 12), and observed five-year running average NFRR flow was the fourth lowest on record (61,600 acre-ft/yr; Figure 13, top graphic). The lowest observed five-year running averages over the period of record are as follows: 61,600 acre-ft/yr (1931-1935), 56,900 acre-ft/yr (1980-1984); 54,500 acre-ft/yr (1952-1956), 54,000 acre-ft/yr (1970-1974), and 31,700 acre-ft/yr (2010-2014) (Figure 13).

[4] The HydroMet network collects remote field data and transmits it via satellite to provide real-time reservoir storage data.

Based on these data, the period 2010-2014 appears to be the critical drought of record. However, given the increase in groundwater use upstream of Lugert-Altus Reservoir, and recognizing the influence that groundwater withdrawals have on NFRR flow[5], the dataset of naturalized NFRR flow was evaluated because naturalized flows exclude depletions from groundwater pumping and are indicative of climatic factors as opposed to both climatic and anthropogenic factors[6]. As will be discussed more under Method 3, naturalized flows are available only between 1950 and 2016. For naturalized NFRR flows, the four lowest observed five-year running averages over the period of record are as follows: 70,100 acre-ft/yr (1980-1984); 62,800 acre-ft/yr (1970-1974); 57,000 acre-ft/yr (1952-1956), and 55,600 acre-ft/yr (2010-2014) (Figure 13, bottom graphic). In comparing the observed and naturalized flow regimes, naturalized flows are higher than observed flows, indicating the influence of groundwater pumping on observed NFRR flows. Despite the role that groundwater pumping plays in reducing observed NFRR flow, the lowest five-year running average flow within the naturalized dataset is still 2010-2014; that said, the naturalized dataset reveals just how similar drought conditions were between the 2010-2014 and 1952-1956 periods once the influence of groundwater pumping is removed.

Based on these data, the period Aug 2010 to Apr 2015 was selected to be the new critical drought of record for this yield update. The period of record for this analysis was selected to be Jan 1926 to Dec 2016. This allowed for a simulation of Lugert-Altus Reservoir during the 2010-2015 drought of record.

[5] This is discussed more under "Water Rights and Inflow Depletions" and even more extensively under Method 3.
[6] Naturalized flows are discussed extensively under Method 3.

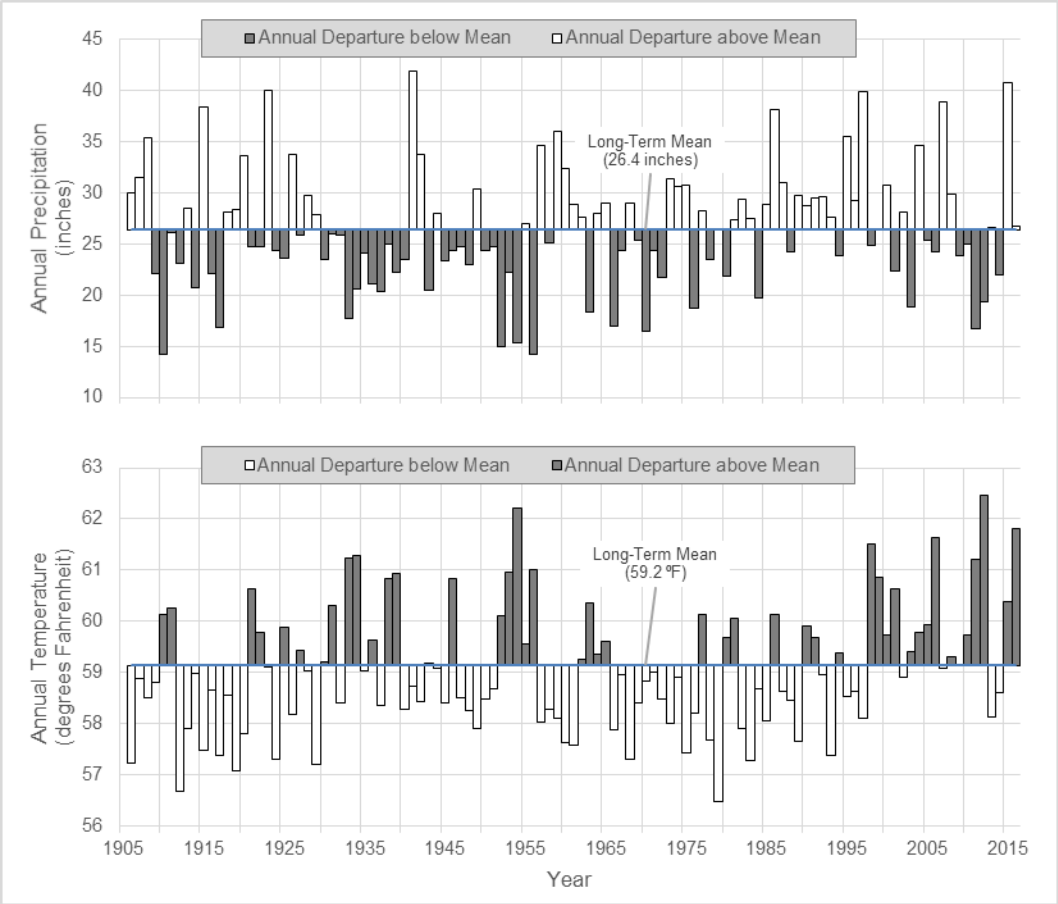


Figure 12. Observed droughts (dark gray shading) are defined such that a drought is initiated when annual precipitation is below the long-term mean and annual temperature is above the long-term mean, and the drought ends when annual precipitation is above the long-term mean and annual temperature is below the long-term mean.

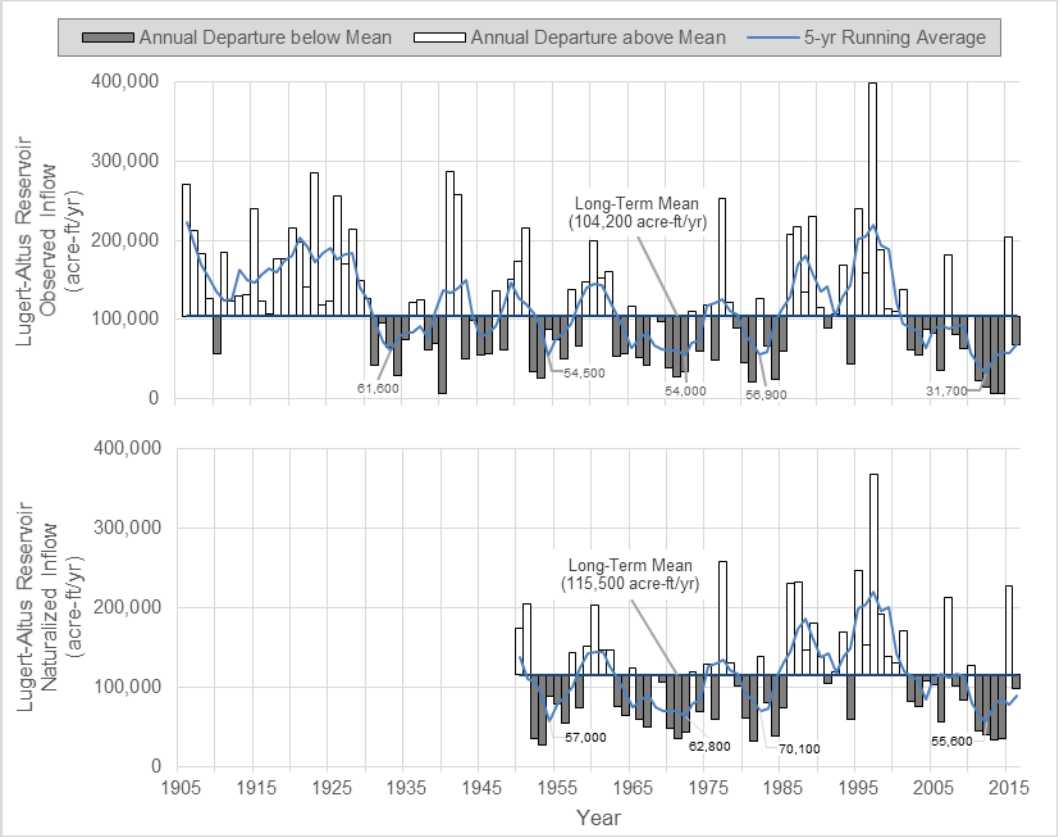


Figure 13. Observed droughts (dark gray shading) are defined such that a drought is initiated when the five-year running average streamflow (light blue line) is below the long-term mean, and the drought ends when the five-year running average streamflow is above the long-term mean.

Extension of Streamflow Records

As previously stated, monthly NFRR flows for the pre-construction period between Jan 1907 and Jul 1937 were taken directly from the 1937 Project Report, Table No. 2 on page 61 (Appendix Table 5). Between Oct 1937 and Sep 1944, USGS Granite streamgage (07302000) data were available, and these were adjusted to the Altus dam location using methods described below. Recall that no recorded streamflow was available for Aug 1937 and Sept 1937. Flow for these two months, presented in Appendix Table 5, was calculated using the same methodology as that in the 1937 Project Report through a correlation with local rainfall data. The Granite streamgage data between Oct 1937 and Sep 1944 were adjusted to the Altus dam location by increasing the recorded flows by one percent, which is the proportion of the overall NFRR drainage area not recorded by the Granite streamgage. These data are included in Appendix Table 6. As

previously stated, recorded flows were available at the Carter streamgage from Oct 1944 to present. However, only a portion of the Carter gage data are used (Oct 1944 to Dec 1946) because Lugert-Altus Reservoir storage data were available after reservoir construction. For the 27-month period between Oct 1944 and Dec 1946, flows were derived through a correlation analysis of post-construction Cater gage data with computed post-construction inflows. This was done by performing a regression analysis relating monthly Carter streamgage data with post-construction monthly computed streamflow, and then using the regression results to relate the 27 months of pre-construction Carter gage data with the 27-months pre-construction NFRR streamflow[7]. The Correlation Coefficient ranges between 0.90 and 0.98 depending on the month, and is 0.96 overall (Table 2), indicating a fairly strong positive relationship between post-construction Carter gage data and computed NFRR streamflow[8]. The R-squared value shows that post-construction Carter gage data account for between 81 percent and 97 percent of the variation in post-construction computed NFRR streamflow and accounts for 92 percent of the variation overall (Table 2). Looking at Figure 14 and Figure 15, to calculate pre-construction NFRR streamflow, "*y*", pre-construction Carter streamgage flow "*x*" must be applied to the fixed proportion between post-construction Carter gage flow and post-construction computed streamflow as described by the multipliers listed in Table 2. Tables of monthly values are included in Appendix Table 7.

Beginning in Jan 1947, reservoir elevation data recorded by HydroMet[9] (Reclamation, 2020) are used to calculate NFRR flow for the post-construction period up until Dec 2016 (Appendix Table 8).

[7] The years 1962 to 1964 were excluded due to missing data at the Carter streamgage.
[8] In regression, a correlation coefficient ranges from -1 (strong negative relationship) to +1 (strong positive relationship).
[9] The HydroMet network collects remote field data and transmits it via satellite to provide real-time reservoir storage data.

Table 2. Summary of regression and correlation results comparing monthly post-construction NFRR streamflow recorded at the Carter streamgage with post-construction monthly computed NFRR streamflow, Jan 1947 to Dec 2016.

Season / Period	Number of Observations	Multiplier	R-Squared	Correlation Coefficient
January	67	1.09	84%	0.92
February	67	1.31	84%	0.92
March	67	1.33	90%	0.95
April	67	1.37	91%	0.95
May	67	1.07	95%	0.97
June	67	1.18	81%	0.90
July	67	1.15	94%	0.97
August	67	1.19	89%	0.94
September	67	1.20	86%	0.92
October	67	1.28	97%	0.98
November	67	1.28	88%	0.94
December	67	1.21	87%	0.93
All Months (1947-2016)	804	-	92%	0.96

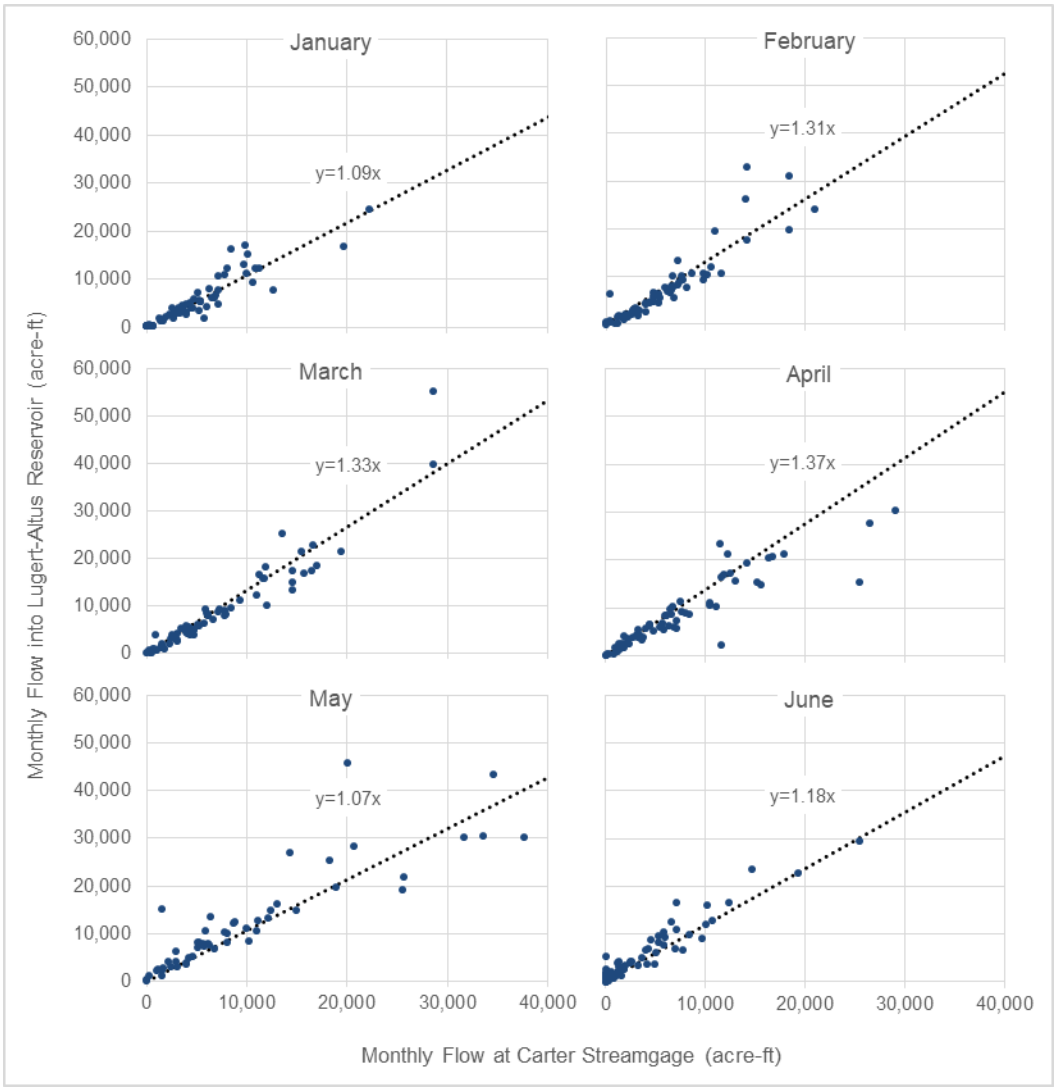


Figure 14. Linear regression results for January to June showing the relationship between monthly post-construction NFRR streamflow recorded at the Carter streamgage with post-construction monthly computed NFRR streamflow, Jan 1947 to Dec 2016

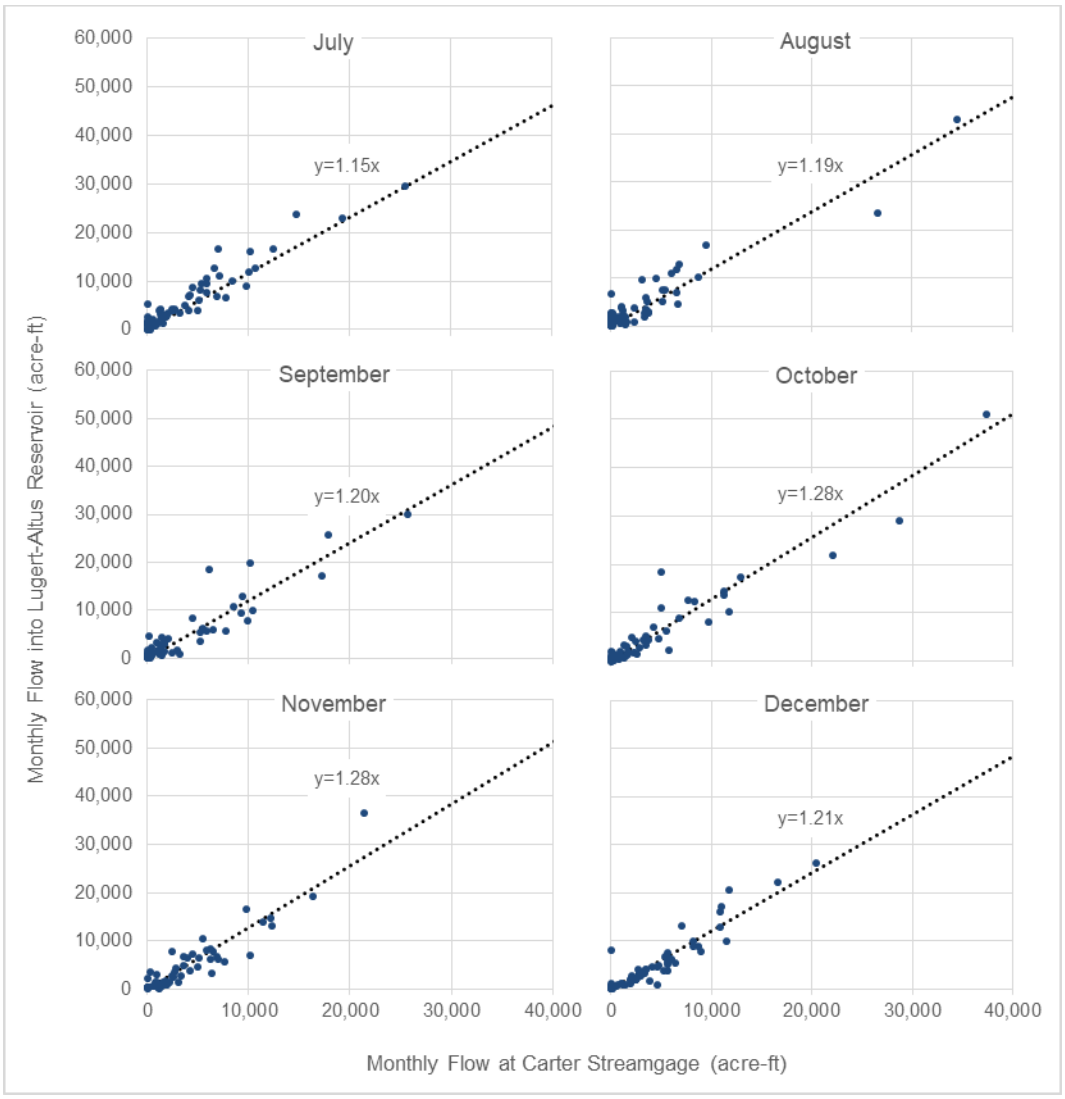


Figure 15. Linear regression results for July to December showing the relationship between monthly post-construction NFRR streamflow recorded at the Carter streamgage with post-construction monthly computed NFRR streamflow, Jan 1947 to Dec 2016

Inflow into Lugert-Altus Reservoir

The full record of extended monthly NFRR streamflow (Jan 1926 to Dec 2016), as derived using the methods described above, was input into the firm yield model as monthly inflow into Lugert-Altus Reservoir.

Water Rights and Inflow Depletions

An important factor to consider that can affect the supply of Lugert-Altus Reservoir is the withdrawal of streamflow caused by changes in land use, flood

retention structures, and human development. Upstream withdrawals directly reduce inflow into the reservoir, while downstream withdrawals can indirectly affect reservoir supply through downstream discharge requirements, if applicable, from the dam. Withdrawals may come from surface water diversions and/or come from groundwater pumping in aquifers that have a hydrologic connection with surface water. Some withdrawals must be permitted, while other withdrawals for domestic and household uses do not require a permit.

Recall that the 1937 Project Report provided no allowances for inflow depletions. No explanation was provided in the report; however, it may be because no floodwater retention structures were contemplated at the time, and it was assumed, like pre-construction planning efforts on other Reclamation reservoirs, that any future structures would be required to release stored water when Lugert-Altus Reservoir was less than full.

Even though additional future inflow depletions in the NFRR are expected through 2060, the volume of those depletions was not considered for the purposes of updating and extending the 1937 Project Report yield estimate. These depletions, caused by both ground and surface water development upstream of Lugert-Altus Reservoir, are quantified through a separate and extensive modeling effort, and are subsequently accounted for in the yield update provided under Method 3.

Sedimentation and Storage Allocations

Six sediment surveys have been completed for Lugert-Altus Reservoir since completion of the 1937 Project Report: 1940[10], 1948, 1953, 1967, 2007, and 2018. These surveys show that the sediment accumulation rate has generally decreased over time, with the highest rate (1,062 acre-ft/yr) estimated by the 1953 survey, and the lowest rate (362 acre-ft/yr) estimated in the most recent survey in 2018 (Figure 16). In fact, the 2018 survey estimated only a 500 acre-ft accumulation of sediment between 2007 and 2018. The reduction in sediment

[10] Prior to reservoir construction, a sediment survey was completed in 1940. The area capacity table derived by the 1940 survey data is considered the "original" reservoir area and capacity.

accumulation may be attributable to the differing survey techniques and/or from changes over time in watershed management, land use, etc. For this yield update, a sediment accumulation rate of 414 acre-ft/yr was used, which is based on the 2007 survey. The reason that the 2007 rate was used here as opposed to the 2018 rate is that the URRBS, and by extension Method 3 (Section 2.1.3), both used the 2007 survey estimate of 414 acre-ft/yr. This is because the 2018 survey estimate of 362 acre-ft/yr was unavailable at the time that the URRBS was completed. Based on the 2007 survey, the storage capacity of Lugert-Altus Reservoir at the top of conservation pool (elevation 1,559 ft) in 2007 was estimated to be 128,900 acre-ft (Ferrari, 2008). Applying a sediment accumulation rate of 414 acre-ft/yr, the storage capacity at the top of conservation pool was estimated to be 121,500 acre-ft in the year 2025; 107,000 acre-ft in the year 2060; and 100,700 acre-ft/yr in the year 2075 (Table 3).

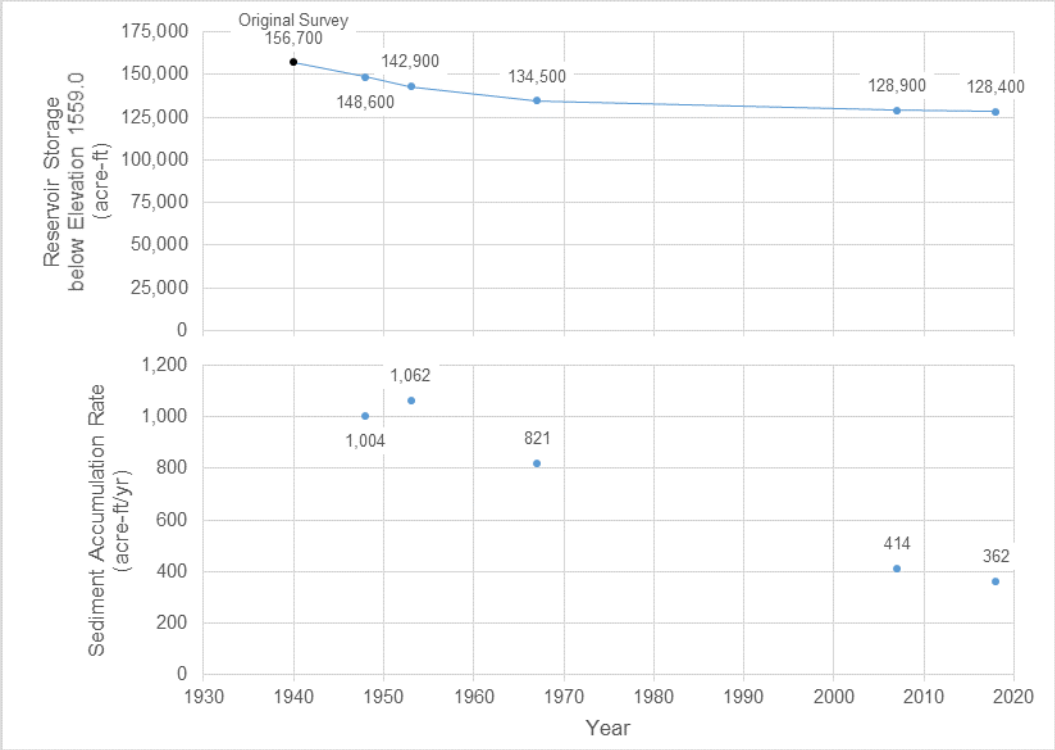


Figure 16. Reservoir storage below elevation 1559.0 ft plotted by sediment survey year and the resulting sediment accumulation rate since 1940.

Table 3. Lugert-Altus Reservoir change in area capacity over time based on a projected sediment rate of 414 acre-ft/yr (Ferrari, 2008).

Reservoir Pool	Reservoir Elevation (ft)	2007 Survey Conditions		Projected Capacity based on Sediment Accumulation (acre-ft)		
		Area (acres)	Capacity (acre-ft)	2025 (16 yrs remaining)	2060 (51 yrs remaining)	2075 (66 yrs remaining)
Conservation	1559.0	6,273	128,900	121,500	107,000	100,700
Inactive	1517.5	266	600	0	0	0
Reservoir Storage	Below 1559.0	-	128,300	121,500	107,000	100,700
Storage Lost to Sediment Accumulation	-	-	-	7,400	21,900	28,200

Reservoir Evaporation

Reservoir evaporation losses are calculated by multiplying monthly pan evaporation measurements[11] by a free surface coefficient factor of 0.7 to obtain a monthly net evaporation rate for the reservoir (Reclamation, 1994). The monthly net evaporation rate is then multiplied by the reservoir surface area to obtain monthly evaporative losses out of Lugert-Altus Reservoir. Reservoir surface area is assumed to remain unchanged in order to account for reservoir fringe losses and evapotranspiration, and is based on the original area capacity curve developed in 1940. Monthly pan evaporation measurements and monthly net reservoir evaporation rates are cited in the Appendix (Table 11 thru Table 17).

To obtain net evaporation estimates for the pre-construction model period, a linear regression was performed using pure evaporation at Lugert-Altus Reservoir and the Texas Agricultural Experiment Station in Chillicothe, Texas between 1948 and 1959 (Figure 17). The resulting multiplier was applied to Chillicothe's pure evaporation data to derive pure evaporation data at Lugert-Altus Reservoir between Jan 1926 and Dec 1947. These data were then converted to net evaporation using monthly precipitation at the reservoir.

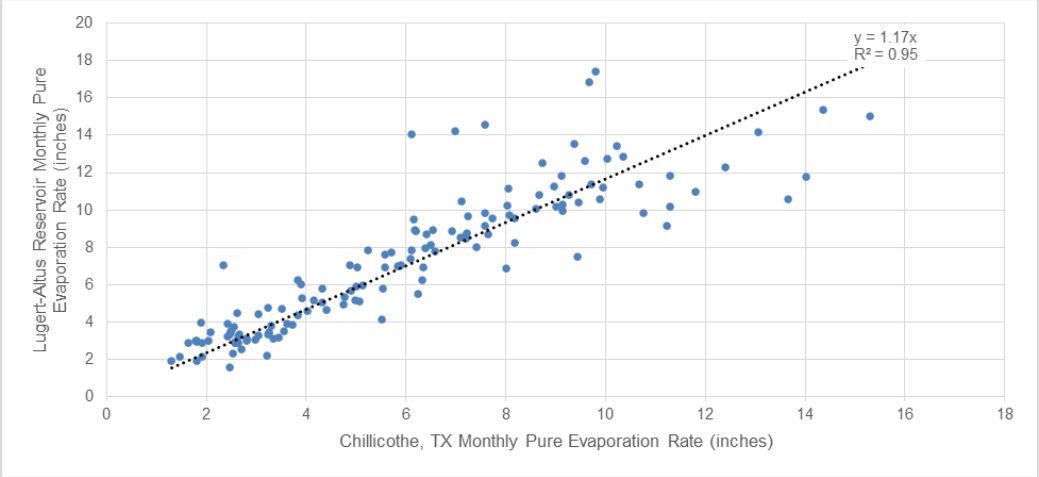


Figure 17. Linear regression results showing the relationship between pure evaporation at Texas Agricultural Experiment Station in Chillicothe, Texas and pure evaporation at Lugert-Altus Reservoir between Jan 1948 and Jun 1959. The relationship between evaporation rates has a good correlation of 0.89 and an R2 value of 0.95.

[11] Pan evaporation measurements include the effects of precipitation.

Reservoir Seepage

The 1937 Project Report estimated seepage losses to be 1.14 feet per year, which was accounted for in the net evaporation calculation. Between Nov 1986 and Apr 2013, seepage was measured at Altus Dam using two flume weirs before flows are returned to the NFRR. During the same period, measured seepage was also recorded at the two largest dikes impounding the reservoir (Lugert Dike and East Dike B). Seepage at the two dikes was collected through a toe drain system and measured at a single measurement point location before entering an unnamed stream that flows into Elk Creek.

Measured seepage was correlated to reservoir elevation by performing a regression analysis over this period. The Correlation Coefficient is 0.84, indicating a fairly strong positive relationship between reservoir seepage and reservoir elevation[12]. The R-squared value shows that reservoir elevation accounts for 70 percent of the variation in seepage. To calculate seepage, "*y*", reservoir elevation "*x*" must be applied to the fixed proportion between seepage and reservoir elevation as described by the multipliers listed in Figure 18.

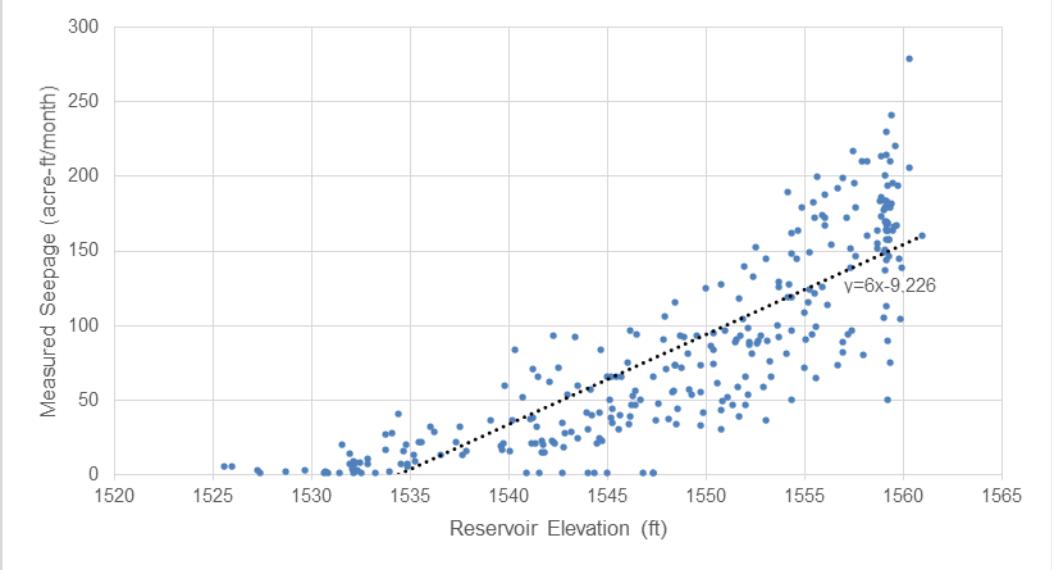


Figure 18. Measured seepage at Altus Dam and dikes compared to reservoir elevation between Nov 1986 and Apr 2013. The dashed trend line shows that as reservoir elevation increases, seepage also increases.

[12] In regression, a correlation coefficient ranges from -1 (strong negative relationship) to +1 (strong positive relationship).

Distribution of Demands and Reservoir Operations

The Lugert-Altus ID holds an 85,630 acre-ft/yr agricultural irrigation permit, and the United States holds a 4,800 acre-ft/yr M&I permit for water stored in Lugert-Altus Reservoir for use by the city of Altus. Importantly, the United States M&I water right for the city of Altus water is senior to Lugert-Altus ID's irrigation water right. As such, a key variable in the model simulation relates to the method by which Lugert-Altus ID avoids interfering with the senior water right for city of Altus M&I use. In 1954, the Lugert-Altus ID and city of Altus signed a settlement agreement that requires the Lugert-Altus District to manage irrigation operations such that the District can deliver 4,800 acre-ft in any given year to the city of Altus for M&I purposes if requested, while also maintaining 10,000 acre-ft in storage at the end of each irrigation season to ensure that 4,800 acre-ft can be delivered to the city of Altus the following year. This end-of-season provision aims to ensure that sufficient storage is available to deliver M&I water in the case that conditions are dry or become dry the following year. Specifically, the settlement agreement states that "…upon completion of any irrigation run and filling of the city reservoirs (lakes), there shall remain in the Altus Dam and Reservoir a minimum of 10,000 acre-ft of active storage"[13]. To "fill the city reservoirs (lakes)" with 4,800 acre-ft of M&I water, a total of 10,000 acre-ft in storage is needed. This is because 5,200 acre-ft/yr in "push" water is needed to create the necessary hydraulic head/pressure to convey the city of Altus' allotted water through the canal system[14]. In effect, Lugert-Altus ID operates to maintain 20,000 acre-ft in storage to ensure compliance with the settlement agreement, 10,000 acre-ft of which is allocated for the current irrigation year, with the other 10,000 acre-ft allocated for the following year. Furthermore, Lugert-Altus ID's current practice is to set aside an additional 5,000 to 9,000 acre-ft to account for evaporative losses, bringing the total storage reserve to up to 29,000 acre-ft for each irrigation season. These losses are

[13] 1954 settlement agreement, Lugert-Altus ID and city of Altus

[14] The 5,200 acre-ft in push water is an assumption and calculated based on best professional management practices.

adjusted throughout the season (typically May to September) to reflect real-world climate conditions and storage volumes.

For the purposes of this yield analysis, when reservoir storage falls below the 29,000 acre-ft threshold, irrigation is discontinued. It should be noted that this threshold was used by Lugert-Altus ID under real-world conditions during the drought of record when inflow was low and evaporation rates were high. Given this, it is considered a conservative, yet defensible assumption in the yield model; however, it should be noted that the storage threshold needed to comply with the settlement agreement changes from year to year and within the irrigation season depending on real-world conditions.

Based on the operational considerations cited above, water was considered available for irrigation only when reservoir storage is above 29,000 acre-ft (the storage needed to protect the 4,800 acre-ft/yr of M&I water for the city of Altus). For the model simulation, when sufficient water was available for irrigation over the model period, the irrigation deliveries were distributed monthly based on observed, average monthly irrigation deliveries during the irrigation season (May through Sept) between 1951 and 2016 (Figure 19).

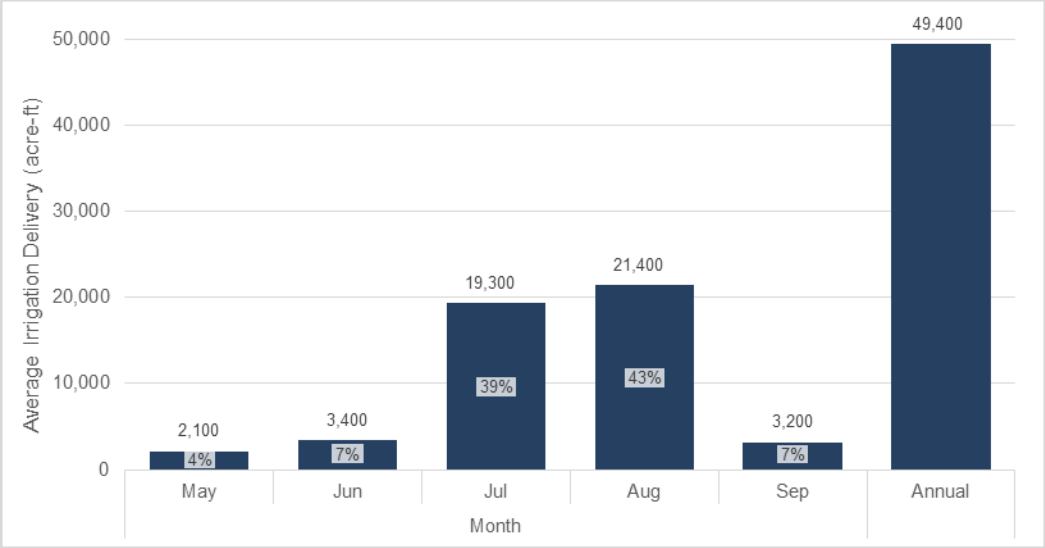


Figure 19. Average annual irrigation deliveries and distribution of average irrigation deliveries throughout the irrigation season (May through Sep) between 1951 and 2016.

Another important operation rule built into the yield model centers on the 85,630 acre-ft/yr irrigation water right. The yield model simulates reservoir storage under the assumption that the Lugert-Altus ID will always deliver its full water right when supplies (i.e. storage and inflow) are available to do so. In years when sufficient supply is not available to deliver the full permitted volume of 85,630 acre-ft, the model solves for the maximum volume of water that can be delivered for irrigation while at the same time attempting to maintain the 29,000 acre-ft storage reserve at the end of the irrigation season (Figure 20). As illustrated in Figure 20, over the model period, during relatively drier periods, the reservoir did drop below 29,000 acre-ft, in which case irrigation deliveries ceased.

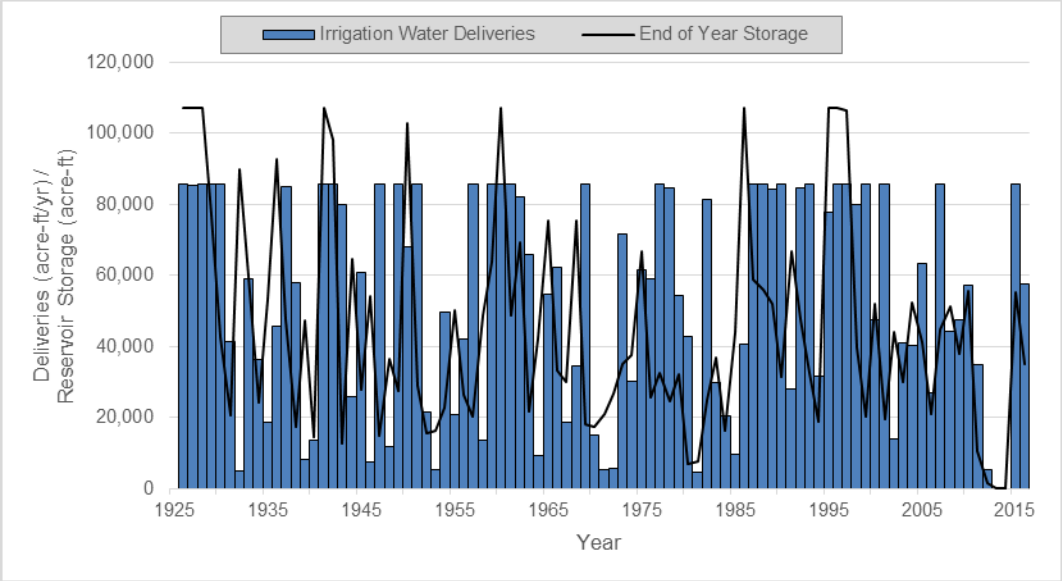


Figure 20. Modeled Lugert-Altus Reservoir storage and irrigation water deliveries up to the full permitted amount of 85,630 acre-ft/yr when available, 2060 sediment condition.

Turning to M&I deliveries, over the past 30 years, the city of Altus has almost exclusively received its M&I water from Tom Steed Reservoir, not Lugert-Altus Reservoir. This is because the quality of Tom Steed Reservoir water is preferred to that of Lugert-Altus Reservoir water. That said, in 2011, 2012, and 2013 (during the peak of the drought of record), the city of Altus received M&I deliveries from Lugert-Altus Reservoir. Interestingly, during this same time period, zero deliveries were made for agricultural irrigation, thus providing a

recent example of the efficacy of Lugert-Altus ID's operations at protecting the senior right for 4,800 acre-ft/yr of M&I water for use by the city of Altus during times of severe shortage. For the purposes of simulating reservoir yield, like irrigation, assumptions must be made about the quantity and distribution of M&I demands on Lugert-Altus Reservoir. For the purposes here, it was assumed that the full permitted M&I volume of 4,800 acre-ft/yr would be delivered from Lugert-Altus Reservoir to the city of Altus. When sufficient water is available for irrigation (storage above 29,000 acre-ft), it was assumed that the distribution of M&I deliveries would be proportionate to the monthly distribution of irrigation deliveries during the irrigation season as displayed above in Figure 19[15]. This is because the Lugert-Altus ID generally delivers the Altus M&I water during the irrigation system thereby utilizing irrigation deliveries as "push water" to convey M&I water more efficiently. When sufficient water is not available for irrigation, meaning that push water is not available in the conveyance system, it was assumed that 10,000 acre-ft would be delivered as one lump volume in the month of May. The volume of 10,000 acre-ft was selected to ensure compliance with the 1954 settlement agreement as previously discussed, and generally reflects 4,800 acre-ft of M&I water and 5,200 acre-ft of push water. The month of May was selected because it was assumed that the city of Altus would want the city reservoir filled by the beginning of summer to ensure water is available to offset evaporation and meet peak demands. The distribution of M&I deliveries under both scenarios is illustrated below in Figure 21.

[15] Consideration was given towards distributing M&I deliveries based on observed deliveries in 2011, 2012, and 2013, but monthly reported use data were unavailable.

