BUREAU OF RECLAMATION

Technical Memorandum for the Upper Red River Basin Study

Tom Steed Reservoir Firm 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
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
MAY	Maximum Annual Yield
MPMCD	Mountain Park Master Conservancy District
M&I	Municipal and Industrial
NED	National Elevation Dataset
NFRR	North Fork Red River
OWRB	Oklahoma Water Resources Board
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 calculates reservoir firm yield using an excel-based model that simulates reservoir storage on a monthly time step. The firm yield is defined as the amount of water the reservoir can reliably deliver during a repeat of the drought of record. Although multiple variables must be considered, the two most significant contributing factors to reservoir yield, and also the areas containing the most uncertainty, are reservoir inflow and reservoir storage capacity. Because future inflow into the reservoir cannot be predicted, we rely on existing historic inflow records, as well as the availability of data related to potential depletions caused by future climatic or anthropogenic factors. Reservoir storage capacity is dependent upon data availability regarding sediment accumulation into the reservoir over time. The future time frame considered is at the discretion of water resource managers and decision-makers, but looking forward 50 to 100 years is common practice for long-term planning purposes. As new data become available, it is important to update the firm yield estimates so water resource managers can plan accordingly. In 2009, the first post-construction sediment survey was conducted at Tom Steed Reservoir, providing an opportunity to update area capacity assumptions for the reservoir. Furthermore, between 2010 and 2015, a new drought of record was observed in southwest Oklahoma. In 2013, the Upper Red River Basin Study (URRBS) was initiated. One of the key objectives of the URRBS was to quantify inflow depletions caused by existing and future ground- and stream- water development in the hydrologic basin containing Tom Steed Reservoir. This analysis has been completed. 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 firm yield estimate of Tom Steed Reservoir.

This report describes four firm yield estimates for Tom Steed Reservoir. The first two calculations are based on data collected prior to reservoir

construction as documented in Reclamation's planning reports for the Mountain Park Project. These two firm yield estimates were repeated as part of this study for comparative purposes and to verify the firm yield models performance in replicating previous calculations performed in the 1960s and 1970s. The third calculation is based on post-construction storage conditions and new inflow records through the year 2016, but it excludes a detailed accounting of future inflow depletions caused by anthropogenic factors such as ground- and stream-water development. The fourth 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 Tom Steed Reservoir hydrologic basin. The four methods are considered as follows (Table 1):

Method 1: Pre-Construction Plan of Development Firm Yield Calculation (1926-1959).

The firm yield was computed based on the pre-construction data developed and used by Reclamation in the August 1962 Mountain Park Project Plan of Development (POD) to support initial planning for the Mountain Park Project. The period considered during the POD was from Jan 1926 through Sept 1959, with a drought of record occurring from 1951 through 1955. The POD calculated a firm yield of **18,600 acre-feet per year (acre-ft/yr)** assuming 100 years of sediment accumulation at a rate of 170 acre-feet/year. The findings of this study were consistent with the POD when firm yield was computed using the same data and assumptions.

Method 2: Pre-Construction Definite Planning Report Firm Yield Update (1949-1969).

The firm yield was computed based on the data and assumptions presented in the project Definite Planning Report's (DPR) 1971 reevaluation of the Mountain Park Project as the project was nearing construction. The period of record for the DPR was extended through Sept 1969, with a drought of record between 1962 and 1968. The DPR calculated a firm yield of **14,700 acre-ft/yr**

for the year 2075 after 100 years of sediment accumulation at a rate of 170 acre-ft/yr, and **16,100 acre-ft/yr** for the year 2025 after 50 years of sediment accumulation. The findings of this study were consistent with the DPR when firm yield was computed using the same data and assumptions.

Method 3: Post-Construction Firm Yield Update (1926-2016).

The data and assumptions used to derive the POD and DPR firm yield calculations were updated/revised to reflect post-construction conditions and to account for the best available data through Dec 2016, new sediment surveys, a new and extended flow record, and new drought of record between 2010 and 2015. Based on these data, the updated firm yield is estimated to be **14,100 acre-ft/yr** for the year 2075 and **15,500 acre-ft/yr** for the year 2025 (100 years and 50 years of sediment accumulation, respectively, at a rate of 165 acre-ft/yr). For additional planning purposes and consistency with the Oklahoma Comprehensive Water Plan's 2012 Update (OCWP's) 2060 planning horizon, a firm yield of **14,600 acre-ft/yr** was calculated for the year 2060 after 85 years of sediment accumulation. Results also show that the Mountain Park Master Conservancy District's permitted volume of **16,100 acre-ft/yr** is available **99 percent** of the time (i.e., 90 of 91 modeled years) based on 2060 sediment conditions. When the full permit volume is not available (i.e., a permit shortage occurs), the lowest volume of permit water available is **12,600 acre-ft/yr**.

Method 4: Upper Red River Bain Study Firm Yield Update (1926-2016).

A range of potential firm yields 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. 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 firm yield was calculated for eight upstream development scenarios under a repeat of the 2010-2015 drought of record for the year 2060 after 85 years of sedimentation at a rate

of 165 acre-ft/yr. Tom Steed Reservoir firm yield varies greatly depending on the scenario considered. Under full use of existing streamwater permits and continued aquifer withdrawals at 2013 groundwater pumping rates, the firm yield was estimated to be **14,700 acre-ft/yr**. The firm yield could be reduced to only **5,300 acre-ft/yr** if the ground- and surface water within the Tom Steed hydrologic basin is fully developed and/or appropriated. Under this methodology, the firm yield was not calculated under 50- and 100-year sedimentation rates.

Results also show that the Mountain Park Master Conservancy District's permitted volume of **16,100 acre-ft/yr** is available between **87** and **99 percent** of the time (years) depending on the development scenario. When the full permit volume is not available (i.e., permit shortages occur), the lowest volume of permit water available ranges from between **2,500** to **12,600 acre-ft/yr** depending on the development scenario.

Table 1. Firm yield estimates of Tom Steed Reservoir as calculated based on four different methodologies that include different periods of record, droughts of record, and other assumptions.

			Sediment Accumulation Since Reservoir Construction		
			50 years (2025)	85 years (2060)	100 years (2075)
	Period of Record	Drought of Record	Reservoir Firm Yield (acre-ft/yr)		
Method 1: Pre-Construction Plan of Development Firm Yield Calculation	1926-1959	1951-55	NA	NA	18,600
Method 2: Pre-Construction Definite Planning Report Firm Yield Update	1949-1969	1962-68	16,100	NA	14,700
Method 3: Post-Construction Firm Yield Update	1926-2016	2010-15	15,500	14,600	14,100
Method 4: Upper Red River Bain Study Firm Yield Update	1926-2016	2010-15	NA	14,700 to 5,300	NA

NA means Not Applicable

2. INTRODUCTION

2.1. Project Background

The Mountain Park Project is a water supply project constructed by Reclamation in Jackson, Kiowa, and Tillman Counties, Oklahoma. Mountain Park Dam, located six miles north of Snyder, regulates the natural flows of West Otter Creek and Glen Creek creating Tom Steed Reservoir (Figure 1). Water from the adjacent Elk Creek hydrologic basin is diverted into Tom Steed Reservoir using the Bretch Diversion Dam and Canal. Tom Steed Reservoir provides municipal and industrial (M&I) water to the member cities of Altus, Snyder, and Frederick, as well as water to support environmental quality (EQ) benefits at the Hackberry Flat Wildlife Management Area (WMA), through the Altus, Snyder, and Frederick aqueducts, respectively (Figure 1).

Congress provided construction authority for the Mountain Park Project under Public Law 90-503 on September 21, 1968, for the purposes of providing water for M&I use, conserving and developing fish and wildlife resources, providing outdoor recreation, and controlling floods. Title IV of Public Law 103-434 (Mountain Park Project Act of 1994) dated October 31, 1994, added "environmental quality activities" to the authorized project purposes and allowed for reallocation of project costs to include EQ activities. Reclamation initiated construction of the Mountain Park Project in 1971. Mountain Park Dam was completed in 1975, and construction of the Altus Aqueduct and Pumping Plant was completed in 1976; the Bretch Diversion Dam and Canal were completed in 1977. The Frederick Pumping Plant and Aqueduct were completed in the early 1980s.

The Mountain Park Project is owned by the U.S. and administered by Reclamation. O&M responsibility for the project has been transferred to the Mountain Park Master Conservancy District (MPMCD) through a contract with the U.S. Reclamation reimburses the MPMCD on an annual basis for the portion

of O&M costs that are attributable to flood control, recreation, fish and wildlife conservation, and environmental quality benefits. The original repayment contract was signed in 1971, but was amended in 1996 to reflect the reallocation of project costs following the authorization of EQ benefits at the project.

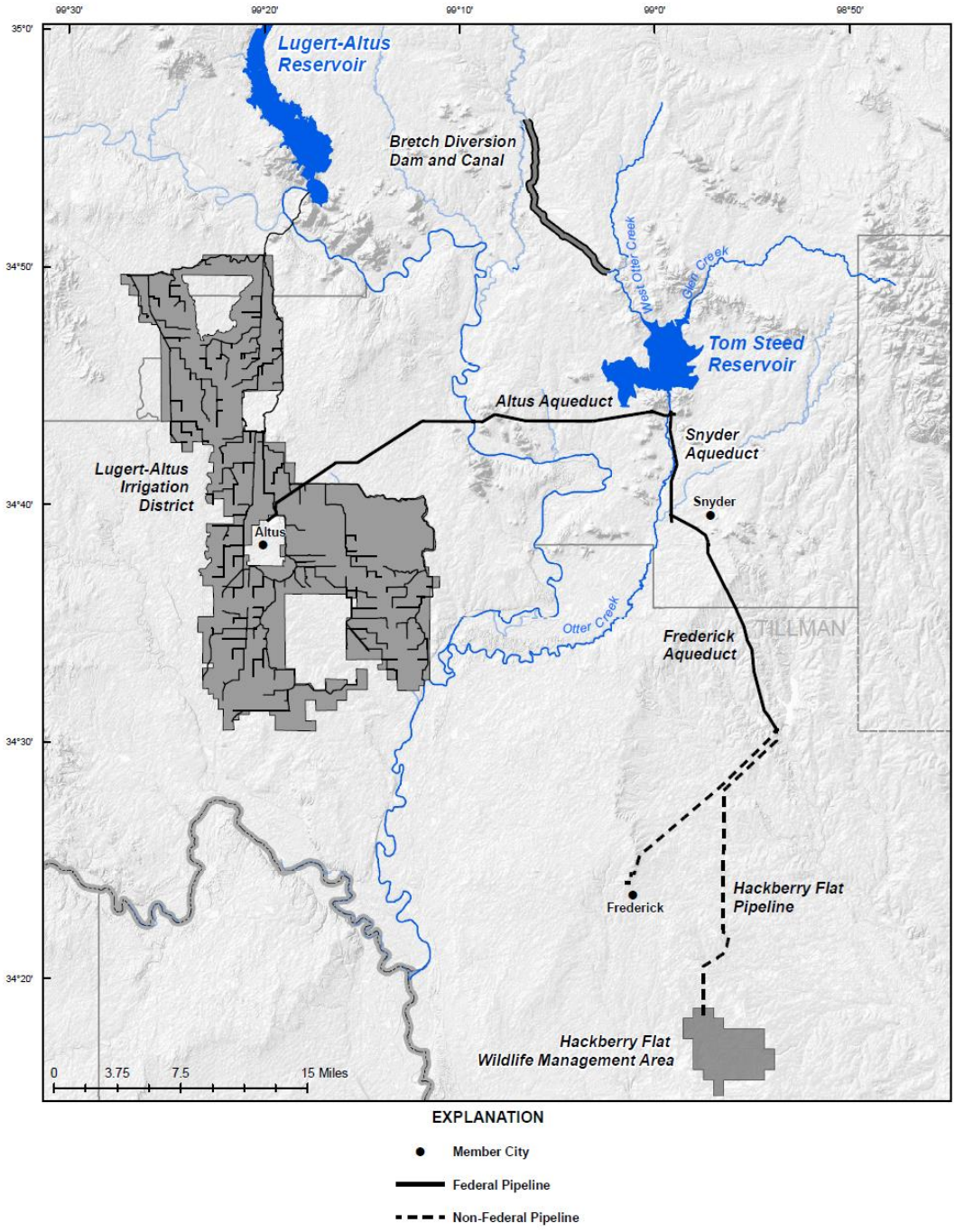

Figure 1. Features and member cities of the Mountain Park Project that receive M&I water, as well as the Hackberry Flat WMA which receives water for EQ benefits.

2.1.1. Mountain Park Dam

Figure 2. Mountain Park Dam

Mountain Park Dam is a double-curvature concrete arch dam flanked by concrete thrust blocks (Figure 2). The dam is 535 feet (ft) long with a maximum structural height of 133 ft. This dam and the rolled earth East and West Dike embankments, which extend 10,311 ft and 13,235 ft, respectively, form Tom Steed Reservoir. The concrete arch portion of Mountain Park Dam functions as an uncontrolled, overflow spillway. The crest is at the top of the exclusive flood control pool at elevation 1414.0 ft and is 320 ft long measured along the axis of the dam. Concrete piers and training walls at each end of the spillway direct floodwater into and over the crest. The spillway is designed for a maximum discharge of 38,300 cubic feet per second (cfs) with the reservoir at elevation 1423.6 ft. The outlet works for Mountain Park Dam include three outlet pipes: a 42-inch-diameter, joint-use outlet pipe is provided to release water into the aqueduct system; an 84-inch-diameter flood outlet pipe for floodwater; and a 15-inch-diameter river outlet pipe for small streamflows.

Tom Steed Reservoir is divided into three operational pools: conservation pool, flood control pool, and surcharge pool. The conservation pool is the largest pool and is used to store water for M&I and EQ purposes. The flood control and surcharge pools are smaller and temporarily store water from large rainfall events to reduce downstream impacts from flooding. There are also two small, nonoperational pools referred to as the dead pool and inactive pool that are located below the conservation pool.

2.1.2. Bretch Diversion Dam and Canal

Figure 3. Bretch Diversion and Canal, Mountain Park Project.

The Bretch Diversion Dam is located on Elk Creek in Kiowa County about 24 miles northeast of the city of Altus and about 15 miles northwest of Mountain Park Dam (Figure 1). The dam diverts flows from Elk Creek into Bretch Canal for conveyance into Tom Steed Reservoir through West Otter Creek. This concrete diversion structure has canal headworks and a concrete wing wall on the left abutment, stream control gates in the center section, and a rolled earthfill dike extending from the concrete structure across the flood plain 5,200 ft to the right abutment. The canal headworks contains an 18-foot-square radial gate for controlling flows into Bretch Canal, which is designed for a flow of 1,000 cfs. The stream control gates include two 27- by 21-foot spillway radial gates, one 10- by 21-foot sluiceway radial gate, and one 24-inch-diameter bypass gate. The rolled earthfill dike across the flood plain to the right abutment contains a low grass-covered section which provides an overflow spillway with a crest length of 3,620 ft. Figure 3 shows a photograph of the Bretch Diversion and Canal. The Bretch Diversion Canal begins at Bretch Diversion Dam and runs generally south and southeast to West Otter Creek (Figure 1). The concrete-lined canal is 9.5 miles long and has a capacity of 1,000 cfs.

2.1.3. Project Benefits, Mountain Park Project

The Mountain Park Project is authorized to store, regulate, and furnish water for municipal, domestic, and industrial purposes; conserve and develop fish and wildlife resources; provide outdoor recreation; and control floods. In addition to these original project purposes, the project provides environmental quality water benefits to 3,750 acres of wetland habitat. MPMCD holds a 16,100 acre-ft/yr water right, which is contractually allocated to the member cities of Altus, Snyder, and Frederick, and to Hackberry Flat WMA. Of that amount, 15,970 acre-ft/yr is allocated as follows (Table 2):

- Altus: 11,200 acre-feet/yr (70.13 percent)
- Frederick: 1,568 acre-feet/yr (9.81 percent)
- Snyder: 850 acre-feet/yr (5.33 percent)
- Hackberry Flat WMA: 2,352 acre-ft/yr (14.73 percent)

The remaining 130 acre-feet/yr has been allocated among its three member cities in proportion to their existing M&I water supply contract volumes by revising the contracts as follows (Table 2):

- Altus: 107 acre-feet/yr (82.25 percent)[1]
- Frederick: 15 acre-feet/yr (11.51 percent)[2]
- Snyder: 8 acre-feet/yr (6.24 percent)[3]

[1] Equals 70.13% of the M&I subtotal of 85.27%

[2] Equals 9.81% of the M&I subtotal of 85.27%

[3] Equals 5.33% of the M&I subtotal of 85.27%

Table 2. M&I and EQ allocation volumes/percentages that are contractually required in accordance with available water supplies, including during times of scarcity.

Contract Provisions	Municipal & Industrial Water Supply								Environmental Quality Water Supply		Total Contracted Water Supply
	Altus		Frederick		Snyder		M&I Subtotal		Hackberry Flat Wildlife Management Area		
	(acre-ft/yr)	(percent)	(acre-ft/yr)	(percent)	(acre-ft/yr)	(percent)	(acre-ft/yr)	(percent)	(acre-ft/yr)	(percent)	(acre-ft/yr)
Water supply allocation when 15,970 acre-ft is available	11,200	70.13	1,567	9.81	851	5.33	13,618	85.27	2,352	14.73	15,970
Excess volume of water supply allocation when more than 15,970 acre-ft is available	107	82.24a	15	11.50b	8	6.25c	130	100.0	0	0	130
Maximum water supply allocation (16,100 acre-ft is available)	11,307	70.23	1,582	9.83	859	5.34	13,748	85.39	2,352	14.61	16,100d

a Equals 82.24 percent (%) of the M&I Subtotal (i.e. 70.13% of 85.27%)
b Equals 11.50% of the M&I Subtotal (i.e. 9.81% of 85.27%)
c Equals 6.25% of the M&I Subtotal (i.e. 5.33% of 85.27%)
d Equals District Surface Water Permit

M&I Benefits and Features

M&I benefits are provided through a water right that was granted to the MPMCD by the State of Oklahoma in 1967 (Application No. 67-671) and amended in 1983. This appropriation allows the MPMCD to deliver up to 16,100 acre-ft/yr from Tom Steed Reservoir for domestic, municipal, and industrial purposes. As previously stated, of this amount, 13,748 acre-ft/yr is allocated to the member cities of Altus, Snyder, and Frederick for M&I purposes. The total population served is around 43,000 people. Water for the city of Altus flows from a joint-use forebay tank that is 0.5 miles downstream of the reservoir to the adjacent Altus Pumping Plant, where it is lifted and conveyed though a 20.6-mile concrete pipe to the city of Altus (Figure 1; Figure 4). The design capacity of the

Altus Aqueduct is 24.3 cfs. Water to Snyder and Frederick flows via gravity from the joint-use forebay tank through a 5.5-mile pipe (9.8 cfs capacity) to the Snyder-Frederick Regulating Tank, where the capacity is reduced to 1.7 cfs before being conveyed to Snyder. The Frederick Aqueduct receives 8.1 cfs from the regulating tank at this point and conveys the flow another 12 miles to the Frederick pumping plant northeast of the city of Frederick.

Figure 4. Altus Aqueduct, Mountain Park Project.

Environmental Quality Benefits and Features

Environmental quality (EQ) was added to the Mountain Park Project benefits through Public Law 103-434 (Mountain Park Project Act of 1994). In the 1980s, the city of Frederick recognized they would have difficulty servicing their future share of the Project repayment obligation. Pursuant to the legislation, Reclamation, the MPMCD, ODWC, and the City of Frederick developed an Environmental Quality Plan (EQ Plan) which was finalized in April 1995. The EQ Plan reallocated 60 percent of the city of Frederick's contractual share of the annual project water supply to the ODWC for use at the Hackberry Flat WMA as an appropriate EQ activity in exchange for an adjustment to their share of the District's repayment and O&M obligations. A water supply contract has since been signed by the MPMCD and ODWC which allows the MPMCD to deliver up to 2,352 acre-ft/yr to the WMA. The ODWC installed a 17-mile aqueduct beginning near the terminus of Reclamation's Frederick Aqueduct and extending to a small storage reservoir at the Hackberry Flat WMA. Construction of the pipeline was completed in 1999, and the District started delivering water to ODWC for use at Hackberry Flat WMA that same year.

Recreation/Fish and Wildlife Benefits and Features

Tom Steed Reservoir is located within the scenic Wichita Mountains and is surrounded by approximately 12,000 acres of federally-owned land that attract tourism and abundant wildlife. Great Plains State Park, managed by the OTRD, is situated on the southern and eastern shores of Tom Steed Reservoir. The park provides opportunities for camping, swimming, boating, fishing, hiking, picnicking, etc. On the western and northern shores is the Mountain Park WMA, which is managed by ODWC. The Mountain Park WMA is comprised of 5,400 acres of mixed grassland, scrub mesquite, and agricultural fields of winter wheat and milo. The area supports numerous upland game species, including deer, rabbit, bobcat, coyote, turkey, dove, and quail, as well as diverse nongame species, including migrating bald eagles during the winter. A 320-acre wetland unit is managed for waterfowl through agriculture plantings and native wetland plant enhancement.

2.1.4. Tom Steed Reservoir Hydrology

Inflow into Tom Steed Reservoir is derived by Elk Creek, West Otter Creek, and Glen Creek. The Tom Steed Reservoir hydrologic basin encompasses about 670 square miles, 530 square miles of which encompasses the Elk Creek drainage area upstream of the Bretch Diversion Dam and Canal, and 140 square miles encompasses the West Otter and Glen Creek drainage areas (Figure 1; Figure 5). Below Tom Steed Reservoir, West Otter Creek turns into Otter Creek and drains into the NFRR. Tom Steed Reservoir is located on the edge of the NFRR aquifer. Base flows in Elk Creek originate in part from the NFRR aquifer, but also from the Elk City aquifer, and following periods of runoff, from numerous floodwater-retarding structures in the Elk Creek hydrologic basin (Smith et al, 2017). Base flows in West Otter Creek and Glen Creek are assumed to originate from the Southwest Oklahoma minor aquifer, although no studies have been conducted to quantify base flows; this aquifer is considered to be too

thinly saturated to support irrigation uses beyond short-term domestic uses (OWRB, 1998).

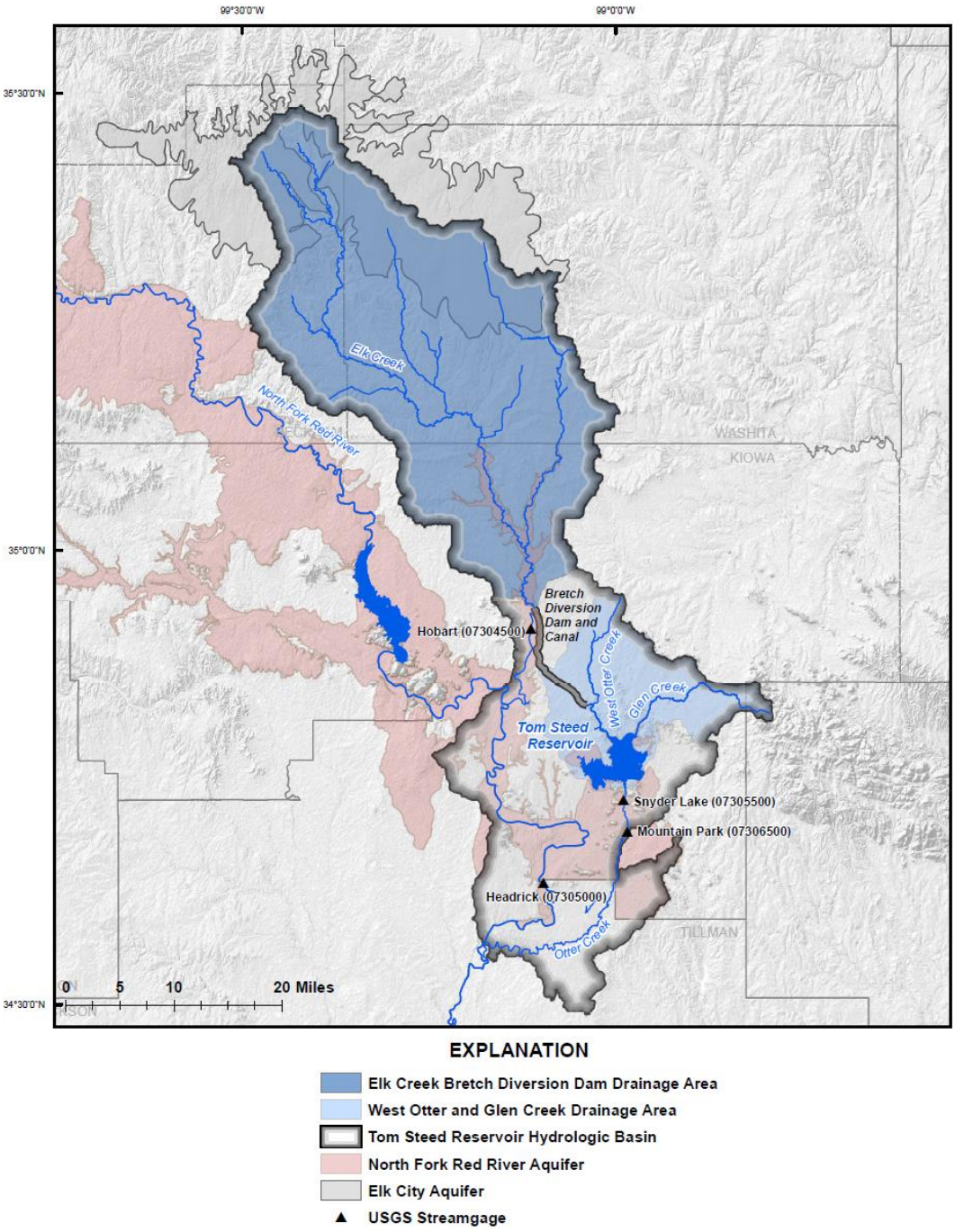

Figure 5: Tom Steed Reservoir drainage area map and respective drainage areas of gages used in the hydrology assessment.

3. FIRM 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. Determining how to best manage water to prepare for drought requires assessing risks and having a better understanding of the reservoir's "firm yield," i.e., the amount of water a reservoir can reliably supply during a repeat of the worst drought on record. From a historical context, the firm 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, the firm yield is important because it represents the amount of water that is "supposed" to be dependable during the most critical drought, and thus should provide a foundation by which local officials may either react during a drought or plan for future droughts. If the firm yield estimate is too low, investments could be made in supplemental supplies to withstand a drought that may never come to fruition. If the estimate of firm yield 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 for drought must determine what assumptions decision-makers 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 firm 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 6). The model for Tom Steed Reservoir has remained much the same over the years, but the inputs and outputs have been updated based

on the availability of data and to reflect assumptions and the best professional judgement of hydrologists and decision-makers. This report describes four firm yield calculations, beginning with pre-construction firm yield estimates and ending with the most up-to-date firm yield calculation based on best available data. The four methods are as follows:

- Pre-Construction Plan of Development Firm Yield Calculation (1926-1959): the firm yield model incorporates pre-construction data developed and used by Reclamation in the August 1962 Mountain Park Project POD to support initial planning for the Mountain Park Project for a period of record Jan 1926 through Sept 1959.
- Pre-Construction Definite Planning Report Firm Yield Update (1949-1969): the firm yield model is used to confirm the DPR's 1971 reevaluation of the Mountain Park Project as the project was nearing construction. The period of record was extended through Sept 1969, which including updating other applicable data sources.
- Post-Construction Firm Yield Update (1926-2016): the data and assumptions used to derive the POD and DPR firm yield calculations are updated/revised to reflect post-construction conditions and to account for the best available data through Dec 2016.
- Upper Red River Bain Study Firm Yield Update (1926-2016): the firm yield was modeled using depleted inflow estimates derived by OWRB as part of OWRB's analysis of water rights and water availability in the NFRR basin. The inflow depletion analysis was performed by OWRB in collaboration with Reclamation using a new SWAM on the NFRR basin in support of the URRBS.

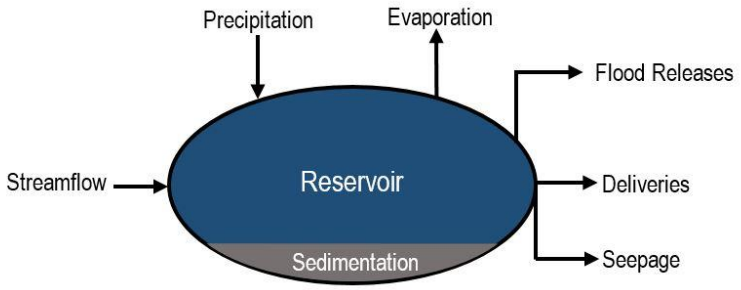

Figure 6: Schematic of Reservoir Firm Yield Model.

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**

3.1. Method 1. Pre-Construction Plan of Development Firm Yield Calculation (1926-1959)

The functionality of the firm yield model was tested by replicating the approach used by Reclamation in the August 1962 Mountain Park Project POD and validating the POD's calculation of Tom Steed Reservoir firm yield for a period of record Jan 1926 through Sept 1959. The data, assumptions, and analyses are described in detail within Appendix A of the POD and are summarized below:

Available Flow and Precipitation Data

The run-off of Otter and Elk Creeks is comprised entirely upon rainfall[4]. The POD obtained flow records from three sources on Otter Creek[5]:

- A staff gage located two miles downstream of what was then the Mountain Park damsite, which recorded flow from Apr 1903 to Mar 1908.
- A water stage recorder located three miles downstream of the Mountain Park damsite (USGS streamgage 07306500), which recorded flows from Mar 1946 to Sept 1951.
- A water stage recorder located one mile below the Mountain Park damsite (USGS streamgage 07305500), immediately downstream of

[4] This statement in the POD is referring to streamwater run-off. Base flows in Elk Creek originate from several sources including the Elk City aquifer, the North Fork Red River aquifer, and following periods of runoff, numerous floodwater-retarding structures in the Elk Creek watershed (Smith et al.,2017).