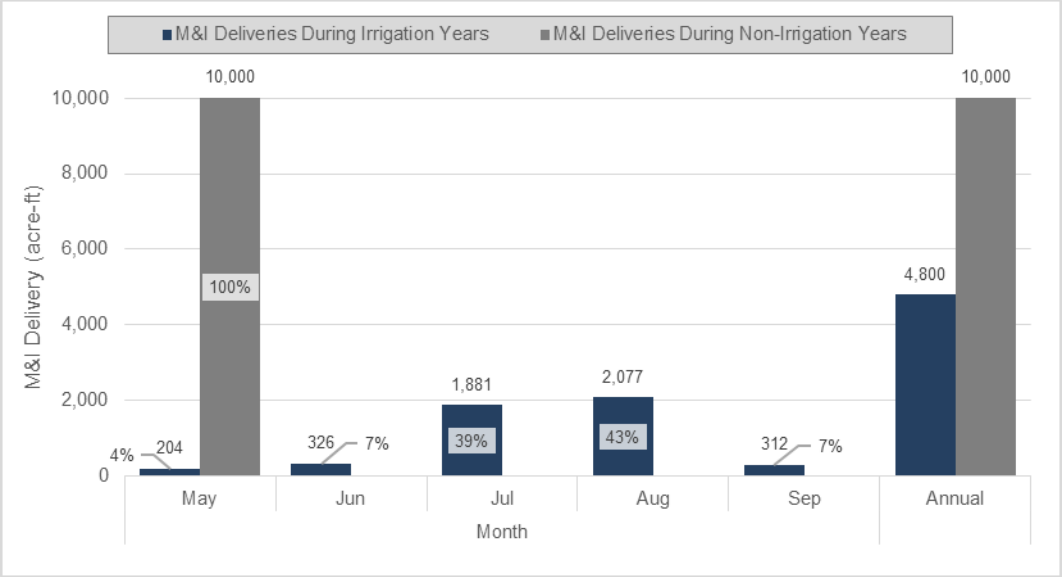


Figure 21. M&I deliveries from Lugert-Altus Reservoir to the city of Altus under two scenarios: "Irrigation Years", when sufficient water is available for irrigation; and "Non-Irrigation Years", when sufficient water is not available for irrigation. The monthly distribution of M&I deliveries during "Irrigation Years" is based on average irrigation deliveries throughout the irrigation season (May through Sep) between 1951 and 2016.

Reservoir Yield Results

One of the biggest challenges facing farmers is planning and adjusting to supply uncertainty. The Lugert-Altus ID's goal is to operate its system in a way that does not interfere with the United States senior water right for city of Altus M&I water and maximizes the reliability of agricultural deliveries. This entails optimizing the reliability of existing and future storage at Lugert-Altus Reservoir - both during wet and dry cycles, as well as throughout extended periods of drought. Not unlike managing a bank account, irrigation deliveries serve as expenditures on necessary goods while the amount of water left in storage acts as a "savings account" that can supplement future year(s) if a drought occurs. From a farmer's perspective, it is preferred to have the maximum amount of water available on a consistent basis, but the two often do not go hand and hand. It is a delicate balance that the Lugert-Altus ID must weigh throughout the irrigation season, and it highlights the importance of supply reliability.

For these reasons, unlike reservoirs that provide water exclusively for M&I use, the yield of Lugert-Altus Reservoir is *not* evaluated in terms of the

"firm" annual volume that can be reliability delivered during a repeat of the drought of record; rather, it is evaluated in terms of its *dependability* (i.e., reliability) at providing water for both irrigation and M&I use.

Yield simulations showed that Lugert-Altus ID's full permitted irrigation volume of 85,630 acre-ft/yr was available **25 percent** of the time compared to the 4,800 acre-ft/yr of M&I water for the city of Altus which was available **98 percent** of the time (Figure 22). These results demonstrate the effectiveness of the District's operating rules at protecting the water right for city of Altus' M&I water, albeit at the expense of its own irrigation water right. In addition, the yield analysis showed that **57,600 acre-ft/yr** was available for irrigation **50 percent** of the time, and at least **8,200 acre-ft/yr** was available for irrigation **90 percent** of the time. The full range of irrigation supply dependability is displayed in Figure 23. The overall average annual yield of Lugert-Altus Reservoir totaled **52,900 acre-ft/yr**.

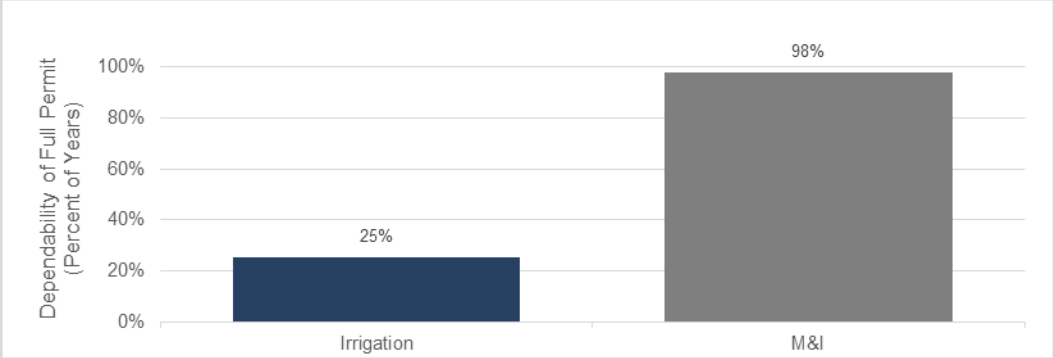


Figure 22. Frequency that the Lugert-Altus ID's full permitted irrigation volume of 85,630 acre-ft/yr and the city of Altus' full permitted M&I volume of 4,800 acre-ft/yr are available based on modeled storage of Lugert-Altus Reservoir, 2060 sediment conditions.

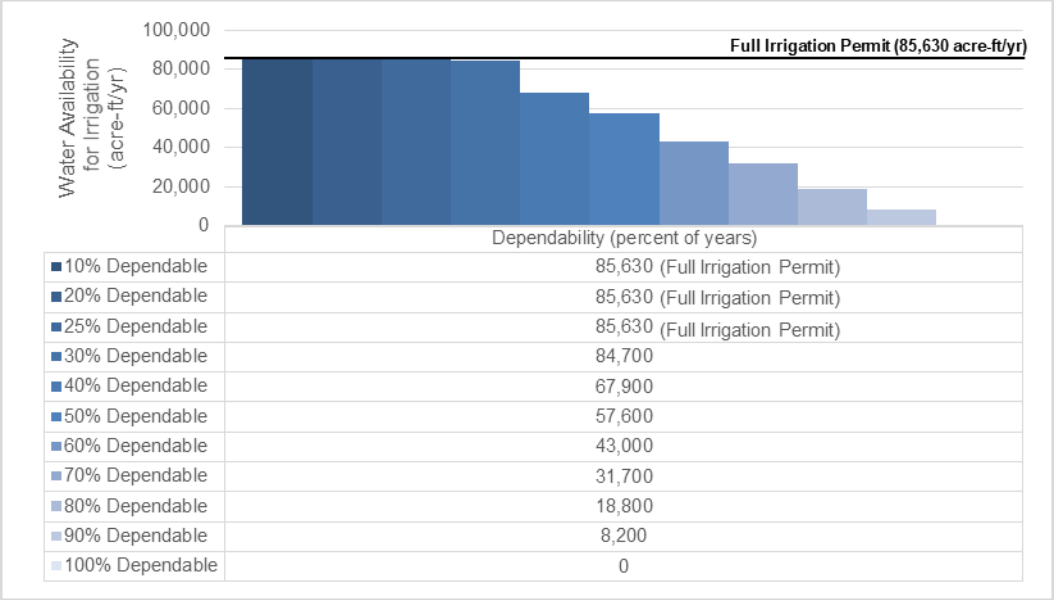


Figure 23. Dependability of a range of irrigation deliveries that could be made by the Lugert-Altus ID based on modeled storage of Lugert-Altus Reservoir, 2060 sediment conditions.

Finally, this section concludes by providing a firm yield estimate of Lugert-Altus Reservoir. This calculation was performed for comparative purposes only with other Reclamation reservoirs that provide water exclusively for M&I purposes. Lugert-Altus Reservoir is clearly not used exclusively for M&I purposes. That said, the firm yield of Lugert-Altus Reservoir was calculated to be 11,000 acre-ft/yr during a repeat of the 2010-2015 drought of record under 2060 sediment conditions.

2.3. Method 3. Upper Red River Basin Study Firm Yield Update (1926-2016)

In Section 2.1.1, the yield model was validated by replicating the 1937 Project Report, and in Section 2.1.2, methods were updated/revised to reflect post-construction conditions and account for the best available data through Dec 2016. In this section, the yield model is used to simulate modeled reservoir storage using future inflow depletions derived by Oklahoma Water Resources Board (OWRB) as part of OWRB's analysis of water rights and water availability in the North Fork Red River (NFRR) basin. The analysis was performed by OWRB in collaboration with Reclamation using a new Surface Water Allocation Model (SWAM) on the NFRR basin in support of the URRBS. The details of the SWAM, including methods and assumptions, can be found in Chapter 6 of the URRBS Study Report.

Overview and Approach

The purpose of the SWAM is to help OWRB simulate allocation of water rights and to assess the impacts of new permits on water availability under a range of future hydrologic conditions, operations, and development scenarios. This includes assessing the impacts on the yield of Lugert-Altus Reservoir. In collaboration with Reclamation, multiple development scenarios were identified, and using the SWAM, multiple inflow sequences were developed that correspond to each development scenario. The SWAM and/or the yield model can then be used to assess impacts of the development scenario on water availability. The purpose and scope of the SWAM is to assess water availability in the entire hydrologic basin, including reservoir yield; whereas the yield model only calculates reservoir yield and does not assess basin-wide water availability. Given these differences in purpose and scope, the SWAM must account for multiple diversion/depletion points along the stream, and thus generally calculates reservoir storage and yield using streamgage data; however, the yield model must

only account for one point in space (i.e., the reservoir), and thus calculates reservoir storage and yield using reservoir elevation levels and computed inflow.

Following a robust model calibration process performed by OWRB and Reclamation as part of the URRBS, Reclamation and OWRB came to a consensus on utilizing Lugert-Altus ID's operation rules that ensure compliance with the 1954 settlement agreement in OWRB's SWAM modeling. Consensus also was made on use of Reclamation's estimates of reservoir area capacity, net evaporation, seepage, and reservoir releases[16]. The full water budget used by OWRB is described in the URRBS Study Report (Reclamation, In press), NFRR Summary Report (AMEC Environmental & Infrastructure, 2014), and NFRR Model Naturalization Update (Lynker Technologies, 2018).

Period of Record, Water Rights, and Inflow Depletions

A key capability of the SWAM over the yield model is that the SWAM is a network model that can quantify impacts of ground- and surface water depletions in both time and space relative to naturalized flow conditions. To calculate naturalized streamflow conditions, the SWAM adds the volume of water reportedly used by streamwater permit holders back into the flows recorded by the gaging station. Permit holders did not begin reporting use volumes to OWRB until 1950. Therefore, the period of record used for the SWAM analysis, and subsequently for this firm yield simulation, is Jan 1950 to Dec 2016. Similar to Method 2, the analysis extends through 2016 to account for the new drought of record between Aug 2010 and Apr 2015. Details on the naturalization process of the NFRR hydrologic basin can be found in the NFRR Summary Report (AMEC Environmental & Infrastructure, 2014), and NFRR Model Naturalization Update (Lynker Technologies, 2018). In addition to reported streamwater use, the volume of baseflows depleted by groundwater pumping out of the NFRR aquifer also is added back into the baseline NFRR flow record. The details of how these volumes are quantified, including related assumptions and uncertainties, can be

[16] The SWAM can adjust these variables as needed to accommodate conditions and scenarios deemed appropriate by the OWRB for its own planning purposes that may be beyond the scope of the URRBS.

found in the USGS Scientific Investigations Report 2017–5098: Hydrogeology and Simulated Groundwater Flow and Availability in the North Fork Red River Aquifer, Southwest Oklahoma, 1980–2013.

Figure 24 illustrates permitted ground and surface water use, and Figure 25 illustrates domestic groundwater wells within the Lugert-Altus and Tom Steed Reservoir hydrologic basins; note that although a water rights permit is not required for domestic groundwater use, a permit to drill the well is required. Domestic streamwater use cannot be illustrated because it also does not require a water rights permit and no good mechanism exists to identify the location of existing domestic stream diversions. As part of the URRBS and in support of OWRB's development of Maximum Annual Yield (MAY)-Equal Proportionate Share (EPS) update, USGS developed a numerical groundwater model on the NFRR aquifer (USGS Scientific Investigations Report 2017–5098: Hydrogeology and Simulated Groundwater Flow and Availability in the North Fork Red River Aquifer, Southwest Oklahoma, 1980–2013). The study identified the physical extent of the NFRR aquifer and found that the NFRR aquifer primarily underlies the NFRR (Figure 24). According to USGS, about half of the annual surface water inflow to Lugert-Altus Reservoir was supplied by base flow during the study period of 1980-2013. USGS also concluded that in recent years (2000-2013) at the streamgage (Carter 07301500) immediately upstream of the reservoir, the base-flow index (the ratio of total annual base-flow to total streamflow) exceeded 60 percent in 4 out of 14 years with a maximum base-flow index of 81.1 percent in 2011. This means that during drought periods when the base-flow index increases, reservoir users are almost entirely dependent on base flow for their water supply.

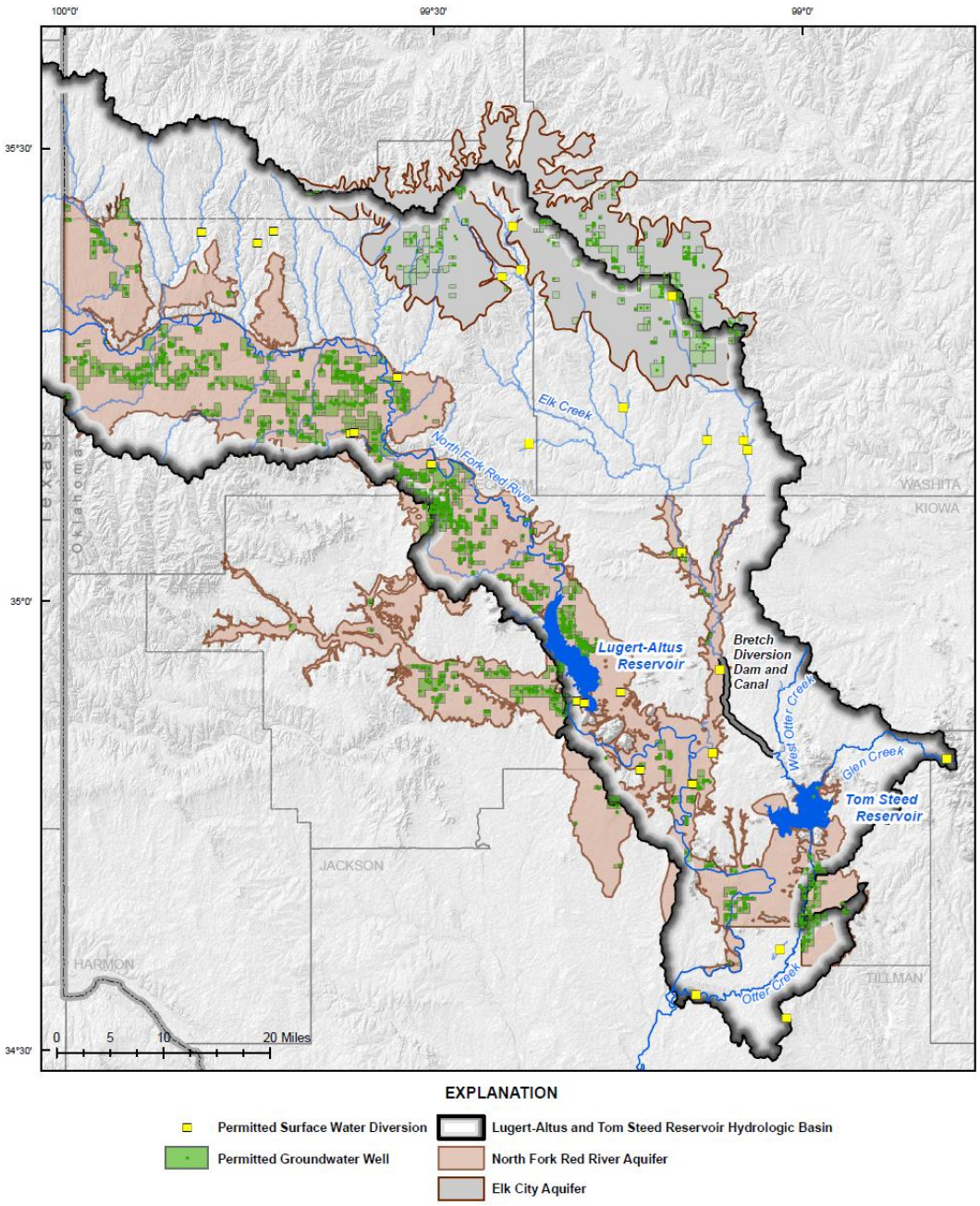


Figure 24. Distribution of permitted surface water diversions and groundwater wells within the Lugert-Altus and Tom Steed hydrologic basins, as well as permitted groundwater wells within the NFRR and Elk City aquifers.

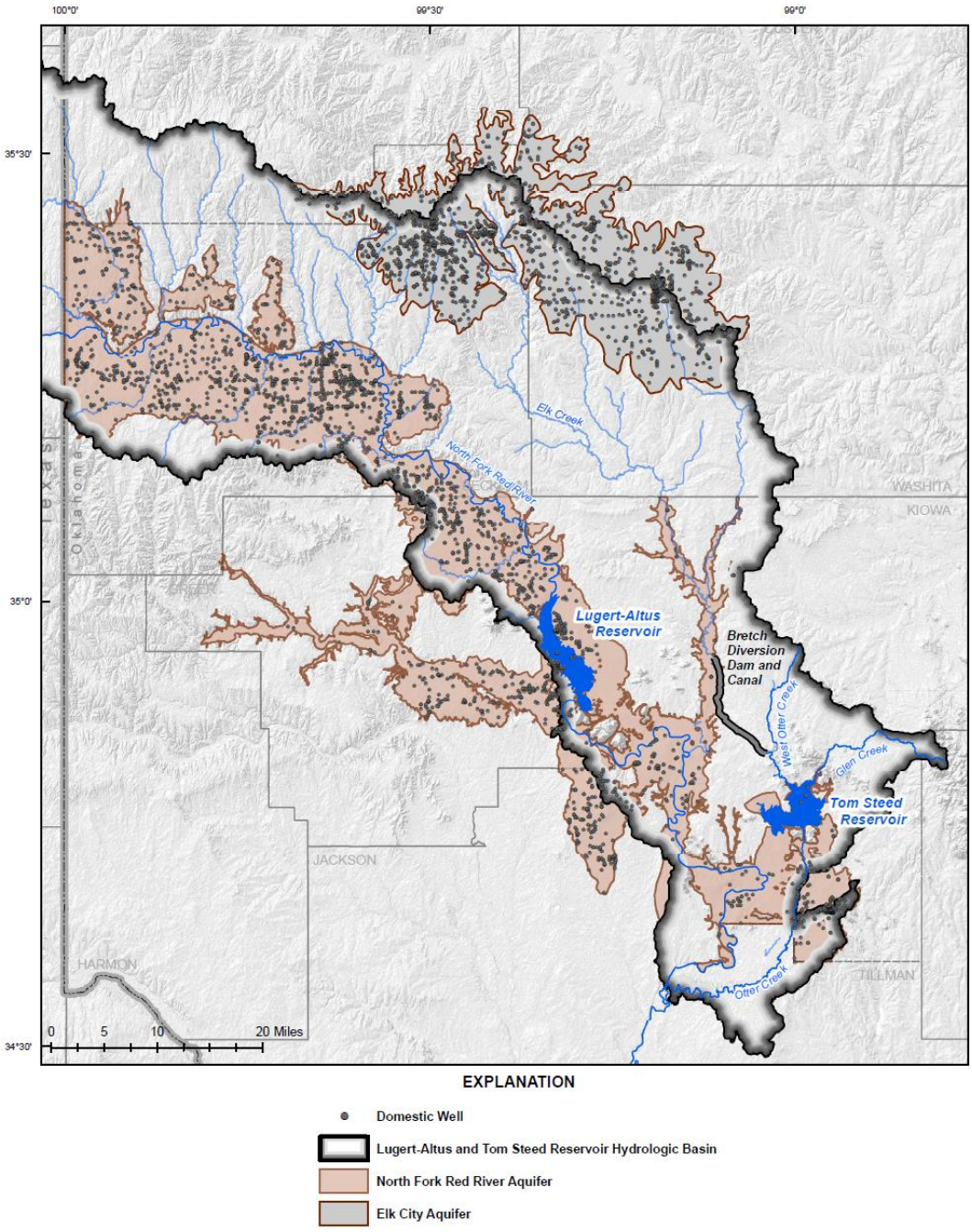


Figure 25. Distribution of domestic groundwater wells (no water rights permit required) within the NFRR and Elk City aquifers. Domestic streamwater use cannot be illustrated because it also does not require a water rights permit and no good mechanism exists to identify the location of existing domestic stream diversions.

Inflow Depletion Scenarios

The NFRR drainage basin hydrologic record was depleted to account for existing and future groundwater withdrawals, as well as existing and future permitted streamwater diversions and new future streamwater domestic use[17]. Permitted groundwater withdrawals for the NFRR aquifer were accounted for using base flow reductions calculated by USGS under four groundwater use scenarios out of the NFRR aquifer. These four scenarios were integrated into four surface water development scenarios and modeled using OWRB's SWAM for the NFRR. Four additional scenarios were included using OWRB's SWAM to account for a range of future inflow conditions as well, resulting in a total of eight new inflow records for the NFRR that could be input into Reclamation's Lugert-Altus Reservoir yield model. Monthly flows provided by OWRB are provided in Appendix Table 18.

Details on the approach, assumptions, and findings can be found in the Status Quo TM. A summary of a few key assumptions is listed below:

- Existing permits are modeled by the SWAM such that only consumptive demands are removed from the stream. Non-consumptive demands remain in the system as return flows. These volumes are presented in Table 4 below, along with the corresponding permit date, location, and type.
- Similar operating rules were used in Method 3 as those used in Method 2, namely that Lugert-Altus ID operates the reservoir as it normally does, which is to deliver 85,630 acre-ft/yr when sufficient supply is available, to maximize irrigation deliveries when sufficient storage to deliver the full permit is not available, and to reserve 29,000 acre-ft/yr in reservoir storage to avoid interference with the United States senior right for city of Altus M&I water by eliminating irrigation withdrawals that would cause the reservoir's storage to drop below 10,000 acre ft.

[17] All streamwater demand scenarios include existing, historical domestic use. This is because domestic stream use is already accounted for in the USGS streamgage data that were used to derive all streamflow calculations. Because existing domestic stream use does not require a permit, it cannot be directly quantified.

- Impacts were evaluated over the 91-year period of record and during the drought of record[18].

Table 4. Regular stream water permits within the Lugert-Altus Reservoir watershed, including modeled consumptive demand volume of junior versus senior permit holders.

Location	Permit Number	Permit Owner	Permit Type	Permits Junior to the City of Altus and the LAID[a]		Permits Senior to the City of Altus and the LAID[b]	
				Permitted Volume (acre-ft/yr)	Modeled Consumptive Demand (acre-ft/yr)	Permitted Volume (acre-ft/yr)	Modeled Consumptive Demand (acre-ft/yr)
Upstream of Reservoir	19470003	Private	Irrigation	84	61	-	-
	19600140	Private	Recreation, Fish, and Wildlife	150	120	-	-
	19620010	Private	Irrigation	110	78	-	-
	19660220	Private	Irrigation	53	39	-	-
	19740253	Private	Irrigation	442.5	313	-	-
	19950037A	Private	Irrigation	80	58	-	-
	20020003	Private	Irrigation	11	9	-	-
	Total			***931***	***678***	***0***	***0***
Reservoir	19260006	City of Altus	M&I	4,800	4,800	4,800	4,800
	19390023	LAID	Irrigation	85,630	85,630	85,630	85,630
Downstream of Reservoir	19900029	Private	Irrigation	100	73	-	-
	19850022C	Private	Irrigation	57	42	-	-
	19650245	Private	Irrigation	15	13	-	-
	20060062	Private	Irrigation	320	226	-	-
	Total			***492***	***354***	***0***	***0***

[a] "Junior" is defined as having an application date later than both the City of Altus and Lugert-Altus Irrigation District.
[b] "Senior" is defined as having an application date earlier than both the City of Altus and Lugert-Altus Irrigation District.

The resulting annual inflow sequence into Lugert-Altus Reservoir generated by the SWAM corresponding to each of these scenarios is illustrated in Figure 26, and impacts on inflow are illustrated in Figure 27. The naturalized condition and seven ground- and stream-water development scenarios are described as follows.

[18] The drought of record occurred from Aug 2010 to Apr 2015. For the URRBS SWAM analysis, impacts were simulated during the four full years of the drought (2011-2014).

- "Naturalized": Assumes no diversions from existing or future streamwater permits and no existing or future groundwater pumping[19].

  Results: Baseline condition that included an increase in runoff and base flow into the reservoir. This resulted in an average annual inflow into Lugert-Altus Reservoir of 116,000 acre-ft/yr over the period of record and 38,000 acre-ft/yr during the drought of record (Figure 27).
- "2013 GW and Existing SW": Assumed full use of existing streamwater permits[20], as well as NFRR aquifer groundwater pumping at a rate of 22,988 acre-ft/yr as occurred in 2013 during the drought of record.

  Results: Compared to the Naturalized baseline condition, average annual inflow into Lugert-Altus Reservoir decreased to 92,000 acre-ft/yr (21 percent) over the period of record and to 12,000 acre-ft/yr (68 percent) during the drought of record (Figure 27).
- "Oklahoma Comprehensive Water Plan 2012 Update (OCWP) GW and Existing SW": Assumes full use of existing streamwater permits, as well as the NFRR aquifer groundwater pumping rate of 27,678 acre-ft/yr associated with a 20.4 percent growth rate beyond the 2013 GW pumping rate. Only existing streamwater permits are modeled because according to the OCWP, the hydrologic basin is currently closed to the appropriation of new "regular" streamwater permits.

  Results: Compared to the Naturalized baseline condition, average annual inflow into Lugert-Altus Reservoir decreased to 91,000 acre-ft/yr (22 percent) over the period of record and to 11,000 acre-ft/yr (71 percent) during the drought of record (Figure 27).

[19] Observed domestic streamwater use is automatically in gage data, meaning under the naturalized condition domestic streamwater use is occurring.

[20] Under the existing SW scenario, it was assumed that new streamwater permits would not be issued because the hydrologic basin is currently closed to the appropriation of new "regular" streamwater permits (OWRB, 2012). This assumption is based on OWRB's current practice of determining unappropriated water availability using (among other considerations) average annual run-off from 1951-1980.

- "Full GW and Existing SW": Assumed full use of existing streamwater permits, as well as NFRR aquifer groundwater pumping rates of 259,000 acre-ft/yr and 294,000 acre-ft/yr[21].
  Results: Compared to the Naturalized baseline condition, average annual inflow into Lugert-Altus Reservoir decreased to 80,000 acre-ft/yr (31 percent) over the period of record and to 9,000 acre-ft/yr (76 percent) during the drought of record (Figure 27).
- "Full GW, Existing SW, and Domestic SW (Low)": Assumes full development of groundwater, full use of existing streamwater permits, and an assumed new future domestic streamwater use of 5,000 acre-ft/yr.
  Results: Compared to the Naturalized baseline condition, average annual inflow into Lugert-Altus Reservoir decreased to 77,000 acre-ft/yr (34 percent) over the period of record and to 8,000 acre-ft/yr (79 percent) during the drought of record (Figure 27).
- "Full GW, Existing SW, and Domestic SW (High)": Assumes full development of groundwater, full use of existing streamwater permits, and an assumed new future domestic streamwater use of 20,000 acre-ft/yr.
  Results: Compared to the Naturalized baseline condition, average annual inflow into Lugert-Altus Reservoir decreased to 71,000 acre-ft/yr (39 percent) over the period of record and to 6,000 acre-ft/yr (84 percent) during the drought of record (Figure 27).
- "Full GW and Full SW (Low)": Assumes full development of groundwater and full development of streamwater under an assumed new future domestic streamwater use of 5,000 acre-ft/yr. Full development of streamwater assumes the full appropriation of all average annual flows above 90,430 acre-ft/yr. Note: the hydrologic basin is currently closed to further

[21] The USGS determined that the 50-yr and 20-yr Equal Proportionate Share pumping rates out of the NFRR aquifer are 0.52 and 0.59 acre-ft/acre/yr, respectively (Smith et al, 2017). Given the 497,582-acre aquifer area, these rates correspond to Maximum Annual Yields of 259,000 acre-ft/yr and 294,000 acre-ft/yr, respectively. The 40-yr EPS pumping rate and corresponding impacts on groundwater storage, saturated thickness, and base flows were the same as under the 50-yr EPS rate.

streamwater appropriation according to OWRB (2012). As part of the URRBS, water availability for new streamwater permits was evaluated based, in part, on the naturalized stream flows generated by the SWAM using USGS gage data from 1950 to 2016 as opposed to using average annual run-off from 1951-1980, which is current OWRB practice. Results found that no additional water is available for new streamwater permits using either the annual runoff from 1951-1980 or the naturalized flow record from 1950 to 2016.

Results: Results are identical to the results cited above under the "Full GW, Existing SW, and Domestic SW (Low)" scenario. Compared to the Naturalized baseline condition, average annual inflow into Lugert-Altus Reservoir decreased to 77,000 acre-ft/yr (34 percent) over the period of record and to 8,000 acre-ft/yr (79 percent) during the drought of record (Figure 27).

- "Full GW and Full SW (High)": Assumes full development of groundwater, full use of existing streamwater permits, and an assumed new future domestic streamwater use of 20,000 acre-ft/yr.

  Results: Results are identical to the results cited above under the "Full GW, Existing SW, and Domestic SW (High)" scenario. Compared to the Naturalized baseline condition, average annual inflow into Lugert-Altus Reservoir decreased to 71,000 acre-ft/yr (39 percent) over the period of record and to 6,000 acre-ft/yr (84 percent) during the drought of record (Figure 27).

Other Considerations

It is important to acknowledge that the observed hydrologic record used in USGS' numerical model on the NFRR aquifer included losses associated with historic domestic surface water uses, as well as losses associated with previously-issued groundwater provisional temporary (PT) permits and domestic groundwater use. Therefore, all three groundwater use scenarios (excludes the "naturalized" use scenario) described above, by default, already account for potential inflow reductions that may have been and continue to be caused by groundwater PT permits and domestic use.

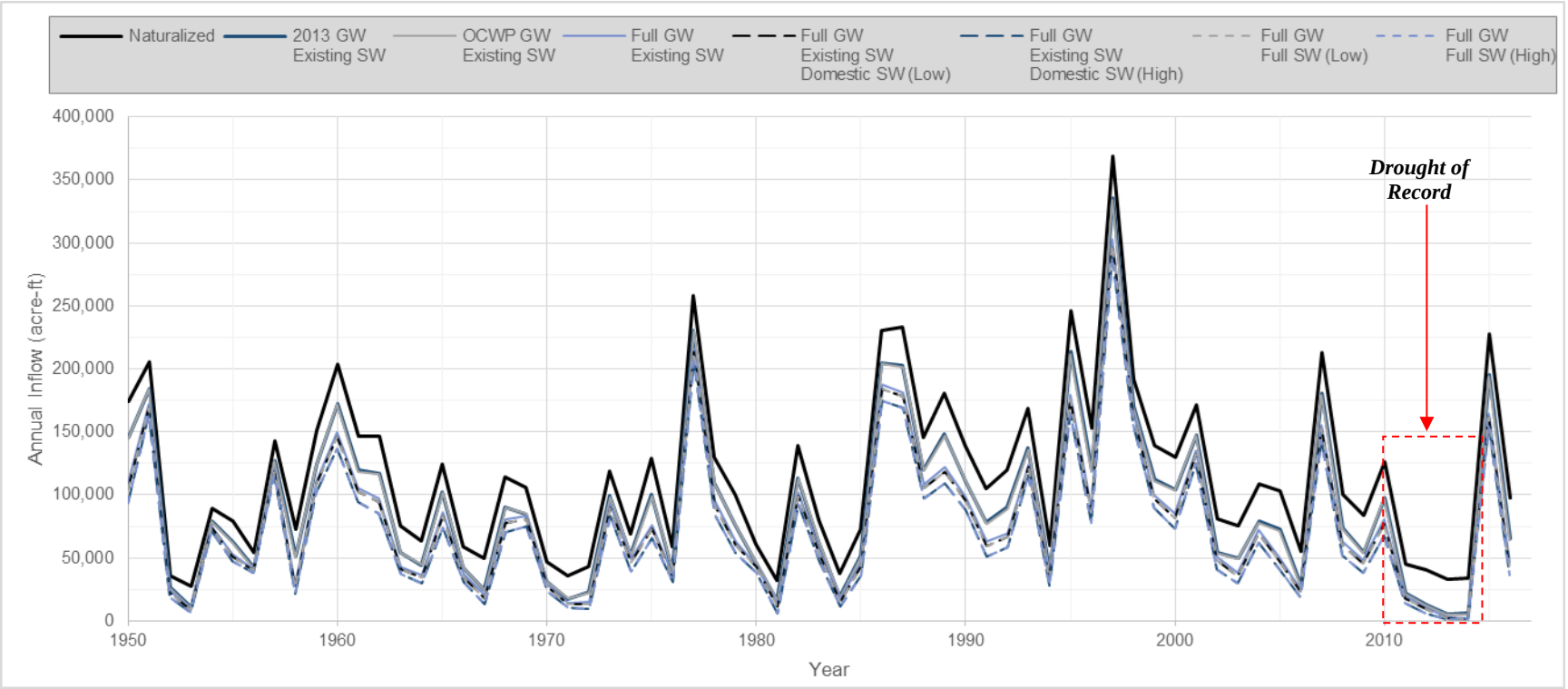


Figure 26. Simulated annual inflows into Lugert-Altus Reservoir under eight "use" scenarios without seniority (1950-2016). The black line at the top represents the "Naturalized" scenario, where inflows are the highest because there is no upstream use. Inflows into the reservoir are reduced under various scenarios as development/use increases.

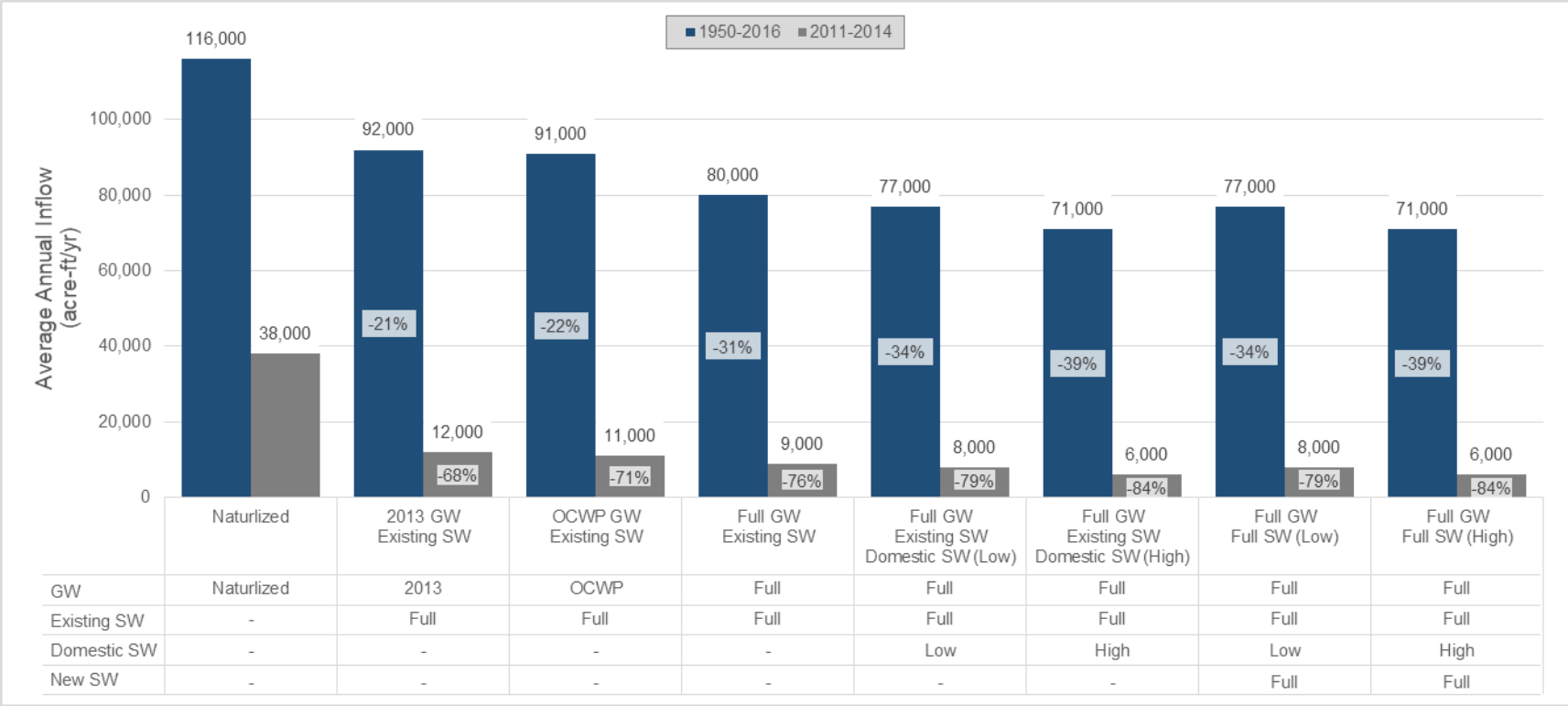


Figure 27. Simulated average annual inflows into Lugert-Altus Reservoir under eight "use" scenarios over the period of record (1950-2016) and during the drought of record (2011-2014). The furthest left bars represents the "Naturalized" scenario, where inflows are the highest because there is no upstream use. Inflows into the reservoir are reduced incrementally under the various scenarios as development/use increases and the associated percent reduction relative the Naturalized scenario is displayed inside each bar.

Reservoir Yield and Permit Availability Results

Similar to Method 2, the yield of Lugert-Altus Reservoir was evaluated under each development scenario in terms of its dependability (i.e., reliability) at providing water for both irrigation and M&I use. The dependability of Lugert-Altus Reservoir varies greatly depending on the scenario considered. Reductions in yield under different use scenarios are caused by the cumulative effect of both sedimentation and upstream permits.

Results showed that Lugert-Altus ID's full permitted irrigation volume of 85,630 acre-ft/yr was available between **10 percent** and **19 percent** of the time depending on the development scenario, and the full volume of M&I water permitted for the city of Altus (4,800 acre-ft/yr) was found to be available **97 percent** of the time regardless of the development scenario (Figure 28). The results presented above exclude the naturalized scenario, which was evaluated in the URRBS for the purposes of understanding the role that ground- versus stream-water withdrawals played in reducing reservoir yield. The reader is encouraged to review the URRBS for a detailed discussion on the topic as it is considered beyond the scope of this report.

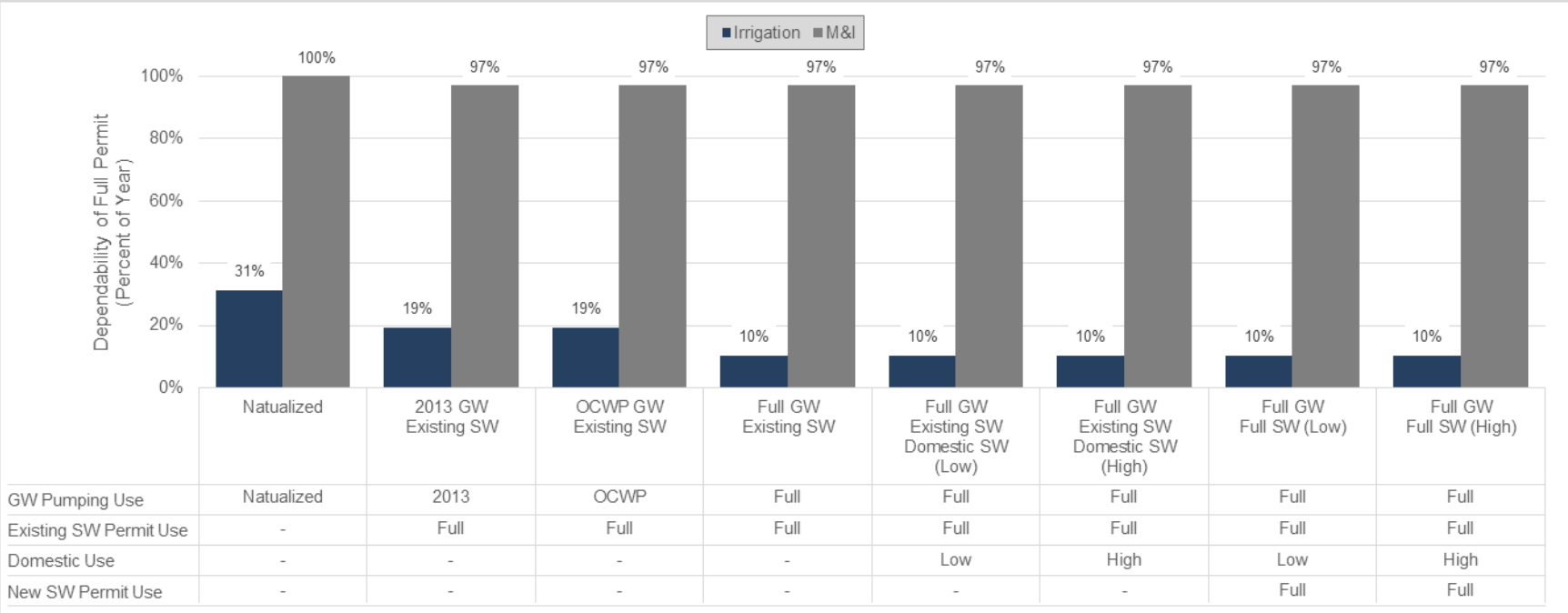
Similar to Method 2, the dependability of available irrigation supplies that could be delivered by the Lugert-Altus ID, up to its existing irrigation permit volume, was evaluated under the full range of development scenarios (Figure 29). Depending on the development scenario, the analysis showed that **40,300 acre-ft/yr** to **46,600 acre-ft/yr** would be available for irrigation **50 percent** of the time, and a minimum of **3,600 acre-ft/yr** to **5,200 acre-ft/yr** would be available **90 percent** of the time. The full range of irrigation supply dependability is displayed in Figure 29. The average annual yield of Lugert-Altus Reservoir for irrigation ranged from **40,300** acre-ft/yr to **46,300 acre-ft/yr** (Figure 30) depending on the development scenario. Some conclusions that can be drawn from these data include:

- Reservoir dependability has been impacted more by existing groundwater permits under the "2013 GW and Existing SW" scenario than any additional

impacts in the future from either the “OCWP GW and Existing SW” or “Full GW and Existing SW” use scenarios.

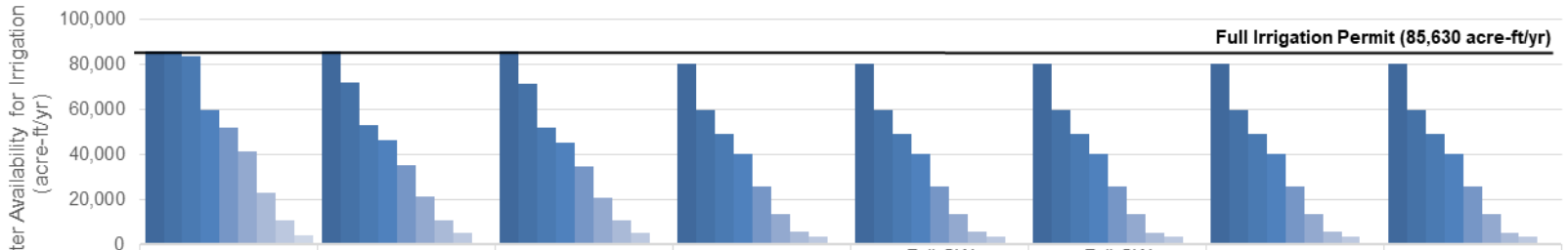
- The “2013 GW and Existing SW” and “OCWP GW and Existing SW” use scenarios appear to result in similar impacts. This is because, according to the OCWP, the hydrologic basin is closed to the appropriation of new regular stream water permits; as well, the projected additional development and influence of the NFRR aquifer through 2060 is relatively minor.

Finally, similar to Method 2, a firm yield calculation was performed for each of the eight development scenarios. This analysis was for comparative purposes only with other Reclamation reservoirs that provide water exclusively for M&I purposes, even though Lugert-Altus Reservoir is clearly not used exclusively for M&I purposes. That said, the firm yield of Lugert-Altus Reservoir under 2060 sediment conditions during a repeat of the 2010-2015 drought of record was estimated to be 6,000 acre-ft/yr to 9,100 acre-ft/yr depending on the development scenario.



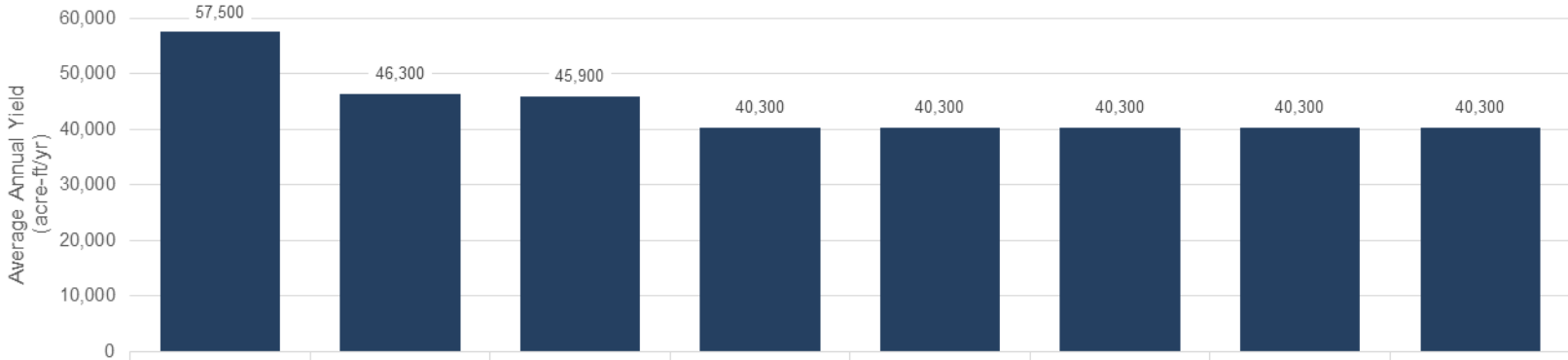
	Natualized	2013 GW Existing SW	OCWP GW Existing SW	Full GW Existing SW	Full GW Existing SW Domestic SW (Low)	Full GW Existing SW Domestic SW (High)	Full GW Full SW (Low)	Full GW Full SW (High)
GW Pumping Use	Natualized	2013	OCWP	Full	Full	Full	Full	Full
Existing SW Permit Use	-	Full	Full	Full	Full	Full	Full	Full
Domestic Use	-	-	-	-	Low	High	Low	High
New SW Permit Use	-	-	-	-	-	-	Full	Full

Figure 28. Dependability of the full volume of irrigation water permitted to Lugert-Altus ID (85,630 acre-ft/yr) and the 4,800 acre ft/yr of M&I water permitted to the United States for use by the city of Altus based on modeled storage of Lugert-Altus Reservoir under a range of ground- and surface-water development scenarios, 2060 sediment conditions.



	Natualized	2013 GW Existing SW	OCWP GW Existing SW	Full GW Existing SW	Full GW Existing SW Domestic SW (Low)	Full GW Existing SW Domestic SW (High)	Full GW Full SW (Low)	Full GW Full SW (High)
GW Pumping Use	Natualized	2013	OCWP	Full	Full	Full	Full	Full
Existing SW Permit Use	-	Full	Full	Full	Full	Full	Full	Full
Domestic Use	-	-	-	-	Low	High	Low	High
New SW Permit Use	-	-	-	-	-	-	Full	Full
Dependability of Full Permit	31%	19%	19%	10%	10%	10%	10%	10%
20% Dependable	85,630	85,600	85,600	80,100	80,100	80,100	80,100	80,100
30% Dependable	85,630	72,000	71,300	59,600	59,600	59,800	59,600	59,800
40% Dependable	83,700	52,700	51,700	48,900	48,900	49,000	48,900	49,000
50% Dependable	59,700	46,200	45,300	40,000	40,000	40,100	40,000	40,100
60% Dependable	51,900	35,100	34,800	25,800	25,800	25,900	25,800	25,900
70% Dependable	41,500	21,300	20,900	13,400	13,400	13,400	13,400	13,400
80% Dependable	22,800	10,900	10,600	5,600	5,600	5,500	5,600	5,500
90% Dependable	10,700	5,200	5,100	3,500	3,500	3,600	3,500	3,600
100% Dependable	4,400	0	0	0	0	0	0	0

Figure 29. Dependability of available irrigation supplies that could be delivered by the Lugert-Altus ID, up to its existing irrigation permit, based on modeled storage of Lugert-Altus Reservoir under a range of ground- and surface-water development scenarios, 2060 sediment conditions.



	Natualized	2013 GW Existing SW	OCWP GW Existing SW	Full GW Existing SW	Full GW Existing SW Domestic SW (Low)	Full GW Existing SW Domestic SW (High)	Full GW Full SW (Low)	Full GW Full SW (High)
GW Pumping Use	Natualized	2013	OCWP	Full	Full	Full	Full	Full
Existing SW Permit Use	-	Full	Full	Full	Full	Full	Full	Full
Domestic Use	-	-	-	-	Low	High	Low	High
New SW Permit Use	-	-	-	-	-	-	Full	Full

Figure 30. Average annual yield of Lugert-Altus Reservoir when operating the reservoir to deliver the full volume of irrigation water permitted to Lugert-Altus ID (85,630 acre-ft/yr) based on modeled storage of Lugert-Altus Reservoir under a range of ground- and surface-water development scenarios, 2060 sediment condition.

3. RISKS AND UNCERTAINTY

The biggest challenge with calculating reservoir yield is making informed assumptions about future conditions. One area of uncertainty is reservoir area capacity and corresponding sedimentation rates. Sedimentation rates change over time, as do the methods of collecting reliable sedimentation data. Seepage losses also are difficult to quantify because technologies are lacking which can detect and measure seepage in a meaningful way, particularly at larger reservoirs like Lugert-Altus Reservoir. Limitations on predicting future streamflow also must be acknowledged. Of particular importance is accounting for and differentiating between human- versus climate-induced impacts. Method 3 provided a robust analysis of future potential human-induced impacts on Lugert-Altus Reservoir. The assumptions and uncertainties of future development scenarios used in Method 3 are well documented in the URRBS report.

Assessing future climate-induced impacts on future reservoir yield also is difficult. First, the period after which record keeping began provides only a snapshot of historical climate conditions. The variation in climate that has occurred over centuries may not be captured, including the potential for more severe droughts to occur in the future beyond those that we have observed over the limited period of record. Such is the case for the 2010-2015 drought of record, which surpassed droughts in the 1930s, 1950s, and 1960s that have been used in earlier yield estimates on other reservoirs in Oklahoma. And so may be the case for the next drought, which very well may exceed the severity of the 2010-2015 drought used to calculate reservoir yield in Methods 2 and 3.

Finally, much attention has been given towards predicting the extent to which future climate conditions may change. An analysis on how a variable and changing climate may affect future supply conditions in the Lugert-Altus Reservoir hydrologic basin is described in the URRBS report.

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5. APPENDIX

This section includes a summary of data sources and calculations used in the model.

5.1. Streamflow into Lugert-Altus Reservoir

Table 5. Monthly flows from the NFRR into Lugert-Altus Reservoir from January 1926 to September 1937. This data is included in the 1937 Report on Altus Project, in Table 2 (page 61) titled "Run-off of North Fork of Red River at Lugert Dam Site". Reclamation developed this dataset based on observations from nearby gages and rainfall-run-off estimates.

	Estimated Run-off of NFRR at Lugert Dam Site (acre-ft)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1926	3,100	2,800	3,100	24,100	14,900	11,600	6,200	46,400	21,400	84,600	15,900	21,900	256,000
1927	16,400	8,500	7,500	21,400	2,400	15,200	900	56,900	1,200	19,100	11,900	9,400	170,800
1928	6,600	6,800	7,100	4,700	58,700	11,600	32,700	2,800	9,800	3,500	59,700	10,500	214,500
1929	9,200	8,400	5,700	25,000	24,800	9,800	5,000	26,400	25,700	1,200	6,100	2,600	149,900
1930	1,100	7,700	3,800	4,600	61,500	17,600	400	0	0	22,500	3,200	3,900	126,300
1931	6,000	5,200	7,500	7,200	8,800	1,200	0	0	0	0	2,400	4,600	42,900
1932	5,600	3,400	1,100	4,500	2,700	28,700	7,500	3,500	0	9,400	3,000	25,700	95,100
1933	3,100	2,800	5,600	4,200	5,500	1,600	8,600	300	10,700	16,000	6,600	400	65,400
1934	200	0	400	1,600	10,600	7,700	0	3,600	3,300	2,200	0	0	29,600
1935	0	0	4,400	600	24,500	11,900	11,500	0	11,800	300	1,400	8,400	74,800
1936	1,700	0	0	2,800	9,400	28,100	0	0	54,600	14,900	6,000	5,000	122,500
1937	3,100	2,800	3,300	6,200	12,800	60,800	1,300	23,500[a]	10,800[a]	-	-	-	-

[a] The last two months of this data were derived by the Missouri Basin Regional Office as part of their 2010 study using the same method outlined in the 1937 Study.

Table 6. Monthly flows from the NFRR into Lugert-Altus Reservoir from October 1937 to September 1944. This data uses USGS streamgage (07302000) near Granite, Oklahoma adjusted to reflect the dam location within the basin relative to the streamgage. This adjustment was completed by the Reclamation Missouri Basin Regional Office as part of their 2010 study. The contributing drainage area above the gage near Granite is 2,095 square miles and the intervening area from the gage location to Altus Dam is 21 square miles.

	Estimated Run-off of NFRR at Lugert Dam Site (acre-ft)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1937	-	-	-	-	-	-	-	-	-	248	120	311	-
1938	405	1,212	1,961	10,722	30,062	16,283	1,374	50	8	0	471	0	62,549
1939	6,429	873	1,793	5,376	10,747	35,738	6,656	2,651	0	9	0	0	70,272
1940	0	140	1	2,169	97	70	1,976	155	0	0	2,285	95	6,988
1941	746	2,327	2,895	16,236	85,078	77,333	9,844	16,370	4,656	49,419	11,403	11,441	287,749
1942	7,497	7,006	9,544	61,701	14,072	70,965	4,624	6,304	5,313	44,276	10,019	16,976	258,296
1943	13,356	7,132	6,371	6,521	11,742	1,758	641	0	0	335	0	2,092	49,946
1944	7,955	4,870	8,512	4,305	6,024	30,663	13,904	2,708	3,076	-	-	-	-

Table 7. Monthly flows from the NFRR into Lugert-Altus Reservoir from October 1944 to December 1946. This data uses USGS streamgage (07301500) near Carter, Oklahoma and a correlation with post-construction reservoir inflow. This analysis was completed by Reclamation's Missouri Basin Regional Office as part of their 2010 study.

	Estimated Run-off of NFRR at Lugert Dam Site (acre-ft)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1944	-	-	-	-	-	-	-	-	-	2,412	4,215	10,304	-
1945	8,016	8,120	10,332	10,847	1,219	10,082	2,778	3,340	0	0	0	231	54,966
1946	2,678	4,224	2,868	750	3,175	1,529	2	101	0	31,781	5,892	4,476	57,476

Table 8. Monthly flows from the NFRR into Lugert-Altus Reservoir from January 1947 to December 2016. Altus Dam computed inflow data is recorded daily by Lugert-Altus Irrigation District and stored on Reclamation's website (https://www.usbr.gov/gp-bin/custom.pl?SWE221A&altus). Negative flows represent months when unaccounted losses from the reservoir exceed inflow. Some corrections were required due to adjustments to area capacity tables and typographical errors. These corrections are included below, but not on the website, which only presents raw data as reported.

	Computed Flows into Lugert-Altus Reservoir (acre-ft)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1947	4,231	1,078	4,745	21,244	69,338	32,769	3,840	167	-1,226	145	-398	243	136,176
1948	481	7,203	13,484	1,810	8,209	11,153	1,990	9,779	-27	39	6,262	856	61,239
1949	5,261	19,722	9,443	7,540	65,506	29,831	4,976	1,293	4,510	1,744	-169	1,830	151,486
1950	2,842	4,198	1,266	2,539	43,471	15,103	51,038	23,576	17,240	7,024	1,403	3,728	173,427
1951	1,861	7,878	5,290	5,604	100,667	77,973	7,007	6,656	519	760	104	1,188	215,508
1952	4,075	3,015	4,104	11,372	4,166	2,322	2,201	2,226	-8	-1	216	480	34,166
1953	-57	79	610	1,492	115	3,360	6,654	3,489	693	8,098	663	288	25,483
1954	306	6,383	-142	2,389	68,619	1,701	5,354	492	1,771	149	201	1,017	88,241
1955	339	245	207	403	30,416	19,595	3,102	2,805	639	17,329	-539	65	74,604
1956	167	2,141	237	220	30,255	2,868	2,739	2,568	-580	1,629	-171	8,009	50,083
1957	160	420	863	30,411	88,927	11,481	-460	3,922	742	1,181	623	-46	138,225
1958	1,615	2,143	5,738	5,220	10,711	17,184	23,643	2,840	-811	-565	-790	19	66,947
1959	362	1,441	4,028	3,961	68,653	18,092	9,910	2,876	4,243	11,125	543	22,189	147,422
1960	16,933	24,177	17,406	6,432	7,104	16,564	29,619	7,100	3,451	51,015	7,099	12,750	199,652
1961	7,646	19,443	10,107	10,429	12,738	57,503	11,037	4,049	2,888	1,112	10,436	5,696	153,081
1962	6,015	4,424	3,193	20,132	9,902	59,899	6,140	10,016	21,707	6,728	4,683	8,301	161,141
1963	2,924	11,017	8,735	3,974	6,436	16,779	1,302	1,706	364	33	-48	53	53,274
1964	750	9,696	2,613	1,663	7,486	16,528	2,119	2,171	704	6,317	3,496	3,519	57,064
1965	3,287	2,948	4,133	3,495	2,824	43,066	4,219	1,999	19,719	21,761	3,872	6,275	117,599
1966	4,059	9,293	5,307	3,994	15,291	990	1,397	4,624	5,581	381	567	926	52,410
1967	2,108	1,524	1,951	10,723	3,754	6,537	9,080	2,546	1,721	590	239	1,840	42,612
1968	4,881	5,715	5,708	5,835	16,256	14,709	6,730	3,005	856	29,071	8,221	5,178	106,165
1969	5,337	8,821	15,727	6,953	45,717	4,262	1,882	5,132	1,525	-264	1,309	1,626	98,027
1970	3,356	2,474	5,491	15,326	4,270	3,070	1,892	1,505	1,169	316	-178	143	38,833
1971	228	494	65	220	443	6,811	1,998	1,099	1,178	4,299	5,560	4,952	27,348
1972	1,897	2,227	888	554	8,526	11,037	3,999	1,483	797	666	810	1,848	34,730
1973	4,082	3,014	18,475	47,174	13,409	8,261	1,487	1,061	3,403	6,171	954	2,117	109,607
1974	2,976	1,957	8,026	4,367	13,705	406	1,402	2,248	3,386	3,219	13,208	4,720	59,620
1975	6,247	12,127	8,705	9,040	19,317	25,657	16,717	10,224	61	852	6,173	4,026	119,147
1976	3,308	2,856	3,052	16,509	12,584	4,719	1,199	908	4,057	0	-311	571	49,452
1977	1,305	3,458	1,920	15,606	181,168	28,888	4,040	9,897	1,382	814	1,163	2,547	252,189
1978	2,717	8,215	4,981	4,386	62,465	27,476	1,054	718	5,617	1,087	1,736	2,041	122,493
1979	3,499	6,275	16,979	8,400	14,909	25,006	9,526	2,054	-350	-154	897	1,805	88,848
1980	3,596	4,764	4,003	5,967	26,992	3,877	-307	1,182	-5,167	38	166	683	45,796
1981	-54	547	2,446	2,588	3,114	4,562	48	482	88	2,400	2,752	2,225	21,198
1982	2,740	3,076	3,178	1,853	64,526	38,334	6,931	2,670	-91	-396	662	2,451	125,934
1983	4,116	7,863	9,552	6,041	10,130	8,674	200	-11	-752	18,429	1,236	1,203	66,680
1984	2,724	3,095	3,978	6,025	2,379	3,971	131	1,438	-296	243	337	1,002	25,028
1985	1,406	5,526	8,157	5,681	5,274	6,912	1,813	638	1,185	12,326	6,352	4,691	59,961
1986	3,357	4,712	2,932	2,592	7,005	21,408	3,152	1,172	10,767	97,507	36,657	16,054	207,317
1987	17,169	26,409	39,783	14,973	52,591	19,731	11,959	7,637	9,867	3,334	3,230	9,958	216,640
1988	15,351	9,290	25,347	20,683	10,260	8,045	4,200	213	25,744	5,133	4,580	6,283	135,127
1989	6,619	7,876	12,300	8,835	21,923	132,871	9,461	10,946	8,380	4,350	2,784	3,708	230,053

Table 8. Continued…

	Computed Flows into Lugert-Altus Reservoir (acre-ft)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1990	10,902	10,133	16,673	17,175	30,286	11,578	4,219	3,198	1,161	1,554	4,967	3,265	115,110
1991	7,112	2,620	5,119	4,009	12,318	20,722	3,356	1,288	5,287	1,954	7,963	17,207	88,957
1992	12,165	10,331	11,270	9,193	7,364	23,849	12,623	3,927	2,157	-409	7,680	7,647	107,797
1993	10,755	13,292	18,266	23,434	71,380	11,792	8,799	5,900	918	58	1,281	2,660	168,534
1994	3,896	4,584	8,318	6,769	10,546	3,659	62	1,180	-69	883	2,971	834	43,634
1995	1,910	1,849	4,943	4,402	14,832	107,331	10,437	43,140	18,391	12,496	7,143	13,123	240,000
1996	12,398	10,233	9,287	6,721	6,229	12,787	8,224	16,985	29,990	10,348	14,597	20,484	158,283
1997	16,306	33,045	15,841	128,554	68,902	41,959	15,973	11,798	12,914	13,644	13,954	26,201	399,090
1998	24,552	31,017	55,154	19,460	25,370	4,295	102	-356	191	1,482	19,148	7,827	188,242
1999	9,456	10,824	14,990	21,229	28,422	20,615	3,835	772	-1,444	405	576	3,631	113,310
2000	3,827	5,983	22,751	17,209	8,137	24,534	12,759	-805	-1,102	4,531	6,754	5,279	109,859
2001	12,409	17,670	17,328	10,329	62,254	11,186	1,237	305	1,030	-232	1,468	2,730	137,715
2002	4,833	5,806	5,064	8,564	4,043	2,466	3,468	1,205	174	9,020	7,762	8,846	61,250
2003	7,799	6,588	7,032	6,426	7,556	7,792	1,191	145	7,769	900	836	1,752	55,785
2004	4,608	4,420	21,419	11,054	3,205	4,568	6,165	1,008	1,616	4,870	16,604	8,975	88,512
2005	13,052	10,731	9,030	6,509	7,890	13,518	1,812	12,961	2,651	2,017	793	2,067	83,030
2006	3,006	2,776	5,541	2,893	7,851	3,533	698	1,042	1,462	1,938	3,625	741	35,105
2007	8,088	6,631	21,410	27,634	60,811	26,903	7,650	5,044	5,891	2,875	2,374	6,819	182,132
2008	5,750	7,613	8,536	8,626	4,900	5,739	721	2,071	9,327	14,502	6,516	6,250	80,551
2009	6,113	6,465	6,209	9,900	11,110	5,159	2,517	2,670	1,786	4,077	3,626	4,092	63,721
2010	5,927	10,779	8,030	20,499	19,905	5,732	22,918	402	583	3,057	4,299	4,175	106,306
2011	4,961	4,512	4,415	2,740	2,185	-44	267	276	209	1,098	2,140	620	23,380
2012	193	1,614	4,017	3,660	2,603	2,001	-50	289	475	-186	-94	257	14,778
2013	325	710	817	948	1,276	467	398	191	385	596	417	117	6,647
2014	220	336	676	442	1,162	2,769	1,039	40	223	-43	366	-46	7,184
2015	334	201	1,273	15,477	109,689	32,579	16,615	7,500	1,659	1,746	6,654	10,049	203,776
2016	11,284	7,012	6,432	8,713	8,226	10,917	2,838	1,968	6,294	878	1,502	2,291	68,354

5.2. Precipitation

This data is used only for climate change scenarios to match historic Net Evaporation when calculated with Evaporation. Precipitation data in the model is provided below and used from the following two sources: Hollis Gage (1926-1945, Table 9) and Altus Dam gage (1945-2016, Table 10).

Table 9. Monthly precipitation for Lugert-Altus Reservoir from January 1926 to July1945. Hollis precipitation gage data is available from the Oklahoma Climatological Survey as a monthly time series using cooperative observer (COOP) data from August 1922 to January 2013 (http://climate.ok.gov/cgi-bin/public/climate.monthseries.one.cgi).

	Hollis Precipitation Gage (inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1926	1.09	0	2.4	3.75	2.6	1.33	2.8	6.26	6.83	6.03	0.12	2.79	36.00
1927	1.48	0.57	0.81	2.13	1.78	2.89	3.13	1.53	2.68	0.92	0	0.9	18.82
1928	0.34	1.38	1.28	2.2	2.66	2.71	4.01	1.62	1.1	1.95	1.94	0.4	21.59
1929	0.48	0.55	5.85	0.35	3.23	3.75	0.3	1.09	4.5	2.56	1.15	0.2	24.01
1930	1.47	0	0	4.19	2.7	1.1	0.33	1.15	0.6	8.6	0.68	2.43	23.25
1931	0.65	1.51	1.88	6.13	1.33	0.46	0.78	0.95	1.37	2.78	2.73	0	20.57
1932	2.45	1.5	0.09	3.53	3.85	6.2	2.64	3.5	2.89	1.28	0	6.75	34.68
1933	0.18	0.68	0.41	0.9	3.01	0	0	2.59	1.29	1.09	0.1	0.12	10.37
1934	0	0.24	1.4	2.48	5.09	3.17	0.41	3.73	3.02	0.33	0.51	0.1	20.48
1935	0	0.48	1.89	1.35	11.12	2.89	1.65	3.87	0.9	1.76	1.73	0.73	28.37
1936	0.28	0	0.68	1.98	3.89	0.54	0.1	0	8.61	1.58	0.11	0.38	18.15
1937	0.43	0	1.08	2.53	5.34	2.3	1.38	3.07	3.33	1.64	0.63	0.45	22.18
1938	0.37	1.4	1.86	1.99	3.62	5.17	1.82	0.18	0.69	0.98	0.85	0.05	18.98
1939	3.12	0.14	1.73	0.55	3.51	4.37	0.2	2.05	0	2.07	0.24	1.05	19.03
1940	0.3	2	0	3.35	5.28	1.3	1.33	1.73	3.42	1.64	2.97	0.21	23.53
1941	0.64	2.09	0.76	4.59	12.7	9.65	1.13	2.62	3.16	6.45	0.34	1.02	45.15
1942	0.05	0.32	1.52	8.86	3	2.64	0.32	1.16	4.93	4.53	0.47	2.07	29.87
1943	0.04	0.27	0.63	0.6	5.56	1.09	0.39	0	1.57	0.44	0.65	1.78	13.02
1944	1.57	0.12	0.85	1.48	2.64	5.62	2.41	2.85	2.75	1.09	1.12	1.93	24.43
1945	1.30	1.58	1.31	1.76	0.27	3.33	2.39	-	-	-	-	-	-

Table 10. Monthly precipitation for Lugert-Altus Reservoir from August 1945 to December 2016. Altus Dam precipitation gage data is recorded daily by Lugert-Altus Irrigation District and stored on Reclamation's website (https://www.usbr.gov/gp-bin/custom.pl?SWE221A&altus). This data since 1995 is also stored on the United States Army Corp of Engineers (USACE) website (https://www.swt-wc.usace.army.mil/ALTUcharts.html).

	Altus Dam Precipitation Gage (inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1945	-	-	-	-	-	-	-	2.79	2.72	0.59	0.00	0.19	-
1946	2.08	0.76	0.81	1.44	3.65	2.89	0.00	5.71	1.65	3.09	1.67	0.76	24.51
1947	0.74	0.00	0.43	4.39	7.34	7.41	2.18	0.65	0.52	1.78	1.28	1.57	28.29
1948	0.42	2.04	1.10	0.37	2.68	1.42	0.70	5.52	0.00	0.40	0.86	0.08	15.59
1949	4.38	0.47	1.63	1.37	11.10	2.61	0.66	1.82	3.98	4.43	0.00	1.60	34.05
1950	0.66	1.59	0.00	0.58	2.57	3.21	4.79	4.42	2.56	0.00	0.03	0.04	20.45
1951	0.70	0.99	1.30	1.13	7.39	8.18	2.45	1.42	1.57	2.52	0.56	0.00	28.21
1952	0.80	0.41	1.12	5.08	2.32	1.02	2.04	0.43	0.46	0.00	1.53	1.34	16.55
1953	0.02	0.56	1.95	1.95	1.04	5.79	4.48	2.35	0.12	6.47	0.97	1.05	26.75
1954	0.08	0.00	0.17	3.31	6.91	0.55	0.23	1.49	1.81	0.27	0.12	1.03	15.97
1955	1.03	0.83	0.50	0.57	7.90	5.23	1.46	0.98	1.94	7.51	0.00	0.02	27.97
1956	0.17	0.66	0.18	0.20	5.62	0.44	4.82	0.67	0.00	3.18	0.25	0.89	17.08
1957	0.49	1.14	2.71	7.94	9.42	6.11	0.17	0.70	3.23	3.27	-	-	35.18
1958	1.41	0.37	2.50	2.45	1.59	6.05	4.34	0.66	0.40	-	0.39	0.25	20.41
1959	0.04	0.16	0.20	0.97	7.32	3.02	8.73	1.31	4.75	-	-	-	26.50
1960	0.81	-	-	-	2.47	3.20	5.91	2.64	-	-	-	-	15.03
1961	0.06	1.52	-	0.15	2.54	4.10	5.04	-	-	-	-	-	13.41
1962	0.18	0.00	0.08	3.04	2.30	7.54	4.19	0.74	-	-	-	0.85	18.92
1963	-	0.33	1.69	0.77	2.93	3.25	1.04	2.29	2.13	-	1.71	0.30	16.44
1964	0.54	0.00	0.33	0.16	4.80	3.12	0.02	2.14	-	-	-	-	11.11
1965	0.12	1.01	0.74	-	-	6.22	0.24	1.42	-	-	-	-	9.75
1966	0.72	0.80	0.43	2.22	-	0.86	0.68	6.44	2.69	0.71	0.08	0.56	16.19
1967	0.00	0.00	1.30	1.56	2.09	3.65	2.04	0.91	4.28	1.45	0.25	0.72	18.25
1968	1.93	1.71	1.02	1.32	-	3.70	5.28	2.61	0.80	1.90	3.63	0.89	24.79
1969	0.00	2.07	2.44	0.65	9.64	2.82	1.35	3.34	5.05	1.82	0.07	0.67	29.92
1970	0.00	0.00	2.78	2.74	2.06	2.45	0.27	0.66	2.41	1.40	0.26	0.30	15.33
1971	-	-	0.00	0.13	2.07	3.90	3.06	1.20	6.07	5.12	0.62	1.93	24.10
1972	0.08	0.10	0.05	1.38	2.05	3.40	1.59	1.28	0.35	4.52	1.94	0.34	17.08
1973	2.86	0.68	5.29	3.90	1.67	3.07	2.65	0.45	6.61	4.11	0.47	0.00	31.76
1974	0.10	0.04	1.22	3.01	2.62	0.85	0.04	6.71	5.17	4.56	1.08	1.47	26.87
1975	1.37	2.13	1.58	0.83	4.14	3.62	6.63	4.47	1.86	2.03	2.52	1.55	32.73
1976	0.00	0.08	0.83	5.08	2.68	3.97	0.79	0.90	5.26	2.58	0.22	0.04	22.43
1977	0.55	1.98	0.46	3.06	12.70	1.72	0.82	8.55	1.16	2.52	1.35	0.03	34.90
1978	0.48	1.95	0.46	1.22	7.36	3.85	0.54	0.95	2.38	0.02	2.11	0.30	21.62
1979	2.02	0.71	2.27	2.31	3.78	2.33	6.70	3.01	0.00	1.95	1.02	0.41	26.51
1980	1.56	0.42	1.86	0.79	16.77	0.27	0.00	1.04	0.97	0.51	0.56	1.68	26.43
1981	0.22	0.54	2.32	4.08	5.17	5.00	1.19	2.86	0.21	4.03	1.58	0.26	27.46
1982	1.97	0.45	1.65	0.56	8.19	7.84	2.31	0.69	2.17	0.21	2.18	1.03	29.25
1983	1.09	2.09	3.46	1.27	4.20	2.67	0.10	0.33	-	10.44	1.33	0.55	27.53
1984	0.06	0.94	1.59	1.24	0.49	3.75	0.34	0.42	0.13	0.73	2.10	3.63	15.42
1985	1.41	2.22	3.79	3.27	0.39	6.46	1.79	2.11	4.02	6.26	1.41	0.25	33.38
1986	0.00	0.68	0.54	2.67	4.81	5.99	1.99	5.99	9.49	6.28	2.26	0.95	41.65
1987	0.73	3.09	1.77	0.05	10.60	3.63	-	1.12	4.56	3.71	0.31	2.98	32.55
1988	1.01	0.05	4.28	5.56	0.38	1.26	0.94	0.48	7.45	0.67	1.03	0.44	23.55

Table 10. Continued…

	Altus Dam Precipitation Gage (inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1989	1.74	1.13	1.21	0.00	3.29	8.20	0.73	3.50	5.71	2.50	0.00	0.05	28.06
1990	1.83	3.28	3.88	3.02	3.51	1.84	2.46	2.99	2.33	0.61	3.49	0.51	29.75
1991	1.35	0.00	1.62	1.54	8.24	7.43	0.50	3.02	3.87	2.21	1.06	4.55	35.39
1992	1.20	1.18	1.47	2.24	3.25	9.00	3.60	3.19	2.00	0.00	-	2.12	29.25
1993	2.32	1.97	1.71	5.25	6.99	2.18	3.26	2.94	2.17	1.36	0.82	1.27	32.24
1994	0.30	0.79	2.46	3.90	3.21	2.39	1.96	0.88	1.37	1.85	3.67	0.19	22.97
1995	1.30	0.02	1.82	1.92	6.03	7.36	2.50	7.36	9.29	1.00	0.04	1.08	39.72
1996	0.02	0.00	0.51	0.07	2.25	3.34	5.50	7.98	2.92	0.81	1.82	0.33	25.55
1997	0.42	4.86	0.13	9.28	3.38	1.97	5.07	6.44	4.45	3.17	0.81	3.10	43.08
1998	1.75	2.73	5.65	0.52	2.44	0.10	0.35	1.09	0.50	3.92	3.26	1.21	23.52
1999	2.05	0.11	2.65	3.91	4.82	10.93	1.96	0.61	1.03	2.58	0.78	2.54	33.97
2000	0.37	1.86	5.40	3.11	2.09	6.31	1.51	0.00	0.06	5.07	1.88	1.14	28.80
2001	1.57	2.88	1.12	1.30	9.55	0.54	0.00	4.42	3.49	0.23	2.10	0.22	27.42
2002	3.15	0.84	1.48	4.51	2.01	2.48	3.41	0.35	1.35	5.76	0.78	2.38	28.50
2003	0.00	0.83	1.42	2.18	2.29	6.23	0.51	2.19	0.78	1.03	0.62	0.28	18.36
2004	4.05	2.15	3.37	2.69	0.07	10.39	1.87	1.85	2.00	6.50	7.25	0.58	42.77
2005	2.17	0.79	0.46	0.97	3.41	3.01	1.97	6.09	4.72	3.63	0.00	0.22	27.44
2006	0.16	0.00	2.51	0.43	3.90	3.01	1.30	3.92	1.84	4.30	0.24	2.52	24.13
2007	1.32	0.52	4.09	2.09	-	8.08	2.15	2.58	2.47	1.91	0.00	2.51	27.72
2008	0.00	1.55	2.06	2.80	1.51	1.80	1.39	4.56	3.08	4.13	0.19	0.06	23.13
2009	0.00	1.55	2.06	2.80	1.51	1.80	1.39	4.56	3.08	4.13	0.19	0.06	23.13
2010	0.16	0.33	2.11	5.19	2.34	1.62	4.56	1.32	3.29	3.25	0.34	0.87	25.38
2011	2.85	0.80	0.57	3.01	1.68	4.54	13.65	0.46	2.13	2.74	1.58	0.09	34.10
2012	0.06	0.42	0.04	0.37	4.16	0.34	0.10	0.42	0.47	3.93	6.20	1.42	17.93
2013	0.41	0.70	4.25	3.67	4.86	4.24	0.35	1.48	2.73	0.05	0.73	0.59	24.06
2014	1.07	3.12	0.19	1.96	1.69	2.15	3.04	2.20	2.81	1.71	1.68	0.08	21.70
2015	1.01	0.49	0.30	4.60	16.92	2.85	2.85	3.82	1.80	3.55	2.57	2.90	43.66
2016	1.00	0.50	1.70	4.77	6.61	8.25	3.20	2.94	6.39	0.63	1.73	1.09	38.81
Average	0.96	1.03	1.67	2.36	4.59	3.95	2.37	2.53	2.71	2.71	1.27	0.98	-

5.3. Evaporation

Table 11. Monthly Observed Pan Evaporation data for Lugert-Altus Reservoir from January 1926 to December 1947. This data is from records for the Chillicothe gage available from Texas Water Development Board on their website in report 192 (https://www.twdb.texas.gov/publications/reports/numbered_reports/doc/R192/R192_partA.pdf). The data were adjusted using a multiplier of 1.167, as derived from a linear regression using post-construction data from Jan 1948 to Jun 1959.

	Chillicothe Gage Pan Evaporation (inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1926	1.82	3.64	3.26	6.19	7.24	8.88	6.08	3.94	2.91	-0.81	2.47	2.32	47.94
1927	1.65	3.23	4.26	6.22	6.90	5.78	5.77	6.03	8.78	2.66	2.90	1.16	55.34
1928	2.09	2.89	4.79	4.78	6.87	6.92	4.62	4.38	3.80	3.37	2.28	1.11	47.89
1929	1.19	1.15	1.01	6.05	10.00	7.57	13.06	6.45	5.60	1.88	2.25	1.99	58.20
1930	2.26	3.71	5.27	5.81	5.23	7.50	9.56	9.17	6.60	4.70	2.67	1.37	63.86
1931	1.35	2.14	3.77	-0.65	4.15	8.06	7.61	5.41	6.04	6.05	3.37	3.77	51.06
1932	1.73	1.91	4.25	4.40	2.83	8.21	6.30	4.88	4.60	4.36	2.84	-1.52	44.80
1933	1.98	2.61	5.25	5.35	7.10	9.09	8.60	11.57	5.02	2.63	3.44	1.91	64.55
1934	2.55	2.89	5.15	4.56	3.28	6.35	9.73	8.63	7.19	4.54	4.94	2.27	62.07
1935	2.32	3.55	5.58	8.11	0.72	8.64	10.07	7.05	9.55	4.32	2.24	1.83	63.99
1936	2.76	2.44	5.84	6.78	5.65	11.83	10.04	12.90	14.53	2.98	3.17	1.85	80.78
1937	1.53	3.54	5.20	5.37	4.44	7.15	9.66	8.33	4.63	5.37	3.44	1.58	60.24
1938	3.22	3.96	6.95	3.80	8.70	7.60	6.89	10.55	14.42	5.72	4.24	3.32	79.38
1939	2.13	3.01	6.53	6.71	7.92	8.59	10.96	9.32	9.06	4.89	3.22	2.69	75.02
1940	2.03	3.44	7.92	5.20	6.09	8.25	9.53	8.53	7.35	5.64	2.25	1.71	67.95
1941	2.74	2.62	3.09	6.06	7.00	7.54	8.18	9.19	4.69	4.38	2.28	1.73	59.48
1942	3.20	3.30	5.05	3.39	6.24	7.37	10.11	9.13	6.87	5.25	2.73	1.34	63.97
1943	2.34	3.48	5.08	7.68	8.26	8.41	8.44	10.88	6.44	4.90	3.39	2.75	72.05
1944	1.45	3.92	3.31	6.95	4.11	4.61	6.22	7.45	4.65	4.61	2.83	1.03	51.14
1945	3.46	1.63	3.09	5.39	7.41	11.01	6.39	5.14	7.87	3.26	3.62	1.67	59.96
1946	0.80	2.50	5.37	5.51	6.55	5.32	10.61	3.89	8.54	3.45	3.05	3.08	58.68
1947	1.93	3.28	3.64	3.56	6.87	1.58	7.42	10.22	10.41	5.66	2.28	1.32	58.18

[a] Data was missing for January 1930, January 1940 was used to fill in this gap using similar values for February of those respective years.

Table 12. Monthly Observed Pan Evaporation data for Lugert-Altus Reservoir from January 1948 to December 1990. This data is from the Altus dam gage records available on NOAA's website (https://www.ncdc.noaa.gov/IPS/cd/cd.html).