[5] No flow records were available for Glen Creek. At some point following construction of Tom Steed Reservoir, the nomenclature of "Otter Creek" was clarified to distinguish between "West" and "East" Otter Creeks. West Otter Creek is divided into an upstream reach, which contributes inflow into the reservoir, as well as a downstream reach comprised of releases from Tom Steed Reservoir. East Otter Creek, located east of the reservoir, does not contribute inflow to the reservoir. Below the confluence of East Otter and West Otter Creeks, the stream resumes the name "Otter Creek".

Snyder Lake, which recorded flows from Oct 1951 to present[6] (Sept 1959).

- Flow records are provided in Tables A-2, A-3, and A-4, respectively in the POD.

The POD obtained flow records from the following on Elk Creek:

- A staff gage located two miles downstream of the Bretch diversion damsite near Hobart, which recorded flow Oct 1904 to Apr 1905.
- A chain gage recorded flows from Apr 1905 to Mar 1908.
- A water stage recorder recorded flows from Oct 1949 to present (Sept 1959[6]).
- Flow records on Elk Creek provided in Table A-5.

Precipitation data were obtained from precipitation stations in and around the Elk and Otter Creek hydrologic basins. The precipitation station at Hobart recorded rainfall between 1904 to 1959. Precipitation data were used in determining the period of record and for extending the streamflow record, but not directly in the firm yield calculation.

Determining the Period of Record

Because of limited flow data, the POD looked at precipitation to determine the presence of historical critical drought periods needed for the firm yield analysis. The Hobart precipitation station had the longest period of recorded precipitation. The Hobart station is located near the geographic center between Elk and Otter Creek hydrologic basins. Based off precipitation and flow data, the POD concluded that two critical periods had been observed on record, one between 1903 and 1907 and the other between 1951 and 1955. The POD determined that 1951-1955 was the most critical drought period that would affect firm yield, more so than the previous critical period between 1903 and 1907. A period of record was chosen as Jan 1926 to Sept 1959. This allowed for a simulation of the proposed reservoir filling prior to the 1951-1955 critical period,

[6] The term "present" refers to September 1959, which was the time when Appendix A of the Plan of Development was written.

while using actual recorded flow data from Hobart in conjunction with precipitation records would allow flow data to be extended back to Jan 1926.

Extension of Streamflow Records

Elk Creek flow near Hobart and Otter Creek flow at Snyder Lake were extended back through Jan 1926 based on multiple seasonal (monthly values grouped by season) correlations of streamflow and precipitation, and simple correlations of streamflow. Details are provided in the POD in pages A-14 to A-21. In summary, the POD used daily flow data of Elk Creek near Hobart recorded from Oct 1949 to Sept 1959, and estimated monthly flow for Jan 1926 to Sept 1949. For Otter Creek, the POD adjusted the recorded streamflow of Otter Creek at Mountain Park (164 sq miles) to be equivalent to the recorded streamflow of Otter Creek at Snyder Lake (132 sq miles) based on the proportions of their respective drainage areas (as shown in Table A-7), and then performed a correlation analysis based on daily precipitation to derive monthly flow at the Mountain Park Dam Site for Jan 1926 to Mar 1946 (Table A-8).

Inflow into Tom Steed Reservoir

The POD used the extended dataset of Otter Creek inflow at Snyder Lake combined with Elk Creek flow that could be diverted through the Bretch Canal to determine inflow into the reservoir. At the time, no records of Snyder Lake operations were available, and given that there was only one square mile of drainage area between the gage station downstream of Snyder Lake and the Mountain Park Dam location, the POD concluded (see Page A-21) that no adjustments were needed to the Snyder Lake gage data to account for depletions from Snyder Lake. For Elk Creek, the POD examined flow records and calculated divertable flows associated with four different canal capacities, and the POD concluded that a 1,000-cfs canal was the preferred option as detailed on Page A-24. The divertable flow from Elk Creek at the Hobart gage for a 1,000-cfs canal was determined based on computed flows from Jan 1926 to Sept 1949 and recorded flows from Oct 1949 to Sept 1959, and then flows were

adjusted to account for the difference in drainage area between the Hobart gage and the Bretch Diversion, losses at the Diversion, canal losses, and sluicing requirements (Pages A-24 to A-34). The POD concluded that divertable flows were reduced by ten percent.

Water Rights and Inflow Depletions

A resolution adopted by the OWRB on January 10, 1961, established that no water rights were granted or recognized by the construction of floodwater retardation reservoirs in Oklahoma, and that the release of any or all waters (including waters in the sediment pool) was required when needed to satisfy existing water rights. As discussed subsequently in this section the unappropriated waters of Elk and Otter Creeks were withdrawn for the Mountain Park project by the Secretary of the Interior on May 4, 1955. Consequently, the POD assumed that proper administration of the OWRB resolution would require the release of any waters from upstream retardation structures at such times as the conservation pool at Mountain Park Reservoir was less than full. On this basis, no allowance was made in the POD for inflow depletions resulting from upstream retardation reservoirs.

Sedimentation and Storage Allocations

The POD calculated a 100-year storage loss of 17,000 acre-ft caused by sedimentation, yielding a rate of 170 acre-ft/yr. Of this amount, 7,700 acre-ft would be derived by Elk Creek and 9,500 acre-ft from Otter Creek. Also, of the amount, 16,500 acre-ft would be lost from within the conservation, inactive, and dead pool storage (below elevation 1,411.0 ft). Details are provided in Pages A-54 to A-69. The POD used the sedimentation data to derive an elevation-area-capacity curve, depicted numerically on page A-70. The corresponding pool allocations are provided on Page A-71. The top of conservation pool was determined to be at elevation 1,411 ft, corresponding to a conservation pool capacity of 92,300 acre-ft, with an active conservation storage

capacity of 88,455 acre-ft after accounting for 11,000 ac-ft of sediment accumulation.

Reservoir Evaporation

The POD estimated evaporation from a free water surface at the Mountain Park Reservoir to average 63.5 inches annually. The average annual evaporation was distributed by months in accordance with the monthly distribution of evaporation at Chillicothe, Texas (as measured from 1926 to 1955) and Tipton, Oklahoma (as measured from 1956 to 1959). The resulting evaporation values were then adjusted by subtracting 90 percent of the recorded precipitation at the Hobart weather station to obtain the net rate of evaporation from the reservoir surface. This is discussed on Pages A-72 through A-74.

Reservoir Seepage

Seepage from Tom Steed Reservoir was estimated by the POD to be 1.5 cfs or 100 acre-ft per month (1,200 acre-ft annually) as described on Page A-74.

Monthly Distribution of M&I Demands

The POD estimated future demands through the year 2015. The annual M&I requirement for Tom Steed Reservoir was estimated for the year 2015 to be 14.181 million gallons per day (mgd; 15,885 acre-ft/yr), 13.420 mgd of which is required by the city of Altus and 0.761 mgd required by the city of Snyder (Table A-1). These requirements were distributed by months on the pattern of use by Oklahoma City, Oklahoma as described on Page A-74.

Firm Yield Results

The POD included a reservoir operation simulation of the variables described above for the time period from Jan 1926 to Sept 1959. Adopting a conservation pool elevation of 1,411 ft with an active conservation pool capacity of 88,455 acre-ft, and assuming a **critical drought period between 1951 and**

1955, the POD calculated a firm yield of **18,600 acre-ft/yr** after 100 years of sediment accumulation, as indicated on Page A-78. The POD concluded that the reservoir had sufficient storage to "obtain maximum economic development", permitting the cities to meet their entire estimated 2015 water demand of 15,885 acre-ft/yr. These results are validated in this firm yield update and are available upon request.

3.2. Method 2. Pre-Construction Definite Planning Report Firm Yield Update (1949-1969)

As the Mountain Park Project was nearing construction, Reclamation reevaluated the Project based on current conditions, including streamflow and water quality; water demands; costs; and recreation, fish and wildlife, and flood control benefits. Corresponding cost allocations were updated accordingly. Results were documented in a Definite Planning Report (DPR) that was published in July 1970 and revised in February 1971. In this section, the firm yield model is used to confirm the DPR's 1971 reevaluation of the Mountain Park Project.

Updated Assumptions

Based on new topography available from the United States Geological Survey (USGS), the conservation pool capacity at elevation 1411.0 ft was revised from 88,455 acre-ft to 77,608 acre-ft, which was about 12 percent less than what was previously estimated in the 1962 POD[7]. The flood control pool elevation was adjusted upward from 1413.92 ft to 1414.03 ft to maintain the required 20,000 acre-ft of flood control capacity. All other reservoir elevations, including the 100-year sediment volume of 17,000 acre-ft, remained the same as what was

[7] The 1971 DPR references "House Document 438", which cited findings from the 1962 POD.

estimated in the POD with reservoir area and capacity values adjusted downward. Table 1 on Page 5 of the DPR summarizes the revised data.

The period of record for the DPR was updated and extended to include the period between Oct 1959 to Sept 1969. The full period of analysis was Oct 1949 to Sept 1969. Updated streamflow records showed that the critical period determining reservoir firm yield changed from between 1951 and 1957 to the period between 1962 and 1968.

Inflow into Tom Steed Reservoir was depleted to account for new land treatment measures and floodwater-retardation structures in the Elk and Otter Creek basins that were either planned or under construction by the Soil Conservation Service at the time of the DPR. Elk Creek was depleted by 16.3 percent, and Otter Creek was depleted by 2.9 percent.

Water demand requirements on Tom Steed Reservoir were updated to include an additional demand by the city of Fredrick, and projections were extended one decade to the year 2025, resulting in a total demand requirement of 14.262 mgd (15,975 acre-ft/yr). No revisions were made to pumping plant and pipeline capacities. As well, no revisions/updates were made to evaporation, seepage, or sedimentation rates. acre-ft

Firm Yield Results

The DPR included a reservoir operation simulation using the simulations of the variables described above for the time period from Oct 1949 to Sept 1969. Adopting a conservation pool elevation of 1,411 ft with an active conservation pool capacity of 77,608 acre-ft, and assuming a **critical period between 1962 and 1968**, the DPR calculated a firm yield of **16,100 acre-ft/yr** after accounting for 50 years of sediment accumulation and **14,700 acre-ft/yr** after accounting for 100 years of sediment accumulation (Page 7-9 and Table 3 of the DPR). The former corresponds to a firm yield in the year 2025, and the latter corresponds to a firm yield in 2075 given the fact that Tom Steed Reservoir was constructed in 1975. These results showed that the reservoir would have sufficient storage to

meet M&I demand requirements through the year 2025. These results are validated in the firm yield update and are available upon request.

3.3. Method 3. Post-Construction Firm Yield Update (1926-2016)

In Sections 2.1.1 and 2.1.2, the firm yield model was validated by replicating the 1962 POD and 1971 DPR calculations of Tom Steed Reservoir firm yield, respectively. In this section, the data and assumptions used to derive these earlier firm yield calculations were updated/revised to reflect post-construction conditions and to account for the best available data through Dec 2016.

Available Flow and Precipitation Data

West Otter Creek and Glen Creek Drainage Areas

Of the three sources of recorded Otter Creek flows discussed in the POD and DPR, the Mountain Park streamgage (USGS 07306500) and the Snyder Lake streamgage (USGS 07305500) were considered in this updated analysis[8]. Recall that the Mountain Park streamgage recorded flows from Mar 1946 to Sept 1951. The Snyder Lake streamgage recorded flows from Oct 1951 to June 2003. In addition to these gage data, Tom Steed Reservoir storage data are available since its construction in 1975. Using reservoir elevation data recorded by HydroMet[9] (Reclamation, 2020), streamflows can be calculated for the post-construction period. To determine which data were considered best for the firm yield analysis, a comparison was made between pre-construction streamflow recorded at the Snyder Lake and Mountain Park streamgages with computed inflow based on observed post-construction reservoir elevation data. Correlations between rainfall and streamflow were analyzed using precipitation recorded at the Roosevelt station and flow recorded at the Mountain Park streamgage, Snyder Lake streamgage, and computed inflow based on observed post-construction reservoir

[8] The staff gage that recorded flow from Apr 1903 to Mar 1908 was not included because the recorded period was prior to the period of record considered here.
[9] The HydroMet network collects remote field data and transmits it via satellite to provide real-time reservoir storage data.

elevation data. As shown in Table 3, despite similar rainfall between pre-construction period (2.2 inches combined at both gage locations) and the post-construction period (2.5 inches), mean, median, and mode streamflow values were significantly lower for the pre-constrution period (1,318 acre-ft/month; 30 acre-ft/month; and 0 acre-ft/month, respectively) than for the post-construction period (2,915 acre-ft/month; 850 acre-ft/month; and 160 acre-ft/month, respectively). The lower relative streamflow values for the pre-construction period show the influence that Snyder Lake dam had on regulating and diminishing flows of Otter Creek. As further discussed below under "Extension of Streamflow Records", computed streamflow using a data regression with precipitation provides a more reliable estimate of pre-construction reservoir inflow than the observed flows recorded at the Snyder Lake and Mountain Park streamgages.

Table 3. Comparison between pre-construction rainfall and streamflow recorded at the Snyder Lake and Mountain Park dam streamgages with post-construction rainfall and computed inflow based on reservoir elevation data available from Hydromet (Reclamation, 2020).

	Pre-Construction Streamflow			Post-Construction Computed Streamflow
	Mountain Park Gage	Snyder Lake Gage	Combined Record	
Period (months)	53	214	267	497
Average Precipitation (inches)	2.4	2.1	2.2	2.5
	Streamflow (acre-ft/month)			
Mean	1,986	1,153	1,318	2,915
Median	30	0	10	850
Mode	10	0	0	160

Elk Creek

Of the three recorded sources noted in the POD and DPR, only flow recorded at the Hobart gage, USGS 07304500, was used in this update because the other two gages only recorded flow before 1908 and for such short periods of time (less than five years). At the time of the DPR, Hobart streamgage data were available between Oct 1949 and Sept 1969. Since construction of Tom Steed Reservoir in 1975, the Hobart streamgage recorded daily flows for another 24 years until Sept 1993 when it was discontinued. Therefore, the Hobart

streamgage record used for this analysis exists from Oct 1949 to Sept 1993. The methods used to derive monthly divertable flows for this period and for an extended period to Dec 2016 are discussed below. Monthly divertable streamflow between Jan 1926 to Sept 1949 was taken directly from the POD (Table A-9).

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, precipitation from the Roosevelt station was used in the comparison of pre- and post-construction streamflow data discussed above, and regional precipitation also was used to determine the critical drought period and period of record as described below. Finally, the Roosevelt precipitation station, which recorded monthly rainfall between Dec 1943 and Dec 2016, was used to extend the streamflow records of Otter Creek. This is discussed later in this report under "Extension of Streamflow Records".

Determining the Period and Drought of Record

The precipitation and temperature data for Oklahoma Climate Division 7 (Vose et al, 2014), as well as the combined streamflow of the Elk and West Otter-Glen Creek drainage basins, were evaluated to determine the presence of historical critical drought periods needed for the firm yield analysis. Based off precipitation and temperature data (Figure 7), the 1950s and 1960s critical periods identified by the POD and DPR, respectively, were confirmed as some of the driest and warmest years on record. The 1930s also included some of the driest and warmest years on record (Figure 7). Following a long, wet period between the late 1980s and 1990s, another drought period was observed between 2010 and 2015, as noted by lower precipitation (Figure 7) and the two warmest years on record [(2011 and 2012); (Figure 7)]. What set the period between 2010 and 2015 apart from other dry periods on record was the streamflow conditions relative to other drought periods on record (Figure 8). The lowest five-year running average

streamflows over the period of record are as follows: 40,300 acre-ft/yr (1930 to 1934); 42,500 acre-ft/yr (1952 to 1956); 35,500 acre-ft/yr (1963 to 1967); 38,900 acre-ft/yr (1966 to 1970); 41,300 acre-ft/yr (2008 to 2012); 33,100 acre-ft/yr (2009 to 2013); and 29,300 acre-ft/yr (2010 to 2014). Based on these data, the period 2010 to 2015 was identified as the new critical drought of record for this firm yield update. The period of record for this analysis was selected to be Jan 1926 to Dec 2016. This allowed for a simulation of Tom Steed Reservoir during the 2010-2015 drought of record.

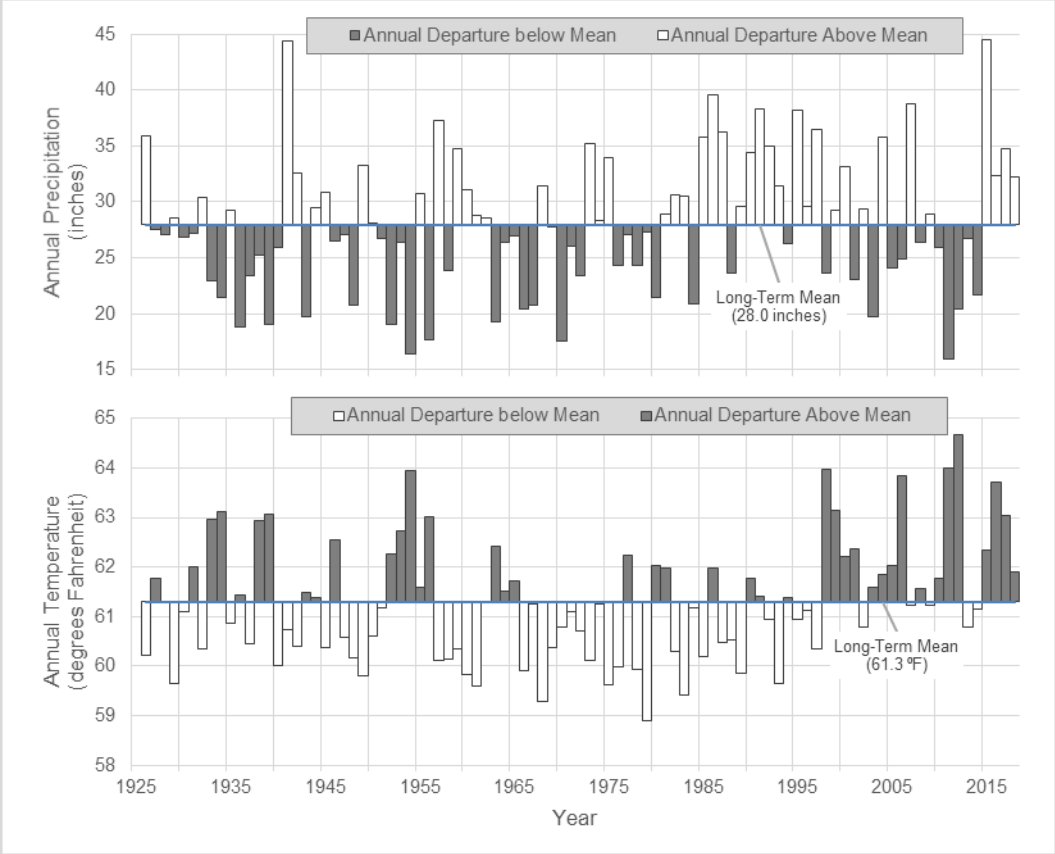

Figure 7. Observed droughts (dark gray shading) are defined such that a drought is initiated when annual precipitation is below the long-term mean and annual temperature is above the long-term mean, and the drought ends when annual precipitation is above the long-term mean and annual temperature is below the long-term mean.

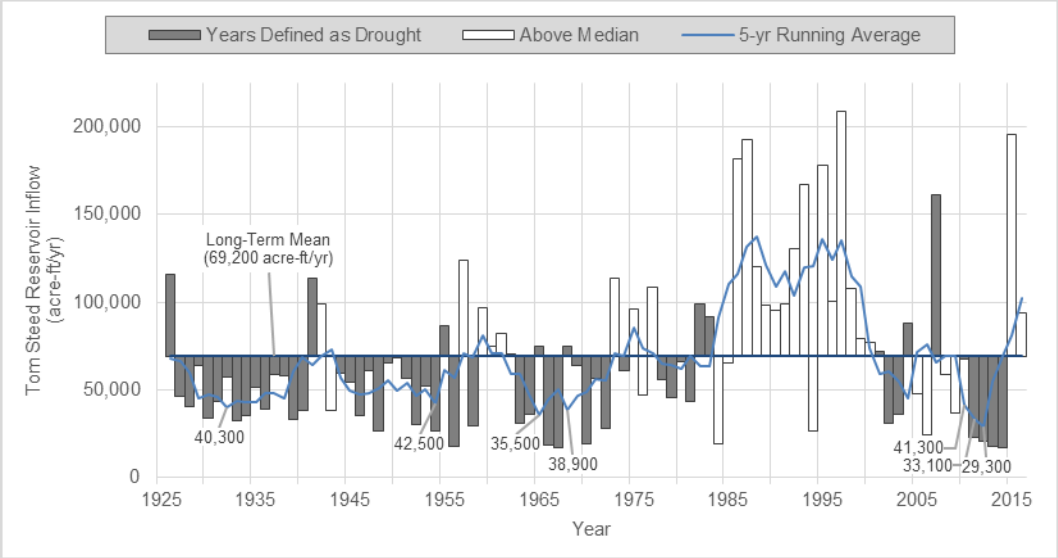

Figure 8. Observed droughts (dark gray shading) are defined such that a drought is initiated when the five-year running average streamflow (blue line) is below the long-term mean, and the drought ends when the five-year running average streamflow is above the long-term mean.

Extension of Streamflow Records

West Otter Creek and Glen Creek Drainage Areas

As previously discussed, the lower relative streamflow values for the pre-construction period showed the influence that Snyder Lake dam had on regulating and diminishing flows of Otter Creek, and we concluded that post-construction computed streamflow provides a more reliable estimate of pre-construction reservoir inflow than the observed flows recorded at the Snyder Lake and Mountain Park streamgages prior to construction. However, to obtain reliable estimates of pre-construction inflow, a regression analysis was performed correlating post-construction computed streamflow with post-construction recorded precipitation between 1975 and 2016. The post-construction precipitation-streamflow correlation data were then used to extend pre-construction streamflow based on pre-construction recorded precipitation between 1926 and 1975. Because a monthly time series of streamflow data are needed for the firm yield model, multiple steps had to be taken, the details of which follow:

Step 1. Extend pre-construction annual precipitation data from post-construction annual precipitation data

As previously stated, the only precipitation station in the watershed is located in Roosevelt, Oklahoma as collected by the National Weather Service's Cooperative Observer Program.[10] It recorded rainfall between Dec 1943 and Dec 2016. The post-construction monthly rainfall record between Jun 1975 and Dec 2016 is complete. Pre-construction monthly rainfall data between Dec 1943 and Dec 1949 is mostly incomplete, so only a portion of the pre-construction period (Jan 1950 to May 1975) data are available. Precipitation data prior to Jan 1950 are available from other precipitation stations in the area, but the data are on an annual time series, not monthly. To obtain monthly precipitation data prior to 1950, the first step is to obtain annual precipitation data prior to 1950 (i.e., between 1926 and 1949). Annual precipitation data were collected from the nine closest (within 45 miles) precipitation stations to the Roosevelt station (Table 4). These stations were mapped to determine each station's relative distance from Roosevelt, and using the Distance Power Method (a.k.a., Inverse Distance Weighting; Lam, 1983), the stations were used to extend (extrapolate) Roosevelt's annual precipitation record back to 1926 (Figure 9). Table 5 provides an example of this calculation with the relative weights corresponding to the nine gages used in the analysis. To verify results, a correlation analysis was performed for a ten-year overlapping period between 1950 and 1959; the analysis showed a 93 percent correlation between the extended precipitation data and precipitation recorded at the Roosevelt station over the 10-year period (Figure 9; Table 6).

[10] Additional information about this program can be accessed at https://www.ncdc.noaa.gov/data-access/land-based-station-data/land-based-datasets/cooperative-observer-network-coop.

Table 4. Precipitation stations, period of record, and distance from Roosevelt.

Precipitation Stations	Period of Record	Distance from Roosevelt (miles)
Altus	1926-37, 1939-47, 1949-59	23
Cordell	1938-43, 1945-1959	31
Elk City	1927-59	45
Frederick	1926-59	32
Hobart	1926-59	14
Snyder	1947, 1949-1959	15
Tipton	1939-59	25
Cloud Chief	1926-59	30
Wichita Mountain Wildlife Refuge	1926-59	25

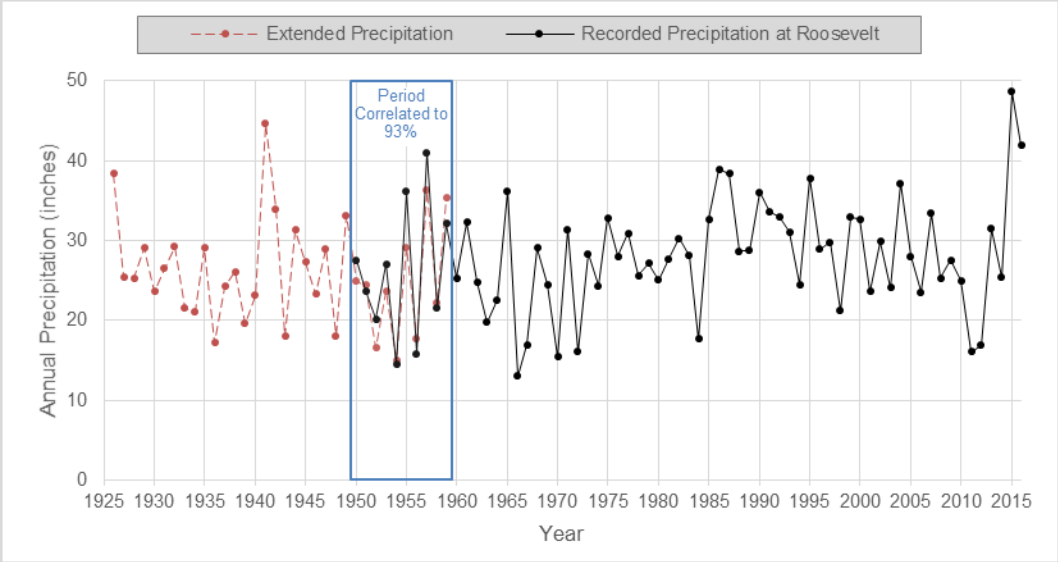

Figure 9. Recorded and extended annual precipitation data for Roosevelt, OK.

Table 5. Example of Distance Power Method calculation for the year 1949.

Precipitation Stations	Distance from Roosevelt (miles)	Precipitation in 1949 (inches)	Distance Weighting	Weighted Precipitation
Altus	23	37.00	1 / 232 = 0.0019	37.00 x 0.0019 = 0.07
Cordell	31	28.19	1 / 312= 0.0010	28.19 x 0.001 = 0.03
Elk City	45	28.54	1 / 452= 0.0005	28.54 x 0.0005 = 0.01
Frederick	32	32.66	1 / 322 = 0.0010	32.66 x 0.001 = 0.03
Hobart	14	33.08	1 / 142= 0.0051	33.08 x 0.0051 = 0.17
Snyder	15	35.18	1 / 152 = 0.0044	35.18 x 0.0044 = 0.16
Tipton	25	28.23	1 / 252= 0.0016	28.23 x 0.0016 = 0.05
Cloud Chief	30	30.99	1 / 302= 0.0011	30.99 x 0.0011 = 0.03
Wichita Mt. WLR	25	35.11	1 / 252= 0.0016	35.11 x 0.0016 = 0.06
1949 Total Weighting			∑ = 0.0183	∑ = 0.6062
1949 Extended Data for Roosevelt			0.6062 / 0.0183 = 33.20	

Table 6. Correlation of annual precipitation recorded at Roosevelt with extended annual precipitation derived using the Distance Power Method, 1950-1959.

Year	Precipitation Recorded at Roosevelt (inches)	Extrapolated Precipitation (inches)	Covariance Between Records
1950	27.55	24.86	(27.6-26)(24.9-24.5) = 0.52
1951	23.83	24.43	(23.8-26)(24.4-24.5) = 0.22
1952	20.16	16.59	(20.2-26)(16.6-24.5) = 46.1
1953	27.09	23.68	(27.1-26)(23.7-24.5) = -0.95
1954	14.44	15.02	(14.4-26)(15-24.5) = 110
1955	36.13	29.16	(36.1-26)(29.2-24.5) = 47.0
1956	15.83	17.71	(15.8-26)(17.7-24.5) = 69.2
1957	40.99	36.29	(41-26)(36.3-24.5) = 177
1958	21.54	22.24	(21.5-26)(22.2-24.5) = 10.1
1959	32.13	35.33	(32.1-26)(35.3-24.5) = 66.5
Mean	25.97	24.53	-
Standard Deviation	8.59	7.32	-
Covariance Between Records	-	-	∑ = 58.3
Correlation Coefficient	-	-	58.3 / [(8.59)(7.32)] = 0.93

Step 2. Convert pre-construction annual precipitation data to a monthly time step

The extended annual precipitation data for the Roosevelt station were converted into a monthly time step between Jan 1926 and Dec 1949. This was done by first identifying years when the recorded and extended time series at the Roosevelt station had similar precipitation totals (Figure 10). Each of the 23 years within the extended record were matched to a similar rainfall year recorded at Roosevelt, with a maximum difference of only seven percent in total rainfall for any given year selected; all other differences were limited to less than two percent. For each of the 23 years, the monthly distribution recorded at Roosevelt on or after 1950 was used as the monthly distribution for the extended time series prior to 1949. For example, looking at Figure 10, the monthly distribution of rainfall recorded in 2016 was used as the monthly distribution of rainfall for the year 1941. This process was completed to derive a monthly precipitation time step for the entire period of record from Jan 1926 to Dec 2016.