	Altus Dam Pan Evaporation (inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1948	-	-	5.62	12.22	11.86	12.54	12.90	12.43	11.21	7.98	5.54	4.45	-
1949	1.85	2.07	5.02	6.32	8.24	10.98	12.69	11.07	6.98	5.98	4.92	3.27	79.39
1950	2.32	3.27	6.63	8.09	8.10	11.39	8.05	9.61	6.14	7.52	4.85	2.66	78.63
1951	3.56	3.49	6.65	8.35	9.65	10.26	11.93	12.04	8.86	6.44	3.35	-	-
1952	3.25	3.80	5.73	7.65	9.74	13.99	12.17	13.73	9.87	7.32	4.33	2.27	93.85
1953	3.60	4.18	7.07	8.84	11.17	16.61	11.97	10.89	12.22	7.02	3.58	-	-
1954	2.96	6.35	6.49	8.82	6.93	12.98	17.51	15.94	13.48	7.24	5.16	3.96	107.82
1955	1.66	3.35	7.13	10.18	10.20	9.42	12.43	11.33	7.94	7.51	5.52	3.03	89.70
1956	-	-	7.99	9.61	11.19	12.40	12.45	13.64	12.18	7.56	5.32	5.05	-
1957	-	2.44	4.57	4.93	-	8.20	12.15	11.51	6.85	5.38	-	-	-
1958	2.44	1.72	2.66	6.38	8.94	12.13	11.33	10.44	6.45	-	4.10	-	-
1959	-	-	8.59	9.45	9.63	9.73	10.11	12.19	9.08	-	-	-	-
1960	2.05	-	-	-	9.13	10.60	9.76	10.61	-	-	-	-	-
1961	-	-	-	8.96	11.93	8.46	10.71	-	-	-	-	-	-
1962	-	-	-	6.61	11.17	7.96	10.75	-	-	-	-	-	-
1963	-	-	7.81	8.18	9.99	11.07	15.44	-	-	-	4.75	2.94	-
1964	-	3.02	6.93	11.01	11.86	10.50	15.97	14.05	-	-	-	-	-
1965	2.77	3.14	3.78	8.21	10.39	11.56	13.48	11.04	-	-	-	-	-
1966	-	3.53	6.83	7.53	-	11.33	12.46	9.61	5.09	6.40	-	-	-
1967	-	-	6.18	6.88	9.91	-	-	12.79	6.82	10.28	-	-	-
1968	-	-	-	7.03	-	9.61	11.28	11.50	7.43	-	-	-	-
1969	-	-	-	-	-	10.81	14.75	12.28	7.45	5.18	-	-	-
1970	-	-	-	9.42	11.65	13.07	13.53	8.71	7.47	5.43	-	-	-
1971	-	-	-	9.41	11.66	13.07	13.53	8.71	6.97	5.43	-	-	-
1972	-	-	8.19	10.11	9.61	11.66	12.55	10.96	8.67	5.95	-	-	-
1973	-	-	5.42	6.28	9.72	10.96	11.61	12.31	5.96	6.42	-	-	-
1974	-	-	7.01	10.44	10.55	12.54	15.33	10.98	6.06	4.67	3.16	-	-
1975	-	-	5.03	7.03	8.09	10.25	8.65	10.13	6.96	-	-	-	-
1976	-	-	-	6.91	7.96	10.41	10.84	12.59	6.75	4.77	-	-	-
1977	-	-	7.73	7.43	7.23	11.52	13.46	9.64	9.31	6.26	3.31	-	-
1978	-	-	-	9.20	8.67	12.30	15.03	11.39	7.62	7.42	3.30	-	-
1979	-	-	5.08	6.10	8.32	10.02	11.27	10.11	8.65	8.69	-	-	-
1980	-	-	6.05	8.49	8.29	12.47	16.88	13.90	8.90	7.29	-	-	-
1981	-	-	5.44	8.34	8.58	10.98	12.90	10.18	8.92	4.25	3.48	-	-
1982	-	-	5.83	7.54	8.07	8.55	11.69	11.90	9.48	6.75	4.50	-	-
1983	-	-	4.20	6.72	8.76	9.58	13.90	12.94	-	5.76	3.62	-	-
1984	-	-	4.98	8.33	10.42	11.67	-	11.48	9.75	5.31	3.70	-	-
1985	-	-	4.85	8.21	10.35	10.90	12.17	11.55	8.98	4.30	2.88	-	-
1986	-	-	6.98	7.73	8.08	8.81	14.17	9.88	6.67	4.56	-	-	-
1987	-	-	-	8.30	10.58	9.70	-	11.31	8.07	6.40	3.77	-	-
1988	-	-	-	8.14	9.92	11.85	11.61	12.11	8.51	5.04	5.21	-	-
1989	-	-	-	8.91	8.02	8.93	11.68	8.98	8.17	7.23	-	-	-
1990	-	-	-	6.49	9.49	13.70	12.31	10.68	8.00	6.82	3.99	-	-

Table 13. Monthly Observed Pan Evaporation data for Lugert-Altus Reservoir from March 1991 to December 2016. This data is from Lugert-Altus dam evaporation records as recorded daily by Lugert-Altus Irrigation District, and is available on Reclamation's website (https://www.usbr.gov/gp-bin/custom.pl?SWE221A&altus).

	Altus Dam Evaporation (inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	-	-	7.05	7.85	8.29	9.89	12.21	10.35	5.75	7.10	-	-	-
1992	-	-	5.52	6.42	7.66	7.72	12.11	8.59	7.83	6.74	3.01	-	-
1993	-	-	-	6.46	7.70	10.10	12.57	11.69	7.84	5.60	-	-	-
1994	-	-	5.98	8.92	7.57	12.49	12.59	12.26	8.21	5.46	1.5	1.48	-
1995	-	-	-	6.82	7.76	9.13	12.96	10.27	5.75	7.73	-	-	-
1996	-	-	5.66	9.95	11.60	10.44	10.85	7.90	6.02	6.47	2.70	-	-
1997	-	-	6.54	5.27	8.12	9.13	11.96	9.24	8.59	5.82	-	-	-
1998	-	-	-	7.25	10.28	14.05	15.04	11.82	9.75	5.87	-	-	-
1999	-	-	3.78	7.10	8.47	9.00	13.11	13.11	8.09	6.64	-	-	-
2000	-	-	-	6.98	10.48	8.34	12.63	15.38	10.81	5.02	-	-	-
2001	-	-	-	7.50	8.75	12.29	15.51	10.67	7.50	7.44	-	-	-
2002	-	-	-	5.86	8.06	10.50	10.00	12.16	9.09	3.92	-	-	-
2003	-	-	-	8.30	9.79	8.75	14.30	11.90	7.42	6.57	-	-	-
2004	-	-	-	6.67	10.30	8.76	10.80	9.45	9.49	4.18	-	-	-
2005	-	-	-	8.13	7.73	10.89	12.40	9.07	9.23	5.51	-	-	-
2006	-	-	-	9.61	10.87	12.11	13.87	12.40	7.95	6.63	-	-	-
2007	-	-	-	5.75	5.97	7.10	9.55	10.23	7.79	7.17	-	-	-
2008	-	-	-	7.86	10.25	12.70	12.77	9.40	6.75	5.77	-	-	-
2009	-	-	-	7.84	7.08	10.68	12.49	12.03	6.58	3.80	-	-	-
2010	-	-	-	6.71	8.75	11.58	8.47	12.41	8.48	7.26	-	-	-
2011	-	-	-	10.56	11.60	17.66	17.44	16.32	10.69	7.53	-	-	-
2012	-	-	-	6.72	10.54	11.27	14.31	12.42	9.90	6.87	-	-	-
2013	-	-	-	5.82	10.04	13.50	12.35	12.71	10.27	6.45	-	-	-
2014	-	-	-	9.02	10.98	10.06	10.84	13.04	8.88	5.77	-	-	-
2015	-	-	-	-	9.01	10.61	12.54	11.80	11.04	6.81	-	-	-
2016	-	-	-	-	8.24	9.30	12.54	12.23	6.03	6.47	-	-	-

Table 14. Monthly Modeled Pan Evaporation data for Lugert-Altus Reservoir from November 1994 to December 2016. This data was used to fill in 108 missing months of data from 1995 to 2016. This data is available on the U.S. Army Corp of Engineers website (Tulsa District Charts Viewer (army.mil), https://www.swt-wc.usace.army.mil/charts/?monthly&proj=ALTU).

	Modeled Mountain Park Dam Evaporation (inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1994	-	-	-	-	-	-	-	-	-	-	1.50	1.48	-
1995	2.33	2.80	5.07	6.82	7.86	9.31	12.93	10.33	6.05	7.74	3.99	2.80	78.03
1996	2.35	3.18	6.22	9.95	11.60	11.34	11.60	8.17	6.02	6.45	2.51	2.32	81.71
1997	2.41	2.92	6.54	5.28	8.10	9.20	11.96	9.87	8.68	5.84	4.00	2.45	77.23
1998	2.39	2.94	5.18	7.25	10.17	14.05	15.10	11.82	9.81	6.07	3.37	2.47	90.61
1999	3.42	5.10	3.89	7.10	8.57	9.23	13.14	13.11	8.52	6.86	5.01	3.89	87.84
2000	3.43	5.18	6.11	7.77	10.44	8.51	12.53	15.38	10.88	5.08	2.54	2.24	90.09
2001	2.03	2.39	4.25	7.49	9.26	12.23	15.51	10.99	7.68	7.44	3.54	3.01	85.82
2002	3.99	4.54	6.63	6.09	7.98	10.76	10.34	12.15	9.40	3.93	3.71	2.30	81.82
2003	3.17	3.07	5.46	8.78	9.73	8.85	14.30	11.87	6.96	6.57	3.97	3.68	86.41
2004	2.97	3.00	5.89	6.98	10.32	9.27	10.80	9.66	9.36	4.70	2.32	3.13	78.40
2005	1.83	2.37	5.28	8.11	7.79	10.92	12.40	9.14	9.40	5.64	5.47	3.32	81.67
2006	4.85	4.94	7.04	9.61	10.87	12.12	13.86	12.44	7.99	6.63	4.10	2.37	96.82
2007	2.33	3.28	5.89	5.96	6.31	7.81	9.57	10.30	7.72	7.17	4.45	2.13	72.92
2008	4.11	4.08	6.13	8.79	10.39	12.93	12.64	9.39	6.76	6.08	4.57	3.75	89.62
2009	4.13	5.84	6.81	8.18	9.40	10.32	12.72	12.03	6.53	3.48	3.60	2.34	85.38
2010	2.16	2.02	6.03	7.76	8.42	12.19	9.34	12.71	8.34	7.22	4.75	3.31	84.25
2011	2.95	3.55	7.44	10.44	11.79	19.26	17.45	16.31	10.69	-	4.40	2.03	-
2012	4.26	3.77	6.19	7.35	10.59	11.28	14.38	12.72	9.90	6.84	5.13	3.46	95.87
2013	2.75	3.72	6.41	6.49	10.00	13.50	12.40	12.71	10.27	6.41	4.08	2.03	90.77
2014	4.64	3.42	7.41	9.02	10.99	10.11	10.72	13.04	8.81	7.48	4.10	2.31	92.05
2015	3.14	3.61	4.88	6.71	6.41	10.88	12.78	11.70	10.94	7.47	3.40	3.02	84.94
2016	2.55	5.32	7.76	8.01	9.10	9.81	12.07	10.34	5.89	6.55	3.86	2.17	83.43

Table 15. Monthly Net Evaporation (Free Surface) data for Lugert-Altus Reservoir from January 1926 to December 1947. This data was calculated by taking the data presented in Table 11 and applying a free surface coefficient of 0.7.

	Altus Dam Net Evaporation (Free Surface, inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1926	1.34	3.12	2.76	3.48	4.99	5.78	4.74	4.31	3.19	2.29	2.02	1.31	39.33
1927	1.18	1.79	3.44	4.66	6.22	5.34	5.33	4.90	3.56	2.58	1.99	1.25	42.24
1928	1.78	1.71	3.90	5.05	5.61	5.75	5.28	4.58	4.15	3.12	1.46	1.11	43.50
1929	1.09	0.85	3.55	5.20	3.74	5.58	5.65	6.18	3.70	2.31	1.31	1.67	40.82
1930	1.50	2.14	3.86	5.13	5.03	6.06	7.60	7.18	5.40	1.88	1.84	0.90	48.52
1931	1.09	1.46	2.32	3.04	4.43	6.51	5.78	5.18	6.14	3.20	1.58	1.05	41.76
1932	1.11	1.48	3.41	4.57	4.38	5.03	5.50	6.37	3.38	3.49	2.22	0.80	41.74
1933	1.70	1.47	3.38	5.08	4.77	6.91	6.45	5.25	3.63	2.86	1.24	1.13	43.86
1934	1.58	1.99	3.32	3.90	4.17	6.16	7.99	8.73	5.19	4.14	2.39	1.87	51.42
1935	1.90	2.39	4.70	5.86	4.45	6.56	8.17	8.27	3.58	3.36	1.57	1.32	52.14
1936	1.83	2.09	5.57	5.49	5.66	8.50	8.40	9.24	4.07	2.96	2.69	1.51	58.01
1937	1.31	2.79	3.21	5.22	6.69	6.45	8.01	6.66	4.94	3.44	2.55	1.19	52.45
1938	2.34	1.71	4.58	3.83	6.06	6.34	6.50	8.25	12.71	4.82	3.16	2.62	62.92
1939	2.15	2.49	4.06	5.16	5.79	7.13	8.59	6.27	7.76	4.76	2.51	2.35	59.02
1940	1.50	2.14	5.36	4.72	6.41	6.46	9.21	6.82	5.38	4.15	1.65	1.23	55.02
1941	1.39	1.46	2.50	3.67	4.63	5.26	6.31	5.96	4.59	2.03	1.76	1.30	40.87
1942	1.74	2.62	4.13	3.58	6.07	6.66	7.47	6.36	5.11	2.93	2.40	0.94	50.00
1943	1.84	3.12	3.27	4.80	3.73	6.41	6.94	9.18	5.71	3.94	2.63	0.87	52.42
1944	0.58	1.47	2.93	5.13	5.08	6.19	5.92	6.01	3.96	2.74	2.04	1.08	43.15
1945	1.33	1.39	2.80	3.46	5.98	6.58	5.54	5.99	4.82	2.16	2.10	1.55	43.69
1946	1.41	2.16	4.00	5.45	5.59	5.41	7.67	7.47	3.57	3.14	2.04	1.72	49.64
1947	1.26	2.51	2.67	3.12	4.30	7.28	7.62	7.50	6.43	3.86	1.95	1.37	49.88

Table 16. Monthly Net Evaporation (Free Surface) data for Lugert-Altus Reservoir from March 1948 to December 2016. This data was calculated by taking the data presented in Table 12, Table 13, and Table 14, and applying a free surface coefficient of 0.7. The 177 missing values are calculated using the monthly average Pure Evaporation minus Precipitation for each specific month.

	Altus Dam Net Evaporation (Free Surface, inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1948	-	-	3.93	8.55	8.30	8.78	9.03	8.70	7.85	5.58	3.88	3.12	-
1949	1.30	1.45	3.51	4.42	5.77	7.69	8.88	7.75	4.89	4.19	3.44	2.29	55.57
1950	1.62	2.29	4.64	5.66	5.67	7.97	5.64	6.73	4.30	5.26	3.40	1.86	55.04
1951	2.49	2.44	4.66	5.85	6.76	7.18	8.35	8.43	6.20	4.51	2.35	-	-
1952	2.28	2.66	4.01	5.36	6.82	9.79	8.52	9.61	6.91	5.12	3.03	1.59	65.70
1953	2.52	2.93	4.95	6.19	7.82	11.63	8.38	7.62	8.55	4.91	2.51	-	-
1954	2.07	4.45	4.54	6.17	4.85	9.09	12.26	11.16	9.44	5.07	3.61	2.77	75.47
1955	1.16	2.35	4.99	7.13	7.14	6.59	8.70	7.93	5.56	5.26	3.86	2.12	62.79
1956	-	-	5.59	6.73	7.83	8.68	8.72	9.55	8.53	5.29	3.72	3.54	-
1957	-	1.71	3.20	3.45	-	5.74	8.51	8.06	4.80	3.77			-
1958	1.71	1.20	1.86	4.47	6.26	8.49	7.93	7.31	4.52		2.87		-
1959	-	-	6.01	6.62	6.74	6.81	7.08	8.53	6.36				-
1960	1.44	-	-	-	6.39	7.42	6.83	7.43					-
1961	-	-	-	6.27	8.35	5.92	7.50						-
1962	-	-	-	4.63	7.82	5.57	7.53						-
1963	-	-	5.47	5.73	6.99	7.75	10.81				3.33	2.06	-
1964	-	2.11	4.85	7.71	8.30	7.35	11.18	9.84				-	-
1965	1.94	2.20	2.65	5.75	7.27	8.09	9.44	7.73				-	-
1966		2.47	4.78	5.27	-	7.93	8.72	6.73	3.56	4.48		-	-
1967	-	-	4.33	4.82	6.94	-	-	8.95	4.77	7.20		-	-
1968	-	-	-	4.92	-	6.73	7.90	8.05	5.20			-	-
1969	-	-	-	-	-	7.57	10.33	8.60	5.22	3.63		-	-
1970	-	-	-	6.59	8.16	9.15	9.47	6.10	5.23	3.80		-	-
1971	-	-	-	6.59	8.16	9.15	9.47	6.10	4.88	3.80		-	-
1972	-	-	5.73	7.08	6.73	8.16	8.79	7.67	6.07	4.17		-	-
1973	-	-	3.79	4.40	6.80	7.67	8.13	8.62	4.17	4.49		-	-
1974	-	-	4.91	7.31	7.39	8.78	10.73	7.69	4.24	3.27	2.21	-	-
1975	-	-	3.52	4.92	5.66	7.18	6.06	7.09	4.87	4.99		-	-
1976	-	-	-	4.84	5.57	7.29	7.59	8.81	4.73	3.34		-	-
1977	-	-	5.41	5.20	5.06	8.06	9.42	6.75	6.52	4.38	2.32	-	-
1978	-	-	5.40	6.44	6.07	8.61	10.52	7.97	5.33	5.19	2.31	-	-
1979	-	-	3.56	4.27	5.82	7.01	7.89	7.08	6.06	6.08		-	-
1980	-	-	4.24	5.94	5.80	8.73	11.82	9.73	6.23	5.10		-	-
1981	-	-	3.81	5.84	6.01	7.69	9.03	7.13	6.24	2.98	2.44	-	-
1982	-	-	4.08	5.28	5.65	5.99	8.18	8.33	6.64	4.73	3.15	-	-
1983	-	-	2.94	4.70	6.13	6.71	9.73	9.06	-	4.03	2.53	-	-
1984	-	-	3.49	5.83	7.29	8.17	-	8.04	6.83	3.72	2.59	-	-
1985	-	-	3.40	5.75	7.25	7.63	8.52	8.09	6.29	3.01	2.02	-	-
1986	-	-	4.89	5.41	5.66	6.17	9.92	6.92	4.67	3.19	-	-	-
1987	-	-	-	5.81	7.41	6.79	-	7.92	5.65	4.48	2.64	-	-
1988	-	-	-	5.70	6.94	8.30	8.13	8.48	5.96	3.53	3.65	-	-
1989	-	-	-	6.24	5.61	6.25	8.18	6.29	5.72	5.06	-	-	-
1990	-	-	-	4.54	6.64	9.59	8.62	7.48	5.60	4.77	2.79	-	-

Table 16. Continued…

	Altus Dam Net Evaporation (Free Surface, inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	-	-	4.94	5.50	5.80	6.92	8.55	7.25	4.03	4.97	-	-	-
1992	-	-	3.86	4.49	5.36	5.40	8.48	6.01	5.48	4.72	2.11	-	-
1993	-	-	-	4.52	5.39	7.07	8.80	8.18	5.49	3.92	-	-	-
1994	-	-	4.19	6.24	5.30	8.74	8.81	8.58	5.75	3.82	1.05	1.04	58.90
1995	1.63	1.96	3.55	4.77	5.43	6.39	9.07	7.19	4.03	5.41	2.79	1.96	54.19
1996	1.65	2.23	3.96	6.97	8.12	7.31	7.60	5.53	4.21	4.53	1.89	1.62	55.61
1997	1.69	2.04	4.58	3.69	5.68	6.39	8.37	6.47	6.01	4.07	2.80	1.71	53.51
1998	1.67	2.05	3.62	5.08	7.20	9.84	10.53	8.27	6.83	4.11	2.36	1.73	63.28
1999	2.39	3.57	2.65	4.97	5.93	6.30	9.18	9.18	5.66	4.65	3.51	2.72	60.70
2000	2.40	3.63	4.28	4.89	7.34	5.84	8.84	10.77	7.57	3.51	1.78	1.57	62.40
2001	1.42	1.67	2.98	5.25	6.13	8.60	10.86	7.47	5.25	5.21	2.48	2.11	59.42
2002	2.79	3.18	4.64	4.10	5.64	7.35	7.00	8.51	6.36	2.74	2.60	1.61	56.53
2003	2.22	2.15	3.82	5.81	6.85	6.13	10.01	8.33	5.19	4.60	2.78	2.58	60.47
2004	2.08	2.10	4.12	4.67	7.21	6.13	7.56	6.62	6.64	2.93	1.62	2.19	53.87
2005	1.28	1.66	3.70	5.69	5.41	7.62	8.68	6.35	6.46	3.86	3.83	2.32	56.86
2006	3.40	3.46	4.93	6.73	7.61	8.48	9.71	8.68	5.57	4.64	2.87	1.66	67.72
2007	1.63	2.30	4.12	4.03	4.18	4.97	6.69	7.16	5.45	5.02	3.12	1.49	50.15
2008	2.88	2.86	4.29	5.50	7.18	8.89	8.94	6.58	4.73	4.04	3.20	2.63	61.70
2009	2.89	4.09	4.77	5.49	4.96	7.48	8.74	8.42	4.61	2.66	2.52	1.64	58.25
2010	1.51	1.41	4.22	4.70	6.13	8.11	5.93	8.69	5.94	5.08	3.33	2.32	57.35
2011	2.07	2.49	5.21	7.39	8.12	12.36	12.21	11.42	7.48	5.27	3.08	1.42	78.52
2012	2.98	2.64	4.33	4.70	7.38	7.89	10.02	8.69	6.93	4.81	3.59	2.42	66.39
2013	1.93	2.60	4.49	4.07	7.03	9.45	8.65	8.90	7.19	4.52	2.86	1.42	63.09
2014	3.25	2.39	5.19	6.31	7.69	7.04	7.59	9.13	6.22	4.04	2.87	1.62	63.33
2015	2.20	2.53	3.42	4.70	6.31	7.43	8.78	8.26	7.73	4.77	2.38	2.11	60.60
2016	1.79	3.72	5.43	5.61	5.77	6.51	8.78	8.56	4.22	4.53	2.70	1.52	59.14

Table 17. Monthly Pure Evaporation (Free Surface) data for Lugert-Altus Reservoir from March 1948 to December 2016. This data is computed from the complete record of Net Evaporation using the monthly average Pure Evaporation minus Precipitation for each specific month.

	Altus Dam Pure Evaporation (Free Surface, inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1948	-	-	5.03	8.92	10.98	10.20	9.73	14.22	7.85	5.98	4.74	3.20	-
1949	5.68	1.92	5.14	5.79	16.87	10.30	9.54	9.57	8.87	8.62	3.44	3.89	89.62
1950	2.28	3.88	4.64	6.24	8.24	11.18	10.43	11.15	6.86	5.26	3.43	1.90	75.49
1951	3.19	3.43	5.96	6.98	14.15	15.36	10.80	9.85	7.77	7.03	2.91	-	-
1952	3.08	3.07	5.13	10.44	9.14	10.81	10.56	10.04	7.37	5.12	4.56	2.93	82.25
1953	2.54	3.49	6.90	8.14	8.86	17.42	12.86	9.97	8.67	11.38	3.48	-	-
1954	2.15	4.45	4.71	9.48	11.76	9.64	12.49	12.65	11.25	5.34	3.73	3.80	91.44
1955	2.19	3.18	5.49	7.70	15.04	11.82	10.16	8.91	7.50	12.77	3.86	2.14	90.76
1956	-	-	5.77	6.93	13.45	9.12	13.54	10.22	8.53	8.47	3.97	4.43	-
1957	-	2.85	5.91	11.39	-	11.85	8.68	8.76	8.03	7.04	-	-	-
1958	3.12	1.57	4.36	6.92	7.85	14.54	12.27	7.97	4.92	-	3.26	-	-
1959	-	-	6.21	7.59	14.06	9.83	15.81	9.84	11.11	-	-	-	-
1960	2.25	-	-	-	8.86	10.62	12.74	10.07	-	-	-	-	-
1961	-	-	-	6.42	10.89	10.02	12.54	-	-	-	-	-	-
1962	-	-	-	7.67	10.12	13.11	11.72	-	-	-	-	-	-
1963	-	-	7.16	6.50	9.92	11.00	11.85	-	-	-	5.04	2.36	-
1964	-	4.15	5.18	7.87	13.10	10.47	11.20	11.98	-	-	-	-	-
1965	2.06	3.21	3.39	6.99	10.20	14.31	9.68	9.15	-	-	-	-	-
1966	-	3.27	5.21	7.49	-	8.79	9.40	13.17	6.25	5.19	-	-	-
1967	-	-	5.63	6.38	9.03	-	-	9.86	9.05	8.65	-	-	-
1968	-	-	-	6.24	-	10.43	13.18	10.66	6.00	-	-	-	-
1969	-	-	-	-	-	10.39	11.68	11.94	10.27	5.45	-	-	-
1970	-	-	-	9.33	10.22	11.60	9.74	6.76	7.64	5.20	-	-	-
1971	-	-	-	6.72	10.23	13.05	12.53	7.30	10.95	8.92	-	-	-
1972	-	-	5.78	8.46	8.78	11.56	10.38	8.95	6.42	8.69	-	-	-
1973	-	-	9.08	8.30	8.47	10.74	10.78	9.07	10.78	8.60	-	-	-
1974	-	-	6.13	10.32	10.01	9.63	10.77	14.40	9.41	7.83	3.29	-	-
1975	-	-	5.10	5.75	9.80	10.80	12.69	11.56	6.73	-	-	-	-
1976	-	-	-	9.92	8.25	11.26	8.38	9.71	9.99	5.92		-	-
1977	-	-	5.87	8.26	17.76	9.78	10.24	15.30	7.68	6.90	3.67	-	-
1978	-	-	-	7.66	13.43	12.46	11.06	8.92	7.71	5.21	4.42	-	-
1979	-	-	5.83	6.58	9.60	9.34	14.59	10.09	6.06	8.03	-	-	-
1980	-	-	6.10	6.73	22.57	9.00	11.82	10.77	7.20	5.61	-	-	-
1981	-	-	6.13	9.92	11.18	12.69	10.22	9.99	6.45	7.01	4.02	-	-
1982	-	-	5.73	5.84	13.84	13.83	10.49	9.02	8.81	4.94	5.33	-	-
1983	-	-	6.40	5.97	10.33	9.38	9.83	9.39	-	14.47	3.86	-	-
1984	-	-	5.08	7.07	7.78	11.92	-	8.46	6.96	4.45	4.69	-	-
1985	-	-	7.19	9.02	7.64	14.09	10.31	10.20	10.31	9.27	3.43	-	-
1986	-	-	5.43	8.08	10.47	12.16	11.91	12.91	14.16	9.47	-	-	-
1987	-	-	-	5.86	18.01	10.42	-	9.04	10.21	8.19	2.95	-	-
1988	-	-	-	11.26	7.32	9.56	9.07	8.96	13.41	4.20	4.68	-	-
1989	-	-	-	6.24	8.90	14.45	8.91	9.79	11.43	7.56	-	-	-
1990	-	-	-	7.56	10.15	11.43	11.08	10.47	7.93	5.38	6.28	-	-

Table 17. Continued…

	Altus Dam Pure Evaporation (Free Surface, inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1991	-	-	6.56	7.04	14.04	14.35	9.05	10.27	7.90	7.18	-	-	-
1992	-	-	5.33	6.73	8.61	14.40	12.08	9.20	7.48	4.72	5.78	-	-
1993	-	-	-	9.77	12.38	9.25	12.06	11.12	7.66	5.28	-	-	-
1994	-	-	6.65	10.14	8.51	11.13	10.77	9.46	7.12	5.67	4.72	1.23	-
1995	2.93	1.98	5.37	6.69	11.46	13.75	11.57	14.55	13.32	6.41	2.83	3.04	93.91
1996	1.67	2.23	4.47	7.04	10.37	10.65	13.10	13.51	7.13	5.34	3.71	1.95	81.16
1997	2.11	6.90	4.71	12.97	9.06	8.36	13.44	12.91	10.46	7.24	3.61	4.81	96.59
1998	3.42	4.78	9.27	5.60	9.64	9.94	10.88	9.36	7.33	8.03	5.62	2.94	86.80
1999	4.44	3.68	5.30	8.88	10.75	17.23	11.14	9.79	6.69	7.23	4.29	5.26	94.67
2000	2.77	5.49	9.68	8.00	9.43	12.15	10.35	10.77	7.63	8.58	3.66	2.71	91.20
2001	2.99	4.55	4.10	6.55	15.68	9.14	10.86	11.89	8.74	5.44	4.58	2.33	86.84
2002	5.94	4.02	6.12	8.61	7.65	9.83	10.41	8.86	7.71	8.50	3.38	3.99	85.03
2003	2.22	2.98	5.24	7.99	9.14	12.36	10.52	10.52	5.97	5.63	3.40	2.86	78.83
2004	6.13	4.25	7.49	7.36	7.28	16.52	9.43	8.47	8.64	9.43	8.87	2.77	96.64
2005	3.45	2.45	4.16	6.66	8.82	10.63	10.65	12.44	11.18	7.49	3.83	2.54	84.30
2006	3.56	3.46	7.44	7.16	11.51	11.49	11.01	12.60	7.41	8.94	3.11	4.18	91.85
2007	2.95	2.82	8.21	6.12	11.54	13.05	8.84	9.74	7.92	6.93	3.12	4.00	85.23
2008	2.88	4.41	6.35	8.30	8.69	10.69	10.33	11.14	7.81	8.17	3.39	2.69	84.83
2009	3.05	4.42	6.88	10.68	7.30	9.10	13.30	9.74	7.90	5.91	2.86	2.51	83.63
2010	4.36	2.21	4.79	7.71	7.81	12.65	19.58	9.15	8.07	7.82	4.91	2.41	2.95
2011	2.13	2.91	5.25	7.76	12.28	12.70	12.31	11.84	7.95	9.20	9.28	2.84	96.45
2012	3.39	3.34	8.58	8.37	12.24	12.13	10.37	10.17	9.66	4.86	4.32	3.01	90.45
2013	1.93	2.60	4.49	4.07	7.03	9.45	8.65	8.90	7.19	4.52	2.86	1.42	63.09
2014	3.25	2.39	5.19	6.31	7.69	7.04	7.59	9.13	6.22	4.04	2.87	1.62	63.33
2015	2.20	2.53	3.42	4.70	6.31	7.43	8.78	8.26	7.73	4.77	2.38	2.11	60.60
2016	1.79	3.72	5.43	5.61	5.77	6.51	8.78	8.56	4.22	4.53	2.70	1.52	59.14
1948			5.03	8.92	10.98	10.20	9.73	14.22	7.85	5.98	4.74	3.20	80.85
Average	**3.04**	**3.42**	**5.86**	**7.67**	**10.59**	**11.36**	**11.08**	**10.35**	**8.35**	**7.02**	**4.11**	**2.88**	-

5.4. SWAM Inflow Sequences

Table 18. Monthly flows from the North Fork Red River SWAM modeled for the NFRR flow into Lugert-Altus Reservoir.

Year	Month	North Fork Red River SWAM Modeled at the Reservoir NFRR flow into Lugert-Altus Reservoir (acre-ft/month)							
		Naturalized	2013 GW Existing SW	OCWP GW Existing SW	Full GW Existing SW	Full GW Existing SW Domestic SW (Low)	Full GW Existing SW Domestic SW (High)	Full GW Full SW (Low)	Full GW Full SW (High)
1950	Jan	2,902	2,741	2,733	2,510	2,365	1,962	2,365	1,962
	Feb	4,253	4,020	4,012	3,789	3,593	3,044	3,593	3,044
	Mar	1,284	1,123	1,115	892	637	194	637	194
	Apr	2,533	2,267	2,251	1,876	1,474	660	1,474	660
	May	43,796	43,484	43,467	43,022	42,515	41,022	42,515	41,022
	Jun	15,154	8,309	7,981	0	0	0	0	0
	Jul	51,127	42,347	41,909	31,080	30,368	28,257	30,368	28,257
	Aug	23,661	15,856	15,467	5,783	5,202	3,484	5,202	3,484
	Sep	17,301	13,740	13,563	9,146	8,918	8,262	8,918	8,262
	Oct	7,039	6,742	6,725	6,307	6,019	5,185	6,019	5,185
	Nov	1,403	1,242	1,234	1,011	799	194	799	194
	Dec	3,792	3,631	3,623	3,400	2,828	1,144	2,828	1,144
1951	Jan	1,921	1,760	1,752	1,529	1,384	981	1,384	981
	Feb	7,944	7,704	7,692	7,358	7,154	6,582	7,154	6,582
	Mar	5,319	5,079	5,067	4,733	4,462	3,690	4,462	3,690
	Apr	5,649	5,383	5,367	4,992	4,589	3,462	4,589	3,462
	May	100,854	100,628	100,617	100,319	99,833	98,424	99,833	98,424
	Jun	66,865	60,318	59,992	51,874	51,394	49,983	51,394	49,983
	Jul	7,139	0	0	0	0	0	0	0
	Aug	6,706	2,249	1,983	0	0	0	0	0
	Sep	554	0	0	0	0	0	0	0
	Oct	787	501	490	286	261	191	261	191
	Nov	145	79	83	194	194	194	194	194
	Dec	1,241	1,080	1,072	849	277	194	277	194
1952	Jan	4,144	3,904	3,892	3,608	3,460	3,051	3,460	3,051
	Feb	3,071	2,910	2,902	2,679	2,487	1,947	2,487	1,947
	Mar	4,150	3,910	3,898	3,564	3,293	2,512	3,293	2,512
	Apr	11,410	11,144	11,128	10,753	10,350	9,168	10,350	9,168
	May	4,199	3,887	3,870	3,425	2,918	1,813	2,918	1,813
	Jun	2,575	0	0	0	0	0	0	0
	Jul	2,503	0	0	0	0	0	0	0
	Aug	2,511	0	0	0	0	0	0	0
	Sep	116	0	0	0	0	0	0	0
	Oct	38	0	0	0	0	0	0	0
	Nov	284	126	122	3	3	3	3	3
	Dec	560	383	375	217	165	72	165	72
1953	Jan	26	0	0	0	0	0	0	0
	Feb	155	26	22	0	0	0	0	0
	Mar	658	424	412	173	149	84	149	84
	Apr	1,544	1,338	1,327	1,077	690	190	690	190
	May	146	2	0	0	0	0	0	0
	Jun	3,724	0	0	0	0	0	0	0
	Jul	7,149	0	0	0	0	20	0	20
	Aug	3,849	0	0	0	0	0	0	0
	Sep	929	0	0	0	0	0	0	0
	Oct	8,246	8,048	8,036	7,757	7,486	6,698	7,486	6,698
	Nov	716	518	510	287	157	157	157	157
	Dec	345	139	131	0	0	0	0	0

Table 18. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir NFRR flow into Lugert-Altus Reservoir (acre-ft/month)							
		Naturalized	2013 GW Existing SW	OCWP GW Existing SW	Full GW Existing SW	Full GW Existing SW Domestic SW (Low)	Full GW Existing SW Domestic SW (High)	Full GW Full SW (Low)	Full GW Full SW (High)
1954	Jan	372	211	203	174	174	174	174	174
	Feb	4,509	4,272	4,260	3,926	3,746	3,651	3,746	3,651
	Mar	0	79	83	0	0	0	0	0
	Apr	2,408	2,230	2,219	1,969	1,589	472	1,589	472
	May	69,175	68,863	68,846	68,401	67,894	66,401	67,894	66,401
	Jun	2,095	1,051	1,111	0	0	0	0	0
	Jul	5,929	1,054	837	0	0	0	0	0
	Aug	1,001	0	0	0	0	0	0	0
	Sep	2,020	132	59	0	0	0	0	0
	Oct	182	28	22	0	0	0	0	0
	Nov	273	118	114	0	0	0	0	0
	Dec	1,108	931	923	693	617	438	617	438
1955	Jan	430	253	245	116	102	101	102	101
	Feb	328	160	156	37	37	37	37	37
	Mar	280	123	119	0	0	0	0	0
	Apr	443	212	201	36	36	36	36	36
	May	30,830	30,622	30,611	30,313	29,834	28,425	29,834	28,425
	Jun	20,430	13,883	13,557	5,439	4,959	3,548	4,959	3,548
	Jul	3,938	0	0	0	0	0	0	0
	Aug	3,552	0	0	0	0	0	0	0
	Sep	981	0	0	0	0	0	0	0
	Oct	17,526	17,229	17,212	16,794	16,506	15,672	16,506	15,672
	Nov	0	0	0	0	0	0	0	0
	Dec	131	0	0	0	0	0	0	0
1956	Jan	242	85	83	0	0	0	0	0
	Feb	2,216	1,989	1,981	1,758	1,562	1,018	1,562	1,018
	Mar	279	119	111	82	82	82	82	82
	Apr	258	109	103	0	0	0	0	0
	May	30,658	30,450	30,439	30,141	29,662	28,253	29,662	28,253
	Jun	3,610	0	0	0	0	0	0	0
	Jul	3,704	0	0	0	0	0	0	0
	Aug	3,453	0	0	0	0	0	0	0
	Sep	0	0	0	0	0	0	0	0
	Oct	1,702	1,413	1,396	1,095	1,058	955	1,058	955
	Nov	0	0	0	0	0	0	0	0
	Dec	8,095	7,918	7,910	7,680	7,604	7,383	7,604	7,383
1957	Jan	255	104	100	0	0	0	0	0
	Feb	511	334	326	179	161	112	161	112
	Mar	926	689	681	458	211	118	211	118
	Apr	30,652	30,386	30,370	29,995	29,592	28,410	29,592	28,410
	May	89,463	89,151	89,134	88,689	88,182	86,689	88,182	86,689
	Jun	12,279	4,948	4,620	0	0	0	0	0
	Jul	934	0	0	0	0	0	0	0
	Aug	4,754	0	0	0	0	0	0	0
	Sep	1,137	0	0	0	0	0	0	0
	Oct	1,244	947	930	590	345	214	345	214
	Nov	682	510	502	279	183	183	183	183
	Dec	25	79	83	0	0	0	0	0
1958	Jan	1,701	1,463	1,455	1,232	1,084	684	1,084	684
	Feb	2,225	2,064	2,056	1,833	1,641	1,101	1,641	1,101
	Mar	5,828	5,588	5,576	5,301	5,041	4,291	5,041	4,291
	Apr	5,305	5,039	5,023	4,745	4,358	3,223	4,358	3,223
	May	10,839	10,631	10,620	10,322	9,843	8,434	9,843	8,434
	Jun	18,191	11,644	11,318	3,200	2,720	2,597	2,720	2,597
	Jul	25,042	14,870	14,350	2,625	1,901	1,147	1,901	1,147
	Aug	3,800	0	0	0	0	0	0	0
	Sep	0	0	0	0	0	0	0	0
	Oct	0	0	0	0	0	0	0	0
	Nov	0	0	0	0	0	0	0	0
	Dec	117	0	0	0	0	0	0	0

Table 18. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir NFRR flow into Lugert-Altus Reservoir (acre-ft/month)							
		Naturalized	2013 GW Existing SW	OCWP GW Existing SW	Full GW Existing SW	Full GW Existing SW Domestic SW (Low)	Full GW Existing SW Domestic SW (High)	Full GW Full SW (Low)	Full GW Full SW (High)
1959	Jan	447	286	278	177	177	177	177	177
	Feb	1,525	1,285	1,273	1,048	852	402	852	402
	Mar	4,088	3,848	3,836	3,502	3,236	2,739	3,236	2,739
	Apr	4,031	3,765	3,749	3,374	2,971	1,930	2,971	1,930
	May	69,197	68,989	68,978	68,680	68,201	66,792	68,201	66,792
	Jun	17,381	9,749	9,361	1,109	1,109	1,109	1,109	1,109
	Jul	11,119	1,758	1,318	0	0	0	0	0
	Aug	3,916	0	0	0	0	0	0	0
	Sep	4,791	1,240	1,116	0	0	0	0	0
	Oct	11,245	10,948	10,931	10,513	10,225	9,391	10,225	9,391
	Nov	614	453	445	222	194	194	194	194
	Dec	22,367	22,127	22,115	21,781	21,175	19,391	21,175	19,391
1960	Jan	15,706	15,545	15,537	15,314	15,169	14,766	15,169	14,766
	Feb	21,261	21,046	21,038	20,815	20,619	20,070	20,619	20,070
	Mar	16,728	16,488	16,476	16,142	15,871	15,090	15,871	15,090
	Apr	6,381	6,115	6,099	5,724	5,321	4,139	5,321	4,139
	May	7,201	6,889	6,872	6,427	5,920	4,427	5,920	4,427
	Jun	15,850	8,407	8,079	57	57	57	57	57
	Jul	31,326	21,251	20,811	9,914	9,190	7,043	9,190	7,043
	Aug	8,270	296	0	0	0	0	0	0
	Sep	3,986	616	651	0	0	0	0	0
	Oct	59,180	58,883	58,866	58,448	58,160	57,326	58,160	57,326
	Nov	6,915	6,754	6,746	6,523	6,311	5,703	6,311	5,703
	Dec	10,666	10,505	10,497	10,274	9,702	8,017	9,702	8,017
1961	Jan	6,783	6,622	6,614	6,391	6,246	5,843	6,246	5,843
	Feb	17,949	17,709	17,697	17,363	17,159	16,587	17,159	16,587
	Mar	9,482	9,321	9,313	9,090	8,835	8,097	8,835	8,097
	Apr	10,152	9,886	9,870	9,495	9,092	7,910	9,092	7,910
	May	12,851	12,539	12,522	12,077	11,570	10,077	11,570	10,077
	Jun	50,565	44,018	43,692	35,574	35,094	33,683	35,094	33,683
	Jul	12,317	2,433	1,993	0	0	0	0	0
	Aug	5,122	0	0	0	0	0	0	0
	Sep	3,445	0	0	0	0	0	0	0
	Oct	1,196	902	885	506	481	411	481	411
	Nov	10,545	10,305	10,293	9,959	9,734	9,090	9,734	9,090
	Dec	5,801	5,608	5,600	5,377	4,795	3,107	4,795	3,107
1962	Jan	6,131	5,970	5,962	5,739	5,594	5,191	5,594	5,191
	Feb	4,533	4,361	4,353	4,130	3,934	3,394	3,934	3,394
	Mar	3,260	3,020	3,008	2,785	2,525	1,775	2,525	1,775
	Apr	20,317	20,139	20,128	19,878	19,498	18,381	19,498	18,381
	May	10,092	9,780	9,763	9,318	8,811	7,318	8,811	7,318
	Jun	52,617	44,985	44,597	34,942	34,434	32,939	34,434	32,939
	Jul	7,535	0	0	0	0	0	0	0
	Aug	11,195	2,515	2,124	0	0	0	0	0
	Sep	22,425	18,762	18,584	14,147	13,919	13,263	13,919	13,263
	Oct	3,918	3,621	3,604	3,186	2,898	2,144	2,898	2,144
	Nov	2,258	2,018	2,006	1,672	1,447	943	1,447	943
	Dec	2,270	2,030	2,018	1,694	1,119	225	1,119	225
1963	Jan	1,871	1,631	1,619	1,302	1,154	787	1,154	787
	Feb	5,696	5,456	5,444	5,110	4,906	4,334	4,906	4,334
	Mar	18,752	18,512	18,500	18,166	17,895	17,114	17,895	17,114
	Apr	8,445	8,179	8,163	7,788	7,385	6,526	7,385	6,526
	May	8,076	7,764	7,747	7,302	6,795	5,387	6,795	5,387
	Jun	16,419	8,849	8,521	499	499	499	499	499
	Jul	4,547	0	0	0	0	0	0	0
	Aug	3,774	0	0	0	0	0	0	0
	Sep	2,977	7	0	0	0	0	0	0
	Oct	2,151	1,857	1,840	1,422	1,356	1,253	1,356	1,253
	Nov	1,514	1,276	1,264	930	736	639	736	639
	Dec	1,161	924	912	588	375	225	375	225