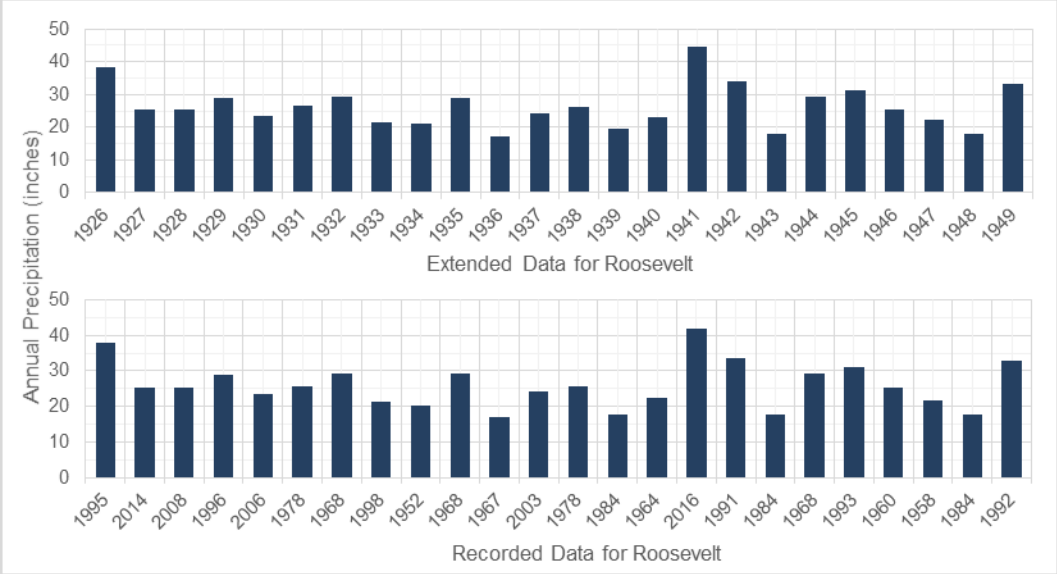

Figure 10: Years when the recorded and extended time series at the Roosevelt station had similar precipitation totals.

Step 3: Convert pre-construction monthly precipitation data to pre-construction monthly inflow

Finally, the extended monthly precipitation data were used to estimate monthly pre-construction inflow between Jan 1926 and May 1975. This was done by performing a regression analysis relating seasonal post-construction precipitation with post-construction computed streamflow, and then using the regression results to relate pre-construction precipitation with pre-construction streamflow. The Correlation Coefficient ranges between 0.71 and 0.91 depending on the season, and is 0.90 overall (Table 7), indicating a fairly strong positive relationship between post-construction precipitation and streamflow[11]. The R-squared value shows that post-construction precipitation accounts for between 60 percent and 82 percent of the variation in post-construction streamflow depending on the season, and accounts for 79 percent of the variation overall (Table 7). Looking at Figure 11, to calculate pre-construction streamflow, "*y*", pre-construction precipitation "*x*" must be applied to the fixed proportion between post-construction precipitation and streamflow as described by the exponents and multipliers listed in Table 7. Tables of monthly values are included in Table 12 and Table 13 in the Appendix. The full record of annual inflow from the West Otter and Glen Creek drainage basins is illustrated in Figure 12.

Table 7. Summary of regression and correlation results comparing seasonal post-construction precipitation and computed streamflow in the West Otter and Glen Creek drainage basins, Jun 1975 to Dec 2016.

Season / Period	Number of Observations	Exponent	Multiplier	R-Squared	Correlation Coefficient
April-June	123	1.80	356	82%	0.91
July-October	168	2.35	99	77%	0.88
November-March	206	1.85	474	60%	0.77
All Months (1975-2016)	497	-	-	79%	0.90

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

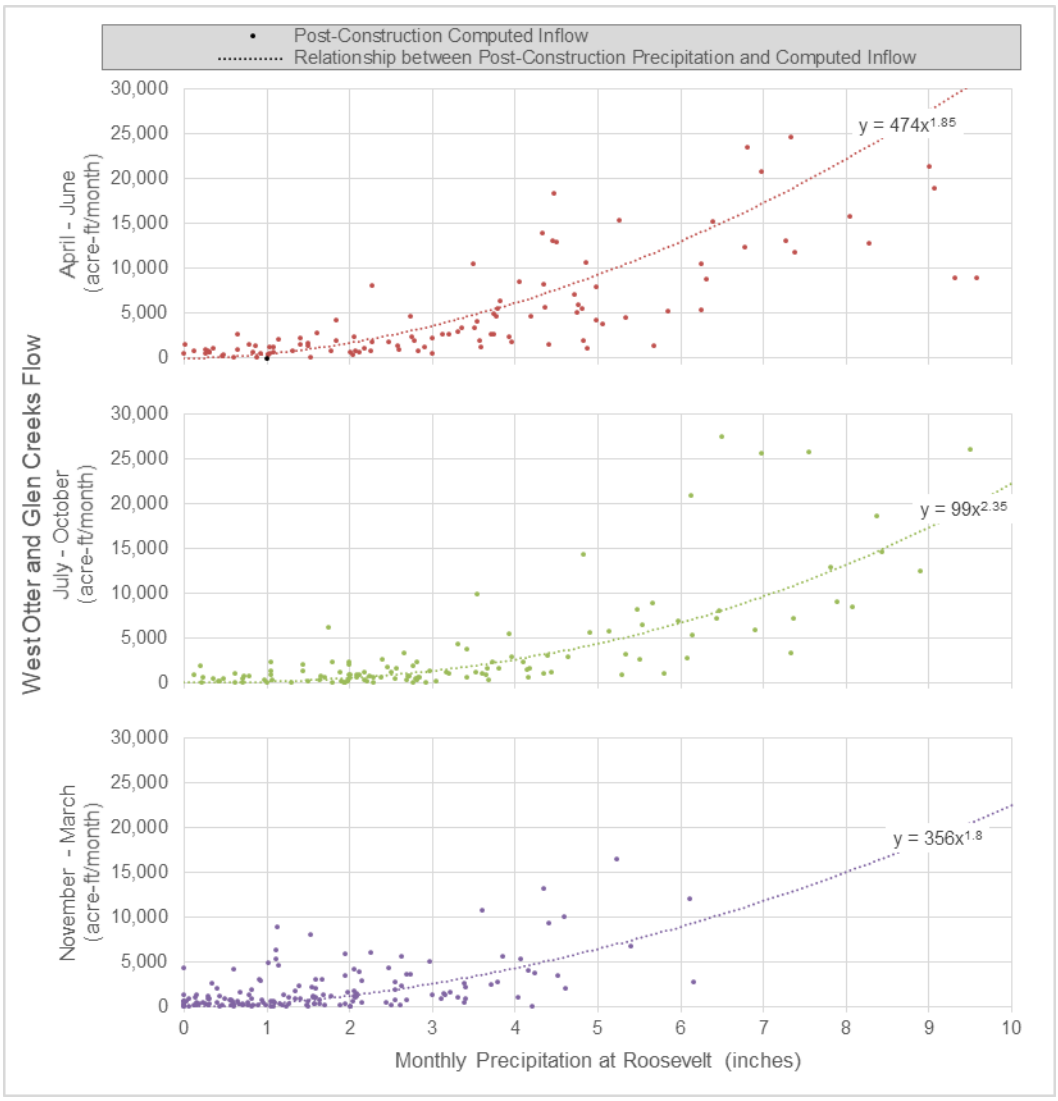

Figure 11. Trend line showing the relationship between seasonal post-construction precipitation and computed streamflow in the West Otter and Glen Creek drainage basins.

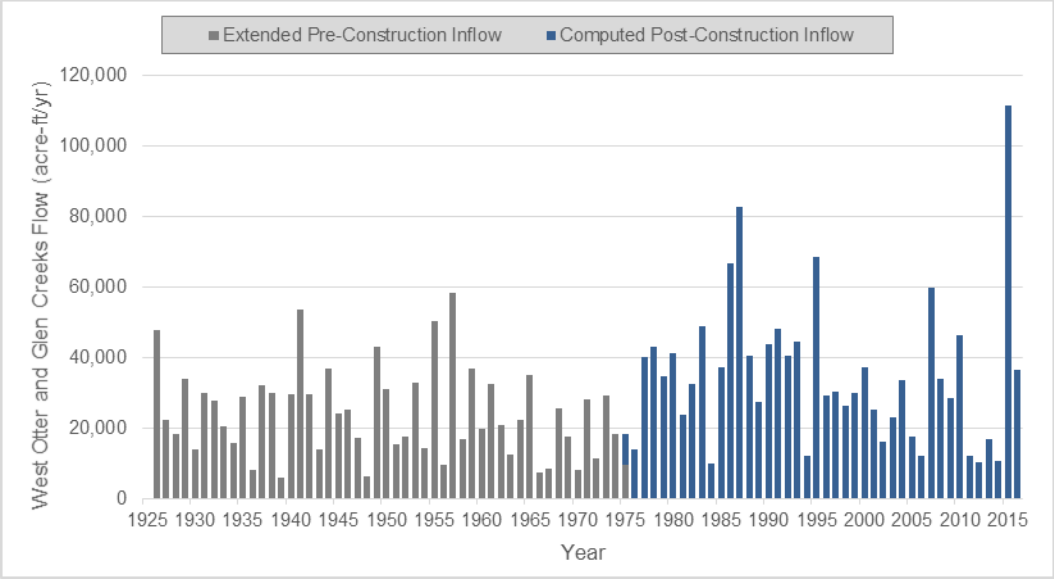

Figure 12. Annual inflow into Tom Steed Reservoir from West Otter and Glen Creeks. Flows between June 1975 and Dec 2016 are computed using Tom Steed Reservoir storage elevation data. Flows between Jan 1926 and May 1975 are extrapolated based on correlations between recorded precipitation and post-construction computed streamflow.

Elk Creek

Elk Creek streamflow must first be evaluated on a daily time step because Elk Creek does not have continuous flow year-round, and diversions only occur on days when sufficient flow is available. Once daily divertable flows are known, they can be totaled by month and input into the firm yield model. Of the three gages noted in Section 2.1.1, only flow recorded at the Hobart gage, USGS 07304500, was used in this update because the other two gages only recorded flow outside the period of record.

The Hobart gage recorded daily flows from Oct 1949 to Sept 1993. Because no data exist at the Hobart streamgage beyond 1993, more recent flow data recorded in nearby watersheds were used to extend the Hobart streamgage data on Elk Creek to Dec 2016. Seven streamgages were identified within a 50-mile radius of the Hobart streamgage (Table 8). A regression analysis was performed to determine how well flows recorded at each of the seven streamgages correlate with flows recorded at the Hobart streamgage between Oct 1949 and Sept 1993. Of the seven streamgages evaluated, the NFRR flow at the Headrick showed the strongest relationship with Elk Creek flow recorded at the Hobart

streamgage, with an R-squared of 87 percent and a correlation coefficient of 0.92 (Table 8). According to the linear regression line is displayed on Figure 13, the rate of change of Elk Creek flow relative to flow recorded at the Headrick streamgage is 0.281, as indicated by the slope of the regression line. Therefore, the extended monthly flows at the Hobart streamgage between Oct 1993 and Dec 2016 were derived by multiplying monthly flows recorded by the Headrick streamgage between Oct 1993 and Dec 2016 by 0.281. Monthly flows are displayed in Appendix Table 18.

Table 8. Results from the linear regression analysis and calculated correlation coefficient. The correlation of data recorded at the Hobart-Headrick streamgages between Oct 1949 and Sept 1993.

USGS Streamgage	Distance to Elk Creek Gage (miles)	Regression Period Tested	R Squared	Correlation Coefficient
NFRR at Headrick (07305000)	20.4	Oct-49 to Sep-93	87%	0.92
NFRR at Tipton (07307028)	30.4	Jun-83 to Sep-93	86%	0.91
SFRR at Elmer (07301110)	35	Oct-79 to Sep-93	67%	0.76
Washita River at Clinton (07325000)	41.8	Oct-49 to Sep-93	54%	0.68
NFRR at Carter (07301500)	27.5	Oct-49 to Sep-93	54%	0.67
SFRR at Mangum (07300500)	23.3	Oct-49 to Sep-93	47%	0.61
Washita River at Hammon (07324200)	51	Oct-69 to Sep-93	47%	0.61

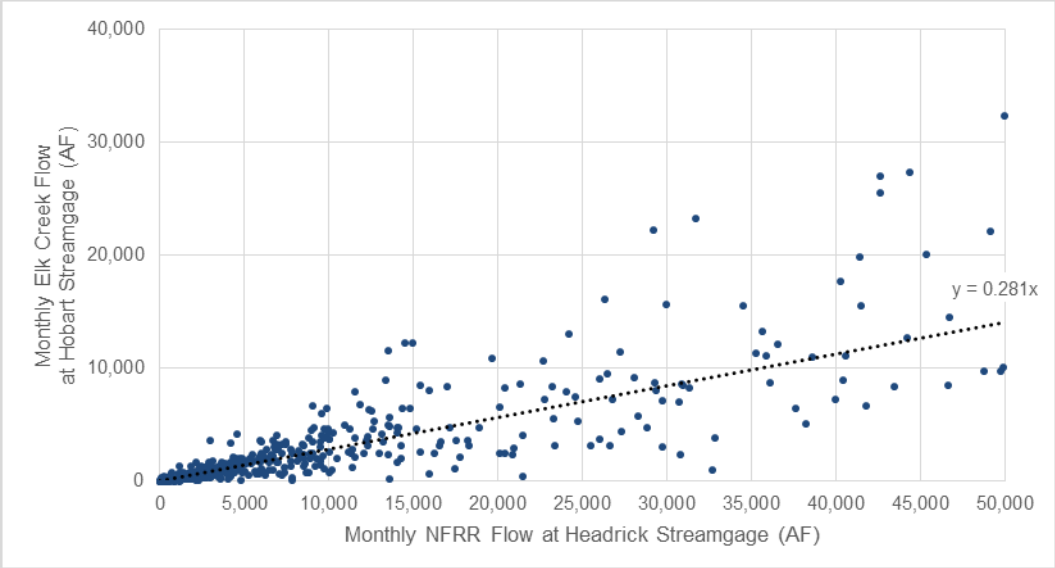

Figure 13. Linear regression results showing the relationship between flow in the NFRR at Headrick and flow in Elk Creek at Hobart.

Next, the extended Hobart streamgage dataset (Oct 1993 to Dec 2016) was adjusted to derive Elk Creek flows at the Bretch Diversion. Because the Bretch diversion is 2.3 river miles upstream from the Hobart streamgage, contributing flows emanating within the ten square-mile watershed downstream of the Bretch diversion had to be subtracted from the extended Hobart streamgage flows. An adjustment factor of 0.983 was calculated by dividing the contributing watershed size to the Bretch diversion (540 square miles) by the total watershed contributing to flow at the Hobart streamgage (549 square miles). Therefore, monthly flow at the Bretch diversion was derived by multiplying the extended Hobart streamgage dataset (Oct 1949 to Dec 2016) by 0.983. Figure 14 illustrates recorded (1949-1993) and extended (1993-2016) annual streamflow for Elk Creek at the Hobart streamgage, as well as adjusted flow at the Bretch Diversion Dam. Monthly flows are provided in Appendix Table 19.

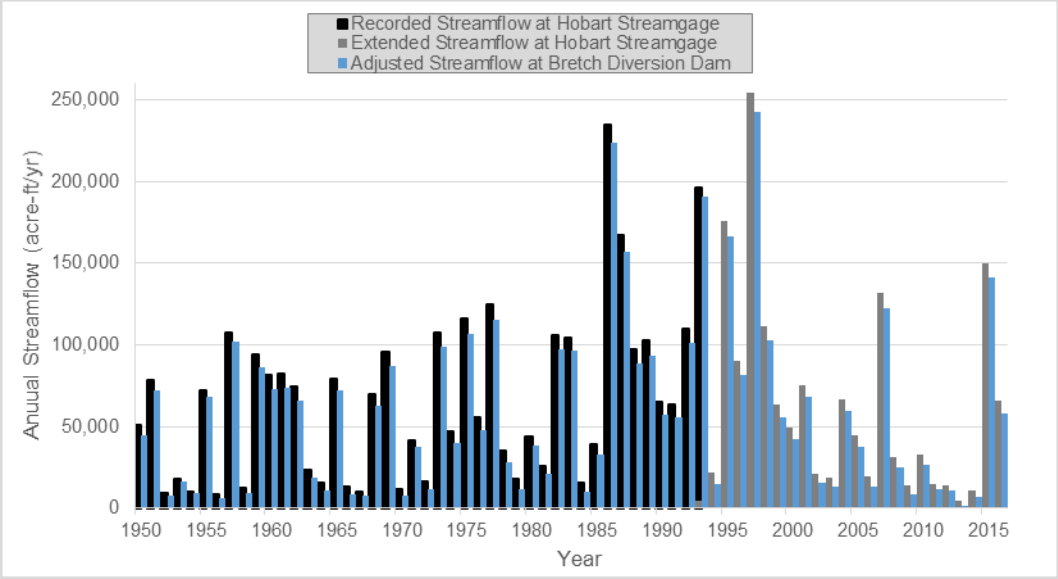

Figure 14. Recorded (1949-1993) and extended (1993-2016) annual streamflow data for Elk Creek at the Hobart streamgage, as well as adjusted flow at the Bretch Diversion Dam.

Next, the extended monthly Elk Creek flows at the Bretch diversion were converted to a daily time step through a process called temporal disaggregation. Annual flows were calculated for both the recorded period (Oct 1949 to Sept 1993) and the extended (disaggregation) period (Oct 1993 to Dec 2016), and years were ranked from driest to wettest. Weights were assigned to each year in the recorded period based on how closely that year ranks relative to a particular disaggregation year (Nowak et al. 2010). For example, if a disaggregation year is ranked at the 50th percentile (median), years in the recorded period close to the 50th percentile receive higher weights, and years in the recorded period farther away from the 50th percentile receive less weight. For each year in the disaggregation period, a set of recorded years with the highest weights relative to that year were selected for further evaluation. Using that subset of recorded years, individual months within those recorded years were compared with the months of the disaggregation year to identify the recorded year(s) where the month of maximum flow matched the maximum flow month of the disaggregation year. If none of the high-weighted recorded year maximum flow months matched the maximum flow months of the disaggregation year, then the months before and after were considered. If none of those months matched, then

two months before and after were considered. Once the most suitable recorded year match was identified, daily flows from that recorded year were assigned to the corresponding days of the disaggregation year, and the daily flows were proportionally adjusted such that the total flow each month was equal to the monthly totals for the disaggregation year. For example, if the recorded flow disaggregation flow ratio for February flow is 0.8, then each daily recorded flow would be reduced by a factor of 0.2 to create the daily flows for the disaggregation month. The full record of daily flows was then used to calculate divertable flows (i.e., inflow) into Tom Steed Reservoir, which is discussed below.

Inflow into Tom Steed Reservoir

West Otter Creek and Glen Creek Drainage Areas

The full record of extended monthly inflow from West Otter and Glen Creeks (Jan 1926 to Dec 2016), as derived using the methods described above, were input into the firm yield model as monthly inflow into Tom Steed Reservoir.

Elk Creek

Inflow into Tom Steed Reservoir was calculated as monthly divertable flows at the Bretch Diversion Dam. Recall that divertable flows between Jan 1926 and Sept 1949 were taken directly from the POD before daily data were available. The daily recorded and adjusted flow records from Oct 1949 through-Dec 2016 were analyzed to determine monthly divertable flows. The Bretch canal has a capacity of 1,000 cfs and can divert flows above 10 cfs (Reclamation, 1983). The flow through the canal is controlled by a single radial gate with an invert elevation at 1,455 ft (water stored below this elevation cannot enter the canal by gravity) and a maximum gate opening of 10.4 ft (i.e., elevation 1,465.4 ft) which limits flow to the canal capacity.

Before entering the canal, flows are regulated in a small reservoir formed by the diversion dam. The diversion dam is designed to store water up to the normal reservoir water surface elevation of 1,465.4 ft. Based on an area-capacity

curve plotted using elevation contours extracted from the 10-meter National Elevation Dataset (NED) for Kiowa County, it was determined that the regulating reservoir can store approximately 970 acre-ft of streamflow, with 810 acre-ft of active capacity that could be diverted through the canal (invert elevation 1,455 ft) (Figure 15).

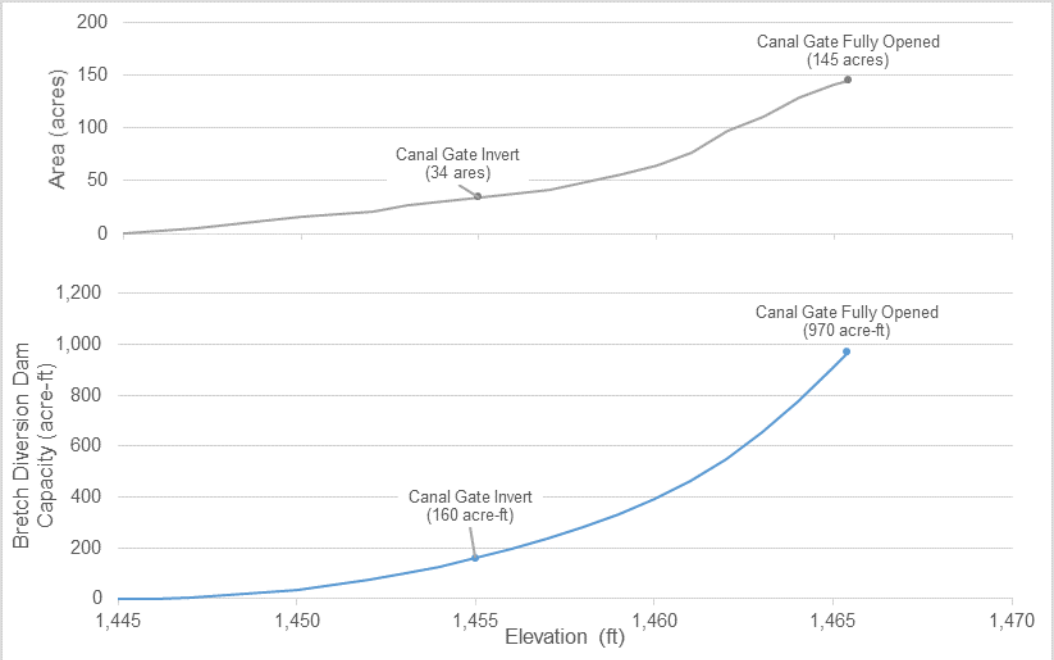

Figure 15. Bretch Diversion Dam area capacity curves.

Daily evaporative losses out of the regulating reservoir were estimated using monthly evaporation rates for Tom Steed Reservoir by multiplying the rate (inches per day) times the surface area of the diversion dam reservoir. Seepage losses were estimated to range from only one to two acre-ft per day depending on the storage volume (volumes less than 160 acre-ft in storage are assumed to result in the lower estimate for seepage of one acre-ft per day and greater storage volumes resulting in two acre-ft per day). This assumed rate for seepage is consistent with estimates in the POD for canal seepage losses, although no actual seepage from the regulating reservoir was evaluated during the POD.

Using the physical limitations of the existing infrastructure and assumptions for losses from evaporation and seepage, the modeled daily divertible streamflows for

Elk Creek were totaled to determine the maximum monthly divertible streamflows for Tom Steed Reservoir. Figure 16 illustrates the total annual adjusted streamflow along with the divertable streamflow at the Bretch Diversion Dam between 1949 and 2016.

Monthly divertable flows between Oct 1949 and Dec 2016 are displayed in Appendix Table 17 and Table 18. These data were combined with the total monthly divertable streamflow calculated by the POD between Jan 1926 to Sept 1949 to derive a complete period of record of monthly divertable Elk Creek flows between Jan 1926 and Dec 2016 (Appendix Table 19).

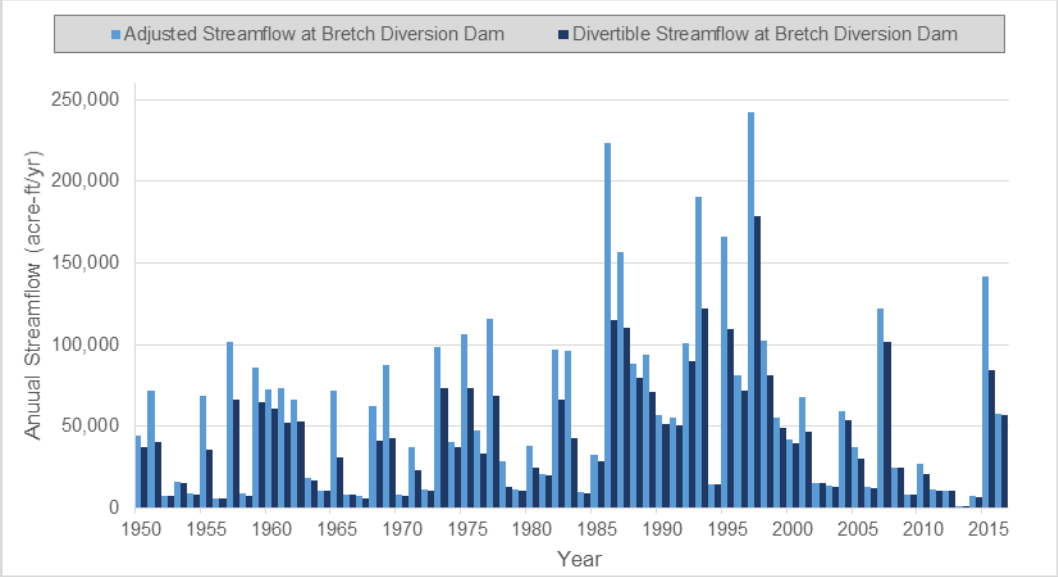

Figure 16. Adjusted and Divertable annual streamflow at the Bretch Diversion Dam, 1949-2016.

Water Rights and Inflow Depletions

An important factor to consider when determining the water supply available from Tom Steed Reservoir is the depletion 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 require permits, while other withdrawals for domestic and household uses do not require permits.

Recall that the POD provided no allowances for inflow depletions. This is because no floodwater retention structures were contemplated at the time, and it was assumed that any future structures would be required to release stored water when Tom Steed Reservoir was less than full. The POD also assumed that the withdrawal of all unappropriated waters in 1955 meant that no new streamwater rights would be permitted by OWRB. In the DPR however, because new land use developments and flood retention structures were either planned or under construction, West Otter and Glen Creek inflow was reduced by 2.9 percent and Elk Creek inflow was reduced by 16.3 percent to account for future development.

For this firm yield update, similar allowances were made as those made for the DPR for Elk Creek by applying a 16.3 percent depletion to flows from Jan 1926 through Dec 1970 to account for the absence of floodwater regulation structures in the Elk Creek basin that were either planned or under construction by the Soil Conservation Service after 1970. The reductions for Elk Creek were applied before calculating divertible flow as previously described. Since the entire record of flows from West Otter and Glen Creek were developed using post-construction data, it is assumed that the reductions from development within this watershed are already accounted for; therefore, the additional 2.9% depletion that was made in the DPR was not made for this firm yield update.

Even though additional future inflow depletions in both drainage areas are expected through 2060, the volume of those depletions was not considered when updating and extending the POD and DPR firm yield approaches, which was the purpose here. However, in Method 4, depletions caused by both ground and surface water development upstream of Tom Steed Reservoir are quantified through a separate and extensive modeling effort, and are subsequently accounted for in that firm yield analysis.

Sedimentation and Storage Allocations

Since the POD and DPR, two sediment surveys have been completed for Tom Steed Reservoir: one in 2009, and one in 2018. Both sediment surveys show negligible sediment accumulation within the conservation pool since reservoir construction. While negligible sediment accumulation may be partially attributable to inconsistencies between the survey methods over time, many factors attribute to changes in sediment accumulation. The location, magnitude, and frequency of inflow events are a main contributing factor. The POD and DPR concluded that the Elk Creek watershed would contribute more sediment than West Otter and Glen Creek drainage basins. However, since construction, diversions from Elk Creek have only contributed 15 percent of the total inflow into Tom Steed Reservoir, most of which has occurred since the year 2000. This is because the wet period throughout the 1980s and 1990s provided sufficient inflows from West Otter and Glen Creek drainage basins to meet the demands on Tom Steed Reservoir; and leading up to the 2010-2015 drought, diversions from the Bretch diversion were not as high as they could have been. Whatever the case may be, for planning purposes, this analysis assumes that sedimentation would continue to accumulate in Tom Steed Reservoir at a rate of 165 acre-ft/yr, which was the projected rate used in the DPR.

This sedimentation rate is applied to reservoir storage based on the area capacity curve generated by the 2009 sediment survey[12]. For consistency between

[12] The 2018 sediment survey yielded an almost identical area capacity curve and the same firm yield estimate as the 2009 sediment survey. Furthermore, the firm yield estimate in Method 4 (Section 2.1.4) is based on the 2009 sediment survey, and the decision was made to ensure consistency between Methods 3 and 4.

Methods 3 and 4 (Section 2.1.4), the 2009 survey was used in the model for this update. Based on the 2009 survey, the storage capacity of Tom Steed Reservoir at the top of conservation pool (elevation 1,411 ft) in 2009 was estimated to be 97,300 acre-ft (Reclamation, 2010). Applying a sediment accumulation rate of 165 acre-ft/yr from the year 2009, the storage capacity at the top of conservation pool was estimated to be 88,900 acre-ft in the year 2060, and 86,400 acre-ft/yr in the year 2075 (Table 9).

Table 9. Tom Steed Reservoir change in area capacity over time based on a projected sediment rate of 165 acre-ft/yr (Reclamation, 2010).

Reservoir Pool	Reservoir Elevation (ft)	2009 Survey Conditions		Projected Capacity based on Sediment Accumulation (acre-ft)		
		Area (acres)	Capacity (acre-ft)	2025 (16 yrs remaining)	2060 (51yrs remaining)	2075 (66yrs remaining)
Conservation	1411.0	6,362	92,900	91,100	87,200	85,500
Inactive	1386.3	1,176	4,400	3,500	1,700	900
Reservoir Storage	Below 1411.0	-	97,300	94,600	88,900	86,400
Storage Lost to Sediment Accumulation	-	-	-	2,700	8,400	10,900

Reservoir Evaporation

Reservoir evaporation losses for the post-construction model period were calculated by multiplying monthly pan evaporation measurements[13] by a free surface coefficient factor of 0.7 to obtain a monthly net evaporation rate for the reservoir (Kohler et. al., 1955). The monthly net evaporation rate was then multiplied by the reservoir surface area to obtain monthly evaporative losses out of Tom Steed Reservoir. Reservoir surface area was assumed to remain unchanged and is based on the original area capacity curve developed in the POD. Monthly pan evaporation measurements and monthly net reservoir evaporation rates are cited in the Appendix (Table 23 through Table 27).