Table 18. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir NFRR flow into Lugert-Altus Reservoir (acre-ft/month)							
		Naturalized	2013 GW Existing SW	OCWP GW Existing SW	Full GW Existing SW	Full GW Existing SW Domestic SW (Low)	Full GW Existing SW Domestic SW (High)	Full GW Full SW (Low)	Full GW Full SW (High)
1964	Jan	1,206	967	955	638	498	353	498	353
	Feb	4,626	4,386	4,374	4,040	3,836	3,264	3,836	3,264
	Mar	2,550	2,310	2,298	1,964	1,706	1,429	1,706	1,429
	Apr	6,852	6,587	6,571	6,196	5,928	5,782	5,928	5,782
	May	7,157	6,845	6,828	6,383	5,876	4,622	5,876	4,622
	Jun	18,081	10,511	10,183	5,121	5,096	5,023	5,096	5,023
	Jul	4,498	0	0	0	0	0	0	0
	Aug	3,656	0	0	0	0	0	0	0
	Sep	1,336	0	0	0	0	0	0	0
	Oct	6,409	6,202	6,191	5,902	5,865	5,762	5,865	5,762
	Nov	3,603	3,363	3,351	3,017	2,792	2,156	2,792	2,156
	Dec	3,638	3,398	3,386	3,052	2,446	1,151	2,446	1,151
1965	Jan	3,402	3,162	3,150	2,858	2,710	2,301	2,710	2,301
	Feb	3,060	2,899	2,891	2,668	2,476	1,936	2,476	1,936
	Mar	4,244	4,047	4,039	3,816	3,556	2,809	3,556	2,809
	Apr	3,607	3,429	3,418	3,168	2,788	1,676	2,788	1,676
	May	2,945	2,633	2,616	2,171	1,664	673	1,664	673
	Jun	44,786	38,239	37,913	29,795	29,315	27,904	29,315	27,904
	Jul	5,854	0	0	0	0	0	0	0
	Aug	3,453	0	0	0	0	0	0	0
	Sep	20,534	16,363	16,150	10,849	10,607	9,913	10,607	9,913
	Oct	21,994	21,796	21,784	21,505	21,234	20,446	21,234	20,446
	Nov	3,977	3,816	3,808	3,585	3,373	2,765	3,373	2,765
	Dec	6,398	6,158	6,146	5,840	5,258	3,545	5,258	3,545
1966	Jan	4,178	4,017	4,009	3,786	3,641	3,238	3,641	3,238
	Feb	9,426	9,265	9,257	9,034	8,842	8,302	8,842	8,302
	Mar	5,421	5,181	5,169	4,835	4,564	3,783	4,564	3,783
	Apr	4,082	3,816	3,800	3,460	3,073	1,976	3,073	1,976
	May	15,400	15,088	15,071	14,626	14,122	13,176	14,122	13,176
	Jun	2,271	0	0	0	0	0	0	0
	Jul	3,280	0	0	0	0	0	0	0
	Aug	6,274	0	0	0	0	0	0	0
	Sep	6,423	2,876	2,699	0	0	0	0	0
	Oct	482	284	272	243	243	243	243	243
	Nov	663	502	494	271	194	194	194	194
	Dec	1,036	875	867	644	194	194	194	194
1967	Jan	2,228	1,991	1,983	1,760	1,612	1,203	1,612	1,203
	Feb	1,623	1,462	1,454	1,231	1,039	499	1,039	499
	Mar	2,040	1,879	1,871	1,648	1,393	668	1,393	668
	Apr	10,896	10,630	10,614	10,337	9,950	8,815	9,950	8,815
	May	3,860	3,652	3,641	3,343	2,864	1,524	2,864	1,524
	Jun	8,067	864	536	0	0	0	0	0
	Jul	11,114	2,095	1,655	0	0	0	0	0
	Aug	4,552	0	0	0	0	0	0	0
	Sep	2,589	0	0	0	0	0	0	0
	Oct	696	498	486	243	243	243	243	243
	Nov	334	173	165	194	194	194	194	194
	Dec	1,965	1,804	1,796	1,573	1,001	194	1,001	194
1968	Jan	5,016	4,855	4,847	4,624	4,479	4,076	4,479	4,076
	Feb	5,850	5,610	5,598	5,370	5,174	4,625	5,174	4,625
	Mar	5,844	5,604	5,592	5,258	4,987	4,206	4,987	4,206
	Apr	5,979	5,801	5,790	5,540	5,160	4,043	5,160	4,043
	May	16,526	16,214	16,197	15,752	15,245	13,752	15,245	13,752
	Jun	16,365	9,818	9,492	2,597	2,597	2,597	2,597	2,597
	Jul	8,768	0	0	0	0	0	0	0
	Aug	4,835	0	0	0	0	0	0	0
	Sep	1,719	0	0	0	0	0	0	0
	Oct	29,376	29,079	29,062	28,726	28,450	27,649	28,450	27,649
	Nov	8,350	8,110	8,098	7,764	7,539	6,895	7,539	6,895
	Dec	5,313	5,152	5,144	4,921	4,349	2,664	4,349	2,664

Table 18. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir NFRR flow into Lugert-Altus Reservoir (acre-ft/month)							
		Naturalized	2013 GW Existing SW	OCWP GW Existing SW	Full GW Existing SW	Full GW Existing SW Domestic SW (Low)	Full GW Existing SW Domestic SW (High)	Full GW Full SW (Low)	Full GW Full SW (High)
1969	Jan	5,466	5,276	5,268	5,045	4,897	4,488	4,897	4,488
	Feb	8,957	8,717	8,705	8,371	8,167	7,595	8,167	7,595
	Mar	15,890	15,650	15,638	15,304	15,033	14,252	15,033	14,252
	Apr	7,069	6,803	6,787	6,412	6,009	4,827	6,009	4,827
	May	46,011	45,699	45,682	45,237	44,730	43,237	44,730	43,237
	Jun	5,810	0	0	0	0	0	0	0
	Jul	3,933	0	0	0	0	0	0	0
	Aug	6,950	0	0	0	0	0	0	0
	Sep	2,407	0	0	0	0	0	0	0
	Oct	0	99	104	243	243	243	243	243
	Nov	1,414	1,253	1,245	1,022	810	274	810	274
	Dec	1,743	1,582	1,574	1,351	779	194	779	194
1970	Jan	3,480	3,319	3,311	3,088	2,943	2,540	2,943	2,540
	Feb	2,581	2,413	2,405	2,182	1,987	1,447	1,987	1,447
	Mar	5,615	5,375	5,363	5,029	4,758	3,977	4,758	3,977
	Apr	15,494	15,255	15,244	14,994	14,607	13,473	14,607	13,473
	May	4,398	4,086	4,069	3,624	3,117	1,875	3,117	1,875
	Jun	4,623	0	0	0	0	0	0	0
	Jul	4,875	489	357	0	0	0	0	0
	Aug	3,357	0	0	0	0	0	0	0
	Sep	2,037	11	0	0	0	0	0	0
	Oct	429	226	220	70	70	70	70	70
	Nov	0	0	0	0	0	0	0	0
	Dec	258	113	109	0	0	0	0	0
1971	Jan	352	186	182	63	63	63	63	63
	Feb	608	388	380	157	132	132	132	132
	Mar	158	79	83	0	0	0	0	0
	Apr	317	148	142	8	8	8	8	8
	May	560	341	329	160	137	137	137	137
	Jun	8,658	2,111	1,785	0	0	105	0	105
	Jul	4,306	0	0	0	0	0	0	0
	Aug	3,138	0	0	0	0	0	0	0
	Sep	2,177	0	0	0	0	0	0	0
	Oct	4,443	4,146	4,129	3,795	3,519	2,718	3,519	2,718
	Nov	5,698	5,537	5,529	5,306	5,094	4,486	5,094	4,486
	Dec	5,093	4,853	4,842	4,619	4,037	2,415	4,037	2,415
1972	Jan	2,027	1,866	1,858	1,635	1,490	1,087	1,490	1,087
	Feb	2,349	2,188	2,180	1,957	1,765	1,225	1,765	1,225
	Mar	995	763	755	532	281	123	281	123
	Apr	658	397	386	136	132	132	132	132
	May	8,741	8,533	8,522	8,224	7,745	6,336	7,745	6,336
	Jun	12,989	6,150	5,822	0	0	0	0	0
	Jul	6,405	0	0	0	0	0	0	0
	Aug	3,646	0	0	0	0	0	0	0
	Sep	1,829	0	0	0	0	0	0	0
	Oct	789	580	569	347	322	252	322	252
	Nov	919	721	713	490	278	157	278	157
	Dec	1,974	1,813	1,805	1,582	1,010	194	1,010	194
1973	Jan	4,228	3,988	3,976	3,642	3,488	3,062	3,488	3,062
	Feb	3,154	2,993	2,985	2,762	2,570	2,030	2,570	2,030
	Mar	18,695	18,455	18,443	18,109	17,838	17,057	17,838	17,057
	Apr	47,595	47,329	47,313	46,938	46,535	45,353	46,535	45,353
	May	13,630	13,318	13,301	12,856	12,349	10,859	12,349	10,859
	Jun	10,228	2,596	2,232	0	0	0	0	0
	Jul	4,024	0	0	0	0	0	0	0
	Aug	3,333	0	0	0	0	0	0	0
	Sep	4,503	1,308	1,184	0	0	0	0	0
	Oct	6,331	6,034	6,017	5,667	5,391	4,590	5,391	4,590
	Nov	1,072	911	903	680	468	194	468	194
	Dec	2,249	2,088	2,080	1,857	1,285	194	1,285	194

Table 18. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir NFRR flow into Lugert-Altus Reservoir (acre-ft/month)							
		Naturalized	2013 GW Existing SW	OCWP GW Existing SW	Full GW Existing SW	Full GW Existing SW Domestic SW (Low)	Full GW Existing SW Domestic SW (High)	Full GW Full SW (Low)	Full GW Full SW (High)
1974	Jan	3,114	2,953	2,945	2,722	2,577	2,174	2,577	2,174
	Feb	2,086	1,925	1,917	1,694	1,502	962	1,502	962
	Mar	8,180	7,940	7,928	7,594	7,323	6,542	7,323	6,542
	Apr	4,510	4,244	4,228	3,853	3,450	2,553	3,450	2,553
	May	13,947	13,635	13,618	13,173	12,666	11,173	12,666	11,173
	Jun	2,328	0	0	0	0	0	0	0
	Jul	4,231	0	0	0	0	0	0	0
	Aug	4,498	0	0	0	0	0	0	0
	Sep	4,499	556	467	0	0	0	0	0
	Oct	3,366	3,069	3,052	2,634	2,346	1,720	2,346	1,720
	Nov	13,365	13,125	13,113	12,779	12,554	11,910	12,554	11,910
	Dec	4,861	4,661	4,653	4,430	3,848	2,252	3,848	2,252
1975	Jan	6,391	6,230	6,222	5,999	5,854	5,451	5,854	5,451
	Feb	12,291	12,051	12,039	11,705	11,501	10,929	11,501	10,929
	Mar	8,863	8,623	8,611	8,277	8,006	7,225	8,006	7,225
	Apr	9,199	8,933	8,917	8,542	8,139	6,977	8,139	6,977
	May	19,567	19,359	19,348	19,050	18,571	17,162	18,571	17,162
	Jun	27,888	21,208	20,880	12,759	12,279	10,868	12,279	10,868
	Jul	19,562	9,390	8,870	172	172	172	172	172
	Aug	12,330	3,780	3,389	0	0	0	0	0
	Sep	1,132	0	0	0	0	0	0	0
	Oct	972	678	661	337	230	160	230	160
	Nov	6,317	6,143	6,135	5,912	5,696	5,087	5,696	5,087
	Dec	4,170	3,930	3,918	3,616	3,034	1,620	3,034	1,620
1976	Jan	3,450	3,289	3,281	3,058	2,913	2,510	2,913	2,510
	Feb	2,988	2,777	2,769	2,546	2,350	1,801	2,350	1,801
	Mar	3,154	2,914	2,902	2,604	2,344	1,601	2,344	1,601
	Apr	16,719	16,453	16,437	16,062	15,659	14,477	15,659	14,477
	May	12,725	12,413	12,396	11,951	11,444	9,951	11,444	9,951
	Jun	6,443	681	518	0	0	0	0	0
	Jul	3,858	0	0	0	0	0	0	0
	Aug	3,345	0	0	0	0	0	0	0
	Sep	5,229	1,058	845	0	0	0	0	0
	Oct	134	0	0	0	0	0	0	0
	Nov	0	79	83	0	0	0	0	0
	Dec	699	494	486	263	150	150	150	150
1977	Jan	1,436	1,264	1,256	1,033	885	490	885	490
	Feb	3,591	3,351	3,339	3,045	2,849	2,300	2,849	2,300
	Mar	2,037	1,797	1,785	1,511	1,251	652	1,251	652
	Apr	15,821	15,555	15,539	15,164	14,761	13,579	14,761	13,579
	May	181,620	181,308	181,291	180,846	180,339	178,846	180,339	178,846
	Jun	27,607	19,975	19,587	11,381	10,893	9,458	10,893	9,458
	Jul	6,337	0	0	0	0	0	0	0
	Aug	12,331	3,228	2,765	0	0	0	0	0
	Sep	2,539	0	0	0	0	0	0	0
	Oct	949	653	641	362	145	145	145	145
	Nov	1,289	1,128	1,120	897	685	194	685	194
	Dec	2,750	2,554	2,546	2,323	1,741	495	1,741	495
1978	Jan	2,957	2,796	2,788	2,565	2,420	2,017	2,420	2,017
	Feb	8,472	8,232	8,220	7,886	7,682	7,110	7,682	7,110
	Mar	5,168	4,928	4,916	4,682	4,422	3,672	4,422	3,672
	Apr	4,504	4,238	4,222	3,847	3,444	2,324	3,444	2,324
	May	62,228	61,916	61,899	61,454	60,947	59,454	60,947	59,454
	Jun	26,907	19,275	18,887	10,406	9,918	8,483	9,918	8,483
	Jul	3,811	0	0	0	0	0	0	0
	Aug	3,328	0	0	0	0	0	0	0
	Sep	6,870	3,139	2,961	0	0	0	0	0
	Oct	1,236	1,038	1,026	747	476	243	476	243
	Nov	1,889	1,695	1,687	1,464	1,248	666	1,248	666
	Dec	2,208	2,047	2,039	1,816	1,244	194	1,244	194

Table 18. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir NFRR flow into Lugert-Altus Reservoir (acre-ft/month)							
		Naturalized	2013 GW Existing SW	OCWP GW Existing SW	Full GW Existing SW	Full GW Existing SW Domestic SW (Low)	Full GW Existing SW Domestic SW (High)	Full GW Full SW (Low)	Full GW Full SW (High)
1979	Jan	3,709	3,469	3,457	3,123	2,969	2,543	2,969	2,543
	Feb	6,633	6,393	6,381	6,047	5,843	5,271	5,843	5,271
	Mar	17,417	17,177	17,165	16,831	16,560	15,779	16,560	15,779
	Apr	8,680	8,414	8,398	8,023	7,620	6,438	7,620	6,438
	May	15,106	14,794	14,777	14,332	13,825	12,332	13,825	12,332
	Jun	27,540	20,993	20,667	12,549	12,069	10,658	12,069	10,658
	Jul	12,544	2,372	1,919	0	0	0	0	0
	Aug	4,701	0	0	0	0	0	0	0
	Sep	1,222	0	0	0	0	0	0	0
	Oct	0	0	0	0	0	0	0	0
	Nov	1,030	869	861	638	426	194	426	194
	Dec	2,083	1,903	1,895	1,672	1,093	175	1,093	175
1980	Jan	3,840	3,600	3,588	3,364	3,216	2,807	3,216	2,807
	Feb	4,985	4,745	4,733	4,488	4,292	3,743	4,292	3,743
	Mar	4,148	3,987	3,979	3,756	3,501	2,763	3,501	2,763
	Apr	6,091	5,825	5,809	5,434	5,031	3,849	5,031	3,849
	May	27,378	27,066	27,049	26,604	26,097	24,604	26,097	24,604
	Jun	6,281	0	0	0	0	0	0	0
	Jul	3,069	0	0	0	0	0	0	0
	Aug	4,019	0	0	0	0	0	0	0
	Sep	0	0	0	0	0	0	0	0
	Oct	139	0	0	0	0	0	0	0
	Nov	259	110	106	0	0	0	0	0
	Dec	800	627	619	405	353	203	353	203
1981	Jan	92	0	0	0	0	0	0	0
	Feb	648	417	409	186	123	123	123	123
	Mar	2,552	2,391	2,383	2,160	1,905	1,167	1,905	1,167
	Apr	2,710	2,444	2,428	2,062	1,675	825	1,675	825
	May	3,252	2,940	2,923	2,537	2,050	954	2,050	954
	Jun	7,067	845	682	0	0	0	0	0
	Jul	3,312	0	0	0	0	0	0	0
	Aug	3,364	0	0	0	0	0	0	0
	Sep	1,420	0	0	0	0	0	0	0
	Oct	2,527	2,329	2,317	2,038	1,767	979	1,767	979
	Nov	2,852	2,612	2,600	2,363	2,147	1,529	2,147	1,529
	Dec	2,325	2,164	2,156	1,933	1,361	194	1,361	194
1982	Jan	2,864	2,624	2,612	2,349	2,201	1,792	2,201	1,792
	Feb	3,207	3,011	3,003	2,780	2,584	2,035	2,584	2,035
	Mar	3,307	3,067	3,055	2,829	2,569	1,819	2,569	1,819
	Apr	1,981	1,772	1,761	1,511	1,124	279	1,124	279
	May	65,176	64,943	64,932	64,634	64,147	62,736	64,147	62,736
	Jun	41,299	33,790	33,462	25,293	24,805	23,370	24,805	23,370
	Jul	10,524	1,249	977	0	0	0	0	0
	Aug	5,837	0	0	0	0	0	0	0
	Sep	1,467	0	0	0	0	0	0	0
	Oct	0	99	94	0	0	0	0	0
	Nov	772	611	603	380	194	194	194	194
	Dec	2,566	2,405	2,397	2,174	1,602	328	1,602	328
1983	Jan	4,254	4,093	4,085	3,862	3,717	3,314	3,717	3,314
	Feb	8,056	7,895	7,887	7,664	7,472	6,932	7,472	6,932
	Mar	9,715	9,475	9,463	9,129	8,858	8,077	8,858	8,077
	Apr	6,208	5,942	5,926	5,588	5,201	4,066	5,201	4,066
	May	10,328	10,016	9,999	9,554	9,047	7,554	9,047	7,554
	Jun	11,563	4,115	3,787	0	0	0	0	0
	Jul	3,804	0	0	0	0	0	0	0
	Aug	3,228	0	0	0	0	0	0	0
	Sep	1,490	0	0	0	0	0	0	0
	Oct	18,707	18,410	18,393	17,975	17,687	16,853	17,687	16,853
	Nov	1,384	1,148	1,140	917	701	232	701	232
	Dec	1,333	1,124	1,116	893	356	146	356	146

Table 18. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir NFRR flow into Lugert-Altus Reservoir (acre-ft/month)							
		Naturalized	2013 GW Existing SW	OCWP GW Existing SW	Full GW Existing SW	Full GW Existing SW Domestic SW (Low)	Full GW Existing SW Domestic SW (High)	Full GW Full SW (Low)	Full GW Full SW (High)
1984	Jan	2,874	2,709	2,701	2,478	2,331	1,928	2,331	1,928
	Feb	3,214	2,981	2,973	2,750	2,554	2,005	2,554	2,005
	Mar	4,119	3,958	3,950	3,727	3,472	2,734	3,472	2,734
	Apr	6,187	6,009	5,998	5,748	5,368	4,251	5,368	4,251
	May	2,558	2,246	2,229	1,833	1,346	379	1,346	379
	Jun	6,834	218	0	0	0	0	0	0
	Jul	3,922	0	0	0	0	0	0	0
	Aug	4,876	0	0	0	0	0	0	0
	Sep	1,569	0	0	0	0	0	0	0
	Oct	381	166	160	10	10	10	10	10
	Nov	449	253	245	116	101	101	101	101
	Dec	1,124	963	955	732	204	194	204	194
1985	Jan	1,532	1,371	1,363	1,140	995	595	995	595
	Feb	5,675	5,514	5,506	5,283	5,091	4,551	5,091	4,551
	Mar	8,332	8,092	8,080	7,839	7,579	6,829	7,579	6,829
	Apr	5,853	5,656	5,645	5,395	5,008	3,890	5,008	3,890
	May	5,465	5,153	5,136	4,746	4,259	2,831	4,259	2,831
	Jun	9,836	2,599	2,271	0	0	0	0	0
	Jul	5,616	0	0	0	0	0	0	0
	Aug	4,094	0	0	0	0	0	0	0
	Sep	2,766	0	0	0	0	0	0	0
	Oct	12,571	12,274	12,257	11,839	11,551	10,717	11,551	10,717
	Nov	6,496	6,256	6,244	5,910	5,685	5,041	5,685	5,041
	Dec	4,827	4,587	4,575	4,280	3,698	2,170	3,698	2,170
1986	Jan	3,497	3,304	3,296	3,073	2,925	2,516	2,925	2,516
	Feb	4,865	4,684	4,676	4,453	4,257	3,713	4,257	3,713
	Mar	3,083	2,922	2,914	2,691	2,436	1,698	2,436	1,698
	Apr	2,749	2,483	2,467	2,092	1,689	844	1,689	844
	May	7,222	6,913	6,902	6,604	6,117	4,684	6,117	4,684
	Jun	24,813	17,181	16,793	7,407	6,919	5,484	6,919	5,484
	Jul	7,472	15	0	0	0	0	0	0
	Aug	5,008	0	0	0	0	0	0	0
	Sep	12,638	8,467	8,254	3,677	3,445	2,778	3,445	2,778
	Oct	102,149	101,852	101,835	101,417	101,129	100,295	101,129	100,295
	Nov	42,058	41,818	41,806	41,472	41,247	40,603	41,247	40,603
	Dec	15,373	15,133	15,121	14,787	14,181	12,397	14,181	12,397
1987	Jan	16,858	16,618	16,606	16,272	16,118	15,692	16,118	15,692
	Feb	26,264	26,024	26,012	25,678	25,474	24,902	25,474	24,902
	Mar	41,495	41,255	41,243	40,909	40,638	39,857	40,638	39,857
	Apr	15,387	15,209	15,198	14,948	14,568	13,451	14,568	13,451
	May	58,255	57,943	57,926	57,481	56,974	55,481	56,974	55,481
	Jun	24,720	17,088	16,700	7,738	7,250	5,815	7,250	5,815
	Jul	10,938	2,208	1,770	0	0	0	0	0
	Aug	11,028	2,230	1,839	0	0	0	0	0
	Sep	11,487	7,816	7,638	3,198	2,970	2,314	2,970	2,314
	Oct	3,348	3,150	3,138	2,859	2,588	1,800	2,588	1,800
	Nov	3,220	3,059	3,051	2,828	2,616	2,008	2,616	2,008
	Dec	10,004	9,843	9,835	9,612	9,040	7,355	9,040	7,355
1988	Jan	15,190	14,950	14,938	14,604	14,450	14,024	14,450	14,024
	Feb	8,295	8,055	8,043	7,773	7,577	7,028	7,577	7,028
	Mar	24,025	23,785	23,773	23,439	23,168	22,387	23,168	22,387
	Apr	21,813	21,547	21,531	21,156	20,753	19,571	20,753	19,571
	May	9,440	9,128	9,111	8,666	8,159	6,666	8,159	6,666
	Jun	11,074	3,442	3,094	0	0	0	0	0
	Jul	8,279	0	0	0	0	0	0	0
	Aug	4,002	0	0	0	0	0	0	0
	Sep	27,583	23,412	23,199	17,898	17,656	16,962	17,656	16,962
	Oct	5,203	4,906	4,889	4,471	4,183	3,349	4,183	3,349
	Nov	4,658	4,497	4,489	4,266	4,054	3,446	4,054	3,446
	Dec	6,381	6,141	6,129	5,891	5,309	3,596	5,309	3,596

Table 18. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir NFRR flow into Lugert-Altus Reservoir (acre-ft/month)							
		Naturalized	2013 GW Existing SW	OCWP GW Existing SW	Full GW Existing SW	Full GW Existing SW Domestic SW (Low)	Full GW Existing SW Domestic SW (High)	Full GW Full SW (Low)	Full GW Full SW (High)
1989	Jan	6,776	6,615	6,607	6,384	6,239	5,836	6,239	5,836
	Feb	8,046	7,806	7,794	7,460	7,256	6,684	7,256	6,684
	Mar	12,479	12,239	12,227	11,893	11,622	10,841	11,622	10,841
	Apr	9,014	8,748	8,732	8,425	8,038	6,903	8,038	6,903
	May	22,195	21,987	21,976	21,678	21,199	19,790	21,199	19,790
	Jun	72,844	65,212	64,824	55,169	54,661	53,166	54,661	53,166
	Jul	13,330	3,240	2,800	0	0	0	0	0
	Aug	14,833	5,730	5,267	0	0	0	0	0
	Sep	10,186	6,015	5,802	851	619	350	619	350
	Oct	4,510	4,213	4,196	3,778	3,490	2,671	3,490	2,671
	Nov	2,941	2,780	2,772	2,549	2,337	1,729	2,337	1,729
	Dec	3,853	3,692	3,684	3,461	2,889	1,210	2,889	1,210
1990	Jan	11,033	10,793	10,781	10,447	10,293	9,867	10,293	9,867
	Feb	10,287	10,047	10,035	9,701	9,497	8,925	9,497	8,925
	Mar	16,763	16,523	16,511	16,177	15,906	15,125	15,906	15,125
	Apr	17,409	17,143	17,127	16,752	16,349	15,167	16,349	15,167
	May	32,405	32,197	32,186	31,888	31,409	30,000	31,409	30,000
	Jun	21,899	14,267	13,879	4,224	3,997	3,811	3,997	3,811
	Jul	8,542	901	684	0	0	0	0	0
	Aug	7,138	377	186	0	0	0	0	0
	Sep	3,061	0	0	0	0	0	0	0
	Oct	1,711	1,513	1,501	1,222	951	283	951	283
	Nov	5,140	4,900	4,888	4,554	4,329	3,685	4,329	3,685
	Dec	3,435	3,256	3,248	3,025	2,446	1,077	2,446	1,077
1991	Jan	7,299	7,059	7,047	6,713	6,559	6,133	6,559	6,133
	Feb	2,789	2,628	2,620	2,397	2,205	1,665	2,205	1,665
	Mar	5,327	5,087	5,075	4,741	4,470	3,689	4,470	3,689
	Apr	4,283	4,017	4,001	3,731	3,344	2,211	3,344	2,211
	May	12,565	12,253	12,236	11,791	11,284	9,791	11,284	9,791
	Jun	24,400	16,768	16,380	7,694	7,206	5,771	7,206	5,771
	Jul	7,817	0	0	0	0	0	0	0
	Aug	5,455	0	0	0	0	0	0	0
	Sep	7,230	3,345	3,167	0	0	0	0	0
	Oct	2,123	1,847	1,835	1,556	1,280	602	1,280	602
	Nov	8,095	7,855	7,843	7,509	7,284	6,640	7,284	6,640
	Dec	17,271	17,031	17,019	16,685	16,079	14,295	16,079	14,295
1992	Jan	12,328	12,088	12,076	11,742	11,588	11,162	11,588	11,162
	Feb	10,504	10,267	10,259	10,036	9,840	9,291	9,840	9,291
	Mar	11,484	11,244	11,232	10,898	10,627	9,846	10,627	9,846
	Apr	9,383	9,117	9,101	8,726	8,323	7,141	8,323	7,141
	May	7,549	7,237	7,220	6,775	6,268	4,775	6,268	4,775
	Jun	24,004	16,372	15,984	6,329	5,821	4,813	5,821	4,813
	Jul	16,172	6,000	5,480	0	0	0	0	0
	Aug	7,926	1,080	886	0	0	0	0	0
	Sep	4,009	897	773	0	0	0	0	0
	Oct	0	76	64	0	0	0	0	0
	Nov	8,053	7,813	7,801	7,467	7,242	6,598	7,242	6,598
	Dec	7,905	7,665	7,653	7,319	6,713	4,929	6,713	4,929
1993	Jan	11,006	10,766	10,754	10,420	10,266	9,840	10,266	9,840
	Feb	11,771	11,531	11,519	11,185	10,981	10,409	10,981	10,409
	Mar	15,787	15,547	15,535	15,201	14,930	14,149	14,930	14,149
	Apr	20,956	20,690	20,674	20,299	19,896	18,714	19,896	18,714
	May	64,489	64,177	64,160	63,715	63,208	61,715	63,208	61,715
	Jun	14,172	6,540	6,152	0	0	0	0	0
	Jul	13,498	3,326	2,806	0	0	0	0	0
	Aug	10,150	1,211	820	0	0	0	0	0
	Sep	2,857	0	0	0	0	0	0	0
	Oct	158	99	104	0	0	0	0	0
	Nov	1,421	1,181	1,169	925	709	255	709	255
	Dec	2,791	2,551	2,539	2,241	1,659	472	1,659	472

Table 18. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir NFRR flow into Lugert-Altus Reservoir (acre-ft/month)							
		Naturalized	2013 GW Existing SW	OCWP GW Existing SW	Full GW Existing SW	Full GW Existing SW Domestic SW (Low)	Full GW Existing SW Domestic SW (High)	Full GW Full SW (Low)	Full GW Full SW (High)
1994	Jan	4,085	3,845	3,833	3,499	3,345	2,919	3,345	2,919
	Feb	4,727	4,487	4,475	4,171	3,975	3,426	3,975	3,426
	Mar	8,463	8,223	8,211	7,877	7,606	6,825	7,606	6,825
	Apr	6,870	6,604	6,588	6,213	5,810	4,628	5,810	4,628
	May	10,661	10,349	10,332	9,887	9,380	7,887	9,380	7,887
	Jun	7,268	1,260	1,049	0	0	0	0	0
	Jul	5,006	0	0	0	0	0	0	0
	Aug	5,584	79	0	0	0	0	0	0
	Sep	2,021	0	0	0	0	0	0	0
	Oct	1,054	763	746	420	395	325	395	325
	Nov	3,162	2,922	2,910	2,576	2,351	1,870	2,351	1,870
	Dec	1,037	810	802	579	128	128	128	128
1995	Jan	2,117	1,877	1,865	1,541	1,393	995	1,393	995
	Feb	2,041	1,801	1,789	1,480	1,284	810	1,284	810
	Mar	5,152	4,912	4,900	4,627	4,367	3,617	4,367	3,617
	Apr	4,612	4,346	4,330	3,955	3,552	2,392	3,552	2,392
	May	15,181	14,929	14,918	14,620	14,133	12,715	14,133	12,715
	Jun	108,838	101,206	100,818	91,163	90,655	89,160	90,655	89,160
	Jul	13,899	3,731	3,291	0	0	0	0	0
	Aug	50,311	41,208	40,745	29,222	28,606	26,787	28,606	26,787
	Sep	20,419	16,248	16,035	10,734	10,492	9,798	10,492	9,798
	Oct	11,101	10,804	10,787	10,369	10,081	9,247	10,081	9,247
	Nov	4,349	4,188	4,180	3,957	3,745	3,137	3,745	3,137
	Dec	8,426	8,186	8,174	7,840	7,234	5,450	7,234	5,450
1996	Jan	7,785	7,624	7,616	7,393	7,248	6,845	7,248	6,845
	Feb	6,400	6,239	6,231	6,008	5,816	5,276	5,816	5,276
	Mar	6,269	6,029	6,017	5,781	5,521	4,771	5,521	4,771
	Apr	4,871	4,605	4,589	4,338	3,951	2,816	3,951	2,816
	May	6,244	5,932	5,915	5,470	4,963	3,710	4,963	3,710
	Jun	16,547	8,915	8,527	202	202	202	202	202
	Jul	13,107	3,000	2,560	0	0	0	0	0
	Aug	21,449	12,346	11,883	1,140	780	780	780	780
	Sep	32,201	28,030	27,817	22,717	22,485	21,818	22,485	21,818
	Oct	10,566	10,368	10,356	10,077	9,806	9,018	9,806	9,018
	Nov	12,558	12,318	12,306	12,081	11,865	11,247	11,865	11,247
	Dec	14,750	14,510	14,498	14,164	13,558	11,774	13,558	11,774
1997	Jan	11,086	10,846	10,834	10,500	10,346	9,920	10,346	9,920
	Feb	28,882	28,642	28,630	28,296	28,092	27,520	28,092	27,520
	Mar	13,373	13,133	13,121	12,787	12,516	11,735	12,516	11,735
	Apr	123,189	122,923	122,907	122,532	122,129	120,947	122,129	120,947
	May	54,593	54,281	54,264	53,914	53,427	51,994	53,427	51,994
	Jun	37,480	30,004	29,676	21,507	21,019	19,584	21,019	19,584
	Jul	19,486	9,314	8,794	0	0	0	0	0
	Aug	16,324	7,221	6,758	0	0	0	0	0
	Sep	15,060	10,889	10,676	5,760	5,528	4,861	5,528	4,861
	Oct	13,885	13,588	13,571	13,153	12,865	12,031	12,865	12,031
	Nov	11,698	11,481	11,473	11,250	11,034	10,416	11,034	10,416
	Dec	23,443	23,203	23,191	22,857	22,251	20,467	22,251	20,467
1998	Jan	21,657	21,496	21,488	21,265	21,120	20,717	21,120	20,717
	Feb	26,778	26,538	26,526	26,192	25,988	25,416	25,988	25,416
	Mar	52,559	52,319	52,307	51,973	51,702	50,921	51,702	50,921
	Apr	17,613	17,347	17,331	16,956	16,553	15,371	16,553	15,371
	May	23,361	23,049	23,032	22,587	22,080	20,587	22,080	20,587
	Jun	8,239	1,016	688	0	0	0	0	0
	Jul	5,507	0	0	0	0	0	0	0
	Aug	4,824	0	0	0	0	0	0	0
	Sep	2,409	0	0	0	0	0	0	0
	Oct	1,658	1,460	1,448	1,169	898	243	898	243
	Nov	19,367	19,127	19,115	18,781	18,556	17,912	18,556	17,912
	Dec	7,970	7,809	7,801	7,578	7,006	5,321	7,006	5,321

Table 18. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir NFRR flow into Lugert-Altus Reservoir (acre-ft/month)							
		Naturalized	2013 GW Existing SW	OCWP GW Existing SW	Full GW Existing SW	Full GW Existing SW Domestic SW (Low)	Full GW Existing SW Domestic SW (High)	Full GW Full SW (Low)	Full GW Full SW (High)
1999	Jan	9,595	9,434	9,426	9,203	9,058	8,655	9,058	8,655
	Feb	10,954	10,793	10,785	10,562	10,370	9,830	10,370	9,830
	Mar	15,145	14,905	14,893	14,621	14,361	13,611	14,361	13,611
	Apr	21,423	21,157	21,141	20,766	20,363	19,181	20,363	19,181
	May	29,397	29,085	29,068	28,623	28,116	26,623	28,116	26,623
	Jun	29,241	21,609	21,221	12,251	11,763	10,328	11,763	10,328
	Jul	9,957	708	268	0	0	0	0	0
	Aug	5,673	0	0	0	0	0	0	0
	Sep	2,455	333	345	0	0	0	0	0
	Oct	543	310	298	29	29	29	29	29
	Nov	675	514	506	283	194	194	194	194
	Dec	3,740	3,500	3,488	3,154	2,572	1,253	2,572	1,253
2000	Jan	3,968	3,728	3,716	3,475	3,327	2,918	3,327	2,918
	Feb	6,148	5,908	5,896	5,562	5,358	4,786	5,358	4,786
	Mar	22,984	22,744	22,732	22,398	22,127	21,346	22,127	21,346
	Apr	17,393	17,127	17,111	16,736	16,333	15,151	16,333	15,151
	May	8,230	7,918	7,901	7,456	6,949	5,456	6,949	5,456
	Jun	28,822	21,952	21,624	13,455	12,967	11,537	12,967	11,537
	Jul	18,620	8,506	8,066	0	0	0	0	0
	Aug	4,941	0	0	0	0	0	0	0
	Sep	2,287	0	0	0	0	0	0	0
	Oct	4,717	4,519	4,507	4,228	3,957	3,169	3,957	3,169
	Nov	6,882	6,721	6,713	6,490	6,278	5,670	6,278	5,670
	Dec	5,371	5,210	5,202	4,979	4,407	2,722	4,407	2,722
2001	Jan	12,509	12,269	12,257	11,923	11,769	11,343	11,769	11,343
	Feb	17,790	17,550	17,538	17,204	17,000	16,428	17,000	16,428
	Mar	17,442	17,202	17,190	16,856	16,585	15,816	16,585	15,816
	Apr	10,483	10,305	10,294	10,044	9,664	8,547	9,664	8,547
	May	72,421	72,109	72,092	71,647	71,140	69,647	71,140	69,647
	Jun	20,879	13,247	12,859	3,706	3,218	1,783	3,218	1,783
	Jul	6,621	0	0	0	0	0	0	0
	Aug	5,166	0	0	0	0	0	0	0
	Sep	3,296	339	250	0	0	0	0	0
	Oct	0	12	0	0	0	0	0	0
	Nov	1,649	1,488	1,480	1,257	1,045	440	1,045	440
	Dec	2,916	2,755	2,747	2,524	1,952	631	1,952	631
2002	Jan	5,019	4,779	4,767	4,433	4,279	3,853	4,279	3,853
	Feb	5,995	5,755	5,743	5,452	5,256	4,707	5,256	4,707
	Mar	5,247	5,007	4,995	4,738	4,478	3,728	4,478	3,728
	Apr	8,840	8,574	8,558	8,183	7,780	6,598	7,780	6,598
	May	4,374	4,066	4,055	3,757	3,270	1,915	3,270	1,915
	Jun	6,885	0	0	0	0	0	0	0
	Jul	9,363	0	0	0	0	0	0	0
	Aug	6,544	565	420	0	0	0	0	0
	Sep	2,614	0	0	0	0	0	0	0
	Oct	9,253	8,956	8,939	8,521	8,233	7,399	8,233	7,399
	Nov	7,957	7,717	7,705	7,371	7,146	6,502	7,146	6,502
	Dec	9,023	8,814	8,806	8,583	8,001	6,307	8,001	6,307
2003	Jan	7,975	7,735	7,723	7,403	7,255	6,846	7,255	6,846
	Feb	6,761	6,529	6,521	6,298	6,102	5,553	6,102	5,553
	Mar	7,212	6,972	6,960	6,698	6,438	5,688	6,438	5,688
	Apr	6,623	6,375	6,364	6,114	5,727	4,592	5,727	4,592
	May	7,779	7,467	7,450	7,005	6,498	5,012	6,498	5,012
	Jun	12,174	4,542	4,154	0	0	0	0	0
	Jul	7,130	0	0	0	0	0	0	0
	Aug	5,471	0	0	0	0	0	0	0
	Sep	10,252	6,690	6,513	2,096	1,868	1,498	1,868	1,498
	Oct	1,102	904	892	613	342	243	342	243
	Nov	1,004	843	835	612	400	194	400	194
	Dec	1,923	1,762	1,754	1,531	959	194	959	194

Table 18. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir NFRR flow into Lugert-Altus Reservoir (acre-ft/month)							
		Naturalized	2013 GW Existing SW	OCWP GW Existing SW	Full GW Existing SW	Full GW Existing SW Domestic SW (Low)	Full GW Existing SW Domestic SW (High)	Full GW Full SW (Low)	Full GW Full SW (High)
2004	Jan	4,789	4,549	4,537	4,203	4,049	3,623	4,049	3,623
	Feb	4,592	4,402	4,394	4,171	3,975	3,428	3,975	3,428
	Mar	21,716	21,476	21,464	21,130	20,859	20,078	20,859	20,078
	Apr	11,304	11,038	11,022	10,684	10,297	9,162	10,297	9,162
	May	3,400	3,115	3,104	2,806	2,319	1,110	2,319	1,110
	Jun	8,946	1,456	1,128	0	0	0	0	0
	Jul	12,131	2,329	1,889	0	0	0	0	0
	Aug	6,321	0	0	0	0	0	0	0
	Sep	4,076	227	49	0	0	0	0	0
	Oct	5,146	4,849	4,832	4,414	4,126	3,347	4,126	3,347
	Nov	16,817	16,577	16,565	16,231	16,006	15,362	16,006	15,362
	Dec	9,158	8,918	8,906	8,572	7,977	6,264	7,977	6,264
2005	Jan	13,218	12,978	12,966	12,632	12,478	12,052	12,478	12,052
	Feb	10,896	10,656	10,644	10,310	10,106	9,534	10,106	9,534
	Mar	9,218	8,978	8,966	8,632	8,361	7,580	8,361	7,580
	Apr	6,688	6,422	6,406	6,031	5,628	4,475	5,628	4,475
	May	8,087	7,775	7,758	7,313	6,806	5,313	6,806	5,313
	Jun	17,984	10,352	9,964	1,688	1,379	1,379	1,379	1,379
	Jul	7,869	115	0	0	0	0	0	0
	Aug	18,319	9,216	8,753	0	0	0	0	0
	Sep	5,137	966	778	0	0	0	0	0
	Oct	2,243	1,946	1,929	1,511	1,226	646	1,226	646
	Nov	968	807	799	576	364	194	364	194
	Dec	2,248	2,059	2,051	1,828	1,246	166	1,246	166
2006	Jan	3,182	2,965	2,957	2,734	2,586	2,177	2,586	2,177
	Feb	2,937	2,737	2,729	2,506	2,310	1,761	2,310	1,761
	Mar	5,721	5,481	5,469	5,135	4,864	4,083	4,864	4,083
	Apr	3,037	2,771	2,755	2,431	2,044	1,110	2,044	1,110
	May	8,100	7,788	7,771	7,326	6,819	5,326	6,819	5,326
	Jun	8,071	603	390	0	0	0	0	0
	Jul	6,775	199	37	0	0	0	0	0
	Aug	6,482	0	0	0	0	0	0	0
	Sep	4,007	83	0	0	0	0	0	0
	Oct	2,081	1,784	1,767	1,424	1,387	1,284	1,387	1,284
	Nov	3,817	3,577	3,565	3,231	3,061	2,981	3,061	2,981
	Dec	913	752	744	521	194	194	194	194
2007	Jan	8,290	8,050	8,038	7,704	7,550	7,124	7,550	7,124
	Feb	6,825	6,585	6,573	6,239	6,035	5,463	6,035	5,463
	Mar	21,714	21,474	21,462	21,128	20,857	20,076	20,857	20,076
	Apr	27,963	27,697	27,681	27,306	26,903	25,721	26,903	25,721
	May	62,323	62,011	61,994	61,549	61,042	59,549	61,042	59,549
	Jun	37,721	30,089	29,701	20,046	19,538	18,043	19,538	18,043
	Jul	16,570	6,398	5,878	0	0	0	0	0
	Aug	10,366	1,497	1,106	0	0	0	0	0
	Sep	8,378	4,596	4,418	57	57	57	57	57
	Oct	3,106	2,877	2,865	2,586	2,310	1,515	2,310	1,515
	Nov	2,574	2,413	2,405	2,182	1,970	1,362	1,970	1,362
	Dec	7,047	6,807	6,795	6,461	5,855	4,075	5,855	4,075
2008	Jan	6,008	5,768	5,756	5,441	5,293	4,884	5,293	4,884
	Feb	7,838	7,598	7,586	7,252	7,048	6,476	7,048	6,476
	Mar	8,739	8,499	8,487	8,153	7,882	7,101	7,882	7,101
	Apr	8,847	8,581	8,565	8,190	7,787	6,605	7,787	6,605
	May	5,096	4,784	4,767	4,394	3,907	2,495	3,907	2,495
	Jun	10,261	3,191	2,863	0	0	0	0	0
	Jul	6,741	0	0	0	0	0	0	0
	Aug	7,465	87	0	0	0	0	0	0
	Sep	11,789	7,860	7,682	3,238	3,006	2,339	3,006	2,339
	Oct	14,744	14,447	14,430	14,012	13,724	12,890	13,724	12,890
	Nov	6,670	6,430	6,418	6,084	5,859	5,215	5,859	5,215
	Dec	6,429	6,189	6,177	5,952	5,370	3,661	5,370	3,661

Table 18. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir NFRR flow into Lugert-Altus Reservoir (acre-ft/month)							
		Naturalized	2013 GW Existing SW	OCWP GW Existing SW	Full GW Existing SW	Full GW Existing SW Domestic SW (Low)	Full GW Existing SW Domestic SW (High)	Full GW Full SW (Low)	Full GW Full SW (High)
2009	Jan	6,317	6,156	6,148	5,925	5,780	5,377	5,780	5,377
	Feb	6,668	6,428	6,416	6,082	5,878	5,306	5,878	5,306
	Mar	6,384	6,144	6,132	5,798	5,527	4,746	5,527	4,746
	Apr	10,079	9,813	9,797	9,422	9,019	7,837	9,019	7,837
	May	11,363	11,051	11,034	10,589	10,082	8,615	10,082	8,615
	Jun	9,716	2,448	2,120	0	0	0	0	0
	Jul	8,685	210	48	0	0	0	0	0
	Aug	8,201	41	0	0	0	0	0	0
	Sep	4,297	397	308	0	0	0	0	0
	Oct	4,368	4,071	4,054	3,636	3,348	2,524	3,348	2,524
	Nov	3,812	3,572	3,560	3,226	3,001	2,357	3,001	2,357
	Dec	4,259	4,019	4,007	3,673	3,067	1,696	3,067	1,696
2010	Jan	6,097	5,857	5,845	5,511	5,357	4,931	5,357	4,931
	Feb	10,959	10,719	10,707	10,373	10,169	9,597	10,169	9,597
	Mar	8,206	7,966	7,954	7,728	7,468	6,718	7,468	6,718
	Apr	20,804	20,538	20,522	20,147	19,744	18,562	19,744	18,562
	May	20,236	19,924	19,907	19,462	18,955	17,517	18,955	17,517
	Jun	10,262	2,965	2,637	0	0	0	0	0
	Jul	28,985	18,813	18,293	7,188	6,464	4,317	6,464	4,317
	Aug	5,852	0	0	0	0	0	0	0
	Sep	3,054	0	0	0	0	0	0	0
	Oct	3,197	2,900	2,883	2,465	2,177	1,493	2,177	1,493
	Nov	4,370	4,130	4,118	3,784	3,559	2,915	3,559	2,915
	Dec	4,326	4,086	4,074	3,754	3,172	1,747	3,172	1,747
2011	Jan	5,127	4,887	4,875	4,555	4,407	3,998	4,407	3,998
	Feb	4,711	4,550	4,542	4,319	4,127	3,587	4,127	3,587
	Mar	4,575	4,335	4,323	4,043	3,783	3,033	3,783	3,033
	Apr	2,896	2,630	2,614	2,342	1,955	1,005	1,955	1,005
	May	2,420	2,108	2,091	1,646	1,167	672	1,167	672
	Jun	5,011	0	0	0	0	0	0	0
	Jul	6,957	0	0	0	0	0	0	0
	Aug	5,929	0	0	0	0	0	0	0
	Sep	2,913	0	0	0	0	0	0	0
	Oct	1,010	738	727	469	444	374	444	374
	Nov	2,339	2,114	2,106	1,876	1,847	1,767	1,847	1,767
	Dec	805	582	574	370	318	168	318	168
2012	Jan	359	198	190	194	194	194	194	194
	Feb	1,794	1,588	1,580	1,357	1,161	636	1,161	636
	Mar	4,208	3,968	3,956	3,622	3,351	2,575	3,351	2,575
	Apr	3,865	3,599	3,583	3,208	2,805	1,820	2,805	1,820
	May	2,833	2,521	2,504	2,059	1,563	873	1,563	873
	Jun	7,687	557	394	0	0	0	0	0
	Jul	7,660	0	0	0	0	0	0	0
	Aug	7,067	0	0	0	0	0	0	0
	Sep	3,778	351	262	0	0	0	0	0
	Oct	175	0	0	0	0	0	0	0
	Nov	181	0	0	0	0	0	0	0
	Dec	441	218	210	89	89	89	89	89
2013	Jan	518	288	280	143	129	94	129	94
	Feb	896	656	644	388	212	126	212	126
	Mar	1,001	840	832	609	354	194	354	194
	Apr	1,154	976	965	715	338	218	338	218
	May	1,525	1,317	1,306	1,008	530	257	530	257
	Jun	6,603	0	0	48	0	0	0	0
	Jul	8,197	124	69	0	0	0	0	0
	Aug	7,526	0	0	0	0	0	0	0
	Sep	3,744	128	39	0	0	0	0	0
	Oct	838	552	541	325	300	230	300	230
	Nov	612	383	375	217	197	143	197	143
	Dec	311	103	99	0	0	0	0	0

Table 18. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir NFRR flow into Lugert-Altus Reservoir (acre-ft/month)							
		Naturalized	2013 GW Existing SW	OCWP GW Existing SW	Full GW Existing SW	Full GW Existing SW Domestic SW (Low)	Full GW Existing SW Domestic SW (High)	Full GW Full SW (Low)	Full GW Full SW (High)
2014	Jan	405	244	236	126	126	126	126	126
	Feb	522	361	353	194	194	194	194	194
	Mar	862	701	693	470	215	194	215	194
	Apr	644	466	455	218	218	218	218	218
	May	1,470	1,161	1,144	699	622	496	622	496
	Jun	8,995	2,338	2,012	0	0	0	0	0
	Jul	9,296	293	76	0	0	0	0	0
	Aug	7,403	0	0	0	0	0	0	0
	Sep	3,593	0	0	0	0	0	0	0
	Oct	236	0	0	0	0	0	0	0
	Nov	554	324	316	171	151	97	151	97
	Dec	191	0	0	0	0	0	0	0
2015	Jan	531	333	325	112	112	112	112	112
	Feb	393	232	224	194	194	194	194	194
	Mar	1,471	1,310	1,302	1,079	824	198	824	198
	Apr	15,834	15,656	15,645	15,395	15,015	13,898	15,015	13,898
	May	111,976	111,664	111,647	111,202	110,695	109,202	110,695	109,202
	Jun	36,191	28,559	28,171	18,516	18,008	16,513	18,008	16,513
	Jul	21,562	11,711	11,271	568	568	568	568	568
	Aug	15,075	5,972	5,577	0	0	0	0	0
	Sep	5,158	1,141	963	0	0	0	0	0
	Oct	2,030	1,832	1,820	1,541	1,270	496	1,270	496
	Nov	6,939	6,699	6,687	6,353	6,128	5,484	6,128	5,484
	Dec	10,306	10,066	10,054	9,720	9,114	7,330	9,114	7,330
2016	Jan	11,544	11,304	11,292	10,958	10,804	10,378	10,804	10,378
	Feb	7,266	7,026	7,014	6,680	6,476	5,904	6,476	5,904
	Mar	6,701	6,461	6,449	6,115	5,844	5,094	5,844	5,094
	Apr	9,093	8,827	8,811	8,436	8,033	6,851	8,033	6,851
	May	8,697	8,385	8,368	7,923	7,416	5,923	7,416	5,923
	Jun	18,219	10,587	10,199	1,235	747	691	747	691
	Jul	11,117	1,256	816	0	0	0	0	0
	Aug	9,543	783	589	0	0	0	0	0
	Sep	9,879	5,708	5,525	1,081	887	887	887	887
	Oct	1,188	960	948	669	394	213	394	213
	Nov	1,729	1,489	1,477	1,143	928	489	928	489
	Dec	2,521	2,281	2,270	2,047	1,465	273	1,465	273

5.5. Reservoir Model Operations

The table below includes the water supply accounting for Lugert-Altus Reservoir assuming 2060 sediment conditions (113 years of sediment accumulation of 49,700 acre-ft) and associated conservation pool storage of 106,962 acre-ft at elevation 1,559 ft as the starting elevation. The demand in the table is associated with operation rules as described in Method 2.

Table 19. Model platform of the inputs and outputs based on modeled storage of Lugert-Altus Reservoir, 2060 sediment conditions.

		In			Out							
Year	Month	NFRR Streamflow (acre-ft)	Seepage (acre-ft)	**TOTAL IN (acre-ft)**	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Irrigation (acre-ft)	Releases for M&I (acre-ft)**t)**	**TOTAL OUT (acre-ft)**	*Spilled (acre-ft)*	**Change in Storage (acre-ft)**	**Volume Stored** (acre-ft)	**Water Surface Elevation** (ft)
1926	Jan	3,100	128	2,972	758	0	0	758	2,214	0	106,962	1559.00
	Feb	2,800	128	2,672	1,762	0	0	1,762	910	0	106,962	1559.00
	Mar	3,100	128	2,972	1,556	0	0	1,556	1,416	0	106,962	1559.00
	Apr	24,100	128	23,972	1,963	0	0	1,963	22,009	0	106,962	1559.00
	May	14,900	128	14,772	2,817	3,644	204	6,665	8,107	0	106,962	1559.00
	Jun	11,600	128	11,472	3,259	5,813	326	9,398	2,074	0	106,962	1559.00
	Jul	6,200	128	6,072	2,674	33,554	1,881	38,109	0	-32,037	74,926	1552.39
	Aug	46,400	88	46,312	2,026	37,057	2,077	41,160	0	5,152	80,077	1553.58
	Sep	21,400	95	21,305	1,545	5,563	312	7,419	0	13,885	93,962	1556.57
	Oct	84,600	113	84,487	1,203	0	0	1,203	70,283	13,000	106,962	1559.00
	Nov	15,900	128	15,772	1,138	0	0	1,138	14,634	0	106,962	1559.00
	Dec	21,900	128	21,772	739	0	0	739	21,033	0	106,962	1559.00
1927	Jan	16,400	128	16,272	668	0	0	668	15,604	0	106,962	1559.00
	Feb	8,500	128	8,372	1,011	0	0	1,011	7,361	0	106,962	1559.00
	March	7,500	128	7,372	1,944	0	0	1,944	5,428	0	106,962	1559.00
	April	21,400	128	21,272	2,631	0	0	2,631	18,641	0	106,962	1559.00
	May	2,400	128	2,272	3,508	3,395	204	7,108	0	-4,836	102,127	1558.13
	June	15,200	123	15,077	2,940	5,813	326	9,079	1,163	4,836	106,962	1559.00
	July	900	128	772	3,010	33,554	1,881	38,445	0	-37,673	69,290	1551.04
	Aug	56,900	80	56,820	2,225	37,057	2,077	41,359	0	15,461	84,751	1554.63
	Sept	1,200	102	1,098	1,765	5,563	312	7,639	0	-6,541	78,210	1553.16
	Oct	19,100	93	19,007	1,234	0	0	1,234	0	17,773	95,983	1556.97
	Nov	11,900	116	11,784	1,058	0	0	1,058	0	10,727	106,709	1558.95
	Dec	9,400	128	9,272	702	0	0	702	8,317	253	106,962	1559.00
1928	Jan	6,600	128	6,472	1,003	0	0	1,003	5,469	0	106,962	1559.00
	Feb	6,800	128	6,672	964	0	0	964	5,708	0	106,962	1559.00
	March	7,100	128	6,972	2,200	0	0	2,200	4,772	0	106,962	1559.00
	April	4,700	128	4,572	2,848	0	0	2,848	1,724	0	106,962	1559.00
	May	58,700	128	58,572	3,168	3,644	204	7,017	51,555	0	106,962	1559.00
	June	11,600	128	11,472	3,243	5,813	326	9,382	2,090	0	106,962	1559.00
	July	32,700	128	32,572	2,979	33,554	1,881	38,413	0	-5,841	101,121	1557.94
	Aug	2,800	122	2,678	2,506	37,057	2,077	41,640	0	-38,961	62,160	1549.25
	Sept	9,800	70	9,731	1,789	5,563	312	7,663	0	2,067	64,227	1549.78
	Oct	3,500	73	3,427	1,369	0	0	1,369	0	2,058	66,285	1550.30
	Nov	59,700	76	59,624	652	0	0	652	18,295	40,677	106,962	1559.00
	Dec	10,500	128	10,372	628	0	0	628	9,744	0	106,962	1559.00

Table 19. Continued…

		In			Out							
Year	Month	Otter Creek Watershed Streamflow (acre-ft)	Diverted Flow thru Bretch Canal (acre-ft)	**TOTAL IN (acre-ft)**	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Senior Rights (acre-ft)	**Demand (acre-ft)**	**TOTAL OUT (acre-ft)**	*Spilled (acre-ft)*	**Change in Storage (acre-ft)**	**Volume Stored** (acre-ft)	**Water Surface Elevation** (ft)
1929	Jan	9,200	128	9,072	612	0	0	612	8,460	0	106,962	1559.00
	Feb	8,400	128	8,272	478	0	0	478	7,794	0	106,962	1559.00
	March	5,700	128	5,572	2,003	0	0	2,003	3,569	0	106,962	1559.00
	April	25,000	128	24,872	2,935	0	0	2,935	21,937	0	106,962	1559.00
	May	24,800	128	24,672	2,109	3,644	204	5,958	18,714	0	106,962	1559.00
	June	9,800	128	9,672	3,148	5,813	326	9,287	385	0	106,962	1559.00
	July	5,000	128	4,872	3,188	33,554	1,881	38,622	0	-33,750	73,212	1551.99
	Aug	26,400	86	26,314	2,876	37,057	2,077	42,009	0	-15,695	57,517	1548.03
	Sept	25,700	62	25,638	1,527	5,563	312	7,401	0	18,236	75,753	1552.59
	Oct	1,200	90	1,110	1,091	0	0	1,091	0	20	75,773	1552.59
	Nov	6,100	90	6,010	618	0	0	618	0	5,392	81,165	1553.83
	Dec	2,600	97	2,503	814	0	0	814	0	1,689	82,853	1554.21
1930	Jan	1,100	99	1,001	736	0	0	736	0	265	83,118	1554.27
	Feb	7,700	100	7,600	1,054	0	0	1,054	0	6,547	89,665	1555.68
	Mar	3,800	108	3,692	1,976	0	0	1,976	0	1,716	91,380	1556.04
	Apr	4,600	110	4,490	2,654	0	0	2,654	0	1,836	93,217	1556.42
	May	61,500	113	61,387	2,630	3,644	204	6,478	41,163	13,746	106,962	1559.00
	Jun	17,600	128	17,472	3,421	5,813	326	9,560	7,912	0	106,962	1559.00
	Jul	400	128	272	4,290	33,554	1,881	39,725	0	-39,453	67,510	1550.60
	Aug	0	78	-78	3,224	37,057	2,077	42,358	0	-42,435	25,074	1537.79
	Sep	0	1	-1	1,550	5,563	312	7,425	0	-7,426	17,649	1534.63
	Oct	22,500	0	22,500	478	0	0	478	0	22,022	39,670	1542.91
	Nov	3,200	31	3,169	621	0	0	621	0	2,548	42,218	1543.70
	Dec	3,900	36	3,864	309	0	0	309	0	3,555	45,774	1544.75
1931	Jan	6,000	43	5,958	387	0	0	387	0	5,571	51,344	1546.33
	Feb	5,200	52	5,148	559	0	0	559	0	4,589	55,933	1547.60
	March	7,500	60	7,440	943	0	0	943	0	6,498	62,431	1549.32
	April	7,200	70	7,130	1,312	0	0	1,312	0	5,818	68,249	1550.79
	May	8,800	79	8,721	1,999	2,022	204	4,225	0	4,496	72,744	1551.88
	June	1,200	85	1,115	3,020	2,939	326	6,285	0	-5,170	67,574	1550.62
	July	0	78	-78	2,593	16,965	1,881	21,439	0	-21,517	46,058	1544.83
	Aug	0	43	-43	1,839	18,736	2,077	22,652	0	-22,695	23,363	1537.11
	Sept	0	0	0	1,720	2,813	312	4,845	0	-4,845	18,518	1535.02
	Oct	0	0	0	828	0	0	828	0	-828	17,690	1534.65
	Nov	2,400	0	2,400	402	0	0	402	0	1,998	19,688	1535.54
	Dec	4,600	0	4,600	277	0	0	277	0	4,323	24,011	1537.37
1932	Jan	5,600	0	5,600	315	0	0	315	0	5,285	29,296	1539.41
	Feb	3,400	10	3,390	451	0	0	451	0	2,939	32,235	1540.46
	March	1,100	17	1,083	1,071	0	0	1,071	0	12	32,247	1540.47
	April	4,500	17	4,483	1,437	0	0	1,437	0	3,046	35,293	1541.50
	May	2,700	23	2,677	1,420	363	204	1,987	0	690	35,983	1541.73
	June	28,700	24	28,676	1,639	578	326	2,543	0	26,133	62,116	1549.24
	July	7,500	69	7,431	2,370	3,338	1,881	7,589	0	-159	61,957	1549.20
	Aug	3,500	69	3,431	2,740	3,687	2,077	8,504	0	-5,073	56,883	1547.86
	Sept	0	61	-61	1,388	553	312	2,253	0	-2,315	54,569	1547.22
	Oct	9,400	57	9,343	1,399	0	0	1,399	0	7,944	62,513	1549.34
	Nov	3,000	70	2,930	959	0	0	959	0	1,971	64,484	1549.85
	Dec	25,700	73	25,627	351	0	0	351	0	25,276	89,760	1555.70
1933	Jan	3,100	108	2,992	870	0	0	870	0	2,121	91,881	1556.14
	Feb	2,800	111	2,689	763	0	0	763	0	1,927	93,808	1556.53
	March	5,600	113	5,487	1,775	0	0	1,775	0	3,712	97,519	1557.26
	April	4,200	118	4,082	2,723	0	0	2,723	0	1,359	98,879	1557.52
	May	5,500	119	5,381	2,582	3,184	204	5,970	0	-589	98,290	1557.41
	June	1,600	118	1,482	3,724	4,673	326	8,723	0	-7,241	91,049	1555.97
	July	8,600	110	8,490	3,327	24,137	1,881	29,345	0	-20,855	70,194	1551.26
	Aug	300	82	218	2,398	17,632	2,077	22,107	0	-21,888	48,306	1545.48
	Sept	10,700	47	10,653	1,329	2,647	312	4,288	0	6,365	54,671	1547.25
	Oct	16,000	58	15,943	1,147	0	0	1,147	0	14,795	69,466	1551.08
	Nov	6,600	80	6,520	563	0	0	563	0	5,956	75,422	1552.51
	Dec	400	89	311	531	0	0	531	0	-220	75,202	1552.46

Table 19. Continued…

Year	Month	In			Out					Change in Storage (acre-ft)	Volume Stored (acre-ft)	Water Surface Elevation (ft)
		Otter Creek Watershed Streamflow (acre-ft)	Diverted Flow thru Bretch Canal (acre-ft)	TOTAL IN (acre-ft)	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Senior Rights (acre-ft)	Demand (acre-ft)	TOTAL OUT (acre-ft)	*Spilled (acre-ft)*			
1934	Jan	200	89	111	745	0	0	745	0	-633	74,569	1552.31
	Feb	0	88	-88	932	0	0	932	0	-1,020	73,548	1552.07
	March	400	86	314	1,547	0	0	1,547	0	-1,233	72,315	1551.77
	April	1,600	85	1,515	1,804	0	0	1,804	0	-289	72,027	1551.70
	May	10,600	84	10,516	1,924	2,259	204	4,387	0	6,128	78,155	1553.14
	June	7,700	93	7,607	2,949	3,306	326	6,581	0	1,026	79,181	1553.38
	July	0	94	-94	3,846	19,487	1,881	25,214	0	-25,308	53,873	1547.02
	Aug	3,600	56	3,544	3,477	21,521	2,077	27,075	0	-23,532	30,341	1539.79
	Sept	3,300	13	3,287	1,599	3,231	312	5,141	0	-1,854	28,487	1539.11
	Oct	2,200	9	2,191	1,247	0	0	1,247	0	945	29,432	1539.46
	Nov	0	11	-11	727	0	0	727	0	-737	28,694	1539.18
	Dec	0	9	-9	564	0	0	564	0	-573	28,121	1538.97
1935	Jan	0	8	-8	570	0	0	570	0	-578	27,544	1538.75
	Feb	0	7	-7	711	0	0	711	0	-718	26,826	1538.48
	Mar	4,400	5	4,395	1,385	0	0	1,385	0	3,011	29,836	1539.61
	Apr	600	12	588	1,793	0	0	1,793	0	-1,205	28,632	1539.16
	May	24,500	9	24,491	1,339	1,007	204	2,551	0	21,940	50,572	1546.12
	Jun	11,900	51	11,849	2,491	1,607	326	4,424	0	7,425	57,997	1548.16
	Jul	11,500	63	11,437	3,390	9,276	1,881	14,547	0	-3,110	54,887	1547.31
	Aug	0	58	-58	3,328	10,244	2,077	15,650	0	-15,708	39,179	1542.76
	Sep	11,800	31	11,769	1,203	1,538	312	3,053	0	8,716	47,896	1545.36
	Oct	300	46	254	1,223	0	0	1,223	0	-969	46,926	1545.08
	Nov	1,400	44	1,356	562	0	0	562	0	794	47,720	1545.31
	Dec	8,400	46	8,354	480	0	0	480	0	7,874	55,594	1547.50
1936	Jan	1,700	59	1,641	743	0	0	743	0	898	56,491	1547.75
	Feb	0	61	-61	856	0	0	856	0	-917	55,575	1547.50
	March	0	59	-59	2,259	0	0	2,259	0	-2,318	53,257	1546.85
	April	2,800	55	2,745	2,168	0	0	2,168	0	577	53,834	1547.01
	May	9,400	56	9,344	2,253	1,435	204	3,892	0	5,452	59,286	1548.50
	June	28,100	65	28,035	3,568	2,290	326	6,184	0	21,851	81,137	1553.82
	July	0	97	-97	4,089	20,253	1,881	26,223	0	-26,320	54,817	1547.29
	Aug	0	58	-58	3,718	22,368	2,077	28,163	0	-28,220	26,597	1538.39
	Sept	54,600	4	54,596	1,193	3,358	312	4,863	0	49,733	76,330	1552.72
	Oct	14,900	90	14,810	1,403	0	0	1,403	0	13,407	89,737	1555.70
	Nov	6,000	108	5,892	1,376	0	0	1,376	0	4,516	94,253	1556.62
	Dec	5,000	114	4,886	796	0	0	796	0	4,090	98,343	1557.42
1937	Jan	3,100	119	2,981	706	0	0	706	0	2,276	100,619	1557.85
	Feb	2,800	121	2,679	1,521	0	0	1,521	0	1,158	101,777	1558.07
	March	3,300	122	3,178	1,766	0	0	1,766	0	1,412	103,189	1558.32
	April	6,200	124	6,076	2,887	0	0	2,887	0	3,190	106,378	1558.89
	May	12,800	127	12,673	3,761	3,644	204	7,609	4,479	584	106,962	1559.00
	June	60,800	128	60,672	3,642	5,813	326	9,781	50,891	0	106,962	1559.00
	July	1,300	128	1,172	4,519	33,554	1,881	39,954	0	-38,782	68,181	1550.77
	Aug	23,500	79	23,421	3,005	37,057	2,077	42,139	0	-18,717	49,463	1545.81
	Sept	10,800	49	10,751	1,845	5,563	312	7,720	0	3,031	52,494	1546.65
	Oct	240	54	187	1,343	0	0	1,343	0	-1,157	51,338	1546.33
	Nov	120	52	68	979	0	0	979	0	-911	50,427	1546.08
	Dec	311	50	260	451	0	0	451	0	-191	50,236	1546.02
1938	Jan	405	50	355	883	0	0	883	0	-529	49,707	1545.87
	Feb	1,212	49	1,163	640	0	0	640	0	523	50,230	1546.02
	March	1,961	50	1,911	1,729	0	0	1,729	0	182	50,412	1546.07
	April	10,722	50	10,672	1,450	0	0	1,450	0	9,221	59,633	1548.59
	May	30,062	66	29,997	2,554	2,561	204	5,319	0	24,678	84,311	1554.53
	June	16,283	101	16,182	3,140	3,724	326	7,190	0	8,992	93,304	1556.43
	July	1,374	113	1,262	3,400	25,021	1,881	30,301	0	-29,040	64,264	1549.79
	Aug	50	73	-22	3,621	27,633	2,077	33,331	0	-33,353	30,911	1540.00
	Sept	8	14	-6	3,939	4,148	312	8,399	0	-8,405	22,506	1536.75
	Oct	0	0	0	1,334	0	0	1,334	0	-1,334	21,172	1536.19
	Nov	471	0	471	857	0	0	857	0	-386	20,786	1536.02
	Dec	0	0	0	704	0	0	704	0	-704	20,082	1535.72

Table 19. Continued…

Year	Month	In			Out					Change in Storage (acre-ft)	Volume Stored (acre-ft)	Water Surface Elevation (ft)
		Otter Creek Watershed Streamflow (acre-ft)	Diverted Flow thru Bretch Canal (acre-ft)	TOTAL IN (acre-ft)	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Senior Rights (acre-ft)	Demand (acre-ft)	TOTAL OUT (acre-ft)	*Spilled (acre-ft)*			
1939	Jan	6,429	0	6,429	572	0	0	572	0	5,857	25,939	1538.13
	Feb	873	3	870	723	0	0	723	0	147	26,086	1538.19
	March	1,793	3	1,790	1,183	0	0	1,183	0	607	26,693	1538.43
	April	5,376	5	5,371	1,516	0	0	1,516	0	3,856	30,548	1539.87
	May	10,747	13	10,734	1,787	504	204	2,495	0	8,239	38,787	1542.64
	June	35,738	30	35,708	2,387	803	326	3,516	0	32,193	70,980	1551.45
	July	6,656	83	6,573	3,941	16,273	1,881	22,095	0	-15,522	55,458	1547.47
	Aug	2,651	59	2,592	2,537	17,972	2,077	22,586	0	-19,994	35,465	1541.56
	Sept	0	23	-23	2,519	2,698	312	5,529	0	-5,552	29,912	1539.63
	Oct	9	12	-3	1,457	0	0	1,457	0	-1,460	28,452	1539.09
	Nov	0	9	-9	756	0	0	756	0	-764	27,688	1538.81
	Dec	0	7	-7	700	0	0	700	0	-707	26,981	1538.54
1940	Jan	0	5	-5	442	0	0	442	0	-447	26,534	1538.37
	Feb	140	4	136	626	0	0	626	0	-490	26,044	1538.18
	Mar	1	3	-2	1,560	0	0	1,560	0	-1,562	24,483	1537.56
	Apr	2,169	0	2,169	1,344	0	0	1,344	0	825	25,308	1537.89
	May	97	1	96	1,847	0	10,000	11,847	0	-11,751	13,557	1532.67
	Jun	70	0	70	1,522	0	0	1,522	0	-1,453	12,104	1531.92
	Jul	1,976	0	1,976	2,102	0	0	2,102	0	-126	11,978	1531.85
	Aug	155	0	155	1,551	0	0	1,551	0	-1,395	10,583	1531.09
	Sep	0	0	0	1,184	0	0	1,184	0	-1,184	9,399	1530.42
	Oct	0	0	0	886	0	0	886	0	-886	8,513	1529.90
	Nov	2,285	0	2,285	344	0	0	344	0	1,941	10,454	1531.02
	Dec	95	0	95	270	0	0	270	0	-175	10,279	1530.92
1941	Jan	746	0	746	304	0	0	304	0	442	10,721	1531.17
	Feb	2,327	0	2,327	323	0	0	323	0	2,004	12,725	1532.24
	March	2,895	0	2,895	578	0	0	578	0	2,317	15,042	1533.40
	April	16,236	0	16,236	890	0	0	890	0	15,346	30,388	1539.81
	May	85,078	13	85,065	1,428	3,644	204	5,276	3,215	76,575	106,962	1559.00
	June	77,333	128	77,205	2,971	5,813	326	9,109	68,096	0	106,962	1559.00
	July	9,844	128	9,716	3,559	33,554	1,881	38,994	0	-29,277	77,685	1553.03
	Aug	16,370	92	16,278	2,844	37,057	2,077	41,978	0	-25,700	51,985	1546.51
	Sept	4,656	53	4,603	1,781	5,563	312	7,656	0	-3,053	48,932	1545.66
	Oct	49,419	48	49,371	752	0	0	752	0	48,619	97,551	1557.27
	Nov	11,403	118	11,285	943	0	0	943	931	9,411	106,962	1559.00
	Dec	11,441	128	11,313	735	0	0	735	10,578	0	106,962	1559.00
1942	Jan	7,497	128	7,369	980	0	0	980	6,389	0	106,962	1559.00
	Feb	7,006	128	6,878	1,477	0	0	1,477	5,400	0	106,962	1559.00
	March	9,544	128	9,416	2,331	0	0	2,331	7,085	0	106,962	1559.00
	April	61,701	128	61,573	2,023	0	0	2,023	59,551	0	106,962	1559.00
	May	14,072	128	13,944	3,425	3,644	204	7,273	6,670	0	106,962	1559.00
	June	70,965	128	70,837	3,757	5,813	326	9,895	60,941	0	106,962	1559.00
	July	4,624	128	4,496	4,215	33,554	1,881	39,649	0	-35,154	71,809	1551.65
	Aug	6,304	84	6,220	2,935	37,057	2,077	42,069	0	-35,849	35,960	1541.73
	Sept	5,313	24	5,289	1,666	5,563	312	7,541	0	-2,252	33,708	1540.97
	Oct	44,276	20	44,256	933	0	0	933	0	43,323	77,030	1552.88
	Nov	10,019	91	9,927	1,142	0	0	1,142	0	8,785	85,816	1554.86
	Dec	16,976	103	16,873	468	0	0	468	0	16,405	102,221	1558.15
1943	Jan	13,356	123	13,233	1,014	0	0	1,014	7,478	4,741	106,962	1559.00
	Feb	7,132	128	7,004	1,758	0	0	1,758	5,246	0	106,962	1559.00
	March	6,371	128	6,243	1,845	0	0	1,845	4,398	0	106,962	1559.00
	April	6,521	128	6,393	2,710	0	0	2,710	3,683	0	106,962	1559.00
	May	11,742	128	11,614	2,106	3,644	204	5,954	5,660	0	106,962	1559.00
	June	1,758	128	1,630	3,615	5,813	326	9,753	0	-8,123	98,839	1557.52
	July	641	119	522	3,751	33,554	1,881	39,186	0	-38,664	60,175	1548.74
	Aug	0	66	-66	3,889	37,057	2,077	43,022	0	-43,089	17,086	1534.37
	Sept	0	0	0	1,440	0	312	1,751	0	-1,751	15,335	1533.54
	Oct	335	0	335	962	0	0	962	0	-627	14,707	1533.24
	Nov	0	0	0	633	0	0	633	0	-633	14,074	1532.93
	Dec	2,091	0	2,091	207	0	0	207	0	1,885	15,959	1533.84

Table 19. Continued…

Year	Month	In			Out					Change in Storage (acre-ft)	Volume Stored (acre-ft)	Water Surface Elevation (ft)
		Otter Creek Watershed Streamflow (acre-ft)	Diverted Flow thru Bretch Canal (acre-ft)	TOTAL IN (acre-ft)	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Senior Rights (acre-ft)	Demand (acre-ft)	TOTAL OUT (acre-ft)	*Spilled (acre-ft)*			
1944	Jan	7,955	0	7,955	144	0	0	144	0	7,812	23,771	1537.27
	Feb	4,870	0	4,870	414	0	0	414	0	4,456	28,227	1539.01
	March	8,512	8	8,504	879	0	0	879	0	7,625	35,851	1541.69
	April	4,305	24	4,281	1,671	0	0	1,671	0	2,610	38,461	1542.53
	May	6,024	29	5,995	1,695	639	204	2,538	0	3,457	41,918	1543.60
	June	30,663	36	30,628	2,126	1,019	326	3,470	0	27,158	69,076	1550.99
	July	13,904	80	13,824	2,686	5,880	1,881	10,447	0	3,378	72,453	1551.81
	Aug	2,708	85	2,623	2,785	18,610	2,077	23,472	0	-20,849	51,605	1546.40
	Sept	3,406	52	3,354	1,528	2,794	312	4,634	0	-1,279	50,325	1546.05
	Oct	3,860	50	3,810	1,038	0	0	1,038	0	2,772	53,097	1546.81
	Nov	4,409	55	4,355	806	0	0	806	0	3,549	56,646	1547.79
	Dec	10,823	61	10,763	442	0	0	442	0	10,321	66,967	1550.47
1945	Jan	7,676	77	7,599	595	0	0	595	0	7,005	73,971	1552.17
	Feb	8,385	87	8,298	651	0	0	651	0	7,647	81,618	1553.93
	Mar	11,320	98	11,223	1,366	0	0	1,366	0	9,856	91,474	1556.06
	Apr	11,034	110	10,924	1,790	0	0	1,790	0	9,134	100,608	1557.85
	May	1,184	121	1,063	3,264	3,074	204	6,542	0	-5,479	95,129	1556.80
	Jun	10,092	115	9,977	3,482	4,458	326	8,267	0	1,710	96,839	1557.13
	Jul	3,075	117	2,958	2,963	26,406	1,881	31,250	0	-28,292	68,547	1550.86
	Aug	3,519	79	3,440	2,705	29,163	2,077	33,945	0	-30,504	38,042	1542.40
	Sep	0	28	-28	1,601	4,378	312	6,290	0	-6,319	31,724	1540.29
	Oct	0	16	-16	674	0	0	674	0	-690	31,034	1540.04
	Nov	0	14	-14	652	0	0	652	0	-666	30,368	1539.80
	Dec	243	13	230	476	0	0	476	0	-246	30,122	1539.71
1946	Jan	2,565	12	2,553	434	0	0	434	0	2,119	32,241	1540.47
	Feb	4,362	17	4,345	680	0	0	680	0	3,665	35,905	1541.71
	March	3,142	24	3,117	1,305	0	0	1,305	0	1,813	37,718	1542.30
	April	762	28	735	1,805	0	0	1,805	0	-1,070	36,647	1541.95
	May	3,083	26	3,057	1,835	436	204	2,476	0	581	37,228	1542.14
	June	1,531	27	1,504	1,785	696	326	2,807	0	-1,303	35,925	1541.71
	July	2	24	-22	2,500	4,018	1,881	8,399	0	-8,421	27,504	1538.74
	Aug	107	6	100	2,219	4,438	2,077	8,734	0	-8,633	18,870	1535.18
	Sept	0	0	0	930	666	312	1,908	0	-1,908	16,962	1534.31
	Oct	30,890	0	30,890	789	0	0	789	0	30,100	47,063	1545.12
	Nov	6,164	45	6,119	734	0	0	734	0	5,386	52,448	1546.63
	Dec	4,702	54	4,648	672	0	0	672	0	3,975	56,424	1547.73
1947	Jan	4,231	60	4,171	515	0	0	515	0	3,656	60,079	1548.71
	Feb	1,078	66	1,011	1,063	0	0	1,063	0	-52	60,028	1548.70
	March	4,745	66	4,679	1,131	0	0	1,131	0	3,548	63,576	1549.62
	April	21,244	72	21,172	1,362	0	0	1,362	0	19,810	83,387	1554.33
	May	69,338	100	69,238	2,118	3,644	204	5,966	39,696	23,576	106,962	1559.00
	June	32,769	128	32,641	4,108	5,813	326	10,247	22,394	0	106,962	1559.00
	July	3,840	128	3,712	4,298	33,554	1,881	39,732	0	-36,021	70,942	1551.44
	Aug	167	83	84	3,442	37,057	2,077	42,576	0	-42,492	28,450	1539.09
	Sept	-1,226	9	-1,234	1,934	5,563	312	7,809	0	-9,043	19,407	1535.42
	Oct	145	0	145	1,016	0	0	1,016	0	-870	18,536	1535.03
	Nov	-398	0	-398	504	0	0	504	0	-901	17,635	1534.62
	Dec	243	0	243	350	0	0	350	0	-107	17,528	1534.57
1948	Jan	481	0	481	649	0	0	649	0	-168	17,360	1534.50
	Feb	7,203	0	7,203	327	0	0	327	0	6,876	24,236	1537.46
	March	13,484	0	13,484	1,117	0	0	1,117	0	12,367	36,603	1541.94
	April	1,810	26	1,784	2,806	0	0	2,806	0	-1,022	35,581	1541.60
	May	8,209	24	8,185	2,697	609	204	3,510	0	4,675	40,256	1543.10
	June	11,153	33	11,121	2,974	972	326	4,272	0	6,849	47,105	1545.13
	July	1,990	45	1,946	3,245	5,610	1,881	10,735	0	-8,790	38,315	1542.49
	Aug	9,779	29	9,750	2,898	6,195	2,077	11,170	0	-1,421	36,894	1542.03
	Sept	-27	26	-53	2,581	930	312	3,823	0	-3,876	33,018	1540.74
	Oct	39	18	21	1,769	0	0	1,769	0	-1,749	31,269	1540.12
	Nov	6,262	15	6,247	1,206	0	0	1,206	0	5,041	36,311	1541.84
	Dec	856	25	831	1,020	0	0	1,020	0	-189	36,121	1541.78