For the pre-construction model period between Jan 1926 and Dec 1959, data from Method 2 was used for net evaporation at Tom Steed Reservoir (a combination of data from Chillicothe, TX and Tipton, OK). For the pre-construction model period between Jan 1947 and Apr 1975, monthly pan evaporation data from the weather station near Tipton, Oklahoma were used. Gaps in data were filled using the average pure evaporation each month and monthly precipitation data.

Reservoir Seepage

The POD estimated seepage to be 1.5 cfs or 100 acre-ft per month (1,200 acre-ft annually). However, post-construction seepage is mostly immeasurable in so far as it accounts of no measurable change in reservoir storage elevation data. For the firm yield update, seepage was considered to be zero over the period of record.

Monthly Distribution of Demands and Reservoir Releases

The POD estimated the annual water requirement (i.e., future demands) through the year 2015, and the DPR and extended those through the year 2025. In

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

both the POD and DPR, because use of the reservoir had not yet occurred, annual demands were distributed monthly based on usage patterns from Oklahoma City. In the firm yield update here, annual demands were distributed monthly as a percent of (actual) monthly use between Jan 1979 (when deliveries from Tom Steed Reservoir began) and Dec 2016 (Figure 17). This includes not only M&I demands, but environmental quality (EQ) demands from Hackberry Flat WMA. The total annual demand of 16,100 acre-ft/yr was distributed by month. This demand represents the maximum volume of water available for use by the MPMCD through their 1967 water right permit, as amended in 1983.

To simulate flood events, when net inflow into the reservoir exceeds storage limits at the top of the reservoir conservation pool, the firm yield model "spills" the volume above the conservation pool (i.e., assumes the water is released from the reservoir.) These losses are calculated directly by the firm yield model. In any month when a spill occurs, the end-of-month reservoir content will be equal to the content at the top of the conservation pool. In a month where no spilling occurs, the model shows the spill to be zero.

A reservoir may be required to release a specified amount of water over certain periods of time to fulfill legal or institutional requirements/agreements. Typically, releases would be associated with meeting minimum flow requirements for a specific purpose (water rights, ecosystem needs, etc.). In such cases, the Firm Yield model will account for these losses. MPMCD has only one permit senior to their water right downstream of the reservoir. The 77 acre-ft/yr permit is located on Otter Creek approximately 4.5 miles south of Headrick. No downstream releases are required for Tom Steed Reservoir unless requested by prior water right holders, which has not occurred since 1984. However, for the purpose of the firm yield calculation, it is assumed that Tom Steed Reservoir releases the entire 77 acre-ft/yr permit each year over the model period. Further consideration of surface water seniority is assessed as part of the URRBS.

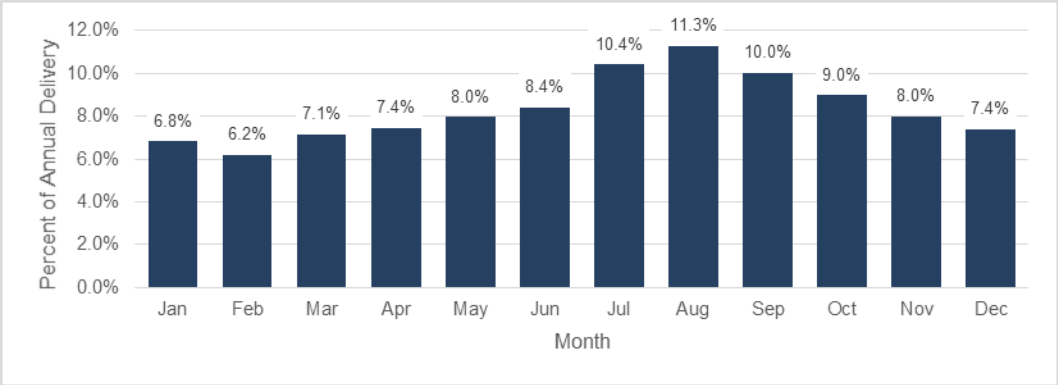

Figure 17. Monthly distribution of annual water deliveries from MPMCD as based on actual water deliveries between Jan 1979 and Dec 2016.

Firm Yield Results

Recall that the POD assumed a drought of record between ***1951 and 1955*** and calculated a firm yield of **18,600 acre-ft/yr** after 100 years of sediment accumulation (corresponding to the year 2075). The DPR assumed a drought of record between ***1962 and 1968*** and calculated a firm yield of **14,700 acre-ft/yr** over the same sedimentation/time period. The DPR also provided a firm yield calculation of **16,100 acre-ft/yr** after only 50 years of sediment accumulation (corresponding to the year 2025). Based on the methods and assumptions included in this section, and based on a new drought of record between ***2010 and 2015***, the 50-yr firm yield update is estimated to be **15,500 acre-ft/yr** (corresponding to the year 2025), and the 100-year firm yield update is estimated to be **14,100 acre-ft/yr** (corresponding to the year 2075). For additional planning purposes[14] and for consistency with the OCWP's 2060 planning horizon, a firm yield of **14,600 acre-ft/yr** was calculated for the year 2060 after 85 years of sediment accumulation. Figure 18 provides an illustration of the firm yield simulation of Tom Steed Reservoir storage based on full delivery of 14,600 acre-ft/yr and 2060 sediment conditions. Henceforth, this simulation may be referred to as the "firm yield" modeling scenario.

[14] The planning and modeling period for the Upper Red River Basin Study went through the year 2060.

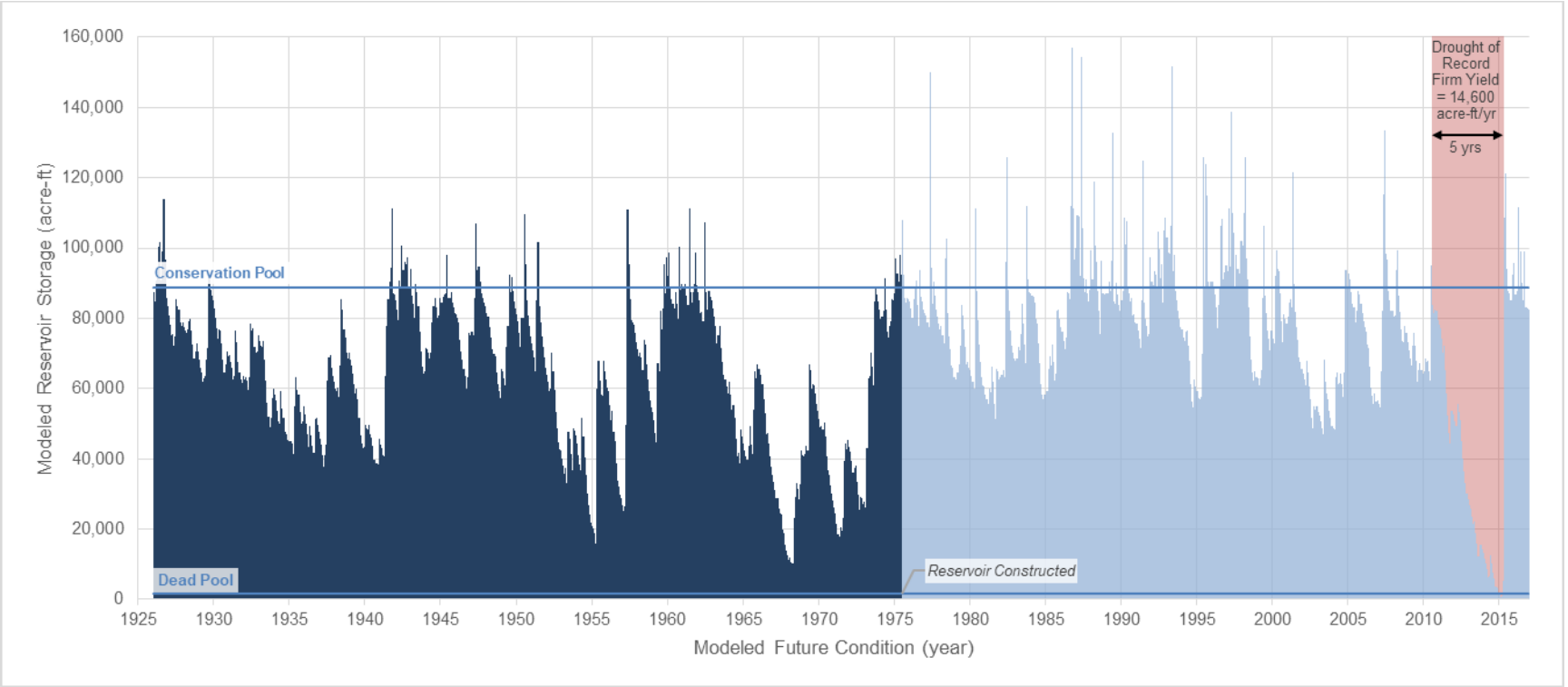

Figure 18: Firm yield simulation of Tom Steed Reservoir storage over the 91-year period of record adjusted to account for 85 years of sediment accumulation through the year 2060. Dark blue shading illustrates pre-construction storage conditions, and light blue shading illustrates post-construction storage conditions. Red shading illustrates the new drought of record between 2010 and 2015.

Permit Availability Results

In a separate modeling scenario, called "permit availability", the availability of Mountain Park Master Conservancy District's permit volume of 16,100 acre-ft/yr was evaluated. In this scenario, the model simulates the delivery of the maximum volume of water available, up to and including the permit of 16,100 acre-ft/yr. Results show that 16,100 acre-ft/yr is available 99 percent of the time (i.e., 90 of 91 modeled years). When the full permit volume is not available (i.e., a permit shortage occurs), the lowest volume of permit water available is 12,600 acre-ft/yr. Figure 19 illustrates modeled permit availability and permit shortages over the 91-year model period. For comparison purposes, under the "firm yield" operational scenario with constant deliveries of 14,600 acre-ft/yr, no shortages would exist. Although no shortages exist under the "firm yield" scenario, less water (1,500 acre-ft/yr) is put to beneficial use in 90 of the 91 modeled years than would be available if the District operates the reservoir to deliver the full permit volume of 16,100 acre-ft/yr.

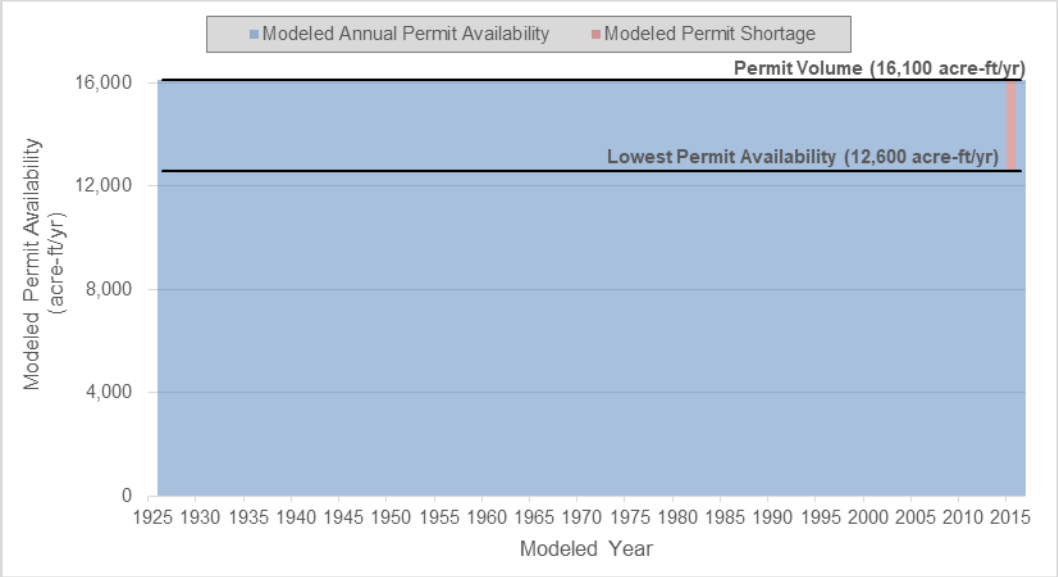

Figure 19. Availability of 16,100 acre-f/yr over the 91-year model period, 2060 sediment conditions.

3.4. Method 4. Upper Red River Bain Study Firm Yield Update (1926-2016)

In Sections 2.1.1 and 2.1.2, the firm yield model was validated by replicating the 1962 POD and 1971 DPR calculations of Tom Steed Reservoir firm yield, respectively. In section 2.1.3, the methods used to derive these earlier firm yield calculations were updated/revised to reflect post-construction conditions and account for the best available data through Dec 2016. In this section, the firm yield model is used to simulate modeled reservoir storage using future estimated 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 for the NFRR basin in support of the URRBS. The details of the SWAM, including methods and assumptions, can be found in Chapter 6.2 of the URRBS Study Report. The new inflow sequences developed by OWRB are reported in Figure 6 in the Technical Memorandum, "Impacts of Status Quo Management on Water Availability in the Tom Steed Reservoir Hydrologic Basin" (Status Quo TM). The reservoir firm yield results are reported in Table 4 and Figure 9 in the Status Quo TM.

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 firm yield of Tom Steed 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 or the firm 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 firm yield; whereas the firm yield model

only calculates reservoir firm 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 firm yield using streamgage data; however, the firm yield model must only account for one point in space (i.e., the reservoir), and thus calculates reservoir storage and firm yield using reservoir elevation levels and computed inflow.

Following a robust model calibration process performed by OWRB and Reclamation as part of the URRBS, the Reclamation and OWRB came to a consensus to utilize both of the Elk Creek and West Otter Creek-Glen Creek inflow records derived by Reclamation (described in Section 3.3) as a "baseline flow record" into the NFRR SWAM's larger water budget, which is comprised of estimates of evaporation, consumptive demands, return flows, etc. along the stream network. This water budget is described in the URRBS Study Report (USBR, In press), NFRR Summary Report (AMEC Environmental & Infrastructure, 2014), and NFRR Model Naturalization Update (Lynker Technologies, 2018). For Elk Creek, similar to Reclamation's firm yield model, the SWAM calculates monthly inflow into Tom Steed Reservoir based on daily divertable flows at the Bretch Diversion. As a side note, following the model calibration process, Reclamation and OWRB also came to consensus on incorporating Reclamation's assumptions related to the reservoir's area capacity curve, net evaporation, seepage, and releases to ensure that the SWAM simulated reservoir storage and firm yield under a similar set of assumptions as that of Reclamation's firm yield model[15]. Although these assumptions are not relevant to the firm yield simulation performed in this section, they are important nonetheless in demonstrating the validity and consistency of reservoir storage and firm yield estimates calculated by the OWRB's SWAM as part of the URRBS. What is particularly relevant here is that the baseline inflow dataset used by the SWAM to

[15] 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.

quantify inflow depletions (as discussed in the next section) is the same inflow dataset used by Reclamation in its firm yield calculation. This means that depleted inflows can be simulated and compared to non-depleted inflows on an "apples to apples" basis using the firm yield model. Furthermore, given that OWRB Reclamation models included the same set of assumptions for calculating firm yield, the SWAM's estimate of firm yield should be similar if not identical to the estimate made by Reclamation. Aside from the inflow depletions described below, the other firm yield variables (i.e., sedimentation/area capacity, evaporation, seepage, and reservoir releases) remain unchanged for this simulation.

Period of Record, Water Rights, and Inflow Depletions

A key capability of the SWAM over the firm 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 - or in the case of Tom Steed - back into the Elk Creek baseline flow records derived by Reclamation. 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 3, 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 Elk Creek 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 Elk Creek flow record. The details of how these volumes are quantified, including related assumptions and uncertainties, can be found in the USGS Scientific Investigations

Report 2017–5098: Hydrogeology and Simulated Groundwater Flow and Availability in the NFRR Aquifer, Southwest Oklahoma, 1980–2013.
Figure 20 illustrates permitted ground and surface water use, and Figure 21 illustrates non-permitted (groundwater) domestic use within the Lugert-Altus and Tom Steed Reservoir hydrologic basins. 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 NFRR 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, but a relatively small portion extends underneath Elk Creek upstream of the Bretch diversion (Figure 20). According to USGS, base flows of Elk Creek primarily derive from the Elk City Sandstone (ECS) aquifer which lies in Washita and Beckham Counties within the headwaters of Elk Creek. However, the USGS analysis focused on the NFRR aquifer and development of a numerical groundwater flow model on the ECS aquifer was not considered a part of the URRBS scope.

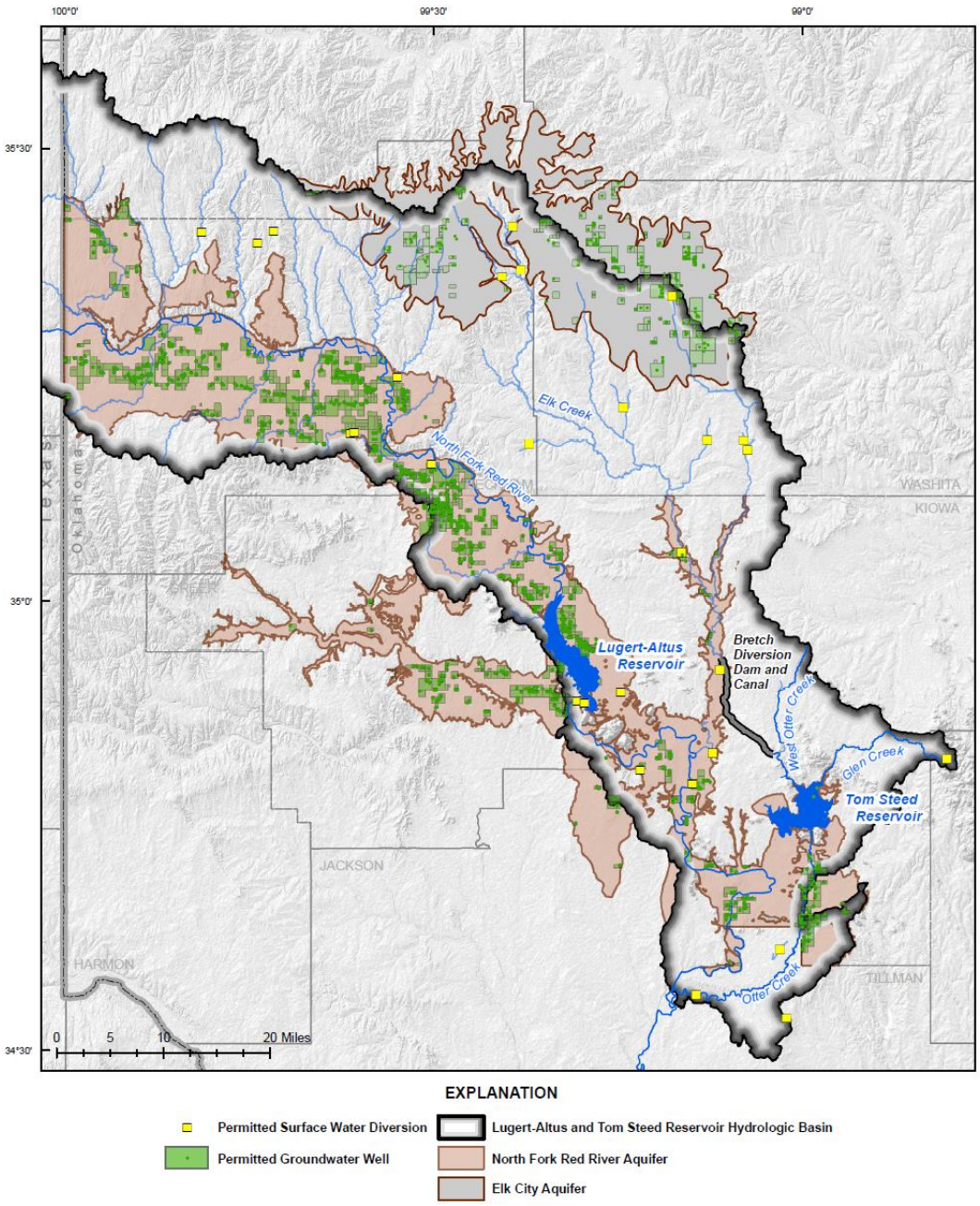

Figure 20. Distribution of permitted surface water diversions within the Lugert-Altus and Tom Steed hydrologic basins, as well as permitted groundwater wells within the NFRR and Elk City aquifers.

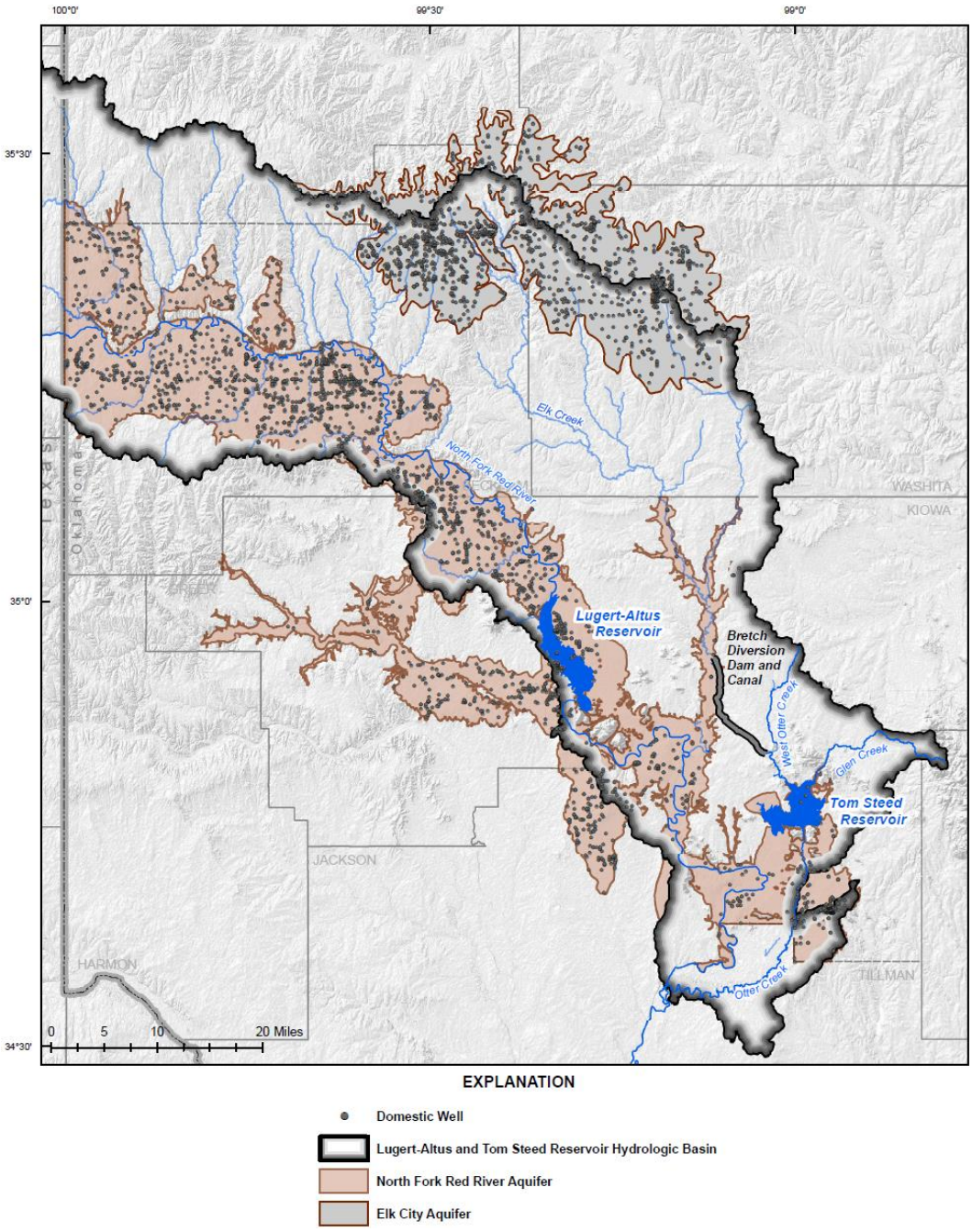

Figure 21. Distribution of non-permitted domestic groundwater wells within the NFRR and Elk City aquifers.

Inflow Depletion Scenarios

The West Otter and Glen Creek drainage basin was depleted to account for existing and future permitted streamwater diversions and new future streamwater domestic use. Because no major aquifer underlies the West Otter and Glen Creek drainage area, inflows were not depleted to account new groundwater development. The OWRB's SWAM on the NFRR was used to develop six new inflow records for West Otter and Glen Creek by analyzing incremental increases in streamwater development that could be input into Reclamation's firm yield model. Monthly flows provided by OWRB are provided in Appendix Table 29.

Elk Creek was depleted to account for existing and future permitted groundwater withdrawals, as well as existing and future permitted streamwater diversions and new future streamwater domestic use. Permitted groundwater withdrawals for Elk Creek were accounted for using base flow reductions calculated by USGS under four groundwater use scenarios out of the NFRR aquifer. One of these four scenarios also included consideration to the impact of full groundwater development in the Elk City Sandstone Aquifer, which would result in a complete reduction in base flow in Elk Creek. These four scenarios were integrated into four surface water development scenarios and modeled using OWRB's SWAM on the NFRR. Four additional scenarios were included using OWRB's SWAM on the NFRR to account for a range of future inflow conditions as well, resulting in a total of eight new inflow records for Elk Creek that could be input into Reclamation's firm yield model. Monthly flows provided by OWRB are provided in Appendix Table 30.

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 10, along with the corresponding permit date, location, and type.

- For the "Full SW" permit scenarios, all future new streamwater permits are considered "junior" to all existing streamwater permits in the basin. Impacts on permits in the hydrologic basin, including Tom Steed Reservoir, are modeled by distributing the volume of unappropriated water available from Elk Creek upstream of the Bretch Diversion and from West Otter and Glen Creeks upstream of Tom Steed Reservoir[16].

[16] The volume of new streamwater permits was calculated using the SWAM based on the average annual flows above 16,100 acre-ft/yr.

Table 10. Regular streamwater permits within the Tom Steed Reservoir watershed, including modeled consumptive demand volume of junior versus senior permit holders.

Location	Permit Number	Permit Owner	Permit Type	Permits Junior to MPMCDa		Permits Senior to MPMCDb	
				Permitted Volume (acre-ft/yr)	Modeled Consumptive Demand (acre-ft/yr)	Permitted Volume (acre-ft/yr)	Modeled Consumptive Demand (acre-ft/yr)
Elk Creek Drainage Basin	19650249	Private	Recreation, Fish, and Wildlife	-	-	800	600
	19550353	Private	Irrigation	-	-	7.5	7
	19600053	Private	Irrigation	-	-	108	77
	20030029	Private	Irrigation	100	73	-	-
	19740306	Private	Irrigation	20	16	-	-
	19641018	Private	Irrigation	-	-	160	113
	20060043	Private	Irrigation	1,470	1,031	-	-
	19320051	Public	M&I	-	-	631	321
	19650553	Private	Irrigation	-	-	149	106
	19970006	Public	M&I	1,100	558	-	-
West Otter and Glen Creeks Drainage Basin	19820113	Public	Recreation, Fish, and Wildlife	10	10	-	-
	Total			2,700	1,688	1,856	1,224
Reservoir	19670671	MPMCD	M&I	16,100	16,100	16,100	16,100
Downstream of Reservoir	19970010	Private	Irrigation	297	210	-	-
	19980025	Private	Irrigation	1,338	939	-	-
	20060062	Private	Irrigation	320	226	-	-
	19520414	Private	Irrigation	-	-	77	55
	19960036	Private	Recreation, Fish, and Wildlife	15	12	-	-
	20090008	Private	Irrigation	46	34	-	-
	Total			2,016	1,421	77	55

a "Junior" is defined as having an application date later than the MPMCD.

The resulting annual inflow sequences into Tom Steed Reservoir generated by the SWAM corresponding to each of these scenarios is illustrated in Figure 22 and Figure 23. The eight ground- and stream-water development scenarios are described as follows.

- "Naturalized": Assumes no diversions from existing or future streamwater permits and no existing or future groundwater pumping[17].
  Results: Baseline condition that included a slight increase in Elk Creek flow at Bretch Diversion Dam as well as a slight increase in flows in the West Otter and Glen Creek drainage basin. This resulted in a combined average annual inflow into Tom Steed Reservoir of 55,000 acre-ft/yr over the period of record and 22,000 acre-ft/yr during the drought of record (Figure 23).
- "2013 GW and Existing SW": Assumed full use of existing streamwater permits[18], as well as NFRR aquifer 2013 groundwater pumping at a rate of 22,988 acre-ft/yr as occurred during the drought of record.
  Results: Compared to the Naturalized baseline condition, combined average annual inflow into Tom Steed Reservoir decreased to 53,000 acre-ft/yr (four percent) over the period of record and to 20,000 acre-ft/yr (nine percent) during the drought of record (Figure 23).
- "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, combined average annual inflow into Tom Steed Reservoir decreased to

[17] Observed domestic streamwater use is automatically in gage data, meaning under the naturalized condition domestic streamwater use is occurring.
[18] 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.

53,000 acre-ft/yr (four percent) over the period of record and to 20,000 acre-ft/yr (nine percent) during the drought of record (Figure 23). In other words, there is no measurable decrease to reservoir inflow beyond that which was simulated under the 2013 GW and Existing SW condition.

- "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[19].

  Results: Compared to the Naturalized baseline condition, combined average annual inflow into Tom Steed Reservoir decreased to 46,000 acre-ft/yr (16 percent) over the period of record and to 17,000 acre-ft/yr (23 percent) during the drought of record (Figure 23).

- "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, combined average annual inflow into Tom Steed Reservoir decreased to 45,000 acre-ft/yr (18 percent) over the period of record and to 16,000 acre-ft/yr (27 percent) during the drought of record (Figure 23).

- "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 15,000 acre-ft/yr.

  Results: Compared to the Naturalized baseline condition, combined average annual inflow into Tom Steed Reservoir decreased to

[19] 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.

44,000 acre-ft/yr (20 percent) over the period of record and to 15,000 acre-ft/yr (32 percent) during the drought of record (Figure 23).

- "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 16,100 acre-ft/yr. Note: although the hydrologic basin is currently closed to further streamwater appropriation according to OWRB (2012), there may be water available for new streamwater permits 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: Compared to the Naturalized baseline condition, combined average annual inflow into Tom Steed Reservoir decreased to 40,000 acre-ft/yr (27 percent) over the period of record and to 12,000 acre-ft/yr (45 percent) during the drought of record (Figure 23).
- "Full GW and Full SW (High)": Assumes full development of groundwater and full development of streamwater under an assumed new future domestic streamwater use of 15,000 acre-ft/yr. Full development of streamwater assumes the full appropriation of all average annual flows above 16,100 acre-ft/yr.
  Results: Compared to the Naturalized baseline condition, combined average annual inflow into Tom Steed Reservoir decreased to 39,000 acre-ft/yr (29 percent) over the period of record and to 11,000 acre-ft/yr (50 percent) during the drought of record (Figure 23).

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 uses, as well as losses associated with previously-issued groundwater provisional temporary (PT) permits and domestic 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 in part by groundwater PT permits and domestic use; however, the actual base flow reductions attributable to these uses were not quantified as part of the URRBS.

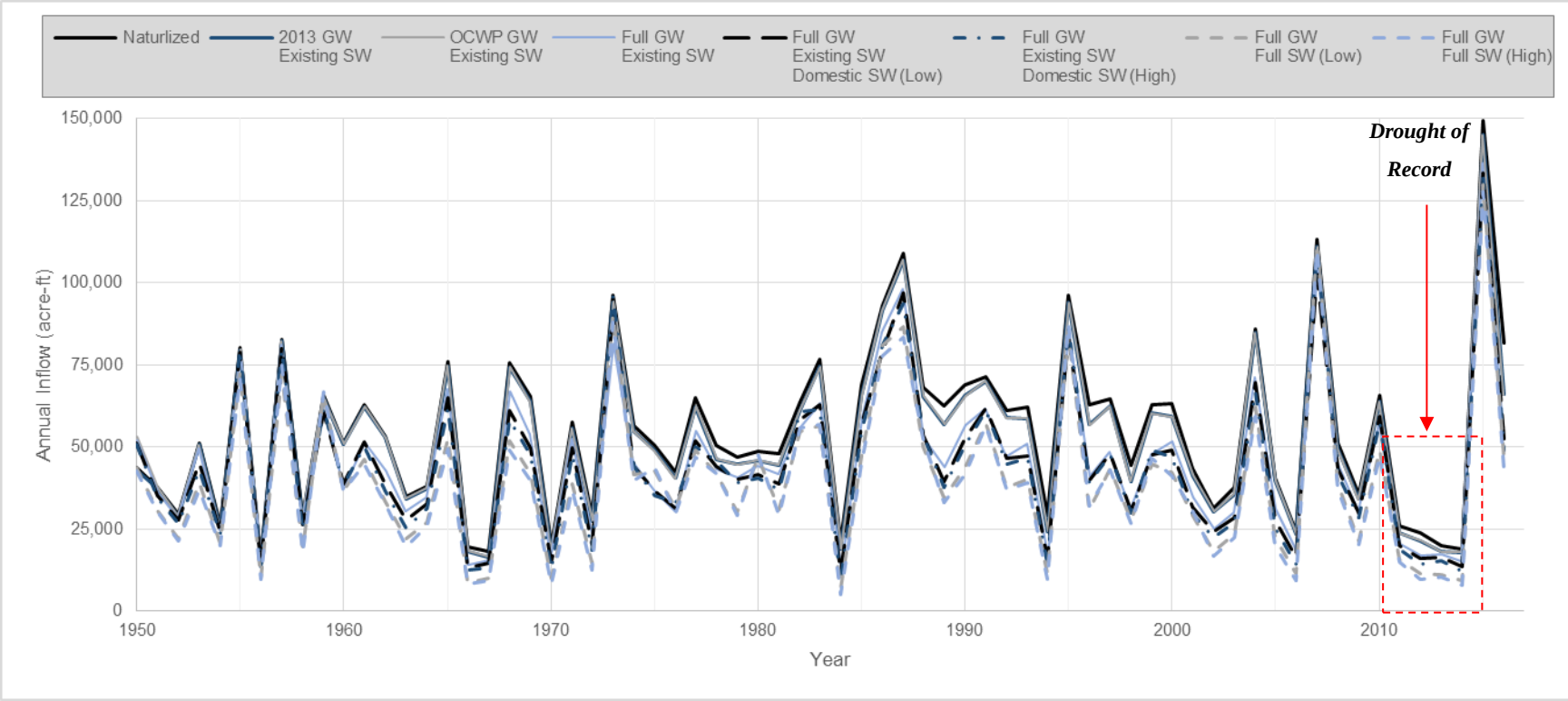

Figure 22. Simulated annual inflows into Tom Steed Reservoir (i.e. combined inflow from West Otter and Glen Creeks, as well as Elk Creek flow diverted at the Bretch Diversion Dam) under eight "use" scenarios without seniority (1950-2016). The black line at the top represents the "Naturalized" scenario, where inflows are the highest because there is no upstream use. Inflows into the reservoir are reduced incrementally under the various scenarios as development/use increases.

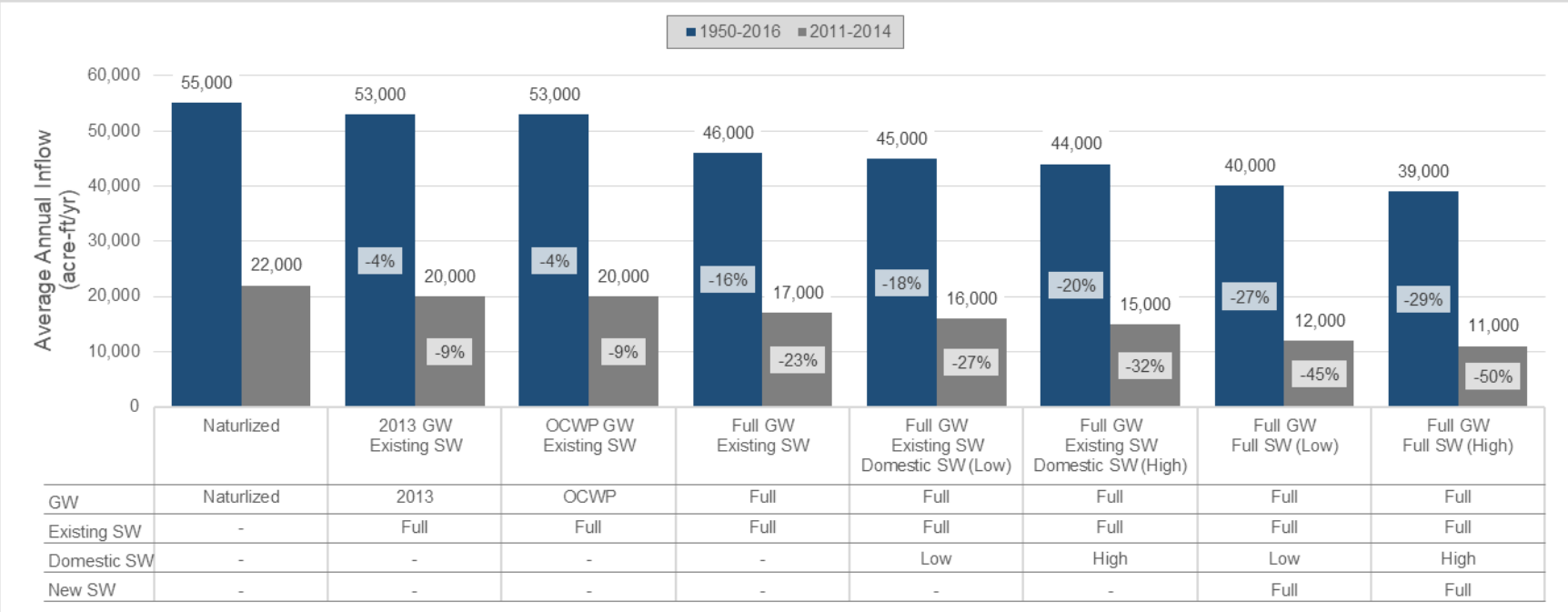

Figure 23. Simulated average annual inflows into Tom Steed Reservoir (i.e. combined inflow from West Otter and Glen Creeks, as well as Elk Creek flow diverted at the Bretch Diversion Dam) under eight "use" scenarios over the period of record (1950-2016) and during the drought of record (2011-2014). The 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 inside each bar.

Firm Yield Results

Similar to Method 3, a "firm yield" scenario was evaluated for all eight scenarios under a repeat of the 2010-2015 drought of record for the year 2060 after 85 years of sedimentation. The firm yield estimates corresponding to each of the eight inflow sequences is provided in Figure 24. Tom Steed Reservoir firm yield varies greatly depending on the scenario considered. Under full use of existing streamwater permits and continued withdrawals at 2013 groundwater pumping rates, the firm yield is estimated to be **14,700 acre-ft/yr**. The firm yield could be reduced to only **5,300 acre-ft/yr** if the ground- and stream-water within the Tom Steed hydrologic basin is fully developed and/or appropriated. Some conclusions that can be drawn from these data include:

- USGS results show that current groundwater usage from the NFRR aquifer has had no measurable impact on the base flow of Elk Creek, so impacts on reservoir firm yield under the "2013 GW and Existing SW" scenario are the result of upstream streamwater permits;
- The "2013 GW and Existing SW" and "OCWP GW and Existing SW" use scenarios appear to result in the same impacts. This is because according to the OCWP, the hydrologic basin is closed to the appropriation of new regular streamwater permits; as well, the projected additional development and influence of the NFRR aquifer through 2060 is relatively minor and appears to have little to no impact on the future base flow of Elk Creek.

Permit Availability Results

In addition to firm yield, a "permit availability" scenario was simulated to evaluate the impacts of ground- and surface-water development scenarios on the availability of Mountain Park Master Conservancy District's permit volume of 16,100 acre-ft/yr. As previously explained in Method 3, in this scenario, the model simulates the delivery of the maximum volume of water available, up to

and including the permit of 16,100 acre-ft/yr. Results show that the permit of 16,100 acre-ft/yr is available between 87 and 99 percent of the time (years) depending on the development scenario. When the full permit volume is not available (i.e., permit shortages occur), the lowest volume of permit water available over the period of record ranges from 2,500 acre-ft/yr to 12,600 acre-ft/yr depending on the development scenario (Table 11).

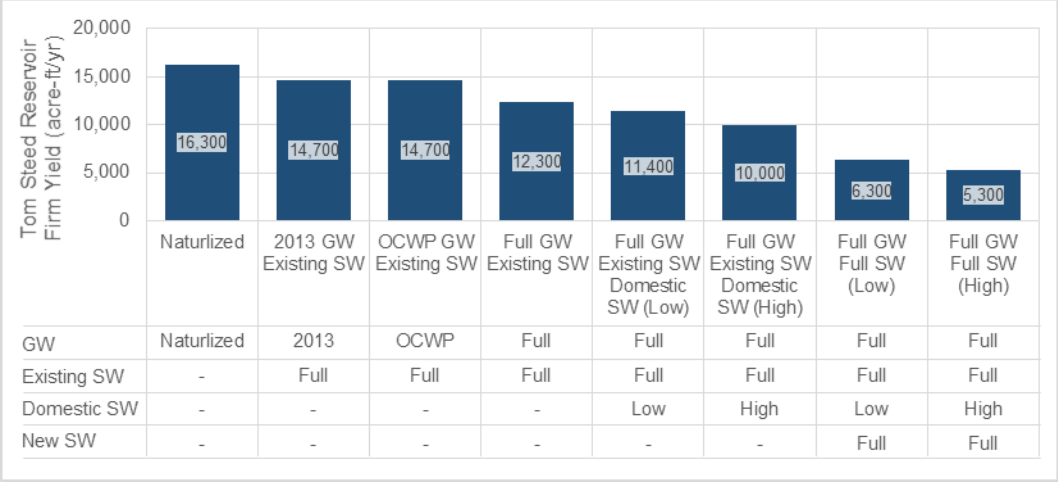

Figure 24. Impacts on Tom Steed Reservoir firm yield from eight ground- and surface-water development scenarios, 2060 sediment condition.

Table 11. Dependability of the full volume of M&I water permitted to Mountain Park Master Conservancy District (16,100 acre-ft/yr), as well as lowest volume of permit water available, based on modeled storage of Tom Steed Reservoir under eight ground- and surface-water development scenarios, 2060 sediment condition.

Modeling Scenarios for the MPMCD	Permit Volume Dependability		Lowest Volume Available	
	(Percent of Years)	(Percent of Months)	(acre-ft/yr)	(Percent of Permit)
Naturalized	100	100	16,100	100
2013 GW and Existing SW	98.5	99.6	12,600	78
OCWP GW and Existing SW	98.5	99.6	12,600	78
Full GW and Existing SW	97.0	99.0	11,000	68
Full GW, Existing SW, and Domestic SW (Low)	97.0	99.0	8,300	52
Full GW, Existing SW, and Domestic SW (High)	92.5	98.1	5,600	35
Full GW and Full SW (Low)	91.0	95.5	4,600	29
Full GW and Full SW (High)	85.1	94.0	2,500	16

4. RISKS AND UNCERTAINTY

The biggest challenge with calculating reservoir firm yield is making informed assumptions about future conditions. One area of uncertainty is sedimentation rates and the resulting impacts to reservoir area and capacity. 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 Tom Steed Reservoir. Limitations on predicting future streamflow also must be acknowledged. Of particular importance is accounting for and differentiating between human- versus climate-induced impacts. Methods 2 and 3 made allowances for future depletions in inflow caused by human development, but those assumptions were limited either by the historical record by which they were basing future conditions from and/or by limited data. Method 4 provides a relatively robust analysis of future potential human-induced impacts on Tom Steed Reservoir. The assumptions and uncertainties of future development scenarios used in Method 4 are well documented in the Status Quo TM.

Another item that should be acknowledged given the uncertainty of future conditions is how this uncertainty can inform our understanding of whether or not modifications to the existing Bretch Diversion and Canal system could increase reservoir firm yield. This is a question that has recently been posed by the District given the fact that Method 3 resulted in a firm yield below the District's 16,100 acre-ft/yr water right. In light of these results, the District asked Reclamation to perform an analysis as part of the URRBS to determine if the firm yield of Tom Steed Reservoir could be increased by modifying the Bretch Diversion Dam and Canal to accommodate additional storage and flows. A discussion of this analysis is provided in the Appendix. In short, results show that expansion of the system would not increase reservoir firm yield. This is because there were no additional flows in Elk Creek in excess of the existing Bretch Canal capacity of 1,000 cfs which could have been diverted during the critical drought

period between Sep 2010 and Mar 2015. However, if one plans for the 1960s drought instead of the 2010-2015 drought, then expansion of the Bretch Diversion and Canal system does have an impact on reservoir yield for that time period. The yield of Tom Steed Reservoir during the 1960s drought without any modifications (i.e., based on divertable flows through existing infrastructure) is 17,600 acre-ft/yr, 16,700 acre-ft/yr, and 16,400 acre-ft/yr based on year 2025, 2060, and 2075 sediment conditions. Indeed, if this limited flow record is used as a basis of planning and decision-making, then expansion of the system is *not needed* because the yield based on the 1960s drought is sufficient to deliver the District's permitted water right of 16,100 acre-ft/yr. That said, an analysis of the 11 modification alternatives described in the Appendix shows that reservoir firm yield during the 1960s drought could be increased to between 16,500 acre-ft/yr and 19,300 acre-ft/yr depending on the modification and sediment condition (Table 32 in the Appendix). Of course, this discussion excludes an analysis of the costs to implement these modifications. Reclamation performed a cost evaluation of numerous expansion alternatives, but a presentation of costs is beyond the scope of this 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 is not 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 both the 1950s and 1960s droughts of record used to calculate firm yield in Methods 1 and 2, respectively. 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 firm yield in Methods 3 and 4.

Finally, the climate is variable and changing, and 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 Tom Steed Reservoir hydrologic basin is described in the URRBS Study Report.

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6. APPENDIX

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

6.1. West Otter and Glen Creek Watershed Flow

Table 12. Pre-construction monthly flows from the West Otter and Glen Creek watersheds into Tom Steed Reservoir from January 1926 to May 1975. These data were estimated using a regression analysis between precipitation and post-construction flows.

	Estimated Flows from Otter Creek Watershed (acre-ft)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1926	281	0	7,662	2,638	9,068	9,579	733	4,510	13,042	115	20	85	47,734
1927	85	0	125	283	87	5,345	9,641	2,311	444	184	546	3,393	22,444
1928	152	982	909	4,473	2,785	150	690	1,499	1,089	393	5,233	63	18,417
1929	0	0	0	103	1	578	8,353	5,853	15,156	2,083	331	1,414	33,872
1930	0	26	0	1,061	280	1,556	1,793	1,326	944	624	6,245	113	13,967
1931	2,346	60	1,109	16	449	16,908	3,534	2	1,233	596	0	3,550	29,804
1932	13	1,309	1,858	486	1,121	9,353	200	4,792	83	155	1,708	6,704	27,780
1933	118	1,050	446	6,379	108	823	1	107	99	14	6,955	4,483	20,583
1934	309	331	160	285	1,394	11,410	689	502	9	2	0	798	15,889
1935	1,328	1,298	1,841	482	1,112	9,273	198	4,745	82	153	1,692	6,644	28,848
1936	116	1	3	264	305	378	1,145	3,584	112	1,824	451	33	8,216
1937	357	0	391	4	1,589	1,966	24,287	1	2,529	93	189	552	31,956
1938	52	66	1,205	17	486	18,301	3,864	3	1,348	651	0	3,858	29,852
1939	14	26	571	897	405	21	2,459	66	19	3	571	964	6,014
1940	7,984	90	2,948	38	16	4,782	121	59	577	3,963	38	8,916	29,531
1941	42	502	797	905	12,148	5,681	9,632	5,226	2,005	14,905	53	1,562	53,457
1942	531	237	0	1,107	264	8,868	11,296	154	1,641	2,586	2,155	726	29,564
1943	7,632	27	603	946	427	23	2,609	70	20	3	603	1,018	13,981
1944	8,437	1,335	1,895	495	1,142	9,528	204	4,893	84	158	1,741	6,836	36,748
1945	120	1,550	1,645	616	3,320	10,222	626	1,336	2,390	764	1,327	393	24,310
1946	449	274	909	111	0	1,556	2,333	3,036	869	104	15,541	0	25,183
1947	2,070	905	10	1,691	1,850	271	6,922	3,254	56	143	37	52	17,262
1948	13	27	608	954	430	23	2,633	70	20	3	608	1,027	6,418
1949	8,510	385	174	83	1,443	2,554	19,002	2,898	5,993	1,953	0	0	42,995
1950	104	968	1	128	5,033	4,687	14,507	4,892	565	0	0	0	30,885
1951	171	401	1,147	288	8,082	3,455	170	1,233	532	1,069	300	0	16,847
1952	334	161	424	1,407	11,513	1,024	507	9	2	0	806	1,340	17,527
1953	3	60	1,160	2,018	84	16,740	674	191	0	11,074	730	72	32,806
1954	0	0	157	1,650	11,889	165	9	205	0	12	0	401	14,488
1955	571	1,030	1,297	87	31,225	6,400	376	779	3,422	5,150	0	0	50,339
1956	7	795	24	73	4,910	45	1,273	25	0	1,399	93	1,043	9,687
1957	7	378	3,336	11,328	29,531	4,667	3,987	0	2,888	1,315	897	5	58,339
1958	66	11	2,851	1,926	283	8,160	3,405	59	150	13	54	13	16,990
1959	944	2	0	488	11,052	1,509	8,139	87	5,128	3,874	6	5,491	36,720

Table 12. Continued…

	Estimated Flows from Otter Creek Watershed (acre-ft)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1960	2	908	157	0	1,555	2,988	3,033	868	104	7,916	0	2,068	19,599
1961	4	784	2,366	488	921	18,536	1,542	618	2,856	1,243	2,704	526	32,588
1962	4	2	15	2,450	462	11,022	1,953	114	3,528	843	300	267	20,960
1963	2	24	1,030	303	5,435	967	279	1,184	431	160	2,684	21	12,520
1964	93	3,044	52	16	4,930	225	61	598	4,102	13	9,208	44	22,385
1965	24	237	348	1,900	5,609	5,264	696	2,639	7,375	6,184	5	4,915	35,197
1966	24	421	60	986	2	462	284	4,600	489	50	5	16	7,398
1967	1	3	378	298	370	1,555	3,492	109	1,777	173	32	348	8,537
1968	1	1,841	730	1,111	9,271	336	4,745	82	153	733	6,643	116	25,762
1969	1,297	1,612	1,708	128	5,307	1,532	341	2,505	2,005	876	46	192	17,549
1970	9	5	2,424	1,203	2,908	87	33	639	565	87	108	32	8,099
1971	93	274	0	23	2,436	3,900	2,206	5,371	9,302	2,031	255	2,214	28,105
1972	1	12	197	238	1,991	593	106	674	5	6,064	1,187	512	11,582
1973	1	157	7,765	3,791	1,626	1,234	884	21	12,372	1,069	255	16	29,192
1974	0	13	449	4,029	2,629	277	0	4,297	4,807	1,356	274	214	18,346
1975	1,283	2,308	363	216	5,587	-	-	-	-	-	-	-	-

Table 13. Computed, post-construction monthly flows from the West Otter and Glen Creek watersheds into Tom Steed Reservoir from January 1975 to December 2016. Mountain Park Dam computed inflow data is recorded monthly by MPMCD and stored on Reclamation's website (https://www.usbr.gov/gp-bin/custom.pl?SWE221A&toms). Flows are determined by subtracting the Reported Bretch flow from computed inflow in the water supply report. Negative flows represent months when unaccounted losses from the reservoir exceed inflow from the watershed.

	Computed Flows from Otter Creek Watershed (acre-ft)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1975	-	-	-	-	-	65	7,231	719	333	3	158	78	-
1976	-43	386	164	1,983	1,273	1,806	-67	72	8,434	12	-181	251	14,090
1977	-55	-149	-674	-88	38,971	631	-6	1,533	-354	178	55	9	40,051
1978	-376	1,196	-218	2,261	21,448	18,459	-184	1	414	-680	1,461	-876	42,907
1979	1,176	-54	4,337	5,566	5,729	12,938	2,311	1,112	-94	-513	1,742	261	34,512
1980	968	270	813	1,584	36,844	1,098	-504	-155	-404	-307	74	1,045	41,326
1981	-383	761	1,197	7,139	2,693	5,435	1,254	-1,083	28	6,862	396	-601	23,697
1982	-400	341	3,606	1,874	12,871	12,327	2,908	-117	-798	-402	386	-30	32,566
1983	756	1,864	2,604	1,377	2,290	2,463	618	358	-177	34,707	3,028	-893	48,997
1984	161	1,022	1,673	889	893	2,718	778	170	-893	-22	391	2,015	9,796
1985	596	2,183	5,073	4,131	952	8,946	1,001	740	5,774	9,822	-679	-1,266	37,273
1986	236	649	626	1,936	4,503	4,897	1,115	1,015	18,641	25,547	6,107	1,296	66,566
1987	4,343	10,773	4,887	1,483	49,914	4,655	2,343	1,927	949	261	-436	1,657	82,756
1988	5,368	630	16,469	5,042	1,023	821	-412	-280	12,400	-481	57	-29	40,607
1989	1,241	157	3,010	475	5,184	19,036	-2,771	356	3,040	134	-1,193	-1,292	27,376
1990	1,122	2,742	13,159	8,538	13,935	650	2,720	1,790	-197	-1,494	1,128	-425	43,665
1991	17	-65	510	546	10,556	24,750	891	116	-68	531	861	9,384	48,029
1992	-288	277	831	1,804	2,930	9,006	2,823	2,556	4,294	-848	8,013	8,971	40,368
1993	4,198	3,860	2,861	6,350	23,497	1,978	2,341	1,642	312	-581	-574	-1,230	44,655
1994	474	-1,415	826	4,668	1,072	280	581	-1,211	-977	1,321	6,813	-456	11,975
1995	252	-98	1,590	3,365	8,787	27,419	905	14,360	12,856	-22	-724	-57	68,633
1996	40	-511	-671	-926	-1,282	7,141	8,153	14,524	3,709	482	323	-1,797	29,186
1997	-409	5,683	-61	15,224	3,381	559	-580	1,186	18	2,199	307	2,897	30,405
1998	3,016	6,310	15,455	2,624	1,935	-677	-1,014	-1,038	400	95	424	-1,090	26,440
1999	657	-105	2,707	803	13,084	6,384	-5	471	-235	1,307	-796	5,856	30,128
2000	-241	1,072	10,709	8,073	5,505	3,322	-2,151	-507	152	10,072	11	1,319	37,337
2001	3,543	2,889	1,258	555	15,883	-280	89	1,103	79	-799	719	140	25,179
2002	160	527	1,442	5,996	70	564	642	44	1,099	2,846	461	2,124	15,974
2003	281	628	782	1,007	1,298	17,356	-370	2,373	-329	-141	-236	258	22,908
2004	1,264	1,539	8,248	594	325	958	3,242	1,401	22	3,768	12,008	343	33,713
2005	2,812	2,357	644	105	1,957	969	1,544	863	5,425	504	87	199	17,465
2006	1,201	1,366	668	1,289	1,446	-37	457	2,532	127	1,116	157	1,914	12,234
2007	847	942	2,637	-120	11,785	25,765	6,115	8,926	2,269	201	-911	1,358	59,814
2008	721	2,129	13,059	10,510	1,577	837	1,365	1,562	-25	2,542	69	-222	34,124
2009	608	847	1,710	8,036	4,737	827	848	199	5,335	4,044	441	911	28,543
2010	2,656	4,143	2,157	761	559	2,361	25,979	690	2,078	3,669	1,831	-401	46,483
2011	639	1,578	-1,357	750	2,399	413	834	450	-39	863	5,360	206	12,097
2012	1,043	866	2,324	4,273	-830	1,875	39	315	667	-462	-173	304	10,243
2013	439	941	295	420	3,849	536	722	531	3,219	5,573	16	405	16,946
2014	633	387	648	95	1,118	5,905	1,047	236	70	117	1,346	-307	11,296
2015	592	190	442	1,452	81,596	20,867	-698	-2,193	1,357	-397	3,434	4,691	111,334
2016	-3,789	2,301	4,258	20,831	-199	8,009	5,554	1,194	9,012	-5,040	-2,504	-3,053	36,574

6.2. Elk Creek Divertible Flow

Table 14. Pre-construction monthly divertible flows from Elk Creek at the Bretch Diversion Dam from January 1926 to December 1949. These data are taken from Table A-8 "Runoff of Elk Creek at Hobart Gage (1,000's acre-feet)" from the 1962 Plan of Development.

	Divertible Flow from Elk Creek at Bretch Diversion Dam (acre-ft)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1926	500	800	200	5,900	7,700	9,300	9,600	13,400	17,900	15,900	400	300	81,900
1927	100	300	400	6,300	1,100	1,200	7,600	3,200	5,200	900	400	200	26,900
1928	300	200	500	0	7,600	8,200	2,300	500	0	5,800	500	700	26,600
1929	300	600	3,000	2,700	8,300	4,800	400	0	12,700	2,500	400	300	36,000
1930	400	600	300	800	9,700	4,600	300	0	0	6,000	300	500	23,500
1931	300	100	1,200	1,100	3,000	700	0	0	800	2,700	1,100	1,200	12,200
1932	800	1,700	400	700	7,400	15,300	2,800	3,700	200	2,300	100	300	35,700
1933	100	100	800	0	0	0	0	2,400	2,800	6,400	500	400	13,500
1934	300	500	200	0	600	4,000	0	3,800	1,900	4,600	800	800	17,500
1935	400	300	800	0	19,400	6,300	600	200	0	0	0	100	28,100
1936	200	100	100	0	13,500	2,500	0	0	17,100	3,200	600	100	37,400
1937	300	400	100	0	7,500	3,200	0	14,900	4,300	800	300	500	32,300
1938	300	1,700	4,600	1,900	13,200	6,600	700	0	2,000	0	200	400	31,600
1939	400	800	200	200	4,000	7,500	900	1,200	0	2,000	100	200	17,500
1940	400	300	300	7,100	1,200	0	4,200	1,100	2,100	100	700	900	18,400
1941	200	400	200	0	18,200	15,300	2,900	7,200	6,600	15,900	1,000	400	68,300
1942	200	100	100	19,200	3,900	8,300	800	16,500	11,800	12,500	600	400	74,400
1943	200	100	100	0	20,200	5,300	400	0	0	0	0	0	26,300
1944	0	0	500	2,500	4,500	6,900	11,500	5,800	4,000	800	500	800	37,800
1945	300	500	4,400	4,400	400	9,100	2,900	5,400	5,500	400	700	400	34,400
1946	1,500	1,600	2,100	0	2,700	1,400	0	500	1,000	6,400	400	1,100	18,700
1947	400	300	300	13,100	26,600	7,900	900	100	0	0	100	200	49,900
1948	200	300	1,600	0	1,400	2,100	900	5,800	500	0	0	0	12,800
1949	0	1,800	900	800	16,200	8,100	900	800	2,900	-	-	-	-

Table 15. Pre-construction monthly divertible flows from Elk Creek at the Bretch Diversion Dam from January 1926 to December 1949. These data are taken from Table A-8 "Runoff of Elk Creek at Hobart Gage (1,000's acre-feet)" of the POD with a 16.3 percent depletion. This depletion is not included in the POD Appendix A: Hydrology report; rather, they are described on page 7 of the DPR which applied a 16.3 percent depletion to Elk Creek.