Table 19. Continued…

Year	Month	In			Out					Change in Storage (acre-ft)	Volume Stored (acre-ft)	Water Surface Elevation (ft)
		Otter Creek Watershed Streamflow (acre-ft)	Diverted Flow thru Bretch Canal (acre-ft)	**TOTAL IN (acre-ft)**	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Senior Rights (acre-ft)	**Demand (acre-ft)**	**TOTAL OUT (acre-ft)**	*Spilled (acre-ft)*			
1949	Jan	5,261	25	5,236	423	0	0	423	0	4,813	40,935	1543.30
	Feb	19,722	34	19,688	494	0	0	494	0	19,194	60,129	1548.73
	March	9,443	66	9,376	1,488	0	0	1,488	0	7,889	68,018	1550.73
	April	7,540	78	7,462	1,993	0	0	1,993	0	5,469	73,487	1552.05
	May	65,506	86	65,420	2,687	3,644	204	6,536	25,409	33,475	106,962	1559.00
	June	29,831	128	29,703	4,337	5,813	326	10,476	19,227	0	106,962	1559.00
	July	4,976	128	4,848	5,013	33,554	1,881	40,447	0	-35,599	71,363	1551.54
	Aug	1,293	83	1,210	3,564	37,057	2,077	42,698	0	-41,488	29,875	1539.62
	Sept	4,510	12	4,498	1,496	5,563	312	7,370	0	-2,872	27,003	1538.55
	Oct	1,744	5	1,739	1,235	0	0	1,235	0	504	27,507	1538.74
	Nov	-169	6	-176	1,023	0	0	1,023	0	-1,199	26,308	1538.28
	Dec	1,830	4	1,826	669	0	0	669	0	1,157	27,464	1538.72
1950	Jan	2,842	6	2,836	482	0	0	482	0	2,353	29,818	1539.60
	Feb	4,198	12	4,187	700	0	0	700	0	3,486	33,304	1540.83
	Mar	1,266	19	1,247	1,475	0	0	1,475	0	-228	33,076	1540.76
	Apr	2,539	19	2,520	1,796	0	0	1,796	0	724	33,801	1541.00
	May	43,471	20	43,451	1,811	2,034	204	4,049	0	39,402	73,203	1551.98
	Jun	15,103	86	15,017	3,708	2,970	326	7,004	0	8,013	81,216	1553.84
	Jul	51,038	97	50,941	2,744	20,284	1,881	24,909	286	25,746	106,962	1559.00
	Aug	23,576	128	23,448	3,796	37,057	2,077	42,930	0	-19,482	87,480	1555.22
	Sep	17,240	105	17,134	2,167	5,563	312	8,041	0	9,093	96,573	1557.08
	Oct	7,024	116	6,908	2,810	0	0	2,810	0	4,098	100,671	1557.86
	Nov	1,403	121	1,282	1,854	0	0	1,854	0	-572	100,099	1557.75
	Dec	3,728	121	3,607	1,014	0	0	1,014	0	2,593	102,692	1558.23
1951	Jan	1,861	123	1,738	1,375	0	0	1,375	0	363	103,055	1558.30
	Feb	7,878	124	7,754	1,351	0	0	1,351	2,495	3,907	106,962	1559.00
	March	5,290	128	5,162	2,627	0	0	2,627	2,535	0	106,962	1559.00
	April	5,604	128	5,476	3,299	0	0	3,299	2,178	0	106,962	1559.00
	May	100,667	128	100,539	3,812	3,644	204	7,661	92,879	0	106,962	1559.00
	June	77,973	128	77,845	4,053	5,813	326	10,192	67,653	0	106,962	1559.00
	July	7,007	128	6,879	4,713	33,554	1,881	40,147	0	-33,268	73,694	1552.10
	Aug	6,656	87	6,570	3,932	37,057	2,077	43,065	0	-36,496	37,199	1542.13
	Sept	519	27	492	2,046	5,563	312	7,920	0	-7,428	29,770	1539.58
	Oct	760	11	748	1,378	0	0	1,378	0	-630	29,141	1539.35
	Nov	104	10	94	711	0	0	711	0	-617	28,523	1539.12
	Dec	1,188	9	1,179	868	0	0	868	0	312	28,835	1539.24
1952	Jan	4,075	9	4,066	687	0	0	687	0	3,378	32,213	1540.46
	Feb	3,015	17	2,998	836	0	0	836	0	2,162	34,375	1541.20
	March	4,104	21	4,082	1,288	0	0	1,288	0	2,794	37,169	1542.12
	April	11,372	27	11,345	1,766	0	0	1,766	0	9,579	46,749	1545.03
	May	4,166	44	4,122	2,435	912	204	3,551	0	571	47,320	1545.20
	June	2,322	45	2,277	3,533	1,454	326	5,313	0	-3,036	44,284	1544.31
	July	2,201	40	2,161	2,983	8,394	1,881	13,258	0	-11,096	33,187	1540.79
	Aug	2,226	19	2,207	3,050	9,270	2,077	14,397	0	-12,190	20,998	1536.11
	Sept	-8	0	-8	1,865	1,392	312	3,569	0	-3,577	17,420	1534.52
	Oct	-1	0	-1	1,301	0	0	1,301	0	-1,302	16,119	1533.92
	Nov	216	0	216	751	0	0	751	0	-536	15,583	1533.66
	Dec	480	0	480	390	0	0	390	0	90	15,673	1533.71
1953	Jan	-57	0	-57	620	0	0	620	0	-677	14,996	1533.38
	Feb	79	0	79	710	0	0	710	0	-631	14,365	1533.07
	March	610	0	610	1,185	0	0	1,185	0	-575	13,790	1532.78
	April	1,492	0	1,492	1,464	0	0	1,464	0	28	13,818	1532.80
	May	115	0	115	1,852	0	10,000	11,852	0	-11,737	2,081	1525.55
	June	3,360	0	3,360	1,984	0	0	1,984	0	1,376	3,457	1526.58
	July	6,654	0	6,654	1,505	0	0	1,505	0	5,150	8,607	1529.96
	Aug	3,489	0	3,489	1,592	0	0	1,592	0	1,897	10,503	1531.05
	Sept	693	0	693	1,878	0	0	1,878	0	-1,186	9,317	1530.37
	Oct	8,098	0	8,098	1,046	0	0	1,046	0	7,052	16,370	1534.04
	Nov	663	0	663	624	0	0	624	0	38	16,408	1534.05
	Dec	288	0	288	457	0	0	457	0	-169	16,239	1533.97

Table 19. Continued…

Year	Month	In			Out					Change in Storage (acre-ft)	Volume Stored (acre-ft)	Water Surface Elevation (ft)
		Otter Creek Watershed Streamflow (acre-ft)	Diverted Flow thru Bretch Canal (acre-ft)	TOTAL IN (acre-ft)	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Senior Rights (acre-ft)	Demand (acre-ft)	TOTAL OUT (acre-ft)	*Spilled (acre-ft)*			
1954	Jan	306	0	306	515	0	0	515	0	-209	16,030	1533.88
	Feb	6,383	0	6,383	1,100	0	0	1,100	0	5,283	21,313	1536.25
	March	-142	0	-142	1,233	0	0	1,233	0	-1,375	19,938	1535.65
	April	2,389	0	2,389	1,638	0	0	1,638	0	751	20,689	1535.98
	May	68,619	0	68,619	1,303	2,547	204	4,055	0	64,564	85,253	1554.74
	June	1,701	102	1,599	4,520	3,788	326	8,634	0	-7,035	78,218	1553.16
	July	5,354	93	5,261	5,871	19,109	1,881	26,861	0	-21,600	56,618	1547.78
	Aug	492	61	432	4,568	21,104	2,077	27,750	0	-27,318	29,300	1539.41
	Sept	1,771	10	1,761	2,868	3,168	312	6,348	0	-4,587	24,713	1537.65
	Oct	149	0	149	1,449	0	0	1,449	0	-1,299	23,414	1537.13
	Nov	201	0	201	1,013	0	0	1,013	0	-812	22,601	1536.79
	Dec	1,017	0	1,017	768	0	0	768	0	249	22,850	1536.89
1955	Jan	339	0	339	323	0	0	323	0	16	22,866	1536.90
	Feb	245	0	245	652	0	0	652	0	-407	22,459	1536.73
	Mar	207	0	207	1,379	0	0	1,379	0	-1,172	21,287	1536.24
	Apr	403	0	403	1,934	0	0	1,934	0	-1,531	19,756	1535.57
	May	30,416	0	30,416	1,888	882	204	2,974	0	27,442	47,198	1545.16
	Jun	19,595	45	19,550	2,373	1,407	326	4,106	0	15,444	62,642	1549.38
	Jul	3,102	70	3,032	3,765	8,120	1,881	13,766	0	-10,734	51,907	1546.49
	Aug	2,805	53	2,752	3,073	8,967	2,077	14,118	0	-11,366	40,542	1543.18
	Sep	639	33	606	1,888	1,346	312	3,546	0	-2,940	37,602	1542.26
	Oct	17,329	28	17,301	1,741	0	0	1,741	0	15,561	53,162	1546.83
	Nov	-539	55	-594	1,525	0	0	1,525	0	-2,119	51,044	1546.25
	Dec	65	52	14	811	0	0	811	0	-798	50,246	1546.03
1956	Jan	167	50	117	1,059	0	0	1,059	0	-942	49,304	1545.76
	Feb	2,141	49	2,093	994	0	0	994	0	1,098	50,402	1546.07
	March	237	50	187	2,118	0	0	2,118	0	-1,932	48,470	1545.52
	April	220	47	173	2,471	0	0	2,471	0	-2,298	46,172	1544.86
	May	30,255	43	30,212	2,783	1,997	204	4,984	0	25,227	71,399	1551.55
	June	2,868	83	2,785	3,994	2,848	326	7,167	0	-4,382	67,017	1550.48
	July	2,739	77	2,662	3,900	16,438	1,881	22,218	0	-19,556	47,461	1545.24
	Aug	2,568	45	2,523	3,452	18,154	2,077	23,683	0	-21,160	26,301	1538.28
	Sept	-580	4	-584	2,492	2,725	312	5,529	0	-6,113	20,187	1535.76
	Oct	1,629	0	1,629	1,410	0	0	1,410	0	219	20,406	1535.86
	Nov	-171	0	-171	996	0	0	996	0	-1,166	19,240	1535.34
	Dec	8,009	0	8,009	926	0	0	926	0	7,083	26,322	1538.28
1957	Jan	160	4	156	726	0	0	726	0	-569	25,753	1538.06
	Feb	420	2	418	495	0	0	495	0	-78	25,675	1538.03
	March	863	2	861	927	0	0	927	0	-66	25,610	1538.01
	April	30,411	2	30,409	999	0	0	999	0	29,410	55,020	1547.34
	May	88,927	58	88,869	471	3,644	204	4,319	32,607	51,943	106,962	1559.00
	June	11,481	128	11,353	3,239	5,813	326	9,378	1,975	0	106,962	1559.00
	July	-460	128	-588	4,800	33,554	1,881	40,234	0	-40,822	66,140	1550.26
	Aug	3,922	76	3,847	3,585	37,057	2,077	42,718	0	-38,872	27,269	1538.65
	Sept	742	6	736	1,420	5,563	312	7,294	0	-6,558	20,710	1535.99
	Oct	1,181	0	1,181	1,012	0	0	1,012	0	169	20,879	1536.06
	Nov	623	0	623	764	0	0	764	0	-141	20,738	1536.00
	Dec	-46	0	-46	511	0	0	511	0	-557	20,181	1535.76
1958	Jan	1,615	0	1,615	455	0	0	455	0	1,160	21,342	1536.26
	Feb	2,143	0	2,143	327	0	0	327	0	1,816	23,158	1537.02
	March	5,738	0	5,738	520	0	0	520	0	5,218	28,375	1539.07
	April	5,220	8	5,211	1,342	0	0	1,342	0	3,870	32,245	1540.47
	May	10,711	17	10,695	1,968	574	204	2,746	0	7,949	40,194	1543.08
	June	17,184	32	17,152	2,876	916	326	4,117	0	13,034	53,228	1546.85
	July	23,643	55	23,588	3,133	5,286	1,881	10,299	0	13,288	66,516	1550.36
	Aug	2,840	76	2,764	3,260	5,838	2,077	11,175	0	-8,411	58,105	1548.19
	Sept	-811	63	-874	1,876	876	312	3,064	0	-3,938	54,167	1547.11
	Oct	-565	57	-621	1,720	0	0	1,720	0	-2,342	51,826	1546.46
	Nov	-790	53	-843	1,110	0	0	1,110	0	-1,953	49,872	1545.92
	Dec	19	50	-31	989	0	0	989	0	-1,020	48,853	1545.63

Table 19. Continued…

		In			Out							
Year	Month	Otter Creek Watershed Streamflow (acre-ft)	Diverted Flow thru Bretch Canal (acre-ft)	**TOTAL IN (acre-ft)**	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Senior Rights (acre-ft)	**Demand (acre-ft)**	**TOTAL OUT (acre-ft)**	*Spilled (acre-ft)*	**Change in Storage (acre-ft)**	**Volume Stored** (acre-ft)	**Water Surface Elevation** (ft)
1959	Jan	362	48	314	1,084	0	0	1,084	0	-770	48,083	1545.41
	Feb	1,441	46	1,394	1,158	0	0	1,158	0	237	48,320	1545.48
	March	4,028	47	3,982	2,204	0	0	2,204	0	1,777	50,097	1545.98
	April	3,961	50	3,911	2,493	0	0	2,493	0	1,418	51,515	1546.38
	May	68,653	52	68,600	2,597	3,644	204	6,445	6,708	55,447	106,962	1559.00
	June	18,092	128	17,964	3,844	5,813	326	9,982	7,982	0	106,962	1559.00
	July	9,910	128	9,782	3,994	33,554	1,881	39,428	0	-29,647	77,316	1552.95
	Aug	2,876	92	2,784	4,066	37,057	2,077	43,200	0	-40,416	36,900	1542.03
	Sept	4,243	26	4,217	2,091	5,563	312	7,965	0	-3,749	33,152	1540.78
	Oct	11,125	19	11,106	1,366	0	0	1,366	0	9,741	42,893	1543.90
	Nov	543	37	505	982	0	0	982	0	-477	42,416	1543.76
	Dec	22,189	37	22,152	655	0	0	655	0	21,497	63,913	1549.70
1960	Jan	16,933	72	16,861	628	0	0	628	0	16,233	80,146	1553.60
	Feb	24,177	96	24,082	1,111	0	0	1,111	0	22,971	103,117	1558.31
	Mar	17,406	124	17,283	2,318	0	0	2,318	11,119	3,845	106,962	1559.00
	Apr	6,432	128	6,304	2,995	0	0	2,995	3,309	0	106,962	1559.00
	May	7,104	128	6,976	3,607	3,596	204	7,407	0	-430	106,532	1558.92
	Jun	16,564	128	16,437	4,178	5,813	326	10,317	5,690	430	106,962	1559.00
	Jul	29,619	128	29,491	3,856	33,554	1,881	39,290	0	-9,799	97,163	1557.20
	Aug	7,100	117	6,983	3,978	37,057	2,077	43,112	0	-36,129	61,034	1548.96
	Sep	3,451	68	3,383	2,404	5,563	312	8,279	0	-4,895	56,139	1547.65
	Oct	51,015	60	50,955	1,754	0	0	1,754	0	49,201	105,339	1558.71
	Nov	7,099	126	6,972	1,587	0	0	1,587	3,762	1,623	106,962	1559.00
	Dec	12,750	128	12,622	1,072	0	0	1,072	11,550	0	106,962	1559.00
1961	Jan	7,646	128	7,518	1,643	0	0	1,643	5,875	0	106,962	1559.00
	Feb	19,443	128	19,315	1,022	0	0	1,022	18,293	0	106,962	1559.00
	March	10,107	128	9,979	2,364	0	0	2,364	7,615	0	106,962	1559.00
	April	10,429	128	10,301	3,539	0	0	3,539	6,762	0	106,962	1559.00
	May	12,738	128	12,610	4,713	3,644	204	8,561	4,049	0	106,962	1559.00
	June	57,503	128	57,375	3,342	5,813	326	9,481	47,894	0	106,962	1559.00
	July	11,037	128	10,909	4,231	33,554	1,881	39,665	0	-28,757	78,206	1553.15
	Aug	4,049	93	3,956	3,745	37,057	2,077	42,878	0	-38,923	39,283	1542.79
	Sept	2,888	31	2,857	1,893	5,563	312	7,768	0	-4,911	34,372	1541.20
	Oct	1,112	21	1,090	1,382	0	0	1,382	0	-292	34,080	1541.10
	Nov	10,436	21	10,415	908	0	0	908	0	9,507	43,587	1544.11
	Dec	5,696	39	5,657	662	0	0	662	0	4,995	48,582	1545.56
1962	Jan	6,015	47	5,968	1,028	0	0	1,028	0	4,940	53,522	1546.93
	Feb	4,424	56	4,368	1,321	0	0	1,321	0	3,047	56,569	1547.77
	March	3,193	61	3,133	2,365	0	0	2,365	0	768	57,337	1547.98
	April	20,132	62	20,070	1,908	0	0	1,908	0	18,163	75,500	1552.53
	May	9,902	89	9,813	3,687	2,377	204	6,269	0	3,544	79,044	1553.35
	June	59,899	94	59,805	2,681	3,367	326	6,373	25,513	27,919	106,962	1558.99
	July	6,140	128	6,012	4,245	33,554	1,881	39,680	0	-33,668	73,295	1552.01
	Aug	10,016	86	9,930	4,474	37,057	2,077	43,608	0	-33,678	39,617	1542.90
	Sept	21,707	31	21,676	1,899	5,563	312	7,773	0	13,902	53,519	1546.93
	Oct	6,728	56	6,673	1,707	0	0	1,707	0	4,965	58,484	1548.29
	Nov	4,683	64	4,620	1,182	0	0	1,182	0	3,437	61,922	1549.19
	Dec	8,301	69	8,232	874	0	0	874	0	7,358	69,279	1551.04
1963	Jan	2,924	80	2,844	912	0	0	912	0	1,932	71,212	1551.51
	Feb	11,017	83	10,934	1,379	0	0	1,379	0	9,555	80,767	1553.74
	March	8,735	96	8,638	2,656	0	0	2,656	0	5,983	86,750	1555.06
	April	3,974	104	3,869	2,872	0	0	2,872	0	998	87,747	1555.28
	May	6,436	106	6,330	3,532	2,750	204	6,487	0	-157	87,591	1555.24
	June	16,779	105	16,674	3,909	3,947	326	8,181	0	8,492	96,083	1556.99
	July	1,302	116	1,186	5,753	26,110	1,881	33,744	0	-32,558	63,525	1549.60
	Aug	1,706	72	1,634	3,516	28,836	2,077	34,428	0	-32,794	30,731	1539.93
	Sept	364	14	350	1,923	4,329	312	6,563	0	-6,213	24,518	1537.57
	Oct	33	0	33	1,227	0	0	1,227	0	-1,194	23,324	1537.09
	Nov	-48	0	-48	931	0	0	931	0	-979	22,344	1536.68
	Dec	53	0	53	568	0	0	568	0	-515	21,830	1536.47

Table 19. Continued…

Year	Month	In			Out					Change in Storage (acre-ft)	Volume Stored (acre-ft)	Water Surface Elevation (ft)
		Otter Creek Watershed Streamflow (acre-ft)	Diverted Flow thru Bretch Canal (acre-ft)	TOTAL IN (acre-ft)	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Senior Rights (acre-ft)	Demand (acre-ft)	TOTAL OUT (acre-ft)	*Spilled (acre-ft)*			
1964	Jan	750	0	750	666	0	0	666	0	84	21,914	1536.50
	Feb	9,696	0	9,696	579	0	0	579	0	9,117	31,031	1540.04
	March	2,613	14	2,599	1,505	0	0	1,505	0	1,094	32,124	1540.43
	April	1,663	17	1,647	2,420	0	0	2,420	0	-773	31,351	1540.15
	May	7,486	15	7,471	2,585	399	204	3,189	0	4,283	35,634	1541.62
	June	16,528	24	16,504	2,389	636	326	3,351	0	13,153	48,787	1545.61
	July	2,119	48	2,071	4,128	3,673	1,881	9,681	0	-7,610	41,177	1543.38
	Aug	2,171	34	2,137	3,359	4,056	2,077	9,492	0	-7,355	33,822	1541.01
	Sept	704	20	684	1,800	609	312	2,720	0	-2,037	31,785	1540.31
	Oct	6,317	16	6,302	1,347	0	0	1,347	0	4,955	36,740	1541.98
	Nov	3,496	26	3,470	931	0	0	931	0	2,539	39,279	1542.79
	Dec	3,519	31	3,489	638	0	0	638	0	2,850	42,129	1543.67
1965	Jan	3,287	36	3,251	667	0	0	667	0	2,583	44,713	1544.44
	Feb	2,948	41	2,907	772	0	0	772	0	2,135	46,848	1545.06
	Mar	4,133	44	4,089	947	0	0	947	0	3,142	49,990	1545.95
	Apr	3,495	50	3,445	2,163	0	0	2,163	0	1,282	51,272	1546.31
	May	2,824	52	2,772	2,791	1,047	204	4,042	0	-1,270	50,002	1545.96
	Jun	43,066	50	43,016	3,047	1,669	326	5,042	0	37,974	87,976	1555.33
	Jul	4,219	106	4,113	4,773	22,933	1,881	29,587	0	-25,474	62,502	1549.34
	Aug	1,999	70	1,929	3,340	25,327	2,077	30,744	0	-28,815	33,687	1540.96
	Sep	19,719	20	19,700	1,797	3,802	312	5,911	0	13,789	47,476	1545.24
	Oct	21,761	45	21,716	1,556	0	0	1,556	0	20,159	67,635	1550.63
	Nov	3,872	78	3,795	1,274	0	0	1,274	0	2,521	70,156	1551.25
	Dec	6,275	82	6,194	867	0	0	867	0	5,327	75,482	1552.52
1966	Jan	4,059	89	3,969	1,062	0	0	1,062	0	2,908	78,390	1553.20
	Feb	9,293	93	9,200	1,185	0	0	1,185	0	8,015	86,406	1554.99
	March	5,307	104	5,203	2,393	0	0	2,393	0	2,811	89,216	1555.59
	April	3,994	108	3,886	2,688	0	0	2,688	0	1,198	90,414	1555.84
	May	15,291	109	15,182	3,081	3,241	204	6,526	0	8,656	99,070	1557.56
	June	990	119	871	4,294	4,726	326	9,346	0	-8,475	90,595	1555.88
	July	1,397	109	1,288	4,488	23,959	1,881	30,328	0	-29,040	61,555	1549.10
	Aug	4,624	69	4,555	2,884	26,461	2,077	31,421	0	-26,866	34,689	1541.30
	Sept	5,581	22	5,560	1,148	3,972	312	5,432	0	128	34,817	1541.35
	Oct	381	22	359	1,445	0	0	1,445	0	-1,086	33,730	1540.98
	Nov	567	20	547	1,286	0	0	1,286	0	-740	32,991	1540.73
	Dec	926	18	907	736	0	0	736	0	171	33,162	1540.78
1967	Jan	2,108	19	2,090	943	0	0	943	0	1,147	34,309	1541.18
	Feb	1,524	21	1,502	1,069	0	0	1,069	0	433	34,742	1541.32
	March	1,951	22	1,929	1,394	0	0	1,394	0	535	35,277	1541.50
	April	10,723	23	10,700	1,560	0	0	1,560	0	9,140	44,416	1544.35
	May	3,754	40	3,714	2,431	795	204	3,431	0	283	44,700	1544.43
	June	6,537	41	6,496	2,707	1,268	326	4,301	0	2,195	46,895	1545.07
	July	9,080	44	9,035	3,237	7,320	1,881	12,438	0	-3,403	43,492	1544.08
	Aug	2,546	38	2,508	3,116	8,084	2,077	13,277	0	-10,769	32,723	1540.63
	Sept	1,721	18	1,703	1,508	1,214	312	3,033	0	-1,330	31,393	1540.17
	Oct	590	15	575	2,242	0	0	2,242	0	-1,668	29,726	1539.57
	Nov	239	11	227	1,180	0	0	1,180	0	-952	28,774	1539.21
	Dec	1,840	9	1,831	653	0	0	653	0	1,178	29,952	1539.65
1968	Jan	4,881	12	4,869	319	0	0	319	0	4,550	34,501	1541.24
	Feb	5,715	21	5,694	521	0	0	521	0	5,172	39,674	1542.91
	March	5,708	31	5,677	1,630	0	0	1,630	0	4,046	43,720	1544.15
	April	5,835	39	5,796	1,716	0	0	1,716	0	4,080	47,800	1545.33
	May	16,256	46	16,210	2,179	1,471	204	3,854	0	12,356	60,157	1548.73
	June	14,709	66	14,643	2,848	2,346	326	5,520	0	9,123	69,280	1551.04
	July	6,730	80	6,650	3,585	13,542	1,881	19,009	0	-12,359	56,921	1547.87
	Aug	3,005	61	2,943	3,307	14,956	2,077	20,340	0	-17,396	39,524	1542.87
	Sept	856	31	825	1,751	2,245	312	4,308	0	-3,484	36,041	1541.75
	Oct	29,071	25	29,046	1,670	0	0	1,670	0	27,376	63,417	1549.58
	Nov	8,221	71	8,149	209	0	0	209	0	7,940	71,357	1551.54
	Dec	5,178	83	5,095	917	0	0	917	0	4,178	75,536	1552.53

Table 19. Continued…

		In			Out							
Year	Month	Otter Creek Watershed Streamflow (acre-ft)	Diverted Flow thru Bretch Canal (acre-ft)	**TOTAL IN (acre-ft)**	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Senior Rights (acre-ft)	**Demand (acre-ft)**	**TOTAL OUT (acre-ft)**	*Spilled (acre-ft)*	**Change in Storage (acre-ft)**	**Volume Stored** (acre-ft)	**Water Surface Elevation** (ft)
1969	Jan	5,337	89	5,248	1,401	0	0	1,401	0	3,847	79,382	1553.42
	Feb	8,821	95	8,727	608	0	0	608	0	8,119	87,501	1555.22
	March	15,727	105	15,622	1,722	0	0	1,722	0	13,900	101,401	1558.00
	April	6,953	122	6,831	3,848	0	0	3,848	0	2,983	104,384	1558.54
	May	45,717	125	45,591	528	3,644	204	4,377	38,636	2,579	106,962	1558.99
	June	4,262	128	4,134	4,269	5,813	326	10,408	0	-6,274	100,689	1557.86
	July	1,882	121	1,761	5,639	33,554	1,881	41,074	0	-39,313	61,376	1549.05
	Aug	5,132	68	5,064	3,679	37,057	2,077	42,813	0	-37,749	23,627	1537.21
	Sept	1,525	0	1,525	1,467	5,563	312	7,342	0	-5,817	17,809	1534.70
	Oct	-264	0	-264	927	0	0	927	0	-1,191	16,619	1534.15
	Nov	1,309	0	1,309	1,011	0	0	1,011	0	298	16,917	1534.29
	Dec	1,626	0	1,626	557	0	0	557	0	1,069	17,986	1534.78
1970	Jan	3,356	0	3,356	762	0	0	762	0	2,594	20,580	1535.93
	Feb	2,474	0	2,474	893	0	0	893	0	1,581	22,161	1536.61
	Mar	5,491	0	5,491	847	0	0	847	0	4,644	26,805	1538.47
	Apr	15,326	5	15,321	1,940	0	0	1,940	0	13,381	40,186	1543.07
	May	4,270	32	4,238	2,761	637	204	3,603	0	635	40,820	1543.27
	Jun	3,070	34	3,036	3,115	1,016	326	4,457	0	-1,421	39,399	1542.83
	Jul	1,892	31	1,861	3,185	5,867	1,881	10,933	0	-9,072	30,327	1539.79
	Aug	1,505	13	1,492	1,877	6,480	2,077	10,434	0	-8,942	21,385	1536.28
	Sep	1,169	0	1,169	1,421	973	312	2,706	0	-1,537	19,848	1535.61
	Oct	316	0	316	1,007	0	0	1,007	0	-691	19,158	1535.31
	Nov	-178	0	-178	1,008	0	0	1,008	0	-1,186	17,972	1534.77
	Dec	143	0	143	662	0	0	662	0	-519	17,453	1534.54
1971	Jan	228	0	228	510	0	0	510	0	-282	17,171	1534.41
	Feb	494	0	494	580	0	0	580	0	-86	17,085	1534.37
	March	65	0	65	1,478	0	0	1,478	0	-1,413	15,672	1533.71
	April	220	0	220	1,620	0	0	1,620	0	-1,400	14,272	1533.02
	May	443	0	443	1,950	0	10,000	11,950	0	-11,507	2,765	1526.07
	June	6,811	0	6,811	1,603	0	0	1,603	0	5,208	7,973	1529.58
	July	1,998	0	1,998	1,946	0	0	1,946	0	52	8,025	1529.61
	Aug	1,099	0	1,099	1,256	0	0	1,256	0	-156	7,869	1529.51
	Sept	1,178	0	1,178	1,000	0	0	1,000	0	178	8,047	1529.62
	Oct	4,299	0	4,299	782	0	0	782	0	3,517	11,564	1531.63
	Nov	5,560	0	5,560	786	0	0	786	0	4,774	16,337	1534.02
	Dec	4,952	0	4,952	237	0	0	237	0	4,715	21,053	1536.14
1972	Jan	1,897	0	1,897	782	0	0	782	0	1,115	22,168	1536.61
	Feb	2,227	0	2,227	889	0	0	889	0	1,338	23,505	1537.16
	March	888	0	888	1,610	0	0	1,610	0	-722	22,784	1536.87
	April	554	0	554	1,966	0	0	1,966	0	-1,412	21,371	1536.27
	May	8,526	0	8,526	1,828	0	10,000	11,828	0	-3,302	18,069	1534.82
	June	11,037	0	11,037	2,096	30	0	2,127	0	8,910	26,980	1538.54
	July	3,999	5	3,993	2,592	175	0	2,767	0	1,227	28,206	1539.00
	Aug	1,483	8	1,475	2,300	193	0	2,493	0	-1,018	27,189	1538.62
	Sept	797	6	791	1,795	29	0	1,824	0	-1,033	26,156	1538.22
	Oct	666	3	662	1,215	0	0	1,215	0	-553	25,603	1538.00
	Nov	810	2	808	628	0	0	628	0	180	25,783	1538.07
	Dec	1,848	2	1,845	738	0	0	738	0	1,107	26,890	1538.50
1973	Jan	4,082	5	4,077	33	0	0	33	0	4,044	30,935	1540.01
	Feb	3,014	14	3,000	822	0	0	822	0	2,178	33,112	1540.77
	March	18,475	19	18,456	1,203	0	0	1,203	0	17,253	50,365	1546.06
	April	47,174	50	47,123	1,664	0	0	1,664	0	45,459	95,824	1556.94
	May	13,409	116	13,293	3,616	3,390	204	7,211	0	6,082	101,906	1558.09
	June	8,261	123	8,139	4,218	4,918	326	9,463	0	-1,324	100,582	1557.84
	July	1,487	121	1,366	4,436	27,873	1,881	34,189	0	-32,823	67,759	1550.66
	Aug	1,061	78	983	3,874	30,783	2,077	36,734	0	-35,751	32,008	1540.38
	Sept	3,403	16	3,386	1,308	4,621	312	6,241	0	-2,854	29,154	1539.36
	Oct	6,171	10	6,161	1,364	0	0	1,364	0	4,797	33,951	1541.05
	Nov	954	20	934	1,164	0	0	1,164	0	-231	33,721	1540.98
	Dec	2,117	20	2,097	920	0	0	920	0	1,177	34,898	1541.37

Table 19. Continued…

Year	Month	In			Out					Change in Storage (acre-ft)	Volume Stored (acre-ft)	Water Surface Elevation (ft)
		Otter Creek Watershed Streamflow (acre-ft)	Diverted Flow thru Bretch Canal (acre-ft)	TOTAL IN (acre-ft)	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Senior Rights (acre-ft)	Demand (acre-ft)	TOTAL OUT (acre-ft)	*Spilled (acre-ft)*			
1974	Jan	2,976	22	2,954	927	0	0	927	0	2,027	36,925	1542.04
	Feb	1,957	26	1,931	1,083	0	0	1,083	0	848	37,773	1542.31
	March	8,026	28	7,998	1,627	0	0	1,627	0	6,371	44,144	1544.27
	April	4,367	40	4,328	2,556	0	0	2,556	0	1,772	45,916	1544.79
	May	13,705	43	13,662	2,619	1,282	204	4,106	0	9,557	55,473	1547.47
	June	406	59	347	3,554	2,045	326	5,925	0	-5,578	49,894	1545.93
	July	1,402	50	1,353	4,034	11,806	1,881	17,720	0	-16,368	33,527	1540.91
	Aug	2,248	19	2,229	2,448	13,038	2,077	17,563	0	-15,335	18,192	1534.87
	Sept	3,386	0	3,386	1,092	1,957	312	3,361	0	25	18,217	1534.88
	Oct	3,219	0	3,219	841	0	0	841	0	2,378	20,595	1535.94
	Nov	13,208	0	13,208	593	0	0	593	0	12,614	33,209	1540.80
	Dec	4,720	19	4,701	449	0	0	449	0	4,253	37,462	1542.21
1975	Jan	6,247	27	6,219	530	0	0	530	0	5,690	43,152	1543.98
	Feb	12,127	38	12,089	417	0	0	417	0	11,672	54,824	1547.29
	Mar	8,705	58	8,648	1,417	0	0	1,417	0	7,231	62,055	1549.23
	Apr	9,040	69	8,971	2,119	0	0	2,119	0	6,852	68,907	1550.95
	May	19,317	80	19,238	2,565	2,498	204	5,268	0	13,970	82,877	1554.21
	Jun	25,657	99	25,557	3,525	3,627	326	7,478	0	18,079	100,957	1557.91
	Jul	16,717	121	16,595	3,312	28,019	1,881	33,212	0	-16,617	84,340	1554.54
	Aug	10,224	101	10,123	3,511	23,754	2,077	29,342	0	-19,219	65,120	1550.01
	Sep	61	74	-13	2,153	3,566	312	6,031	0	-6,044	59,077	1548.45
	Oct	852	65	787	2,091	0	0	2,091	0	-1,304	57,773	1548.10
	Nov	6,173	63	6,110	659	0	0	659	0	5,452	63,225	1549.53
	Dec	4,026	71	3,955	580	0	0	580	0	3,375	66,600	1550.38
1976	Jan	3,308	76	3,232	1,326	0	0	1,326	0	1,906	68,506	1550.85
	Feb	2,856	79	2,776	1,469	0	0	1,469	0	1,308	69,813	1551.17
	March	3,052	81	2,971	2,290	0	0	2,290	0	681	70,495	1551.33
	April	16,509	82	16,427	2,213	0	0	2,213	0	14,214	84,708	1554.62
	May	12,584	102	12,482	2,764	2,883	204	5,851	0	6,631	91,339	1556.03
	June	4,719	110	4,609	3,767	4,201	326	8,294	0	-3,685	87,654	1555.26
	July	1,199	106	1,093	3,830	22,807	1,881	28,518	0	-27,424	60,230	1548.75
	Aug	908	67	842	3,733	25,188	2,077	30,998	0	-30,156	30,073	1539.69
	Sept	4,057	12	4,045	1,450	3,781	312	5,543	0	-1,498	28,576	1539.14
	Oct	0	9	-9	1,006	0	0	1,006	0	-1,014	27,561	1538.76
	Nov	-311	7	-318	1,156	0	0	1,156	0	-1,474	26,087	1538.19
	Dec	571	3	568	829	0	0	829	0	-261	25,826	1538.09
1977	Jan	1,305	3	1,303	703	0	0	703	0	600	26,425	1538.32
	Feb	3,458	4	3,454	395	0	0	395	0	3,058	29,484	1539.48
	March	1,920	11	1,909	1,649	0	0	1,649	0	261	29,745	1539.57
	April	15,606	11	15,595	1,589	0	0	1,589	0	14,006	43,751	1544.15
	May	181,168	39	181,129	1,765	3,644	204	5,613	112,304	63,212	106,962	1558.99
	June	28,888	128	28,760	4,549	5,813	326	10,688	18,072	0	106,962	1558.99
	July	4,040	128	3,912	5,316	33,554	1,881	40,750	0	-36,838	70,124	1551.24
	Aug	9,897	81	9,816	3,080	37,057	2,077	42,214	0	-32,398	37,726	1542.30
	Sept	1,382	28	1,354	2,160	5,563	312	8,035	0	-6,681	31,046	1540.05
	Oct	814	14	800	1,361	0	0	1,361	0	-561	30,485	1539.84
	Nov	1,163	13	1,150	714	0	0	714	0	436	30,921	1540.00
	Dec	2,547	14	2,533	884	0	0	884	0	1,649	32,570	1540.58
1978	Jan	2,717	17	2,700	786	0	0	786	0	1,914	34,483	1541.23
	Feb	8,215	21	8,193	444	0	0	444	0	7,749	42,233	1543.70
	March	4,981	36	4,945	1,859	0	0	1,859	0	3,086	45,319	1544.62
	April	4,386	42	4,344	2,274	0	0	2,274	0	2,070	47,389	1545.22
	May	62,465	45	62,420	2,192	3,420	204	5,816	0	56,603	103,992	1558.47
	June	27,476	125	27,351	4,786	5,060	326	10,172	14,209	2,970	106,962	1559.00
	July	1,054	128	926	5,937	33,554	1,881	41,372	0	-40,446	66,516	1550.36
	Aug	718	76	642	3,557	37,057	2,077	42,690	0	-42,049	24,468	1537.55
	Sept	5,617	0	5,617	1,519	5,563	312	7,394	0	-1,777	22,691	1536.83
	Oct	1,087	0	1,087	1,441	0	0	1,441	0	-354	22,337	1536.68
	Nov	1,736	0	1,736	637	0	0	637	0	1,099	23,436	1537.14
	Dec	2,041	0	2,041	725	0	0	725	0	1,316	24,753	1537.67

Table 19. Continued…

Year	Month	In			Out					Change in Storage (acre-ft)	Volume Stored (acre-ft)	Water Surface Elevation (ft)
		Otter Creek Watershed Streamflow (acre-ft)	Diverted Flow thru Bretch Canal (acre-ft)	TOTAL IN (acre-ft)	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Senior Rights (acre-ft)	Demand (acre-ft)	TOTAL OUT (acre-ft)	*Spilled (acre-ft)*			
1979	Jan	3,499	0	3,499	272	0	0	272	0	3,227	27,980	1538.92
	Feb	6,275	8	6,268	783	0	0	783	0	5,484	33,464	1540.89
	March	16,979	19	16,959	1,132	0	0	1,132	0	15,827	49,292	1545.76
	April	8,400	49	8,352	1,590	0	0	1,590	0	6,762	56,053	1547.63
	May	14,909	60	14,850	2,372	1,764	204	4,340	0	10,509	66,563	1550.37
	June	25,006	76	24,930	3,129	2,814	326	6,269	0	18,661	85,224	1554.73
	July	9,526	102	9,424	3,924	21,855	1,881	27,660	0	-18,235	66,988	1550.47
	Aug	2,054	77	1,977	3,166	24,136	2,077	29,379	0	-27,402	39,586	1542.89
	Sept	-350	31	-381	2,040	3,623	312	5,975	0	-6,357	33,229	1540.81
	Oct	-154	19	-172	1,932	0	0	1,932	0	-2,104	31,125	1540.07
	Nov	897	14	882	960	0	0	960	0	-78	31,047	1540.05
	Dec	1,805	14	1,791	768	0	0	768	0	1,023	32,071	1540.41
1980	Jan	3,596	16	3,580	443	0	0	443	0	3,137	35,207	1541.48
	Feb	4,764	23	4,742	942	0	0	942	0	3,799	39,007	1542.71
	Mar	4,003	30	3,973	1,420	0	0	1,420	0	2,553	41,560	1543.50
	Apr	5,967	35	5,932	2,036	0	0	2,036	0	3,896	45,456	1544.66
	May	26,992	42	26,950	2,051	1,828	204	4,083	0	22,867	68,323	1550.80
	Jun	3,877	79	3,798	3,939	2,916	326	7,181	0	-3,382	64,940	1549.96
	Jul	-307	74	-381	5,214	16,832	1,881	23,927	0	-24,308	40,633	1543.21
	Aug	1,182	33	1,149	3,307	18,589	2,077	23,974	0	-22,825	17,808	1534.70
	Sep	-5,167	0	-5,167	1,592	2,791	312	4,695	0	-9,861	7,947	1529.56
	Oct	38	0	38	1,048	0	0	1,048	0	-1,010	6,937	1528.93
	Nov	166	0	166	710	0	0	710	0	-544	6,393	1528.59
	Dec	683	0	683	237	0	0	237	0	446	6,839	1528.87
1981	Jan	-54	0	-54	549	0	0	549	0	-602	6,236	1528.49
	Feb	547	0	547	547	0	0	547	0	-1	6,236	1528.49
	March	2,446	0	2,446	747	0	0	747	0	1,699	7,935	1529.55
	April	2,588	0	2,588	1,198	0	0	1,198	0	1,390	9,324	1530.38
	May	3,114	0	3,114	1,279	0	9,324	10,603	0	-7,490	1,835	1525.36
	June	4,562	0	4,562	1,299	0	0	1,299	0	3,263	5,098	1527.73
	July	48	0	48	1,711	0	0	1,711	0	-1,664	3,435	1526.56
	Aug	482	0	482	1,279	0	0	1,279	0	-797	2,638	1525.97
	Sept	88	0	88	1,089	0	0	1,089	0	-1,000	1,638	1525.20
	Oct	2,400	0	2,400	499	0	0	499	0	1,901	3,540	1526.64
	Nov	2,752	0	2,752	439	0	0	439	0	2,314	5,853	1528.24
	Dec	2,225	0	2,225	509	0	0	509	0	1,716	7,569	1529.33
1982	Jan	2,740	0	2,740	204	0	0	204	0	2,536	10,105	1530.83
	Feb	3,076	0	3,076	626	0	0	626	0	2,450	12,555	1532.15
	March	3,178	0	3,178	940	0	0	940	0	2,238	14,794	1533.28
	April	1,853	0	1,853	1,275	0	0	1,275	0	577	15,371	1533.56
	May	64,526	0	64,526	1,380	2,147	204	3,731	0	60,795	76,166	1552.68
	June	38,334	90	38,244	2,833	3,171	326	6,330	1,117	30,797	106,962	1559.00
	July	6,931	128	6,803	4,618	33,554	1,881	40,052	0	-33,250	73,713	1552.11
	Aug	2,670	87	2,584	3,887	37,057	2,077	43,021	0	-40,437	33,276	1540.82
	Sept	-91	19	-109	2,108	5,563	312	7,983	0	-8,092	25,183	1537.84
	Oct	-396	1	-397	1,360	0	0	1,360	0	-1,757	23,426	1537.13
	Nov	662	0	662	884	0	0	884	0	-222	23,205	1537.04
	Dec	2,451	0	2,451	518	0	0	518	0	1,933	25,138	1537.82
1983	Jan	4,116	1	4,115	541	0	0	541	0	3,574	28,712	1539.19
	Feb	7,863	9	7,854	374	0	0	374	0	7,480	36,192	1541.80
	March	9,552	25	9,527	961	0	0	961	0	8,566	44,758	1544.45
	April	6,041	41	6,000	1,653	0	0	1,653	0	4,346	49,105	1545.70
	May	10,130	48	10,082	2,275	1,266	204	3,745	0	6,337	55,441	1547.46
	June	8,674	59	8,616	2,714	2,019	326	5,059	0	3,557	58,998	1548.43
	July	200	65	135	4,076	11,652	1,881	17,609	0	-17,474	41,524	1543.49
	Aug	-11	35	-46	3,102	12,869	2,077	18,048	0	-18,094	23,430	1537.13
	Sept	-752	0	-752	1,580	1,932	312	3,824	0	-4,576	18,854	1535.17
	Oct	18,429	0	18,429	1,050	0	0	1,050	0	17,379	36,233	1541.81
	Nov	1,236	25	1,211	828	0	0	828	0	383	36,615	1541.94
	Dec	1,203	26	1,178	765	0	0	765	0	412	37,028	1542.07