	Divertible Flow from Elk Creek at Bretch Diversion Dam (acre-ft)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1926	411	658	165	4,854	6,335	7,652	7,899	11,025	14,728	13,082	329	247	67,385
1927	82	247	329	5,183	905	987	6,253	2,633	4,278	740	329	165	22,133
1928	247	165	411	0	6,253	6,747	1,892	411	0	4,772	411	576	21,886
1929	247	494	2,468	2,221	6,829	3,949	329	0	10,449	2,057	329	247	29,620
1930	329	494	247	658	7,981	3,785	247	0	0	4,937	247	411	19,335
1931	247	82	987	905	2,468	576	0	0	658	2,221	905	987	10,038
1932	658	1,399	329	576	6,089	12,588	2,304	3,044	165	1,892	82	247	29,373
1933	82	82	658	0	0	0	0	1,975	2,304	5,266	411	329	11,107
1934	247	411	165	0	494	3,291	0	3,127	1,563	3,785	658	658	14,398
1935	329	247	658	0	15,962	5,183	494	165	0	0	0	82	23,120
1936	165	82	82	0	11,107	2,057	0	0	14,069	2,633	494	82	30,772
1937	247	329	82	0	6,171	2,633	0	12,259	3,538	658	247	411	26,576
1938	247	1,399	3,785	1,563	10,861	5,430	576	0	1,646	0	165	329	26,000
1939	329	658	165	165	3,291	6,171	740	987	0	1,646	82	165	14,398
1940	329	247	247	5,842	987	0	3,456	905	1,728	82	576	740	15,139
1941	165	329	165	0	14,974	12,588	2,386	5,924	5,430	13,082	823	329	56,195
1942	165	82	82	15,797	3,209	6,829	658	13,576	9,709	10,285	494	329	61,214
1943	165	82	82	0	16,620	4,361	329	0	0	0	0	0	21,639
1944	0	0	411	2,057	3,702	5,677	9,462	4,772	3,291	658	411	658	31,101
1945	247	411	3,620	3,620	329	7,487	2,386	4,443	4,525	329	576	329	28,303
1946	1,234	1,316	1,728	0	2,221	1,152	0	411	823	5,266	329	905	15,386
1947	329	247	247	10,778	21,886	6,500	740	82	0	0	82	165	41,056
1948	165	247	1,316	0	1,152	1,728	740	4,772	411	0	0	0	10,531
1949	0	1,481	740	658	13,329	6,664	740	658	2,386	-	-	-	-

Table 16. Monthly recorded flows from Elk Creek near Hobart from January 1950 to September 1993. Elk Creek flows at the Hobart streamgage (07034500) are stored on USGS's website (https://waterdata.usgs.gov/nwis/dv?referred_module=sw&site_no=07304500).

	Flow from Elk Creek near Hobart (acre-ft)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1949													
1950	388	464	415	822	10,097	1,881	31,513	3,227	875	460	510	549	51,201
1951	525	579	446	29,989	40,171	1,795	1,595	1,376	659	360	265	271	78,031
1952	248	262	282	3,994	4,436	39	2	0	0	7	35	57	9,361
1953	53	149	3,783	7	3,852	2,975	364	79	857	4,395	1,328	58	17,900
1954	45	36	82	2,574	7,270	4	1	0	0	0	0	0	10,012
1955	57	39	67	20,648	9,529	427	777	0	39,734	334	336	355	72,303
1956	407	254	205	207	4,428	2,126	27	0	234	105	13	22	8,027
1957	37	52	8,993	74,594	18,855	1,479	586	448	1,505	414	338	388	107,689
1958	362	493	786	222	5,456	3,779	468	41	25	12	99	176	11,918
1959	281	198	1,644	9,521	12,317	11,440	14,680	1,490	31,039	1,434	7,486	7,414	98,943
1960	15,106	5,080	3,495	3,374	3,505	1,275	8,747	816	21,201	9,195	3,039	3,007	77,840
1961	2,737	2,216	2,481	2,686	21,507	3,679	3,743	1,111	13,020	22,984	3,092	2,354	81,611
1962	1,926	1,434	1,696	3,082	42,169	2,856	4,760	7,660	3,548	1,636	1,765	1,363	73,896
1963	1,146	1,375	1,091	605	13,260	871	240	358	59	3,537	261	230	23,033
1964	2,997	460	293	1,631	3,430	236	365	528	170	3,637	982	813	15,543
1965	697	578	1,337	2,490	5,975	1,089	121	26,741	33,150	3,342	1,783	2,477	79,780
1966	3,189	3,366	805	1,394	416	65	712	1,128	352	220	100	373	12,120
1967	351	221	5,415	903	275	1,269	7	86	748	7	102	235	9,617
1968	245	409	1,807	6,591	20,023	5,322	3,932	891	21,970	5,443	2,118	1,400	70,151
1969	1,525	2,442	4,723	70,612	3,993	1,002	887	7,170	1,057	727	713	643	95,493
1970	696	700	1,375	1,352	4,495	49	4	288	2,250	32	119	133	11,492
1971	265	323	41	23	2,381	505	2,782	18,841	2,134	11,717	2,297	1,275	42,582
1972	1,777	851	458	3,587	5,794	1,400	137	76	66	799	665	851	16,460
1973	2,438	6,284	37,129	5,137	14,670	2,299	872	23,156	11,361	1,561	1,563	1,142	107,612
1974	900	4,417	1,664	12,532	4,917	347	376	2,081	1,836	13,851	2,779	2,856	48,557
1975	7,652	10,350	7,640	7,031	8,346	4,009	55,706	2,305	3,225	4,465	2,178	2,295	115,202
1976	1,759	1,474	6,581	4,030	7,188	2,428	390	26,388	1,630	1,008	887	914	54,677
1977	1,081	865	1,037	40,249	59,189	2,368	3,568	12,496	832	539	1,285	1,337	124,846
1978	1,622	1,472	1,178	708	25,121	1,392	593	380	561	663	555	429	34,675
1979	953	857	1,183	3,938	4,577	1,406	837	524	214	1,463	1,121	638	17,713
1980	757	588	1,019	17,420	21,073	391	88	267	155	163	994	371	43,285
1981	291	805	864	644	7,585	106	336	99	11,250	2,131	750	669	25,531
1982	5,471	1,459	854	39,629	41,482	10,391	1,973	1,092	813	744	1,095	1,039	106,043
1983	1,297	1,260	4,671	4,030	10,145	7,694	396	376	61,092	10,429	1,888	1,765	105,043
1984	1,779	1,424	2,969	1,031	1,620	1,305	194	765	94	1,111	748	2,441	15,484
1985	670	2,196	4,566	4,247	2,452	590	531	471	14,814	6,340	936	964	38,776
1986	877	803	714	3,191	28,300	10,409	1,781	12,787	103,928	57,777	10,616	7,611	238,793
1987	14,380	16,556	13,696	5,302	81,080	9,322	3,023	5,994	5,244	2,097	3,810	7,968	168,472
1988	5,788	25,140	10,443	16,322	5,798	2,265	893	7,795	9,340	3,652	2,565	2,104	92,104
1989	2,456	1,976	6,216	7,831	46,447	11,036	5,730	12,341	2,079	2,539	1,948	4,729	105,326
1990	2,557	16,247	6,115	12,833	8,114	2,208	2,168	4,116	3,570	2,083	770	1,319	62,099
1991	1,656	1,158	1,206	2,059	30,099	2,285	660	2,599	900	2,392	11,730	9,459	66,204
1992	3,854	7,662	6,551	2,975	10,072	12,127	8,339	12,258	1,277	7,189	31,950	12,157	116,410
1993	10,187	7,222	17,010	108,036	17,948	18,879	4,284	2,460	373	-	-	-	-

Table 17. Adjusted monthly flows from Elk Creek at the Bretch Diversion Dam from January 1950 to September 1993. Note that these calculations were made using daily data before being summed to monthly totals.

	Flow from Elk Creek at Bretch Diversion Dam (acre-ft)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1950	388	464	415	822	10,097	1,881	31,513	3,227	875	460	510	549	51,201
1951	525	579	446	29,989	40,171	1,795	1,595	1,376	659	360	265	271	78,031
1952	248	262	282	3,994	4,436	39	2	0	0	7	35	57	9,361
1953	53	149	3,783	7	3,852	2,975	364	79	857	4,395	1,328	58	17,900
1954	45	36	82	2,574	7,270	4	1	0	0	0	0	0	10,012
1955	57	39	67	20,648	9,529	427	777	0	39,734	334	336	355	72,303
1956	407	254	205	207	4,428	2,126	27	0	234	105	13	22	8,027
1957	37	52	8,993	74,594	18,855	1,479	586	448	1,505	414	338	388	107,689
1958	362	493	786	222	5,456	3,779	468	41	25	12	99	176	11,918
1959	281	198	1,644	9,521	12,317	11,440	14,680	1,490	31,039	1,434	7,486	7,414	98,943
1960	15,106	5,080	3,495	3,374	3,505	1,275	8,747	816	21,201	9,195	3,039	3,007	77,840
1961	2,737	2,216	2,481	2,686	21,507	3,679	3,743	1,111	13,020	22,984	3,092	2,354	81,611
1962	1,926	1,434	1,696	3,082	42,169	2,856	4,760	7,660	3,548	1,636	1,765	1,363	73,896
1963	1,146	1,375	1,091	605	13,260	871	240	358	59	3,537	261	230	23,033
1964	2,997	460	293	1,631	3,430	236	365	528	170	3,637	982	813	15,543
1965	697	578	1,337	2,490	5,975	1,089	121	26,741	33,150	3,342	1,783	2,477	79,780
1966	3,189	3,366	805	1,394	416	65	712	1,128	352	220	100	373	12,120
1967	351	221	5,415	903	275	1,269	7	86	748	7	102	235	9,617
1968	245	409	1,807	6,591	20,023	5,322	3,932	891	21,970	5,443	2,118	1,400	70,151
1969	1,525	2,442	4,723	70,612	3,993	1,002	887	7,170	1,057	727	713	643	95,493
1970	696	700	1,375	1,352	4,495	49	4	288	2,250	32	119	133	11,492
1971	265	323	41	23	2,381	505	2,782	18,841	2,134	11,717	2,297	1,275	42,582
1972	1,777	851	458	3,587	5,794	1,400	137	76	66	799	665	851	16,460
1973	2,438	6,284	37,129	5,137	14,670	2,299	872	23,156	11,361	1,561	1,563	1,142	107,612
1974	900	4,417	1,664	12,532	4,917	347	376	2,081	1,836	13,851	2,779	2,856	48,557
1975	7,652	10,350	7,640	7,031	8,346	4,009	55,706	2,305	3,225	4,465	2,178	2,295	115,202
1976	1,759	1,474	6,581	4,030	7,188	2,428	390	26,388	1,630	1,008	887	914	54,677
1977	1,081	865	1,037	40,249	59,189	2,368	3,568	12,496	832	539	1,285	1,337	124,846
1978	1,622	1,472	1,178	708	25,121	1,392	593	380	561	663	555	429	34,675
1979	953	857	1,183	3,938	4,577	1,406	837	524	214	1,463	1,121	638	17,713
1980	757	588	1,019	17,420	21,073	391	88	267	155	163	994	371	43,285
1981	291	805	864	644	7,585	106	336	99	11,250	2,131	750	669	25,531
1982	5,471	1,459	854	39,629	41,482	10,391	1,973	1,092	813	744	1,095	1,039	106,043
1983	1,297	1,260	4,671	4,030	10,145	7,694	396	376	61,092	10,429	1,888	1,765	105,043
1984	1,779	1,424	2,969	1,031	1,620	1,305	194	765	94	1,111	748	2,441	15,484
1985	670	2,196	4,566	4,247	2,452	590	531	471	14,814	6,340	936	964	38,776
1986	877	803	714	3,191	28,300	10,409	1,781	12,787	103,928	57,777	10,616	7,611	238,793
1987	14,380	16,556	13,696	5,302	81,080	9,322	3,023	5,994	5,244	2,097	3,810	7,968	168,472
1988	5,788	25,140	10,443	16,322	5,798	2,265	893	7,795	9,340	3,652	2,565	2,104	92,104
1989	2,456	1,976	6,216	7,831	46,447	11,036	5,730	12,341	2,079	2,539	1,948	4,729	105,326
1990	2,557	16,247	6,115	12,833	8,114	2,208	2,168	4,116	3,570	2,083	770	1,319	62,099
1991	1,656	1,158	1,206	2,059	30,099	2,285	660	2,599	900	2,392	11,730	9,459	66,204
1992	3,854	7,662	6,551	2,975	10,072	12,127	8,339	12,258	1,277	7,189	31,950	12,157	116,410
1993	10,187	7,222	17,010	108,036	17,948	18,879	4,284	2,460	373	-	-	-	-

Table 18. Extended monthly flows from Elk Creek near Hobart from October 1993 to December 2016. Reclamation's Technical Service Center used the daily flows recorded from the North Fork Red River near Headrick (07305000, available at https://waterdata.usgs.gov/ok/nwis/dv/?site_no=07305000&agency_cd=USGS&referred_module=sw) to extend the record of daily flow in Elk Creek. Note that these calculations were made using daily data before being summed to monthly totals.

	Flow from Elk Creek at Bretch Diversion Dam (acre-ft)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1993	-	-	-	-	-	-	-	-	-	1,002	846	1,013	-
1994	905	789	1,540	1,972	3,318	945	501	559	41	274	3,513	505	14,861
1995	424	241	433	496	7,434	74,306	5,257	41,279	19,420	8,960	3,986	3,914	166,148
1996	3,743	3,101	2,593	1,795	1,020	4,898	2,205	15,840	21,955	5,839	7,037	11,214	81,238
1997	6,865	20,651	10,077	85,675	36,350	20,406	7,043	15,193	10,611	6,987	6,935	15,726	242,517
1998	12,556	17,993	45,647	10,382	6,164	1,645	369	155	477	728	5,047	1,227	102,392
1999	945	913	1,968	5,127	15,741	22,085	4,336	1,319	228	155	170	2,545	55,532
2000	652	678	14,339	6,269	4,837	5,797	6,830	6	51	1,170	849	541	42,020
2001	914	3,237	2,474	1,076	47,593	8,866	768	606	1,350	43	552	452	67,931
2002	541	916	501	3,994	323	485	356	212	133	6,432	1,005	753	15,649
2003	516	340	436	474	736	7,781	98	19	2,917	75	8	139	13,540
2004	424	18	11,194	4,204	773	3,894	4,809	184	745	10,311	20,458	2,257	59,272
2005	3,826	2,192	1,299	734	1,125	4,803	373	14,956	5,167	2,248	436	377	37,535
2006	174	165	339	229	2,619	836	79	911	1,538	5,173	36	757	12,856
2007	458	309	16,356	21,705	33,524	31,647	9,014	4,895	1,394	1,384	597	947	122,228
2008	633	1,555	3,897	4,512	1,167	565	4	408	4,277	5,825	1,457	747	25,047
2009	383	136	52	1,658	2,612	676	207	138	1,741	567	28	255	8,452
2010	375	1,439	467	2,785	653	276	17,463	972	280	1,196	736	86	26,729
2011	556	205	109	0	1,778	0	0	0	0	0	8,662	73	11,382
2012	25	21	1,132	5,754	3,268	729	0	0	0	0	2	22	10,953
2013	59	68	123	90	32	0	0	104	110	240	638	0	1,462
2014	0	0	9	15	1,869	2,956	187	885	1,064	0	123	0	7,109
2015	0	285	19	3,705	67,935	33,104	10,800	6,411	4,078	2,768	7,176	5,073	141,353
2016	4,136	1,522	1,393	7,562	4,963	8,153	2,822	1,426	10,756	3,778	5,717	5,840	58,067

Table 19. Monthly divertible flows from Elk Creek at the Bretch Diversion Dam from September 1949 to December 2016. Note that these calculations were made using daily data before being summed to monthly totals.

	Divertible Flow from Elk Creek at Bretch Diversion Dam (acre-ft)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1949	-	-	-	-	-	-	-	-	-	393	0	0	-
1950	0	0	0	212	7,347	533	17,691	6,314	306	0	0	0	32,403
1951	0	0	0	0	17,637	17,914	1,215	1	826	385	0	0	37,979
1952	0	0	0	2,583	3,567	42	0	0	0	0	0	0	6,192
1953	0	0	0	2,854	0	3,022	2,330	0	0	3,638	321	938	13,103
1954	0	0	0	242	6,900	223	0	0	0	0	0	0	7,365
1955	0	0	0	0	16,121	5,665	264	406	14	8,745	0	0	31,214
1956	0	0	0	0	3,273	11	1,507	0	0	0	0	0	4,792
1957	0	0	0	14,939	36,538	7,802	273	0	222	1,025	0	0	60,798
1958	0	0	66	91	0	5,639	979	0	0	0	0	0	6,775
1959	0	0	0	804	16,668	1,467	13,617	476	5,965	11,323	620	7,009	57,948
1960	5,214	11,515	3,650	1,524	2,312	2,086	6,283	663	48	16,695	2,038	2,079	54,108
1961	1,872	1,481	1,513	1,170	1,627	14,174	2,291	2,148	4,179	4,830	9,901	1,813	46,998
1962	1,295	804	654	2,334	3,390	24,404	2,729	1,618	6,262	2,475	495	917	47,376
1963	349	455	667	207	1,888	8,556	139	0	0	2,635	0	0	14,895
1964	0	1,934	0	0	1,145	2,181	0	80	265	22	2,702	173	8,501
1965	84	20	12	614	1,476	4,960	2	0	9,849	8,180	1,425	1,529	28,151
1966	728	2,139	2,293	76	559	0	0	701	259	0	0	0	6,755
1967	0	0	0	3,918	380	608	249	0	338	0	0	0	5,493
1968	0	0	0	871	6,846	9,083	3,841	2,902	41	7,187	4,455	768	35,993
1969	526	863	3,328	1,816	23,633	1,466	85	4,814	1,130	8	77	25	37,770
1970	22	17	166	934	2,657	766	0	3	1,678	0	0	0	6,243
1971	0	0	0	0	0	1,895	957	1,639	9,787	6,240	641	1,775	22,933
1972	560	1,004	142	198	3,041	5,055	474	0	0	0	289	3	10,765
1973	1,824	254	10,897	19,905	3,982	11,548	1,070	76	14,781	7,245	882	712	73,177
1974	372	249	3,865	2,308	12,198	479	0	139	2,574	3,524	9,485	2,091	37,284
1975	2,549	10,137	7,690	6,050	8,099	5,682	16,091	8,178	1,080	2,544	3,982	1,676	73,759
1976	1,361	824	877	6,710	5,804	4,257	298	0	12,296	279	343	218	33,268
1977	315	391	213	429	39,692	11,175	1,163	11,384	2,803	125	494	613	68,799
1978	671	1,014	774	288	7,110	2,666	243	0	0	72	175	0	13,013
1979	321	145	597	180	3,575	3,765	578	259	0	45	1,486	0	10,952
1980	120	35	256	270	19,510	3,787	0	0	0	0	0	461	24,441
1981	0	0	342	326	367	6,588	0	52	0	10,556	1,440	131	19,803
1982	2,916	2,174	713	94	25,187	30,991	2,467	632	420	112	243	389	66,338
1983	422	624	3,375	1,406	7,163	11,377	652	0	0	14,504	1,958	1,164	42,645
1984	1,129	1,061	1,131	1,802	153	1,690	65	439	0	0	790	1,061	9,322
1985	845	694	3,769	3,602	993	1,860	0	106	1,176	11,320	3,602	336	28,303
1986	199	232	182	58	2,782	13,617	5,707	3,182	12,645	47,956	19,858	8,990	115,407
1987	8,951	12,324	19,546	6,462	21,391	18,135	6,361	2,492	7,551	1,696	1,166	3,969	110,044
1988	7,874	4,118	18,127	11,597	12,132	3,941	984	59	13,638	2,514	2,911	1,806	79,700
1989	1,616	1,441	3,882	3,152	7,954	30,835	4,959	4,592	7,868	1,996	1,255	1,343	70,893
1990	4,269	2,933	10,758	7,711	10,061	5,599	1,421	1,068	5,995	273	1,357	114	51,558
1991	986	771	641	460	7,467	20,542	672	456	1,690	278	1,785	14,982	50,730
1992	4,073	2,967	7,584	5,489	1,518	11,518	14,721	5,542	7,252	153	15,703	13,291	89,810
1993	12,191	8,326	10,245	15,557	45,955	8,000	14,385	3,377	1,418	962	822	965	122,201
1994	870	757	1,499	1,928	3,275	922	439	492	11	218	3,477	470	14,358

Table 19. Continued…

	Divertible Flow from Elk Creek at Bretch Diversion Dam (acre-ft)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1995	389	207	395	455	7,261	35,271	5,206	27,793	18,877	6,066	3,948	3,879	109,747
1996	3,708	3,065	2,551	1,749	968	4,850	2,156	8,525	20,355	5,797	7,001	10,765	71,489
1997	6,831	20,002	10,035	40,058	22,715	20,362	6,992	14,129	10,566	6,946	6,896	13,194	178,726
1998	11,783	17,960	25,815	10,339	6,112	1,591	313	105	437	679	5,012	1,193	81,339
1999	909	878	1,929	5,085	12,211	19,949	4,283	1,263	195	100	133	2,506	49,441
2000	613	639	12,324	6,229	4,789	5,754	6,779	1	0	1,083	816	525	39,551
2001	851	3,205	2,436	1,037	27,848	7,783	691	554	1,313	0	508	404	46,631
2002	526	858	457	3,954	290	431	302	181	66	6,394	972	722	15,152
2003	473	304	395	431	702	7,726	73	0	2,815	33	6	80	13,037
2004	375	8	10,334	4,163	735	3,840	4,758	138	706	6,296	20,424	2,218	53,993
2005	3,790	2,159	1,259	693	1,078	4,754	349	8,257	5,123	2,206	402	349	30,419
2006	123	123	296	181	2,575	777	51	829	1,495	5,132	0	720	12,300
2007	421	274	11,042	21,666	26,155	24,051	8,964	4,846	1,349	1,341	569	902	101,579
2008	609	1,501	3,852	4,468	1,124	513	0	326	4,216	5,783	1,431	690	24,513
2009	341	96	16	1,605	2,569	636	177	58	1,699	542	0	225	7,965
2010	313	1,407	434	2,734	606	264	12,090	923	252	1,150	687	46	20,907
2011	516	174	75	0	1,691	0	0	0	0	0	8,457	53	10,968
2012	0	0	1,045	5,710	3,218	679	0	0	0	0	0	0	10,652
2013	0	0	8	52	17	0	0	0	0	196	602	0	875
2014	0	0	0	0	1,671	2,907	158	817	1,032	0	27	0	6,612
2015	0	174	0	3,644	25,328	18,922	10,757	6,365	4,029	2,723	7,139	5,034	84,115
2016	4,099	1,481	1,347	7,519	4,917	8,108	2,789	1,366	10,128	3,731	5,672	5,794	56,951

6.3. Precipitation

Table 20. Monthly precipitation for Tom Steed Reservoir from January 1926 to December 1947.

	Extended Record for Roosevelt Precipitation Gage (inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1926	0.89	0.00	4.47	3.40	6.40	6.58	2.14	4.89	7.92	0.92	0.24	0.50	38.34
1927	0.00	0.60	1.08	0.59	4.88	6.90	3.61	1.70	1.14	1.23	3.00	0.66	25.40
1928	1.64	1.58	4.45	3.49	0.78	2.08	2.96	2.56	1.61	3.71	0.43	0.00	25.30
1929	0.00	0.00	0.64	0.06	1.56	6.47	5.50	8.48	3.44	0.97	1.96	0.00	29.07
1930	0.28	0.00	2.13	1.07	2.59	3.21	2.80	2.40	1.99	4.05	0.57	2.51	23.60
1931	0.45	1.84	0.26	1.45	9.32	4.63	0.17	2.87	2.06	0.00	3.25	0.21	26.50
1932	1.89	2.24	1.43	2.19	6.50	1.19	5.02	0.79	1.05	2.15	4.19	0.58	29.22
1933	1.70	1.12	5.34	0.66	1.87	0.08	0.89	0.86	0.36	4.26	3.44	0.93	21.52
1934	1.01	0.71	1.14	2.57	7.56	2.19	1.89	0.30	0.15	0.00	1.56	2.00	21.09
1935	1.88	2.23	1.42	2.18	6.47	1.18	5.00	0.79	1.05	2.14	4.17	0.58	29.09
1936	0.05	0.09	1.04	1.12	1.25	2.62	4.40	0.91	3.24	1.12	0.31	1.00	17.17
1937	0.00	1.05	0.12	2.62	2.92	10.50	0.12	3.76	0.84	0.74	1.24	0.39	24.29
1938	0.44	1.81	0.25	1.43	9.17	4.55	0.16	2.82	2.03	0.00	3.20	0.20	26.07
1939	0.31	1.41	2.18	1.45	0.32	4.14	0.80	0.45	0.20	1.41	1.82	5.09	19.57
1940	0.53	2.92	0.40	0.26	4.80	0.98	0.71	2.00	4.80	0.35	5.02	0.37	23.14
1941	1.18	1.48	1.96	7.43	5.03	6.90	5.22	3.38	8.41	0.39	2.06	1.22	44.68
1942	0.82	0.00	2.18	1.04	6.32	7.42	1.05	3.09	3.79	2.41	1.42	4.46	34.00
1943	0.29	1.29	2.01	1.33	0.30	3.81	0.73	0.42	0.18	1.29	1.67	4.69	18.01
1944	1.91	2.26	1.44	2.21	6.56	1.20	5.07	0.80	1.06	2.17	4.23	0.59	29.50
1945	2.05	2.11	1.61	3.82	6.80	1.99	2.81	3.66	2.18	1.90	1.05	1.12	31.11
1946	0.88	1.58	0.67	0.00	2.59	3.62	4.08	2.31	0.88	6.31	0.03	2.36	25.32
1947	1.65	0.18	2.83	2.97	1.11	6.22	4.41	0.70	1.07	0.35	0.41	0.21	22.10

Table 21. Monthly precipitation for Tom Steed Reservoir from January 1948 to May 1975. Note that three monthly totals had missing daily values and those points were not used in the average calculations.

	Average of Roosevelt and Snyder Precipitation Gage (inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1948	0.77	2.26	3.42	0.66	1.87	5.48	2.42	1.18	0.05	1.29	0.27	0.00	19.67
1949	4.28	1.00	1.30	1.46	8.03	5.94	2.19	2.67	3.26	3.95	0.00	1.20	35.25
1950	0.64	1.67	0.14	0.83	4.66	5.08	7.81	5.11	2.25	0.00	0.00	0.02	28.19
1951	0.74	1.39	1.51	0.92	6.87	4.80	1.80	2.63	1.62	1.75	0.85	0.00	24.86
1952	0.88	0.89	1.45	2.20	5.31	1.82	1.43	0.23	0.17	0.00	1.55	1.80	17.70
1953	0.08	0.54	2.64	2.31	0.76	5.10	3.56	1.48	0.18	7.33	1.15	0.91	26.00
1954	0.07	0.09	0.43	2.50	7.81	0.56	0.28	0.81	0.00	0.28	0.00	1.23	14.04
1955	1.56	0.84	1.36	0.46	10.26	4.56	1.24	1.42	3.90	5.40	0.00	0.03	31.02
1956	0.23	1.38	0.28	0.69	4.97	0.29	3.08	0.80	0.01	2.96	0.45	1.95	17.06
1957	0.62	1.03	2.80	5.60	11.42	3.70	3.34	0.14	3.02	2.87	1.60	0.07	36.17
1958	2.16	0.18	2.76	2.29	1.69	5.31	4.67	0.73	1.29	0.37	0.55	0.41	22.38
1959	0.04	0.04	0.20	1.80	7.08	2.13	6.35	1.96	3.95	5.49	1.04	3.69	33.74
1960	0.90	1.64	1.09	0.09	3.52	3.38	5.42	3.52	1.26	6.43	0.02	2.53	29.77
1961	0.13	1.90	2.81	0.80	2.06	7.15	2.27	2.51	4.48	2.01	2.64	1.05	29.79
1962	0.15	0.08	0.40	3.07	3.04	6.00	2.52	0.52	4.79	2.82	0.98	0.89	25.24
1963	0.00	0.20	1.91	0.95	4.27	2.05	1.11	1.82	1.29	0.72	2.57	0.37	17.22
1964	0.66	2.88	0.61	0.43	5.07	0.96	0.57	2.28	4.60	0.91	5.60	0.57	25.12
1965	0.61	0.97	0.84	4.00	3.78	4.41	2.73	3.91	5.02	4.86	0.13	2.25	33.49
1966	0.87	0.71	0.25	2.47	0.12	2.11	1.65	5.32	2.15	0.57	0.15	0.35	16.69
1967	0.03	0.15	0.81	1.60	2.27	2.64	3.40	0.51	2.63	1.67	0.26	0.92	16.86
1968	2.14	2.03	1.38	2.07	6.02	2.76	5.89	2.05	1.61	1.87	3.62	0.61	32.04
1969	0.15	2.04	2.16	0.55	5.60	2.91	2.43	2.82	4.58	2.33	0.32	0.57	26.43
1970	0.09	0.50	2.61	1.64	2.83	0.64	0.28	1.38	2.79	0.97	0.46	0.33	14.49
1971	0.26	0.83	0.01	0.37	3.39	3.21	3.69	4.76	6.44	2.86	0.92	2.32	29.03
1972	0.03	0.22	0.43	4.48	2.89	2.25	1.05	2.92	0.38	4.89	2.11	0.27	21.90
1973	4.27	0.79	4.83	4.18	3.25	2.67	2.29	0.43	8.27	2.60	0.80	0.33	34.69
1974	0.02	0.23	0.96	3.36	3.30	1.41	0.23	4.24	5.09	2.88	0.72	0.82	23.24
1975	1.79	2.19	1.07	0.84	5.39	-	-	-	-	-	-	-	-

Table 22. Monthly precipitation for Tom Steed Reservoir from June 1975 to December 2016. Mountain Park Dam precipitation gage data are recorded daily by MPMCD and stored on Reclamation's website (https://www.usbr.gov/gp-bin/custom.pl?SWE221A&toms). This data since 1995 also are stored on the United States Army Corp of Engineers (USACE) website (https://www.swt-wc.usace.army.mil/TOMScharts.html).

	Mountain Park Dam Precipitation Gage (inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1975	-	-	-	-	-	3.00	5.16	3.16	2.57	0.89	2.40	1.00	-
1976	0.00	0.24	1.17	7.03	5.72	5.01	1.49	3.15	5.04	1.75	1.06	0.13	31.79
1977	0.64	1.15	0.51	2.54	10.42	1.74	1.01	4.96	0.92	1.52	1.50	0.03	26.94
1978	0.53	2.07	0.46	0.60	9.48	0.28	0.11	0.95	1.82	0.06	1.82	0.32	18.50
1979	1.55	0.73	2.31	2.92	4.73	2.91	2.42	3.61	0.35	1.06	1.35	0.95	24.89
1980	1.70	0.46	1.33	2.43	9.77	0.56	0.00	1.34	1.19	0.25	0.45	1.30	20.78
1981	0.29	0.66	2.08	4.28	3.46	4.88	0.99	0.69	0.30	4.82	0.71	0.22	23.38
1982	0.80	0.34	1.75	2.29	7.21	5.86	1.67	0.07	1.12	0.08	1.88	1.23	24.30
1983	1.40	4.12	2.23	0.81	3.27	2.72	0.03	0.54	0.86	7.96	1.62	0.33	25.89
1984	0.06	1.15	3.25	0.64	0.15	3.44	1.96	1.89	0.17	1.19	1.79	3.73	19.42
1985	0.80	2.22	4.49	4.15	0.42	6.71	0.59	1.61	4.33	4.54	0.80	0.00	30.66
1986	0.00	0.15	0.95	2.30	8.25	2.19	2.66	3.91	7.70	6.64	3.00	0.29	38.04
1987	1.49	3.41	1.53	0.04	11.23	5.64	3.37	3.43	3.36	2.60	0.17	2.55	38.82
1988	0.93	0.00	2.33	2.25	0.79	2.09	1.12	0.78	7.90	1.29	0.69	0.33	20.50
1989	1.12	1.16	1.88	0.10	5.13	9.40	0.58	1.90	3.55	2.13	0.00	0.05	27.00
1990	1.24	3.54	4.24	4.93	3.19	2.09	5.16	3.72	1.84	0.71	2.27	1.17	34.10
1991	0.76	0.01	1.02	1.18	9.48	8.28	3.98	2.14	3.30	2.32	0.95	4.38	37.80
1992	1.04	0.77	0.57	2.36	4.42	7.07	2.01	2.32	2.01	0.12	4.76	2.43	29.88
1993	1.68	1.84	1.67	2.07	4.59	2.86	2.32	2.99	2.35	0.66	1.02	1.12	25.17
1994	0.18	0.98	2.17	2.64	2.70	0.81	4.18	0.38	1.87	1.24	6.35	0.30	23.80
1995	0.89	3.29	2.17	3.32	6.09	6.14	3.61	5.00	7.29	0.94	0.38	0.46	39.58
1996	0.00	0.00	1.09	0.39	0.84	4.36	7.15	6.90	4.88	1.24	1.35	0.00	28.20
1997	0.28	3.10	0.05	5.14	3.19	2.77	1.41	3.46	5.16	2.29	0.89	2.79	30.53
1998	1.48	2.29	4.63	0.37	1.09	1.34	0.99	2.61	2.49	3.45	2.54	0.75	24.03
1999	1.78	0.50	3.11	2.58	5.98	4.16	1.60	0.13	1.66	3.00	0.15	3.75	28.40
2000	0.44	1.21	4.37	1.95	3.73	6.34	0.75	0.00	1.50	9.01	1.27	1.97	32.54
2001	2.09	1.13	0.92	0.03	9.68	0.80	0.00	1.27	0.80	0.16	1.85	0.06	18.79
2002	1.28	0.66	1.27	3.41	1.33	1.62	2.99	1.57	1.75	5.08	0.49	1.96	23.41
2003	0.00	0.58	0.18	1.90	2.98	9.33	0.32	2.64	0.77	0.46	0.84	0.35	20.35
2004	1.60	1.72	2.96	2.78	0.25	3.80	1.37	4.36	0.56	2.11	5.67	0.24	27.42
2005	1.43	1.05	0.11	0.82	3.23	3.53	2.14	3.49	4.00	2.29	0.00	0.19	22.28
2006	0.07	0.04	2.14	1.30	3.55	0.25	0.83	4.89	1.18	3.69	0.73	1.94	20.61
2007	0.89	0.78	3.43	1.12	4.26	11.89	1.94	3.63	1.02	0.79	0.00	2.01	31.76
2008	0.06	2.16	3.31	2.76	2.14	2.41	1.85	4.42	0.99	3.17	0.00	0.00	23.27
2009	0.00	0.32	1.42	5.94	3.11	2.28	2.98	0.52	4.07	3.58	0.23	1.68	26.13
2010	0.62	3.44	0.56	1.79	0.74	2.96	6.41	1.95	3.97	3.43	1.08	0.00	26.95
2011	0.00	0.53	0.00	0.00	0.00	0.88	0.05	1.20	0.42	3.21	1.81	1.79	9.89
2012	0.82	0.47	3.74	2.71	1.57	3.68	0.51	0.95	2.73	1.25	0.35	0.70	19.48
2013	1.14	2.69	0.05	3.40	2.55	2.51	2.85	1.50	6.42	3.03	0.52	1.50	28.16
2014	0.00	0.02	1.10	0.68	4.85	5.92	4.47	1.45	0.86	1.14	2.86	0.53	23.88
2015	0.98	0.59	1.13	4.86	19.40	5.70	1.93	3.76	1.16	4.41	4.43	2.25	50.60
2016	0.35	0.64	0.74	11.80	3.57	4.18	2.82	3.13	4.66	0.64	2.10	1.11	35.74

6.4. Evaporation

Table 23. Monthly Observed Pan Evaporation for Tipton, OK from Mar 1947 to Oct 1978. Tipton gage data are available from NOAA on their website in annual reports over this period (http://www.ncdc.noaa.gov/IPS/cd/cd.html;jsessionid=B24750D0FC0A5C17E922EA8452D94BAD?_page=0&jsessionid=B24750D0FC0A5C17E922EA8452D94BAD&state=OK&_target1=Next+%3E).

	Tipton Gage Pan Evaporation (inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1947	-	-	5.10	5.34	7.36	11.559	11.105	12.046	10.674	6.207	2.262	-	-
1948	-	1.408	3.38	7.68	8.32	10.21	10.323	10.149	10.068	5.811	4.818	3.726	-
1949	-	-	4.81	5.58	7.06	9.51	11.64	9.35	6.38	5.28	4.31	2.99	-
1950	2.17	3.85	7.03	8.56	8.10	10.71	6.48	8.30	6.00	7.87	5	-	-
1951	-	-	7.2	9.89	10.65	11.31	13.08	11.03	11.03	9.36	6.94	-	-
1952	3.69	3.88	6.01	7.09	11.37	16.78	13.98	15.05	10.71	9.08	5.33	2.37	105.34
1953	4.05	4.65	7.1	8.68	12.54	19.74	12.21	10.2	11.52	5.89	2.79	-	-
1954	-	6.84	7.25	9.07	7.82	14.5	16.8	13.32	12.15	7.01	5.35	5.44	-
1955	2.36	3.7	6.84	10.66	10.31	11.43	14.34	11.62	8.16	5.76	5.88	3.44	94.5
1956	2.95	3.68	9.25	11.24	13.49	14.06	16.43	15.6	12.69	7.75	4.46	3.07	114.67
1957	-	-	3.96	5.29	6.61	11.36	15.56	11.35	7.75	5.19	2.67	3.44	-
1958	2.22	2.12	2.44	6.71	9.04	14.14	12.14	11.07	8.34	6.54	4.18	2.58	81.52
1959	-	3.83	8.55	11.01	10.83	11.43	10.14	12.11	10.07	4.98	3.85	2.61	-
1960	1.54	3.08	-	9.8	10.31	12.67	11.33	9.65	7.36	4.9	4.21	2.28	-
1961	2.16	2.49	6.03	8.91	11.01	9.26	11.02	11.09	8.19	6.82	2.97	1.56	81.51
1962	-	6.05	8.91	8.36	14.37	10.99	12.85	14.38	5.69	6.15	3.6	2.47	-
1963	-	-	8.06	10.36	12.82	12.44	15.63	12.55	8.76	9.68	5.29	2.18	-
1964	-	-	8.08	11.76	13.12	15.31	17.08	13.98	7.89	6.03	3.24	-	-
1965	-	-	4.86	9.24	10.77	12.54	17.7	14.75	12	6.39	5.83	6.13	-
1966	-	-	8.6	8.94	10.99	13.83	16.6	11.62	7.04	8.1	6.49	-	-
1967	-	-	8.4	8.22	10.31	12.72	13.37	13.96	8.23	9.77	3.58	2.78	-
1968	-	-	-	7.71	8.4	11.3	11.43	12.84	9.36	-	-	-	-
1969	-	-	-	7.92	8.76	12.72	14.61	11.89	7.34	5.63	-	-	-
1970	-	-	-	7.67	11.09	14.06	15.05	13.25	9.46	6.29	-	-	-
1971	-	-	-	10	13.37	14.38	14.48	-	7.8	5.44	-	-	-
1972	-	-	-	11.18	9.79	13.16	13.56	12.36	8.56	6.35	-	-	-
1973	-	-	-	-	10.67	12.58	12.19	11.26	6.7	6.45	-	-	-
1974	-	-	-	10.3	11.43	12.85	13.61	11.57	7.1	5.49	-	-	-
1975	-	-	-	8.84	-	10.26	9.42	11.68	7.74	-	-	-	-
1976	-	-	-	7.4	-	11.57	10	11.44	6.7	5.34	-	-	-
1977	-	-	-	8.74	8.07	10.31	12.03	9.63	-	-	-	-	-
1978	-	-	-	9.68	8.24	12.88	14.91	10.87	8.28	7.79	-	-	-

Table 24. Monthly Observed Pan Evaporation data for Tom Steed Reservoir from June 1971 to December 2016. Mountain Park Dam evaporation data are recorded daily by MPMCD and stored on Reclamation's website (https://www.usbr.gov/gp-bin/custom.pl?SWE221A&toms).

	Mountain Park Dam Evaporation (inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1975	-	-	-	-	-	1.00	4.00	7.56	6.90	6.37	3.03	1.94	-
1976	2.67	5.39	6.13	5.05	5.19	6.73	9.01	11.30	6.26	4.18	0.28	-	-
1977	0.09	0.23	0.72	0.71	7.24	10.71	10.95	10.23	8.02	-	2.97	-	-
1978	1.84	0.59	5.25	-	8.25	-	-	-	7.06	7.25	2.40	2.20	-
1979	0.49	0.14	4.93	6.06	7.86	9.42	10.98	10.02	8.70	7.99	3.48	2.50	72.57
1980	1.91	2.78	5.23	7.98	7.64	11.50	15.23	13.15	8.51	7.20	3.40	2.33	86.86
1981	2.51	3.68	4.73	6.61	8.26	9.11	11.65	10.56	8.79	3.65	3.07	2.14	74.76
1982	2.27	1.83	5.05	7.92	7.56	7.98	11.04	11.71	9.50	7.03	3.83	2.18	77.90
1983	2.34	1.87	4.17	7.13	8.45	8.59	13.56	12.25	10.36	5.61	3.31	1.53	79.17
1984	0.60	4.57	4.68	8.16	11.10	11.47	13.41	11.80	9.85	5.35	3.74	1.58	86.31
1985	0.56	2.51	4.10	7.41	9.93	9.76	12.12	12.65	9.33	4.18	2.70	1.33	76.58
1986	4.08	3.27	6.63	8.25	7.33	9.04	13.28	10.26	5.85	3.17	3.05	1.73	75.94
1987	1.76	2.17	5.08	7.90	8.27	9.19	10.65	10.16	7.05	5.95	3.87	2.13	74.18
1988	1.25	3.37	6.05	7.29	10.32	10.96	11.32	12.33	7.46	5.55	3.79	2.66	82.35
1989	3.04	1.06	6.11	8.33	7.59	7.07	10.99	8.90	7.96	7.18	4.13	0.75	73.11
1990	3.37	4.32	3.41	5.94	8.96	12.01	10.55	8.20	6.84	5.91	2.54	1.75	73.80
1991	1.15	3.80	6.37	7.22	6.93	8.05	10.83	9.18	4.77	5.93	1.77	1.55	67.55
1992	2.01	3.98	5.48	5.45	7.72	6.55	10.47	8.63	7.27	6.18	2.50	1.54	67.78
1993	1.02	1.90	4.60	6.05	6.87	9.35	12.67	10.28	6.65	4.86	3.44	2.30	69.99
1994	1.99	2.33	5.16	7.88	6.76	11.25	10.25	11.30	8.14	5.25	2.94	2.22	75.47
1995	2.02	3.29	4.04	6.16	6.78	8.89	10.71	8.95	7.22	6.58	4.26	2.23	71.13
1996	2.00	4.00	5.97	8.73	11.17	10.10	9.82	7.56	5.09	5.63	3.38	2.57	76.02
1997	1.46	2.63	6.08	4.83	6.28	7.68	10.85	9.35	8.12	5.29	4.65	2.80	70.02
1998	3.00	2.81	4.30	7.59	11.12	13.65	14.77	10.53	8.43	5.33	2.97	1.87	86.37
1999	2.69	4.27	4.54	6.80	7.86	8.39	11.86	13.02	8.60	6.10	3.72	-	-
2000	-	-	5.13	5.67	9.31	7.58	11.25	14.29	11.86	5.12	2.00	-	-
2001	-	-	3.53	6.46	6.77	12.11	15.40	11.35	8.48	7.53	4.10	-	-
2002	-	-	-	5.14	6.65	11.03	8.88	11.91	8.48	4.00	2.90	-	-
2003	-	-	-	7.20	8.05	7.24	11.96	11.67	7.22	5.86	2.03	-	-
2004	-	-	-	6.15	8.58	8.84	10.7	8.34	8.23	4	2.3	-	-
2005	-	-	5.05	7.96	6.94	10.28	11.83	9.29	7.8	5.56	5.16	-	-
2006	-	-	3.04	10.33	10.33	12.97	14.14	11.67	7.15	5.5	3.78	-	-
2007	-	-	-	5.03	5.29	6.24	9.03	9.65	7.8	6.42	3.83	-	-
2008	-	-	-	7.58	9.88	11.91	12.13	9.39	6.94	5.39	-	-	-
2009	-	-	-	7.22	6.13	10.19	11.08	12.51	6.32	3.32	3.1	-	-
2010	-	-	-	5.4	8.49	11.48	8.8	12.45	7.57	6.56	3.61	-	-
2011	-	-	1.4	9.87	1.89	16.96	17.84	15.43	10.99	7.37	10.07	0.56	-
2012	-	-	-	7.53	10.36	11.08	14.84	12.44	9.92	5.31	5.19	-	-
2013	-	-	-	5.61	9.28	11.94	11.61	12.59	9.11	6.93	2.99	-	-
2014	-	-	-	8.57	8.57	10.55	10.7	11.95	8.78	7.61	-	-	-
2015	-	-	-	6.39	6.70	13.09	6.46	8.18	10.27	7.44	3.92	-	-
2016	-	-	-	7.34	8.29	9.85	13.47	10.92	8.48	7.26	5.01	-	-

Table 25. Monthly Modeled Pan Evaporation data for Tom Steed Reservoir from January 1999 to December 2016. These data were used to fill in 65 missing months of data from 1999 to 2016. This data are stored on the U.S. Army Corp of Engineers website (https://www.swt-wc.usace.army.mil/TOMScharts.html).

	Modeled Mountain Park Dam Evaporation (inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1999	3.65	4.29	4.55	6.80	7.96	8.98	11.86	13.02	8.73	6.34	3.96	4.35	84.49
2000	4.06	5.63	5.63	5.67	9.30	7.73	11.66	14.29	11.86	5.19	3.21	5.26	89.49
2001	3.66	2.53	4.01	6.46	7.74	12.11	15.42	11.65	8.46	7.43	4.32	4.14	87.93
2002	2.29	5.39	7.19	5.57	7.58	10.76	8.93	12.29	8.48	4.12	2.93	2.34	77.87
2003	3.74	3.24	5.79	7.12	8.50	7.24	11.96	11.67	7.22	5.86	3.71	4.51	80.56
2004	3.66	3.41	6.52	6.44	8.91	8.84	10.47	8.54	8.23	4.00	2.27	4.41	75.70
2005	2.80	2.98	5.37	7.83	7.01	9.97	11.83	9.63	8.12	5.68	5.09	4.67	80.98
2006	7.13	5.57	7.48	10.67	10.89	12.98	14.38	11.69	7.49	6.12	3.90	3.22	101.52
2007	3.06	4.00	5.80	5.80	5.85	6.34	9.04	9.70	7.94	6.42	4.21	2.87	71.03
2008	5.01	5.08	7.48	7.65	10.05	11.59	12.08	9.42	6.97	6.28	6.05	4.94	92.60
2009	5.65	6.67	7.86	7.37	6.26	9.88	11.07	12.61	6.18	3.38	3.28	2.88	83.09
2010	3.03	2.36	7.18	7.34	8.49	11.75	9.36	12.50	8.12	6.62	4.69	2.97	84.41
2011	3.70	4.40	7.38	9.78	11.15	16.76	17.67	14.84	11.09	7.37	4.19	2.57	110.90
2012	5.88	4.56	6.60	7.64	10.22	11.45	14.74	12.95	9.59	5.34	5.51	4.13	98.61
2013	3.63	4.26	6.90	7.30	9.33	12.13	11.42	11.99	9.06	6.12	3.77	2.68	88.59
2014	6.59	3.83	7.41	8.96	10.00	10.49	10.60	11.96	8.05	7.49	5.13	1.88	92.39
2015	3.88	3.93	4.07	6.45	6.47	12.57	14.10	10.75	9.64	7.69	3.73	3.96	87.24
2016	3.10	6.87	8.11	7.30	8.47	10.20	13.08	11.15	8.68	6.82	5.22	3.58	92.58

Table 26. Monthly Net Evaporation (Free Surface) data for Tom Steed Reservoir from January 1926 to September 1959 (Reclamation, 1962).

	Mountain Park Dam Net Evaporation (Free Surface, inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1926	0.82	4.12	1.66	0.70	2.79	5.94	1.57	0.00	0.00	0.00	2.51	0.00	20.11
1927	0.29	1.39	3.51	2.59	6.47	4.58	4.72	5.52	0.69	1.72	2.58	0.89	34.95
1928	2.09	0.55	4.19	4.52	3.58	3.92	4.09	5.81	4.79	1.11	0.06	0.30	35.01
1929	0.92	0.00	0.00	4.32	0.01	4.89	5.85	7.58	0.00	1.02	0.27	2.10	26.96
1930	0.00	2.87	4.28	3.12	2.95	4.63	9.50	8.92	5.88	0.00	1.02	0.29	43.46
1931	0.71	0.79	0.54	1.91	3.14	7.29	6.43	5.64	6.72	1.15	0.00	0.00	34.32
1932	0.00	0.83	4.27	3.32	2.90	0.00	6.73	6.16	3.83	2.88	2.78	0.00	33.70
1933	1.91	0.35	3.54	5.75	4.65	9.02	6.03	3.28	2.95	0.86	0.33	0.01	38.68
1934	1.34	1.86	3.06	4.23	1.88	5.71	10.52	8.35	5.15	1.46	2.64	2.19	48.39
1935	2.31	2.30	4.78	5.51	0.00	5.86	9.34	9.67	3.43	2.71	0.00	0.08	45.99
1936	2.14	2.75	7.17	6.22	4.57	11.10	11.05	11.99	0.00	2.88	3.36	1.67	64.90
1937	1.09	3.58	2.90	5.28	5.82	6.20	10.08	1.36	3.38	2.23	2.99	1.39	46.30
1938	2.67	0.00	3.64	3.27	0.00	5.71	7.73	10.81	4.96	5.59	1.49	3.31	49.18
1939	0.00	3.11	3.69	5.77	5.12	4.85	11.15	6.62	10.10	4.38	3.16	2.30	60.25
1940	1.33	1.05	7.05	2.16	7.31	7.99	10.08	7.56	4.66	4.24	0.00	0.70	54.13
1941	0.98	0.00	2.68	0.31	0.00	0.00	8.01	4.32	2.76	0.00	1.61	0.57	21.24
1942	2.10	2.55	4.15	0.00	6.27	5.13	8.61	1.44	2.38	0.00	3.01	0.00	35.64
1943	2.42	2.83	2.98	5.37	0.00	6.95	8.38	11.62	7.35	4.10	3.06	0.00	55.06
1944	0.00	0.72	1.63	4.52	3.61	2.88	3.38	5.76	2.65	2.25	1.20	0.00	28.60
1945	0.00	1.02	1.58	0.10	7.64	2.64	4.51	6.38	2.70	2.43	2.76	2.04	33.80
1946	0.77	1.90	4.77	5.73	3.84	5.44	9.78	7.16	3.64	3.91	0.83	1.61	49.38
1947	1.16	3.31	3.33	0.00	0.00	5.78	8.49	9.84	8.11	2.73	1.23	0.00	43.98
1948	0.57	0.00	1.52	6.95	4.01	6.52	6.60	5.71	6.77	3.35	3.11	3.05	48.16
1949	0.00	0.34	2.47	2.43	0.00	3.13	8.74	5.03	3.42	0.78	3.27	0.80	30.41
1950	1.65	2.44	5.69	5.92	2.45	6.09	0.00	4.86	3.11	5.16	4.27	2.10	43.74
1951	2.15	0.56	4.12	5.28	3.04	3.86	7.65	7.74	4.90	1.32	1.67	3.39	45.68
1952	2.08	2.31	3.35	2.72	3.90	10.84	8.32	11.10	7.18	6.65	1.85	0.38	60.68
1953	3.38	3.50	3.57	4.09	6.63	6.17	6.24	7.02	8.37	0.00	1.04	1.80	51.81
1954	1.85	3.44	4.29	2.45	0.00	8.66	11.34	10.14	7.81	4.95	3.13	1.44	59.50
1955	1.15	1.12	4.49	6.18	0.00	2.12	7.53	7.23	3.94	0.00	3.45	3.71	40.92
1956	1.77	1.87	6.34	7.36	4.91	9.55	6.75	10.74	8.65	3.20	2.76	0.83	64.73
1957	1.33	0.80	0.07	0.00	0.00	4.37	9.67	7.64	2.99	1.36	0.93	2.27	31.43
1958	0.43	1.12	0.00	2.27	5.93	4.18	5.53	7.55	4.64	3.88	2.63	1.47	39.63
1959	1.63	2.45	5.83	6.33	0.00	3.18	0.27	7.44	2.89	-	-	-	-

Table 27. Monthly Net Evaporation (Free Surface) data for Tom Steed Reservoir from October 1959 to December 2016.

	Mountain Park Dam Net Evaporation (Free Surface, inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1959	-	-	-	-	-	-	-	-	2.89	3.49	2.70	1.827	-
1960	1.08	2.16	4.45	7.33	7.22	8.87	7.93	6.76	5.15	3.43	2.95	1.596	58.91
1961	1.51	1.74	4.22	6.24	7.71	6.48	7.71	7.76	5.73	4.77	2.08	1.092	57.06
1962	2.64	4.24	6.24	5.85	10.06	7.69	9.00	10.07	3.98	4.31	2.52	1.729	68.32
1963	2.79	3.49	5.64	7.25	8.97	8.71	10.94	8.79	6.13	6.78	3.70	1.526	74.72
1964	2.13	0.81	5.66	8.23	9.18	10.72	11.96	9.79	5.52	4.22	2.27	2.50	72.98
1965	2.18	2.72	4.69	6.47	7.54	8.78	12.39	10.33	8.40	4.47	4.08	4.291	76.34
1966	1.92	2.98	6.02	6.26	7.69	9.68	11.62	8.13	4.93	5.67	4.54	2.72	72.16
1967	2.76	3.54	4.72	5.75	7.22	8.90	9.36	9.77	5.76	6.84	2.51	1.946	69.09
1968	0.65	1.66	4.16	5.40	5.88	7.91	8.00	8.99	6.55	4.62	0.41	2.46	56.68
1969	2.64	1.65	3.38	5.54	6.13	8.90	10.23	8.32	5.14	3.94	3.71	2.50	62.09
1970	2.70	3.19	2.92	5.37	7.76	9.84	10.54	9.28	6.62	4.40	3.57	2.74	68.94
1971	2.53	2.86	5.52	7.00	9.36	9.12	9.46	6.10	5.46	3.80	3.11	1.05	65.38
1972	2.76	3.47	5.10	7.17	7.04	8.16	8.79	7.67	6.04	3.50	1.93	2.80	64.43
1973	-1.48	2.90	0.71	4.40	6.80	7.67	7.84	0.86	5.73	4.33	3.24	2.74	45.74
1974	2.77	3.46	4.17	7.24	7.39	8.77	10.73	7.15	4.07	3.16	2.07	2.25	63.22
1975	1.00	1.50	3.52	4.92	5.66	0.70	2.80	5.29	4.83	4.46	2.12	1.36	38.17
1976	1.87	3.77	4.29	3.54	3.63	4.71	6.31	7.91	4.38	2.93	0.19	2.94	46.47
1977	0.07	0.16	0.51	0.50	5.07	7.50	7.67	7.16	5.61	4.97	2.08	3.04	44.32
1978	1.29	0.41	3.68	6.81	5.78	10.58	10.12	9.10	4.94	5.08	1.68	1.54	61.00
1979	0.34	0.10	3.45	4.24	5.50	6.59	7.69	7.01	6.09	5.59	2.44	1.75	50.80
1980	1.34	1.95	3.66	5.59	5.35	8.05	10.66	9.21	5.96	5.04	2.38	1.63	60.80
1981	1.76	2.58	3.31	4.63	5.78	6.38	8.16	7.39	6.15	2.56	2.15	1.50	52.33
1982	1.59	1.28	3.54	5.54	5.29	5.59	7.73	8.20	6.65	4.92	2.68	1.53	54.53
1983	1.64	1.31	2.92	4.99	5.92	6.01	9.49	8.58	7.25	3.93	2.32	1.07	55.42
1984	0.42	3.20	3.28	5.71	7.77	8.03	9.39	8.26	6.90	3.75	2.62	1.11	60.42
1985	0.39	1.76	2.87	5.19	6.95	6.83	8.48	8.86	6.53	2.93	1.89	0.93	53.61
1986	2.86	2.29	4.64	5.78	5.13	6.33	9.30	7.18	4.10	2.22	2.14	1.21	53.16
1987	1.23	1.52	3.56	5.53	5.79	6.43	7.46	7.11	4.94	4.17	2.71	1.49	51.93
1988	0.88	2.36	4.24	5.10	7.22	7.67	7.92	8.63	5.22	3.89	2.65	1.86	57.65
1989	2.13	0.74	4.28	5.83	5.31	4.95	7.69	6.23	5.57	5.03	2.89	0.53	51.18
1990	2.36	3.02	2.39	4.16	6.27	8.41	7.39	5.74	4.79	4.14	1.78	1.23	51.66
1991	0.81	2.66	4.46	5.05	4.85	5.64	7.58	6.43	3.34	4.15	1.24	1.09	47.29
1992	1.41	2.79	3.84	3.82	5.40	4.59	7.33	6.04	5.09	4.33	1.75	1.08	47.45
1993	0.71	1.33	3.22	4.24	4.81	6.55	8.87	7.20	4.66	3.40	2.41	1.61	48.99
1994	1.39	1.63	3.61	5.52	4.73	7.88	7.18	7.91	5.70	3.68	2.06	1.55	52.83
1995	1.41	2.30	2.83	4.31	4.75	6.22	7.50	6.27	5.05	4.61	2.98	1.56	49.79
1996	1.40	2.80	4.18	6.11	7.82	7.07	6.87	5.29	3.56	3.94	2.37	1.80	53.21
1997	1.02	1.84	4.26	3.38	4.40	5.38	7.60	6.55	5.68	3.70	3.26	1.96	49.01
1998	2.10	1.97	3.01	5.31	7.78	9.56	10.34	7.37	5.90	3.73	2.08	1.31	60.46
1999	1.88	2.99	3.18	4.76	5.50	5.87	8.30	9.11	6.02	4.27	2.60	3.05	57.54
2000	2.84	3.94	3.59	3.97	6.52	5.31	7.88	10.00	8.30	3.58	1.40	3.68	61.01
2001	2.56	1.77	2.47	4.52	4.74	8.48	10.78	7.95	5.94	5.27	2.87	2.90	60.24
2002	1.60	3.77	5.03	3.60	4.66	7.72	6.22	8.34	5.94	2.80	2.03	1.64	53.34

Table 27. Continued…

	Mountain Park Dam Net Evaporation (Free Surface, inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2001	2.56	1.77	2.47	4.52	4.74	8.48	10.78	7.95	5.94	5.27	2.87	2.90	60.24
2002	1.60	3.77	5.03	3.60	4.66	7.72	6.22	8.34	5.94	2.80	2.03	1.64	53.34
2003	2.62	2.27	4.05	5.04	5.64	5.07	8.37	8.17	5.05	4.10	1.42	3.16	54.96
2004	2.56	2.39	4.56	4.31	6.01	6.19	7.49	5.84	5.76	2.80	1.61	3.09	52.60
2005	1.96	2.09	3.54	5.57	4.86	7.20	8.28	6.50	5.46	3.89	3.61	3.27	56.22
2006	4.99	3.90	2.13	7.23	7.23	9.08	9.90	8.17	5.01	3.85	2.65	2.25	66.38
2007	2.14	2.80	4.06	3.52	3.70	4.37	6.32	6.76	5.46	4.49	2.68	2.01	48.31
2008	3.51	3.56	5.24	5.31	6.92	8.34	8.49	6.57	4.86	3.77	4.24	3.46	64.25
2009	3.96	4.67	5.50	5.05	4.29	7.13	7.76	8.76	4.42	2.32	2.17	2.02	58.05
2010	2.12	1.65	5.03	3.78	5.94	8.04	6.16	8.72	5.30	4.59	2.53	2.08	55.93
2011	2.59	3.08	0.98	6.91	1.32	11.87	12.49	10.80	7.69	5.16	7.05	0.39	70.34
2012	4.12	3.19	4.62	5.27	7.25	7.76	10.39	8.71	6.94	3.72	3.63	2.89	68.49
2013	2.54	2.98	4.83	3.93	6.50	8.36	8.13	8.81	6.38	4.85	2.09	1.88	61.27
2014	4.61	2.68	5.19	6.00	6.00	7.39	7.49	8.37	6.15	5.33	3.59	1.32	64.10
2015	2.72	2.75	2.85	4.47	4.69	9.16	4.52	5.73	7.19	5.21	2.74	2.77	54.80
2016	2.17	4.81	5.68	5.14	5.80	6.90	9.43	7.64	5.94	5.08	3.51	2.51	64.60

Table 28. Monthly Pure Evaporation (Free Surface) data for Tom Steed Reservoir from October 1959 to December 2016. These data are computed to fill in data gaps in the pan evaporation rate data by accounting for precipitation, which is not included in "Pure Evaporation".