Table 19. Continued…

		In			Out							
Year	Month	Otter Creek Watershed Streamflow (acre-ft)	Diverted Flow thru Bretch Canal (acre-ft)	**TOTAL IN (acre-ft)**	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Senior Rights (acre-ft)	**Demand (acre-ft)**	**TOTAL OUT (acre-ft)**	*Spilled (acre-ft)*	**Change in Storage (acre-ft)**	**Volume Stored** (acre-ft)	**Water Surface Elevation** (ft)
1984	Jan	2,724	26	2,698	959	0	0	959	0	1,739	38,767	1542.63
	Feb	3,095	30	3,065	800	0	0	800	0	2,266	41,032	1543.33
	March	3,978	34	3,944	1,189	0	0	1,189	0	2,756	43,788	1544.17
	April	6,025	39	5,986	2,034	0	0	2,034	0	3,952	47,740	1545.32
	May	2,379	46	2,333	2,650	878	204	3,731	0	-1,398	46,341	1544.91
	June	3,971	43	3,928	2,906	1,400	326	4,632	0	-704	45,637	1544.71
	July	131	42	89	3,802	8,081	1,881	13,764	0	-13,674	31,963	1540.37
	Aug	1,438	16	1,422	2,519	8,925	2,077	13,520	0	-12,099	19,864	1535.62
	Sept	-296	0	-296	1,809	1,340	312	3,460	0	-3,757	16,107	1533.91
	Oct	243	0	243	921	0	0	921	0	-678	15,429	1533.59
	Nov	337	0	337	634	0	0	634	0	-297	15,133	1533.45
	Dec	1,002	0	1,002	-182	0	0	-182	0	1,184	16,316	1534.01
1985	Jan	1,406	0	1,406	389	0	0	389	0	1,017	17,334	1534.48
	Feb	5,526	0	5,526	281	0	0	281	0	5,244	22,578	1536.78
	Mar	8,157	0	8,157	940	0	0	940	0	7,217	29,795	1539.59
	Apr	5,681	12	5,669	1,757	0	0	1,757	0	3,912	33,707	1540.97
	May	5,274	20	5,254	2,311	405	204	2,920	0	2,334	36,041	1541.75
	Jun	6,912	25	6,888	2,490	646	326	3,461	0	3,426	39,467	1542.85
	Jul	1,813	31	1,782	2,867	3,727	1,881	8,475	0	-6,693	32,774	1540.65
	Aug	638	18	620	2,556	4,116	2,077	8,749	0	-8,129	24,645	1537.62
	Sep	1,185	0	1,185	1,795	618	312	2,724	0	-1,539	23,106	1537.00
	Oct	12,326	0	12,326	840	0	0	840	0	11,486	34,592	1541.27
	Nov	6,352	22	6,330	649	0	0	649	0	5,682	40,274	1543.10
	Dec	4,691	33	4,658	892	0	0	892	0	3,766	44,040	1544.24
1986	Jan	3,357	39	3,318	1,039	0	0	1,039	0	2,279	46,319	1544.91
	Feb	4,712	43	4,669	943	0	0	943	0	3,726	50,045	1545.97
	March	2,932	50	2,882	1,841	0	0	1,841	0	1,042	51,087	1546.26
	April	2,592	52	2,541	2,071	0	0	2,071	0	470	51,556	1546.39
	May	7,005	52	6,953	2,180	1,237	204	3,621	0	3,332	54,888	1547.31
	June	21,408	58	21,350	2,483	1,973	326	4,781	0	16,569	71,457	1551.57
	July	3,152	83	3,068	4,565	16,460	1,881	22,906	0	-19,838	51,619	1546.41
	Aug	1,172	52	1,119	2,668	18,179	2,077	22,924	0	-21,805	29,814	1539.60
	Sept	10,767	12	10,756	1,428	2,729	312	4,469	0	6,287	36,101	1541.77
	Oct	97,507	25	97,483	1,042	0	0	1,042	25,579	70,861	106,962	1559.00
	Nov	36,657	128	36,529	1,044	0	0	1,044	35,485	0	106,962	1559.00
	Dec	16,054	128	15,926	1,091	0	0	1,091	14,835	0	106,962	1559.00
1987	Jan	17,169	128	17,041	1,265	0	0	1,265	15,776	0	106,962	1559.00
	Feb	26,409	128	26,281	136	0	0	136	26,145	0	106,962	1559.00
	March	39,783	128	39,655	2,306	0	0	2,306	37,349	0	106,962	1559.00
	April	14,973	128	14,845	3,279	0	0	3,279	11,567	0	106,962	1559.00
	May	52,591	128	52,463	4,179	3,644	204	8,028	44,435	0	106,962	1559.00
	June	19,731	128	19,603	3,832	5,813	326	9,970	9,633	0	106,962	1559.00
	July	11,959	128	11,831	4,918	33,554	1,881	40,352	0	-28,522	78,441	1553.21
	Aug	7,637	93	7,544	3,797	37,057	2,077	42,931	0	-35,387	43,054	1543.95
	Sept	9,867	38	9,829	1,959	5,563	312	7,834	0	1,995	45,049	1544.54
	Oct	3,334	41	3,292	1,578	0	0	1,578	0	1,714	46,763	1545.03
	Nov	3,230	44	3,186	943	0	0	943	0	2,243	49,006	1545.68
	Dec	9,958	48	9,910	-36	0	0	-36	0	9,946	58,952	1548.41
1988	Jan	15,351	64	15,286	821	0	0	821	0	14,465	73,416	1552.04
	Feb	9,290	86	9,203	1,528	0	0	1,528	0	7,675	81,092	1553.81
	March	25,347	97	25,251	767	0	0	767	0	24,483	105,575	1558.75
	April	20,683	127	20,556	3,193	0	0	3,193	15,976	1,387	106,962	1558.99
	May	10,260	128	10,132	3,918	3,644	204	7,766	2,366	0	106,962	1559.00
	June	8,045	128	7,917	4,681	5,813	326	10,820	0	-2,903	104,059	1558.48
	July	4,200	125	4,075	4,519	33,554	1,881	39,954	0	-35,879	68,180	1550.77
	Aug	213	79	134	3,822	37,057	2,077	42,956	0	-42,822	25,358	1537.91
	Sept	25,744	1	25,742	1,719	5,563	312	7,593	0	18,149	43,507	1544.08
	Oct	5,133	38	5,095	1,228	0	0	1,228	0	3,867	47,375	1545.21
	Nov	4,580	45	4,535	1,316	0	0	1,316	0	3,218	50,593	1546.12
	Dec	6,283	51	6,232	928	0	0	928	0	5,304	55,897	1547.59

Table 19. Continued…

Year	Month	In			Out					Change in Storage (acre-ft)	Volume Stored (acre-ft)	Water Surface Elevation (ft)
		Otter Creek Watershed Streamflow (acre-ft)	Diverted Flow thru Bretch Canal (acre-ft)	TOTAL IN (acre-ft)	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Senior Rights (acre-ft)	Demand (acre-ft)	TOTAL OUT (acre-ft)	*Spilled (acre-ft)*			
1989	Jan	6,619	60	6,560	501	0	0	501	0	6,059	61,956	1549.20
	Feb	7,876	69	7,807	947	0	0	947	0	6,860	68,816	1550.93
	March	12,300	80	12,221	2,104	0	0	2,104	0	10,117	78,933	1553.32
	April	8,835	94	8,741	2,999	0	0	2,999	0	5,742	84,675	1554.61
	May	21,923	102	21,821	2,785	3,279	204	6,268	0	15,553	100,228	1557.78
	June	132,871	121	132,750	3,406	4,805	326	8,537	117,479	6,734	106,962	1558.99
	July	9,461	128	9,333	4,613	33,554	1,881	40,047	0	-30,714	76,248	1552.70
	Aug	10,946	90	10,856	2,977	37,057	2,077	42,111	0	-31,255	44,993	1544.52
	Sept	8,380	41	8,339	2,014	5,563	312	7,888	0	451	45,444	1544.65
	Oct	4,350	42	4,308	1,788	0	0	1,788	0	2,520	47,964	1545.38
	Nov	2,784	46	2,738	1,498	0	0	1,498	0	1,240	49,203	1545.73
	Dec	3,708	48	3,660	1,053	0	0	1,053	0	2,607	51,810	1546.46
1990	Jan	10,902	53	10,850	442	0	0	442	0	10,408	62,218	1549.27
	Feb	10,133	70	10,063	22	0	0	22	0	10,041	72,259	1551.76
	Mar	16,673	85	16,589	914	0	0	914	0	15,675	87,933	1555.32
	Apr	17,175	106	17,069	2,297	0	0	2,297	0	14,772	102,705	1558.24
	May	30,286	123	30,163	3,669	3,644	204	7,517	18,388	4,257	106,962	1559.00
	Jun	11,578	128	11,450	5,412	5,813	326	11,551	0	-101	106,862	1558.98
	Jul	4,219	128	4,091	4,860	33,554	1,881	40,294	0	-36,204	70,658	1551.37
	Aug	3,198	82	3,115	3,423	37,057	2,077	42,557	0	-39,442	31,216	1540.11
	Sep	1,161	15	1,146	1,742	5,563	312	7,616	0	-6,470	24,746	1537.66
	Oct	1,554	0	1,554	1,365	0	0	1,365	0	189	24,935	1537.74
	Nov	4,967	0	4,967	801	0	0	801	0	4,166	29,101	1539.34
	Dec	3,265	10	3,255	720	0	0	720	0	2,535	31,636	1540.25
1991	Jan	7,112	16	7,096	507	0	0	507	0	6,590	38,226	1542.46
	Feb	2,620	29	2,591	1,109	0	0	1,109	0	1,483	39,708	1542.93
	March	5,119	32	5,088	1,665	0	0	1,665	0	3,423	43,132	1543.97
	April	4,009	38	3,971	1,907	0	0	1,907	0	2,064	45,196	1544.58
	May	12,318	41	12,277	2,047	1,193	204	3,443	0	8,833	54,029	1547.07
	June	20,722	56	20,666	2,763	1,902	326	4,991	0	15,675	69,704	1551.14
	July	3,356	81	3,276	3,891	10,980	1,881	16,752	0	-13,477	56,227	1547.68
	Aug	1,288	60	1,228	2,956	12,127	2,077	17,160	0	-15,932	40,295	1543.11
	Sept	5,287	33	5,255	1,364	1,820	312	3,497	0	1,758	42,053	1543.65
	Oct	1,954	36	1,918	1,710	0	0	1,710	0	208	42,261	1543.71
	Nov	7,963	36	7,927	1,051	0	0	1,051	0	6,876	49,137	1545.71
	Dec	17,207	48	17,159	-619	0	0	-619	0	17,778	66,915	1550.46
1992	Jan	12,165	77	12,088	792	0	0	792	0	11,296	78,211	1553.16
	Feb	10,331	93	10,238	1,030	0	0	1,030	0	9,208	87,419	1555.21
	March	11,270	105	11,165	1,947	0	0	1,947	0	9,218	96,637	1557.09
	April	9,193	117	9,077	2,399	0	0	2,399	0	6,677	103,314	1558.35
	May	7,364	124	7,240	2,971	3,452	204	6,626	0	614	103,928	1558.46
	June	23,849	125	23,725	3,003	5,056	326	8,385	12,305	3,035	106,962	1559.00
	July	12,623	128	12,495	4,784	33,554	1,881	40,218	0	-27,723	79,239	1553.39
	Aug	3,927	94	3,832	2,896	37,057	2,077	42,030	0	-38,198	41,041	1543.34
	Sept	2,157	34	2,123	1,869	5,563	312	7,744	0	-5,622	35,420	1541.55
	Oct	-409	23	-432	1,531	0	0	1,531	0	-1,963	33,457	1540.89
	Nov	7,680	19	7,660	671	0	0	671	0	6,990	40,446	1543.15
	Dec	7,647	33	7,615	259	0	0	259	0	7,356	47,802	1545.33
1993	Jan	10,755	46	10,709	237	0	0	237	0	10,472	58,274	1548.23
	Feb	13,292	63	13,229	566	0	0	566	0	12,663	70,936	1551.44
	March	18,266	83	18,183	1,902	0	0	1,902	0	16,281	87,217	1555.16
	April	23,434	105	23,329	2,275	0	0	2,275	1,309	19,745	106,962	1559.00
	May	71,380	128	71,252	3,042	3,644	204	6,890	64,361	0	106,962	1559.00
	June	11,792	128	11,664	3,990	5,813	326	10,128	1,535	0	106,962	1559.00
	July	8,799	128	8,671	4,966	33,554	1,881	40,400	0	-31,729	75,234	1552.46
	Aug	5,900	89	5,811	3,852	37,057	2,077	42,986	0	-37,175	38,059	1542.40
	Sept	918	28	889	1,824	5,563	312	7,699	0	-6,809	31,249	1540.12
	Oct	58	15	44	1,219	0	0	1,219	0	-1,176	30,074	1539.69
	Nov	1,281	12	1,268	1,010	0	0	1,010	0	259	30,333	1539.79
	Dec	2,660	13	2,647	497	0	0	497	0	2,151	32,483	1540.55

Table 19. Continued…

		In			Out							
Year	Month	Otter Creek Watershed Streamflow (acre-ft)	Diverted Flow thru Bretch Canal (acre-ft)	**TOTAL IN (acre-ft)**	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Senior Rights (acre-ft)	**Demand (acre-ft)**	**TOTAL OUT (acre-ft)**	*Spilled (acre-ft)*	**Change in Storage (acre-ft)**	**Volume Stored** (acre-ft)	**Water Surface Elevation** (ft)
1994	Jan	3,896	17	3,878	842	0	0	842	0	3,036	35,520	1541.58
	Feb	4,584	23	4,561	825	0	0	825	0	3,736	39,255	1542.78
	March	8,318	31	8,287	1,406	0	0	1,406	0	6,881	46,137	1544.85
	April	6,769	43	6,726	2,218	0	0	2,218	0	4,508	50,645	1546.14
	May	10,546	51	10,495	2,015	1,349	204	3,568	0	6,927	57,572	1548.04
	June	3,659	62	3,596	3,613	2,151	326	6,090	0	-2,494	55,078	1547.36
	July	62	58	4	3,555	12,417	1,881	17,853	0	-17,849	37,230	1542.14
	Aug	1,180	27	1,153	2,831	13,714	2,077	18,622	0	-17,469	19,761	1535.58
	Sept	-69	0	-69	1,521	2,059	312	3,891	0	-3,960	15,801	1533.77
	Oct	883	0	883	942	0	0	942	0	-58	15,742	1533.74
	Nov	2,971	0	2,971	258	0	0	258	0	2,713	18,455	1534.99
	Dec	834	0	834	268	0	0	268	0	566	19,021	1535.25
1995	Jan	1,910	0	1,910	426	0	0	426	0	1,484	20,505	1535.90
	Feb	1,849	0	1,849	525	0	0	525	0	1,324	21,830	1536.47
	Mar	4,943	0	4,943	971	0	0	971	0	3,972	25,802	1538.08
	Apr	4,402	2	4,399	1,386	0	0	1,386	0	3,014	28,816	1539.23
	May	14,832	9	14,823	1,641	604	204	2,449	0	12,374	41,190	1543.38
	Jun	107,331	34	107,297	2,183	963	326	3,472	38,053	65,773	106,962	1559.00
	Jul	10,437	128	10,309	5,120	33,554	1,881	40,554	0	-30,245	76,717	1552.81
	Aug	43,140	91	43,050	3,414	37,057	2,077	42,547	0	502	77,219	1552.93
	Sep	18,391	92	18,300	1,917	5,563	312	7,792	0	10,508	87,728	1555.27
	Oct	12,496	106	12,391	2,732	0	0	2,732	0	9,658	97,386	1557.24
	Nov	7,143	117	7,026	1,498	0	0	1,498	0	5,528	102,914	1558.27
	Dec	13,123	124	13,000	1,083	0	0	1,083	7,868	4,048	106,962	1559.00
1996	Jan	12,398	128	12,270	928	0	0	928	11,342	0	106,962	1559.00
	Feb	10,233	128	10,105	1,256	0	0	1,256	8,849	0	106,962	1559.00
	March	9,287	128	9,159	2,236	0	0	2,236	6,923	0	106,962	1559.00
	April	6,721	128	6,593	3,931	0	0	3,931	2,663	0	106,962	1559.00
	May	6,229	128	6,101	4,582	3,558	204	8,345	0	-2,244	104,718	1558.60
	June	12,787	126	12,661	4,078	5,813	326	10,216	200	2,244	106,962	1559.00
	July	8,224	128	8,096	4,286	33,554	1,881	39,721	0	-31,624	75,338	1552.49
	Aug	16,985	89	16,896	2,605	37,057	2,077	41,739	0	-24,843	50,495	1546.10
	Sept	29,990	51	29,939	1,599	5,563	312	7,474	0	22,466	72,961	1551.93
	Oct	10,348	86	10,263	2,104	0	0	2,104	0	8,159	81,120	1553.82
	Nov	14,597	97	14,500	920	0	0	920	0	13,580	94,700	1556.71
	Dec	20,484	114	20,369	857	0	0	857	7,250	12,262	106,962	1559.00
1997	Jan	16,306	128	16,178	952	0	0	952	15,226	0	106,962	1559.00
	Feb	33,045	128	32,917	1,153	0	0	1,153	31,764	0	106,962	1559.00
	March	15,841	128	15,713	2,584	0	0	2,584	13,129	0	106,962	1559.00
	April	128,554	128	128,426	2,082	0	0	2,082	126,344	0	106,962	1559.00
	May	68,902	128	68,774	3,208	3,644	204	7,056	61,718	0	106,962	1559.00
	June	41,959	128	41,831	3,607	5,813	326	9,745	32,086	0	106,962	1559.00
	July	15,973	128	15,845	4,725	33,554	1,881	40,159	0	-24,314	82,648	1554.16
	Aug	11,798	99	11,699	3,174	37,057	2,077	42,308	0	-30,609	52,039	1546.52
	Sept	12,914	53	12,861	2,334	5,563	312	8,208	0	4,653	56,692	1547.80
	Oct	13,644	61	13,583	1,669	0	0	1,669	0	11,913	68,605	1550.87
	Nov	13,954	79	13,874	1,265	0	0	1,265	0	12,609	81,215	1553.84
	Dec	26,201	97	26,104	833	0	0	833	0	25,271	106,486	1558.91
1998	Jan	24,552	127	24,425	940	0	0	940	23,008	477	106,962	1559.00
	Feb	31,017	128	30,889	1,159	0	0	1,159	29,730	0	106,962	1559.00
	March	55,154	128	55,026	2,045	0	0	2,045	52,981	0	106,962	1559.00
	April	19,460	128	19,332	2,864	0	0	2,864	16,468	0	106,962	1559.00
	May	25,370	128	25,242	4,061	3,644	204	7,909	17,332	0	106,962	1559.00
	June	4,295	128	4,167	5,550	5,813	326	11,689	0	-7,522	99,440	1557.63
	July	102	120	-18	5,711	33,554	1,881	41,146	0	-41,163	58,277	1548.23
	Aug	-356	63	-420	3,442	37,057	2,077	42,576	0	-42,995	15,281	1533.52
	Sept	191	0	191	1,665	0	312	1,977	0	-1,785	13,496	1532.64
	Oct	1,482	0	1,482	967	0	0	967	0	516	14,012	1532.89
	Nov	19,148	0	19,148	561	0	0	561	0	18,587	32,598	1540.59
	Dec	7,827	18	7,809	545	0	0	545	0	7,264	39,862	1542.97

Table 19. Continued…

Year	Month	In			Out					Change in Storage (acre-ft)	Volume Stored (acre-ft)	Water Surface Elevation (ft)
		Otter Creek Watershed Streamflow (acre-ft)	Diverted Flow thru Bretch Canal (acre-ft)	TOTAL IN (acre-ft)	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Senior Rights (acre-ft)	Demand (acre-ft)	TOTAL OUT (acre-ft)	*Spilled (acre-ft)*			
1999	Jan	9,456	32	9,424	808	0	0	808	0	8,616	48,478	1545.53
	Feb	10,824	47	10,776	1,312	0	0	1,312	0	9,464	57,942	1548.14
	March	14,990	63	14,927	1,097	0	0	1,097	0	13,830	71,772	1551.64
	April	21,229	84	21,145	2,292	0	0	2,292	0	18,853	90,625	1555.88
	May	28,422	109	28,313	3,051	3,644	204	6,899	5,076	16,337	106,962	1559.00
	June	20,615	128	20,487	3,555	5,813	326	9,694	10,794	0	106,962	1559.00
	July	3,835	128	3,707	5,179	33,554	1,881	40,613	0	-36,907	70,056	1551.23
	Aug	772	81	691	4,187	37,057	2,077	43,321	0	-42,630	27,426	1538.71
	Sept	-1,444	6	-1,451	1,680	5,563	312	7,555	0	-9,006	18,420	1534.98
	Oct	405	0	405	1,201	0	0	1,201	0	-796	17,624	1534.62
	Nov	576	0	576	894	0	0	894	0	-318	17,306	1534.47
	Dec	3,631	0	3,631	690	0	0	690	0	2,941	20,247	1535.79
2000	Jan	3,827	0	3,827	640	0	0	640	0	3,187	23,435	1537.14
	Feb	5,983	0	5,983	1,017	0	0	1,017	0	4,966	28,401	1539.08
	Mar	22,751	8	22,743	1,285	0	0	1,285	0	21,458	49,858	1545.92
	Apr	17,209	50	17,160	1,836	0	0	1,836	0	15,324	65,182	1550.02
	May	8,137	74	8,063	3,243	1,864	204	5,311	0	2,752	67,934	1550.71
	Jun	24,534	78	24,456	2,628	2,973	326	5,927	0	18,529	86,463	1555.00
	Jul	12,759	104	12,655	4,426	22,340	1,881	28,647	0	-15,991	70,472	1551.33
	Aug	-805	82	-887	4,925	17,752	2,077	24,755	0	-25,641	44,830	1544.47
	Sep	-1,102	41	-1,143	2,661	2,665	312	5,638	0	-6,780	38,050	1542.40
	Oct	4,531	28	4,502	1,168	0	0	1,168	0	3,335	41,385	1543.44
	Nov	6,754	35	6,720	608	0	0	608	0	6,112	47,496	1545.25
	Dec	5,279	46	5,233	567	0	0	567	0	4,666	52,162	1546.56
2001	Jan	12,409	53	12,356	553	0	0	553	0	11,803	63,965	1549.71
	Feb	17,670	72	17,598	732	0	0	732	0	16,866	80,831	1553.75
	March	17,328	97	17,231	1,446	0	0	1,446	0	15,786	96,617	1557.09
	April	10,329	117	10,213	2,803	0	0	2,803	0	7,410	104,027	1558.47
	May	62,254	125	62,130	3,405	3,644	204	7,253	51,940	2,936	106,962	1558.99
	June	11,186	128	11,058	4,854	5,813	326	10,992	66	0	106,962	1559.00
	July	1,237	128	1,109	6,127	33,554	1,881	41,561	0	-40,452	66,510	1550.35
	Aug	305	76	229	3,331	37,057	2,077	42,464	0	-42,235	24,275	1537.48
	Sept	1,030	0	1,030	1,491	5,563	312	7,366	0	-6,337	17,939	1534.76
	Oct	-232	0	-232	1,335	0	0	1,335	0	-1,567	16,372	1534.04
	Nov	1,468	0	1,468	617	0	0	617	0	851	17,223	1534.43
	Dec	2,730	0	2,730	533	0	0	533	0	2,197	19,420	1535.42
2002	Jan	4,833	0	4,833	734	0	0	734	0	4,099	23,519	1537.17
	Feb	5,806	0	5,806	893	0	0	893	0	4,913	28,432	1539.09
	March	5,064	9	5,056	1,395	0	0	1,395	0	3,660	32,092	1540.41
	April	8,564	16	8,547	1,287	0	0	1,287	0	7,260	39,352	1542.81
	May	4,043	31	4,012	1,897	592	204	2,693	0	1,319	40,671	1543.22
	June	2,466	33	2,432	2,499	945	326	3,769	0	-1,337	39,334	1542.81
	July	3,468	31	3,438	2,353	5,452	1,881	9,686	0	-6,249	33,085	1540.76
	Aug	1,205	19	1,186	2,699	6,021	2,077	10,797	0	-9,611	23,474	1537.15
	Sept	174	0	174	1,786	904	312	3,002	0	-2,828	20,646	1535.96
	Oct	9,020	0	9,020	737	0	0	737	0	8,283	28,929	1539.27
	Nov	7,762	10	7,753	786	0	0	786	0	6,967	35,896	1541.70
	Dec	8,846	24	8,822	525	0	0	525	0	8,297	44,194	1544.29
2003	Jan	7,799	40	7,759	777	0	0	777	0	6,983	51,176	1546.29
	Feb	6,588	52	6,536	824	0	0	824	0	5,712	56,889	1547.86
	March	7,032	61	6,971	1,569	0	0	1,569	0	5,401	62,290	1549.29
	April	6,426	70	6,357	2,507	0	0	2,507	0	3,850	66,140	1550.26
	May	7,556	76	7,480	3,049	1,880	204	5,133	0	2,347	68,487	1550.84
	June	7,792	79	7,713	2,766	2,998	326	6,091	0	1,622	70,109	1551.24
	July	1,191	81	1,109	4,569	15,932	1,881	22,381	0	-21,272	48,837	1545.63
	Aug	145	48	97	3,079	17,595	2,077	22,752	0	-22,655	26,182	1538.23
	Sept	7,769	3	7,765	1,516	2,641	312	4,469	0	3,296	29,479	1539.48
	Oct	900	11	889	1,401	0	0	1,401	0	-512	28,967	1539.29
	Nov	836	10	827	841	0	0	841	0	-15	28,952	1539.28
	Dec	1,752	10	1,742	779	0	0	779	0	963	29,915	1539.64

Table 19. Continued…

Year	Month	In			Out					Change in Storage (acre-ft)	Volume Stored (acre-ft)	Water Surface Elevation (ft)
		Otter Creek Watershed Streamflow (acre-ft)	Diverted Flow thru Bretch Canal (acre-ft)	TOTAL IN (acre-ft)	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Senior Rights (acre-ft)	Demand (acre-ft)	TOTAL OUT (acre-ft)	*Spilled (acre-ft)*			
2004	Jan	4,608	12	4,597	637	0	0	637	0	3,960	33,874	1541.03
	Feb	4,420	20	4,399	671	0	0	671	0	3,728	37,603	1542.26
	March	21,419	28	21,392	1,365	0	0	1,365	0	20,027	57,629	1548.06
	April	11,054	62	10,992	1,931	0	0	1,931	0	9,061	66,691	1550.40
	May	3,205	76	3,129	3,219	1,718	204	5,142	0	-2,013	64,678	1549.89
	June	4,568	73	4,495	2,700	2,740	326	5,766	0	-1,271	63,407	1549.57
	July	6,165	71	6,094	3,293	15,818	1,881	20,992	0	-14,899	48,508	1545.54
	Aug	1,008	47	961	2,433	17,470	2,077	21,980	0	-21,019	27,489	1538.73
	Sept	1,616	6	1,609	1,972	2,623	312	4,907	0	-3,297	24,192	1537.44
	Oct	4,870	0	4,870	830	0	0	830	0	4,040	28,231	1539.01
	Nov	16,604	8	16,596	487	0	0	487	0	16,109	44,341	1544.33
	Dec	8,975	40	8,935	768	0	0	768	0	8,167	52,508	1546.65
2005	Jan	13,052	54	12,998	501	0	0	501	0	12,498	65,005	1549.98
	Feb	10,731	74	10,657	732	0	0	732	0	9,925	74,930	1552.39
	Mar	9,030	88	8,942	1,737	0	0	1,737	0	7,205	82,135	1554.05
	Apr	6,509	98	6,411	2,785	0	0	2,785	0	3,625	85,760	1554.85
	May	7,890	103	7,787	2,699	2,728	204	5,631	0	2,155	87,916	1555.31
	Jun	13,518	106	13,412	3,853	3,969	326	8,148	0	5,264	93,179	1556.41
	Jul	1,812	112	1,700	4,540	24,972	1,881	31,393	0	-29,693	63,486	1549.59
	Aug	12,961	72	12,889	2,767	27,579	2,077	32,423	0	-19,534	43,952	1544.21
	Sep	2,651	39	2,611	2,257	4,140	312	6,708	0	-4,097	39,855	1542.97
	Oct	2,017	32	1,985	1,302	0	0	1,302	0	683	40,538	1543.18
	Nov	793	33	760	1,301	0	0	1,301	0	-541	39,997	1543.02
	Dec	2,067	32	2,035	786	0	0	786	0	1,249	41,246	1543.40
2006	Jan	3,006	34	2,971	1,160	0	0	1,160	0	1,811	43,057	1543.95
	Feb	2,776	38	2,739	1,199	0	0	1,199	0	1,539	44,596	1544.40
	March	5,541	40	5,501	1,730	0	0	1,730	0	3,771	48,367	1545.50
	April	2,893	47	2,846	2,468	0	0	2,468	0	377	48,745	1545.60
	May	7,851	48	7,804	2,808	1,153	204	4,165	0	3,639	52,383	1546.62
	June	3,533	54	3,479	3,307	1,840	326	5,473	0	-1,993	50,390	1546.07
	July	698	50	647	3,677	10,618	1,881	16,177	0	-15,529	34,861	1541.36
	Aug	1,042	22	1,019	2,801	11,727	2,077	16,605	0	-15,586	19,275	1535.36
	Sept	1,462	0	1,462	1,459	1,760	312	3,532	0	-2,070	17,205	1534.42
	Oct	1,938	0	1,938	1,173	0	0	1,173	0	765	17,970	1534.77
	Nov	3,625	0	3,625	736	0	0	736	0	2,890	20,860	1536.05
	Dec	741	0	741	447	0	0	447	0	294	21,153	1536.18
2007	Jan	8,088	0	8,088	442	0	0	442	0	7,647	28,800	1539.22
	Feb	6,631	9	6,622	693	0	0	693	0	5,929	34,728	1541.32
	March	21,410	22	21,388	1,329	0	0	1,329	0	20,059	54,788	1547.28
	April	27,634	58	27,577	1,619	0	0	1,619	0	25,958	80,746	1553.73
	May	60,811	96	60,715	2,030	3,644	204	5,878	28,620	26,217	106,962	1559.00
	June	26,903	128	26,775	2,805	5,813	326	8,943	17,832	0	106,962	1559.00
	July	7,650	128	7,522	3,773	33,554	1,881	39,207	0	-31,685	75,278	1552.47
	Aug	5,044	89	4,955	3,372	37,057	2,077	42,505	0	-37,551	37,727	1542.30
	Sept	5,891	28	5,863	1,807	5,563	312	7,682	0	-1,818	35,909	1541.71
	Oct	2,875	24	2,851	1,636	0	0	1,636	0	1,215	37,124	1542.10
	Nov	2,374	27	2,347	1,027	0	0	1,027	0	1,321	38,445	1542.53
	Dec	6,819	29	6,790	497	0	0	497	0	6,293	44,737	1544.45
2008	Jan	5,750	41	5,709	1,011	0	0	1,011	0	4,698	49,436	1545.80
	Feb	7,613	49	7,565	1,066	0	0	1,066	0	6,499	55,934	1547.60
	March	8,536	60	8,476	1,746	0	0	1,746	0	6,730	62,665	1549.38
	April	8,626	70	8,556	2,381	0	0	2,381	0	6,175	68,840	1550.93
	May	4,900	80	4,820	3,248	1,881	204	5,334	0	-514	68,326	1550.80
	June	5,739	79	5,660	4,012	3,001	326	7,339	0	-1,678	66,647	1550.39
	July	721	76	644	3,991	17,323	1,881	23,195	0	-22,551	44,097	1544.26
	Aug	2,071	40	2,031	2,301	19,132	2,077	23,510	0	-21,479	22,618	1536.80
	Sept	9,327	0	9,327	1,309	2,872	312	4,493	0	4,834	27,452	1538.72
	Oct	14,502	6	14,495	1,199	0	0	1,199	0	13,296	40,748	1543.25
	Nov	6,516	34	6,483	1,088	0	0	1,088	0	5,394	46,143	1544.86
	Dec	6,250	43	6,207	933	0	0	933	0	5,275	51,418	1546.35

Table 19. Continued…

Year	Month	In			Out					Change in Storage (acre-ft)	Volume Stored (acre-ft)	Water Surface Elevation (ft)
		Otter Creek Watershed Streamflow (acre-ft)	Diverted Flow thru Bretch Canal (acre-ft)	TOTAL IN (acre-ft)	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Senior Rights (acre-ft)	Demand (acre-ft)	TOTAL OUT (acre-ft)	*Spilled (acre-ft)*			
2009	Jan	6,113	52	6,060	1,112	0	0	1,112	0	4,949	56,366	1547.72
	Feb	6,465	60	6,405	1,670	0	0	1,670	0	4,734	61,100	1548.98
	March	6,209	68	6,141	2,035	0	0	2,035	0	4,106	65,206	1550.03
	April	9,900	74	9,826	2,427	0	0	2,427	0	7,399	72,605	1551.84
	May	11,110	85	11,025	2,297	2,306	204	4,807	0	6,218	78,823	1553.30
	June	5,159	94	5,065	3,593	3,352	326	7,270	0	-2,205	76,618	1552.79
	July	2,517	91	2,426	4,149	18,482	1,881	24,513	0	-22,087	54,531	1547.21
	Aug	2,670	57	2,612	3,378	20,412	2,077	25,867	0	-23,255	31,276	1540.13
	Sept	1,786	15	1,771	1,434	3,064	312	4,810	0	-3,039	28,238	1539.01
	Oct	4,077	8	4,069	798	0	0	798	0	3,271	31,509	1540.21
	Nov	3,626	15	3,611	786	0	0	786	0	2,825	34,334	1541.18
	Dec	4,092	21	4,071	526	0	0	526	0	3,545	37,878	1542.35
2010	Jan	5,927	28	5,898	502	0	0	502	0	5,397	43,275	1544.01
	Feb	10,779	38	10,741	491	0	0	491	0	10,250	53,525	1546.93
	Mar	8,030	56	7,974	1,674	0	0	1,674	0	6,300	59,825	1548.65
	Apr	20,499	66	20,433	1,983	0	0	1,983	0	18,450	78,275	1553.17
	May	19,905	93	19,812	2,934	2,921	204	6,060	0	13,753	92,027	1556.17
	Jun	5,732	111	5,621	4,209	4,248	326	8,783	0	-3,161	88,866	1555.51
	Jul	22,918	107	22,811	3,016	23,282	1,881	28,179	0	-5,368	83,498	1554.35
	Aug	402	100	302	4,282	23,389	2,077	29,748	0	-29,446	54,051	1547.07
	Sep	583	56	527	2,369	3,511	312	6,192	0	-5,665	48,387	1545.50
	Oct	3,057	47	3,010	1,865	0	0	1,865	0	1,145	49,532	1545.83
	Nov	4,299	49	4,250	1,243	0	0	1,243	0	3,007	52,538	1546.66
	Dec	4,175	54	4,121	906	0	0	906	0	3,215	55,754	1547.55
2011	Jan	4,961	59	4,902	839	0	0	839	0	4,063	59,817	1548.64
	Feb	4,512	66	4,446	1,049	0	0	1,049	0	3,397	63,214	1549.52
	March	4,415	71	4,344	2,265	0	0	2,265	0	2,080	65,294	1550.05
	April	2,740	74	2,666	3,270	0	0	3,270	0	-604	64,690	1549.90
	May	2,185	73	2,112	3,576	1,590	204	5,369	0	-3,258	61,432	1549.07
	June	-44	68	-113	5,294	2,535	326	8,155	0	-8,268	53,164	1546.83
	July	267	55	212	4,817	14,636	1,881	21,334	0	-21,121	32,043	1540.40
	Aug	276	16	259	3,584	16,164	2,077	21,825	0	-21,566	10,476	1531.03
	Sept	209	0	209	1,641	0	312	1,953	0	-1,744	8,732	1530.03
	Oct	1,098	0	1,098	1,104	0	0	1,104	0	-6	8,726	1530.03
	Nov	2,140	0	2,140	645	0	0	645	0	1,495	10,221	1530.89
	Dec	620	0	620	310	0	0	310	0	311	10,532	1531.06
2012	Jan	193	0	193	655	0	0	655	0	-462	10,069	1530.81
	Feb	1,614	0	1,614	573	0	0	573	0	1,041	11,110	1531.38
	March	4,017	0	4,017	966	0	0	966	0	3,051	14,161	1532.97
	April	3,660	0	3,660	1,122	0	0	1,122	0	2,538	16,699	1534.19
	May	2,603	0	2,603	1,849	0	10,000	11,849	0	-9,245	7,454	1529.26
	June	2,001	0	2,001	1,599	0	0	1,599	0	402	7,856	1529.50
	July	-50	0	-50	2,052	0	0	2,052	0	-2,102	5,753	1528.17
	Aug	289	0	289	1,681	0	0	1,681	0	-1,392	4,361	1527.22
	Sept	475	0	475	1,283	0	0	1,283	0	-808	3,554	1526.65
	Oct	-186	0	-186	866	0	0	866	0	-1,052	2,501	1525.87
	Nov	-94	0	-94	623	0	0	623	0	-717	1,784	1525.32
	Dec	257	0	257	409	0	0	409	0	-151	1,633	1525.20
2013	Jan	325	0	325	323	0	0	323	0	2	1,635	1525.20
	Feb	710	0	710	437	0	0	437	0	274	1,908	1525.42
	March	817	0	817	761	0	0	761	0	56	1,965	1525.46
	April	948	0	948	692	0	0	692	0	255	2,220	1525.66
	May	1,276	0	1,276	1,206	0	2,220	3,427	0	-2,150	70	1523.82
	June	467	0	467	1,466	0	0	1,466	0	-1,000	0	1523.75
	July	398	0	398	1,336	0	0	1,336	0	-938	0	1523.75
	Aug	191	0	191	1,375	0	0	1,375	0	-1,184	0	1523.75
	Sept	385	0	385	1,111	0	0	1,111	0	-726	0	1523.75
	Oct	596	0	596	698	0	0	698	0	-102	0	1523.75
	Nov	417	0	417	441	0	0	441	0	-24	0	1523.75
	Dec	117	0	117	220	0	0	220	0	-103	0	1523.75

Table 19. Continued…

Year	Month	In			Out					Change in Storage (acre-ft)	Volume Stored (acre-ft)	Water Surface Elevation (ft)
		Otter Creek Watershed Streamflow (acre-ft)	Diverted Flow thru Bretch Canal (acre-ft)	**TOTAL IN (acre-ft)**	Total Net Evaporation (Reservoir) (acre-ft)	Releases for Senior Rights (acre-ft)	**Demand (acre-ft)**	**TOTAL OUT (acre-ft)**	*Spilled (acre-ft)*			
2014	Jan	220	0	220	502	0	0	502	0	-282	0	1523.75
	Feb	336	0	336	370	0	0	370	0	-34	0	1523.75
	March	676	0	676	802	0	0	802	0	-126	0	1523.75
	April	442	0	442	976	0	0	976	0	-534	0	1523.75
	May	1,162	0	1,162	1,188	0	0	1,188	0	-26	0	1523.75
	June	2,769	0	2,769	1,089	0	0	1,089	0	1,680	1,680	1525.24
	July	1,039	0	1,039	1,275	0	0	1,275	0	-235	1,445	1525.05
	Aug	40	0	40	1,518	0	0	1,518	0	-1,478	0	1523.75
	Sept	223	0	223	961	0	0	961	0	-738	0	1523.75
	Oct	-43	0	-43	624	0	0	624	0	-668	0	1523.75
	Nov	366	0	366	444	0	0	444	0	-78	0	1523.75
	Dec	-46	0	-46	250	0	0	250	0	-296	0	1523.75
2015	Jan	334	0	334	340	0	0	340	0	-6	0	1523.75
	Feb	201	0	201	391	0	0	391	0	-189	0	1523.75
	Mar	1,273	0	1,273	528	0	0	528	0	745	745	1524.45
	Apr	15,477	0	15,477	756	0	0	756	0	14,721	15,466	1533.61
	May	109,689	0	109,689	1,544	3,644	204	5,393	12,799	91,497	106,962	1559.00
	Jun	32,579	128	32,451	4,191	5,813	326	10,330	22,121	0	106,962	1559.00
	Jul	16,615	128	16,487	4,954	33,554	1,881	40,388	0	-23,901	83,061	1554.26
	Aug	7,500	100	7,401	4,063	37,057	2,077	43,197	0	-35,796	47,265	1545.18
	Sep	1,659	45	1,614	2,785	5,563	312	8,659	0	-7,046	40,219	1543.08
	Oct	1,746	32	1,713	1,614	0	0	1,614	0	99	40,318	1543.11
	Nov	6,654	33	6,622	807	0	0	807	0	5,815	46,133	1544.85
	Dec	10,049	43	10,005	751	0	0	751	0	9,255	55,388	1547.45
2016	Jan	11,284	59	11,225	722	0	0	722	0	10,503	65,890	1550.20
	Feb	7,012	75	6,937	1,654	0	0	1,654	0	5,283	71,174	1551.50
	March	6,432	83	6,349	2,496	0	0	2,496	0	3,853	75,026	1552.42
	April	8,713	89	8,624	2,637	0	0	2,637	0	5,988	81,014	1553.80
	May	8,226	97	8,129	2,806	2,540	204	5,551	0	2,578	83,592	1554.37
	June	10,917	100	10,817	3,211	3,675	326	7,212	0	3,606	87,198	1555.16
	July	2,838	105	2,733	4,417	22,628	1,881	28,926	0	-26,193	61,005	1548.95
	Aug	1,968	68	1,900	3,651	24,990	2,077	30,719	0	-28,819	32,186	1540.45
	Sept	6,294	17	6,277	1,326	3,752	312	5,389	0	887	33,073	1540.75
	Oct	878	19	859	1,436	0	0	1,436	0	-576	32,497	1540.56
	Nov	1,502	17	1,485	852	0	0	852	0	633	33,130	1540.77
	Dec	2,291	19	2,272	482	0	0	482	0	1,791	34,920	1541.38