	Mountain Park Dam Pure Evaporation (Free Surface, inches)												
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
1975	-	-	-	-	-	3.70	7.96	8.45	7.40	5.35	4.52	2.36	-
1976	1.87	4.01	5.46	10.57	9.35	9.72	7.80	11.06	9.42	4.68	1.25	-	-
1977	0.71	1.31	1.02	3.04	15.49	9.24	8.68	12.12	6.53	-	3.58	-	-
1978	1.82	2.48	4.14	-	15.26	-	-	-	6.76	5.14	3.50	1.86	-
1979	1.89	0.83	5.76	7.16	10.23	9.50	10.11	10.62	6.44	6.65	3.79	2.70	75.69
1980	3.04	2.41	4.99	8.02	15.12	8.61	10.66	10.55	7.15	5.29	2.83	2.93	81.58
1981	2.05	3.24	5.39	8.91	9.24	11.26	9.15	8.08	6.45	7.38	2.86	1.72	75.71
1982	2.39	1.62	5.29	7.83	12.50	11.45	9.40	8.27	7.77	5.00	4.56	2.76	78.83
1983	3.04	5.43	5.15	5.80	9.19	8.73	9.52	9.12	8.11	11.89	3.94	1.40	81.31
1984	0.48	4.35	6.53	6.35	7.92	11.47	11.35	10.15	7.07	4.94	4.41	4.84	79.84
1985	1.19	3.98	7.36	9.34	7.37	13.54	9.07	10.47	10.86	7.47	2.69	0.93	84.27
1986	2.86	2.44	5.59	8.08	13.38	8.52	11.96	11.09	11.80	8.86	5.14	1.50	91.20
1987	2.72	4.93	5.09	5.57	17.02	12.07	10.83	10.54	8.30	6.77	2.88	4.04	90.75
1988	1.81	2.36	6.57	7.35	8.01	9.76	9.04	9.41	13.12	5.18	3.34	2.19	78.15
1989	3.25	1.90	6.16	5.93	10.44	14.35	8.27	8.13	9.12	7.16	2.89	0.58	78.18
1990	3.60	6.56	6.63	9.09	9.46	10.50	12.55	9.46	6.63	4.85	4.05	2.40	85.76
1991	1.57	2.67	5.48	6.23	14.33	13.92	11.56	8.57	6.64	6.47	2.19	5.47	85.09
1992	2.45	3.56	4.41	6.18	9.82	11.66	9.34	8.36	7.10	4.45	6.51	3.51	77.33
1993	2.39	3.17	4.89	6.31	9.40	9.41	11.19	10.19	7.01	4.06	3.43	2.73	74.16
1994	1.57	2.61	5.78	8.16	7.43	8.69	11.36	8.29	7.57	4.92	8.41	1.85	76.63
1995	2.30	5.59	5.00	7.63	10.84	12.36	11.11	11.27	12.34	5.55	3.36	2.02	89.37
1996	1.40	2.80	5.27	6.50	8.66	11.43	14.02	12.19	8.44	5.18	3.72	1.80	81.41
1997	1.30	4.94	4.31	8.52	7.59	8.15	9.01	10.01	10.84	5.99	4.15	4.75	79.54
1998	3.58	4.26	7.64	5.68	8.87	10.90	11.33	9.98	8.39	7.18	4.62	2.06	84.49
1999	3.66	3.49	6.29	7.34	11.48	10.03	9.90	9.24	7.68	7.27	2.75	6.80	85.94
2000	3.28	5.15	7.96	5.92	10.25	11.65	8.63	10.00	9.80	12.59	2.67	5.65	93.55
2001	4.65	2.90	3.39	4.55	14.42	9.28	10.78	9.22	6.74	5.43	4.72	2.96	79.03
2002	2.88	4.43	6.30	7.01	5.99	9.34	9.21	9.91	7.69	7.88	2.52	3.60	76.75
2003	2.62	2.85	4.23	6.94	8.62	14.40	8.69	10.81	5.82	4.56	2.26	3.51	75.31
2004	4.16	4.11	7.52	7.09	6.26	9.99	8.86	10.20	6.32	4.91	7.28	3.33	80.02
2005	3.39	3.14	3.65	6.39	8.09	10.73	10.42	9.99	9.46	6.18	3.61	3.46	78.50
2006	5.06	3.94	4.27	8.53	10.78	9.33	10.73	13.06	6.19	7.54	3.38	4.19	86.99
2007	3.03	3.58	7.49	4.64	7.96	16.26	8.26	10.39	6.48	5.28	2.68	4.02	80.07
2008	3.57	5.72	8.55	8.07	9.06	10.75	10.34	10.99	5.85	6.94	4.24	3.46	87.52
2009	3.96	4.99	6.92	10.99	7.40	9.41	10.74	9.28	8.49	5.90	2.40	3.70	84.18
2010	2.74	5.09	5.59	5.57	6.68	11.00	12.57	10.67	9.27	8.02	3.61	2.08	82.88
2011	2.59	3.61	0.98	6.91	1.32	12.75	12.54	12.00	8.11	8.37	8.86	2.18	80.23
2012	4.94	3.66	8.36	7.98	8.82	11.44	10.90	9.66	9.67	4.97	3.98	3.59	87.97
2013	3.68	5.67	4.88	7.33	9.05	10.87	10.98	10.31	12.80	7.88	2.61	3.38	89.43
2014	4.61	2.70	6.29	6.68	10.85	13.31	11.96	9.82	7.01	6.47	6.45	1.85	87.98
2015	3.70	3.34	3.98	9.33	24.09	14.86	6.45	9.49	8.35	9.62	7.17	5.02	105.40
2016	2.52	5.45	6.42	16.94	9.37	11.08	12.25	10.77	10.60	5.72	5.61	3.62	100.34
Average	2.79	3.69	5.53	7.41	10.18	10.86	10.23	10.05	8.28	6.49	4.03	3.07	82.61

6.5. OWRB's SWAM Inflow Sequences

Table 29. Monthly inflows into Tom Steed Reservoir from the West Otter and Glen Creek watersheds developed using the North Fork Red River SWAM and based on a range of ground- and stream-water development scenarios.

Year	Month	North Fork Red River SWAM Modeled at the Reservoir West Otter and Glen Creeks (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	54	53	10,884	10,884	10,862	10,844	10,851	10,844
	Feb	1,183	1,182	1,182	1,182	1,153	1,097	642	619
	Mar	0	-98	-98	-98	-99	-99	-99	-99
	Apr	228	227	227	227	169	55	67	-47
	May	7,228	7,227	7,227	7,227	7,153	7,008	4,994	4,774
	Jun	6,798	6,797	6,797	6,797	6,723	6,578	4,560	4,340
	Jul	15,772	15,771	15,771	15,771	15,661	15,443	12,427	12,097
	Aug	5,122	5,121	5,121	5,121	5,032	4,854	2,747	2,569
	Sep	474	473	473	473	438	370	247	219
	Oct	0	-99	-99	-99	-100	-100	-100	-100
	Nov	0	-99	-99	-99	-100	-100	-100	-100
	Dec	0	-98	-98	-98	-99	-99	-99	-99
1951	Jan	147	146	146	146	124	83	71	54
	Feb	455	454	454	454	425	369	239	216
	Mar	1,408	1,407	1,407	1,407	1,368	1,292	763	731
	Apr	551	550	550	550	492	377	280	232
	May	10,840	10,839	10,839	10,839	10,765	10,620	8,606	8,386
	Jun	5,229	5,228	5,228	5,228	5,154	5,009	2,991	2,771
	Jul	67	66	66	66	16	16	16	16
	Aug	1,175	1,174	1,174	1,174	1,085	907	613	539
	Sep	440	439	439	439	404	336	228	200
	Oct	1,002	1,001	1,001	1,001	960	878	513	431
	Nov	320	319	319	319	287	225	163	137
	Dec	0	-99	-99	-99	-100	-100	-100	-100
1952	Jan	366	365	365	365	343	302	193	176
	Feb	133	132	132	132	103	47	61	38
	Mar	486	485	485	485	446	370	252	220
	Apr	2,392	2,391	2,391	2,391	2,333	2,218	1,266	1,151
	May	14,658	14,657	14,657	14,657	14,583	14,438	12,424	12,204
	Jun	1,804	1,803	1,803	1,803	1,729	1,584	967	907
	Jul	415	414	414	414	304	99	183	99
	Aug	0	-91	-91	-91	-91	-91	-91	-91
	Sep	0	-97	-97	-97	-97	-97	-97	-97
	Oct	0	-99	-99	-99	-100	-100	-100	-100
	Nov	977	976	976	976	944	882	527	501
	Dec	1,648	1,647	1,647	1,647	1,559	1,385	875	803
1953	Jan	0	-93	-93	-93	-94	-94	-94	-94
	Feb	0	-8	-8	-8	-9	-9	-9	-9
	Mar	1,424	1,423	1,423	1,423	1,384	1,308	772	740
	Apr	3,281	3,280	3,280	3,280	3,222	3,107	1,758	1,643
	May	130	129	129	129	55	31	40	31
	Jun	20,157	20,156	20,156	20,156	20,082	19,937	17,919	17,699
	Jul	588	587	587	587	477	259	279	189
	Aug	89	88	88	88	21	21	21	21
	Sep	0	-99	-99	-99	-99	-99	-99	-99
	Oct	11,941	11,940	11,940	11,940	11,899	11,817	10,692	10,568
	Nov	880	879	879	879	847	785	454	392
	Dec	9	8	8	8	-45	-147	-49	-151

Table 29. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir West Otter and Glen Creeks (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	0	-98	-98	-98	-99	-99	-99	-99
	Feb	0	-99	-99	-99	-100	-100	-100	-100
	Mar	127	126	126	126	87	30	53	30
	Apr	2,752	2,751	2,751	2,751	2,693	2,578	1,465	1,356
	May	15,065	15,064	15,064	15,064	14,990	14,845	12,831	12,611
	Jun	307	306	306	306	232	87	138	78
	Jul	0	-91	-91	-91	-91	-91	-91	-91
	Aug	104	103	103	103	25	25	25	25
	Sep	0	-99	-99	-99	-99	-99	-99	-99
	Oct	0	-88	-88	-88	-89	-89	-89	-89
	Nov	0	-99	-99	-99	-100	-100	-100	-100
	Dec	455	454	454	454	366	192	214	142
1955	Jan	677	676	676	676	654	613	365	348
	Feb	1,262	1,261	1,261	1,261	1,232	1,176	686	663
	Mar	1,595	1,594	1,594	1,594	1,555	1,479	866	834
	Apr	136	135	135	135	77	32	50	32
	May	34,230	34,229	34,229	34,229	34,155	34,010	31,996	31,776
	Jun	8,879	8,878	8,878	8,878	8,804	8,659	6,641	6,421
	Jul	278	277	277	277	167	66	107	66
	Aug	698	697	697	697	608	430	349	275
	Sep	3,524	3,523	3,523	3,523	3,488	3,420	2,482	2,379
	Oct	5,404	5,403	5,403	5,403	5,362	5,280	4,155	4,031
	Nov	0	-99	-99	-99	-100	-100	-100	-100
	Dec	0	-98	-98	-98	-99	-99	-99	-99
1956	Jan	0	-87	-87	-87	-88	-88	-88	-88
	Feb	964	963	963	963	934	878	521	498
	Mar	0	-60	-60	-60	-61	-61	-61	-61
	Apr	104	103	103	103	45	25	33	25
	May	7,075	7,074	7,074	7,074	7,000	6,855	4,841	4,621
	Jun	35	34	34	34	19	19	19	19
	Jul	1,219	1,218	1,218	1,218	1,108	890	628	538
	Aug	0	-75	-75	-75	-75	-75	-75	-75
	Sep	0	-99	-99	-99	-99	-99	-99	-99
	Oct	1,351	1,350	1,350	1,350	1,309	1,227	710	678
	Nov	38	37	37	37	9	9	9	9
	Dec	1,278	1,277	1,277	1,277	1,189	1,015	670	598
1957	Jan	1	1	1	1	0	0	0	0
	Feb	424	423	423	423	394	338	222	199
	Mar	4,062	4,061	4,061	4,061	4,022	3,946	2,891	2,775
	Apr	14,457	14,456	14,456	14,456	14,398	14,283	12,689	12,515
	May	32,648	32,647	32,647	32,647	32,573	32,428	30,414	30,194
	Jun	6,773	6,772	6,772	6,772	6,698	6,553	4,535	4,315
	Jul	4,136	4,135	4,135	4,135	4,025	3,807	2,244	2,154
	Aug	0	-99	-99	-99	-99	-99	-99	-99
	Sep	2,945	2,944	2,944	2,944	2,909	2,841	1,903	1,800
	Oct	1,262	1,261	1,261	1,261	1,220	1,138	657	575
	Nov	1,094	1,093	1,093	1,093	1,061	999	592	566
	Dec	0	-90	-90	-90	-91	-91	-91	-91
1958	Jan	1,152	1,151	1,151	1,151	1,129	1,088	628	611
	Feb	0	-82	-82	-82	-83	-83	-83	-83
	Mar	3,483	3,482	3,482	3,482	3,443	3,367	2,312	2,196
	Apr	3,150	3,149	3,149	3,149	3,091	2,976	1,686	1,615
	May	541	540	540	540	466	321	268	208
	Jun	10,929	10,928	10,928	10,928	10,854	10,709	8,691	8,471
	Jul	3,504	3,503	3,503	3,503	3,393	3,175	1,894	1,804
	Aug	0	-42	-42	-42	-42	-42	-42	-42
	Sep	47	46	46	46	12	11	11	11
	Oct	0	-87	-87	-87	-88	-88	-88	-88
	Nov	0	-16	-16	-16	-17	-17	-17	-17
	Dec	0	-78	-78	-78	-79	-79	-79	-79

Table 29. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir West Otter and Glen Creeks (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	0	-95	-95	-95	-96	-96	-96	-96
	Feb	0	-96	-96	-96	-97	-97	-97	-97
	Mar	0	-98	-98	-98	-99	-99	-99	-99
	Apr	918	917	917	917	859	744	449	334
	May	14,157	14,156	14,156	14,156	14,082	13,937	11,923	11,703
	Jun	2,544	2,543	2,543	2,543	2,469	2,324	1,377	1,317
	Jul	8,689	8,688	8,688	8,688	8,578	8,360	5,344	5,014
	Aug	0	-15	-15	-15	-15	-15	-15	-15
	Sep	5,380	5,379	5,379	5,379	5,344	5,276	4,338	4,235
	Oct	4,113	4,112	4,112	4,112	4,071	3,989	2,864	2,740
	Nov	11	10	10	10	-11	-47	-16	-52
	Dec	6,687	6,686	6,686	6,686	6,598	6,424	4,013	3,749
1960	Jan	386	385	385	385	363	322	191	150
	Feb	1,208	1,207	1,207	1,207	1,178	1,122	639	583
	Mar	227	226	226	226	187	111	86	10
	Apr	1	1	1	1	-33	-100	-34	-101
	May	2,713	2,712	2,712	2,712	2,638	2,493	1,428	1,283
	Jun	4,714	4,713	4,713	4,713	4,639	4,494	2,536	2,519
	Jul	3,202	3,201	3,201	3,201	3,091	2,873	1,662	1,444
	Aug	891	890	890	890	801	623	456	382
	Sep	101	100	100	100	65	24	40	24
	Oct	8,543	8,542	8,542	8,542	8,501	8,419	7,294	7,170
	Nov	0	0	0	0	-19	-55	-19	-55
	Dec	2,641	2,640	2,640	2,640	2,552	2,378	1,374	1,200
1961	Jan	7	6	6	6	-8	-32	-11	-35
	Feb	1,049	1,048	1,048	1,048	1,019	963	551	495
	Mar	3,002	3,001	3,001	3,001	2,962	2,886	1,831	1,715
	Apr	1,018	1,017	1,017	1,017	959	844	505	390
	May	1,742	1,741	1,741	1,741	1,667	1,522	890	745
	Jun	22,082	22,081	22,081	22,081	22,007	21,862	19,844	19,624
	Jul	1,603	1,602	1,602	1,602	1,492	1,274	841	751
	Aug	630	629	629	629	540	362	311	237
	Sep	3,012	3,011	3,011	3,011	2,976	2,908	1,970	1,867
	Oct	1,287	1,286	1,286	1,286	1,245	1,163	671	589
	Nov	3,410	3,409	3,409	3,409	3,377	3,315	2,447	2,353
	Dec	718	717	717	717	629	455	309	135
1962	Jan	4	3	3	3	-10	-34	-12	-36
	Feb	3	2	2	2	-15	-48	-16	-49
	Mar	24	23	23	23	-6	-50	-17	-61
	Apr	3,985	3,984	3,984	3,984	3,926	3,811	2,217	2,043
	May	971	970	970	970	896	751	463	318
	Jun	14,223	14,222	14,222	14,222	14,148	14,003	11,985	11,765
	Jul	2,041	2,040	2,040	2,040	1,930	1,712	1,019	993
	Aug	112	111	111	111	27	27	27	27
	Sep	3,738	3,737	3,737	3,737	3,702	3,634	2,696	2,593
	Oct	865	864	864	864	823	741	437	355
	Nov	421	420	420	420	388	326	200	138
	Dec	377	376	376	376	288	114	120	-54
1963	Jan	1	1	1	1	-12	-36	-13	-37
	Feb	38	37	37	37	9	-24	-8	-41
	Mar	1,361	1,360	1,360	1,360	1,321	1,245	714	638
	Apr	680	679	679	679	621	506	318	203
	May	7,820	7,819	7,819	7,819	7,745	7,600	5,586	5,366
	Jun	1,815	1,814	1,814	1,814	1,740	1,595	930	785
	Jul	279	278	278	278	168	66	107	66
	Aug	1,224	1,223	1,223	1,223	1,134	956	640	566
	Sep	435	434	434	434	399	331	225	197
	Oct	157	156	156	156	115	35	45	-35
	Nov	3,385	3,384	3,384	3,384	3,352	3,290	2,422	2,328
	Dec	33	32	32	32	8	8	8	8

Table 29. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir West Otter and Glen Creeks (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	139	138	138	138	116	75	67	50
	Feb	3,815	3,814	3,814	3,814	3,785	3,729	2,953	2,868
	Mar	79	78	78	78	39	19	27	19
	Apr	58	57	57	57	14	14	14	14
	May	7,200	7,199	7,199	7,199	7,125	6,980	4,966	4,746
	Jun	527	526	526	526	452	307	217	187
	Jul	59	58	58	58	25	25	25	25
	Aug	608	607	607	607	518	340	299	225
	Sep	4,361	4,360	4,360	4,360	4,325	4,257	3,319	3,216
	Oct	12	11	11	11	-16	3	-21	3
	Nov	10,935	10,934	10,934	10,934	10,902	10,840	9,972	9,878
	Dec	67	66	66	66	-5	-107	-35	-137
1965	Jan	38	37	37	37	15	-11	-2	-28
	Feb	336	335	335	335	306	250	156	123
	Mar	485	484	484	484	445	369	229	197
	Apr	3,214	3,213	3,213	3,213	3,155	3,040	1,721	1,606
	May	8,031	8,030	8,030	8,030	7,956	7,811	5,797	5,577
	Jun	7,612	7,611	7,611	7,611	7,537	7,392	5,374	5,154
	Jul	711	710	710	710	600	382	347	257
	Aug	2,777	2,776	2,776	2,776	2,687	2,509	1,500	1,426
	Sep	7,946	7,945	7,945	7,945	7,910	7,842	6,904	6,801
	Oct	6,636	6,635	6,635	6,635	6,594	6,512	5,387	5,263
	Nov	9	8	8	8	-13	-49	-17	-53
	Dec	6,018	6,017	6,017	6,017	5,929	5,755	3,344	3,080
1966	Jan	45	44	44	44	22	-6	2	-26
	Feb	1,913	1,912	1,912	1,912	1,883	1,827	1,051	974
	Mar	92	91	91	91	52	-4	11	-45
	Apr	1,844	1,843	1,843	1,843	1,785	1,670	962	855
	May	9	8	8	8	-37	-122	-41	-126
	Jun	971	970	970	970	896	751	506	446
	Jul	285	284	284	284	174	68	111	68
	Aug	4,903	4,902	4,902	4,902	4,813	4,635	2,678	2,604
	Sep	496	495	495	495	460	392	259	231
	Oct	47	46	46	46	11	11	11	11
	Nov	9	8	8	8	2	2	2	2
	Dec	26	25	25	25	6	6	6	6
1967	Jan	1	1	1	1	0	0	0	0
	Feb	4	3	3	3	1	1	1	1
	Mar	525	524	524	524	485	409	274	242
	Apr	670	669	669	669	611	496	312	197
	May	804	803	803	803	729	584	370	225
	Jun	2,713	2,712	2,712	2,712	2,638	2,493	1,471	1,411
	Jul	3,698	3,697	3,697	3,697	3,587	3,369	2,001	1,911
	Aug	107	106	106	106	25	25	25	25
	Sep	1,854	1,853	1,853	1,853	1,818	1,750	1,011	983
	Oct	171	170	170	170	129	47	77	43
	Nov	51	50	50	50	18	12	14	12
	Dec	485	484	484	484	396	222	230	158
1968	Jan	1,695	1,694	1,694	1,694	1,672	1,631	1,054	992
	Feb	2,365	2,364	2,364	2,364	2,335	2,279	1,503	1,418
	Mar	981	980	980	980	941	865	526	494
	Apr	2,041	2,040	2,040	2,040	1,982	1,867	1,071	956
	May	12,287	12,286	12,286	12,286	12,212	12,067	10,053	9,833
	Jun	741	740	740	740	666	521	335	190
	Jul	5,061	5,060	5,060	5,060	4,950	4,732	2,692	2,474
	Aug	80	79	79	79	3	-101	-33	-137
	Sep	151	150	150	150	115	47	68	40
	Oct	750	749	749	749	708	626	373	291
	Nov	8,016	8,015	8,015	8,015	7,983	7,921	7,053	6,959
	Dec	171	170	170	170	82	-36	6	-112

Table 29. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir West Otter and Glen Creeks (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	1	1	1	1	-12	-36	-13	-37
	Feb	2,084	2,083	2,083	2,083	2,054	1,998	1,222	1,137
	Mar	2,203	2,202	2,202	2,202	2,163	2,087	1,180	1,104
	Apr	328	327	327	327	269	154	123	8
	May	7,664	7,663	7,663	7,663	7,589	7,444	5,430	5,210
	Jun	2,679	2,678	2,678	2,678	2,604	2,459	1,452	1,392
	Jul	342	341	341	341	231	81	142	81
	Aug	2,633	2,632	2,632	2,632	2,543	2,365	1,368	1,190
	Sep	2,097	2,096	2,096	2,096	2,061	1,993	1,126	1,058
	Oct	899	898	898	898	857	775	463	429
	Nov	72	71	71	71	39	-6	7	-38
	Dec	275	274	274	274	186	35	84	35
1970	Jan	16	15	15	15	-2	-26	-9	-33
	Feb	9	8	8	8	-11	-19	-15	-19
	Mar	3,071	3,070	3,070	3,070	3,031	2,955	1,900	1,784
	Apr	2,183	2,182	2,182	2,182	2,124	2,009	1,150	1,035
	May	4,606	4,605	4,605	4,605	4,531	4,386	2,476	2,331
	Jun	236	235	235	235	161	56	99	56
	Jul	31	30	30	30	25	25	25	25
	Aug	652	651	651	651	562	384	323	249
	Sep	573	572	572	572	537	469	281	213
	Oct	85	84	84	84	43	20	29	20
	Nov	160	159	159	159	127	65	75	49
	Dec	51	50	50	50	12	12	12	12
1971	Jan	139	138	138	138	116	75	67	50
	Feb	386	385	385	385	356	300	201	178
	Mar	1	1	1	1	0	0	0	0
	Apr	77	76	76	76	19	18	18	18
	May	3,966	3,965	3,965	3,965	3,891	3,746	2,165	2,105
	Jun	5,905	5,904	5,904	5,904	5,830	5,685	3,667	3,447
	Jul	2,312	2,311	2,311	2,311	2,201	1,983	1,234	1,144
	Aug	5,745	5,744	5,744	5,744	5,655	5,477	3,144	3,070
	Sep	10,075	10,074	10,074	10,074	10,039	9,971	9,033	8,930
	Oct	2,125	2,124	2,124	2,124	2,083	2,001	1,135	1,053
	Nov	361	360	360	360	328	266	167	105
	Dec	2,818	2,817	2,817	2,817	2,729	2,555	1,472	1,298
1972	Jan	1	1	1	1	-12	-36	-13	-37
	Feb	20	19	19	19	-3	-36	-12	-45
	Mar	282	281	281	281	242	166	116	40
	Apr	3,476	3,475	3,475	3,475	3,417	3,302	1,866	1,751
	May	3,344	3,343	3,343	3,343	3,269	3,124	1,777	1,632
	Jun	1,199	1,198	1,198	1,198	1,124	979	589	444
	Jul	104	103	103	103	25	25	25	25
	Aug	689	688	688	688	599	421	344	270
	Sep	4	4	4	4	4	4	4	4
	Oct	6,504	6,503	6,503	6,503	6,462	6,380	5,255	5,131
	Nov	1,557	1,556	1,556	1,556	1,524	1,462	829	767
	Dec	101	100	100	100	21	21	21	21
1973	Jan	4,245	4,244	4,244	4,244	4,222	4,181	3,604	3,542
	Feb	227	226	226	226	197	141	96	40
	Mar	9,298	9,297	9,297	9,297	9,258	9,182	8,127	8,011
	Apr	5,765	5,764	5,764	5,764	5,706	5,591	3,997	3,823
	May	2,818	2,817	2,817	2,817	2,743	2,598	1,486	1,341
	Jun	2,230	2,229	2,229	2,229	2,155	2,010	1,160	1,015
	Jul	908	907	907	907	797	579	456	366
	Aug	20	19	19	20	20	20	20	20
	Sep	13,488	13,487	13,487	13,487	13,452	13,384	12,446	12,343
	Oct	1,103	1,102	1,102	1,102	1,061	979	569	487
	Nov	361	360	360	360	328	266	167	105
	Dec	26	25	25	25	-33	-135	-45	-147

Table 29. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir West Otter and Glen Creeks (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	1	1	1	1	-12	-36	-13	-37
	Feb	22	21	21	21	-2	-35	-12	-45
	Mar	617	616	616	616	577	501	302	226
	Apr	6,070	6,069	6,069	6,069	6,011	5,896	4,302	4,128
	May	4,230	4,229	4,229	4,229	4,155	4,010	2,268	2,123
	Jun	630	629	629	629	555	410	317	257
	Jul	1	1	1	1	1	1	1	1
	Aug	4,573	4,572	4,572	4,572	4,483	4,305	2,495	2,421
	Sep	5,128	5,127	5,127	5,127	5,092	5,024	4,086	3,983
	Oct	1,406	1,405	1,405	1,405	1,364	1,282	737	655
	Nov	386	385	385	385	353	291	181	119
	Dec	304	303	303	303	215	55	79	-81
1975	Jan	1,677	1,676	1,676	1,676	1,654	1,613	1,036	974
	Feb	2,932	2,931	2,931	2,931	2,902	2,846	2,070	1,985
	Mar	505	504	504	504	465	389	240	164
	Apr	509	508	508	508	450	335	223	108
	May	8,004	8,003	8,003	8,003	7,929	7,784	5,770	5,550
	Jun	3,961	3,960	3,960	3,960	3,886	3,741	2,119	1,974
	Jul	7,904	7,903	7,903	7,903	7,793	7,575	4,559	4,229
	Aug	506	505	505	505	416	238	190	12
	Sep	323	322	322	322	287	219	143	75
	Oct	0	-9	-9	-9	-33	-81	-34	-82
	Nov	157	156	156	156	124	62	54	-8
	Dec	77	76	76	76	2	-100	-33	-135
1976	Jan	0	-42	-42	-42	-55	-79	-56	-80
	Feb	601	600	600	600	571	515	303	247
	Mar	278	277	277	277	238	162	114	38
	Apr	2,123	2,122	2,122	2,122	2,064	1,949	1,117	1,002
	May	1,290	1,289	1,289	1,289	1,215	1,070	640	495
	Jun	1,832	1,831	1,831	1,831	1,757	1,612	940	795
	Jul	0	-90	-90	-90	-90	-90	-90	-90
	Aug	38	37	37	37	23	23	23	23
	Sep	8,576	8,575	8,575	8,575	8,540	8,472	7,534	7,431
	Oct	7	6	6	6	-19	-67	-22	-70
	Nov	0	-177	-177	-177	-196	-232	-197	-233
	Dec	251	250	250	250	162	19	50	-93
1977	Jan	0	-79	-79	-79	-92	-116	-93	-117
	Feb	0	-145	-145	-145	-162	-195	-163	-196
	Mar	0	-671	-671	-671	-694	-738	-695	-739
	Apr	0	-85	-85	-85	-119	-186	-120	-187
	May	39,512	39,511	39,511	39,511	39,437	39,292	37,278	37,058
	Jun	597	596	596	596	522	377	256	111
	Jul	0	-52	-52	-52	-52	-52	-52	-52
	Aug	1,519	1,518	1,518	1,518	1,429	1,251	751	573
	Sep	0	-382	-382	-382	-402	-442	-403	-443
	Oct	136	135	135	135	94	21	33	-40
	Nov	54	53	53	53	21	-18	-3	-42
	Dec	4	3	3	3	-48	-150	-50	-152
1978	Jan	0	-374	-374	-374	-387	-411	-388	-412
	Feb	1,199	1,198	1,198	1,198	1,169	1,113	634	578
	Mar	0	-226	-226	-226	-249	-293	-250	-294
	Apr	2,239	2,238	2,238	2,238	2,180	2,065	1,181	1,066
	May	21,717	21,716	21,716	21,716	21,642	21,497	19,483	19,263
	Jun	18,676	18,675	18,675	18,675	18,601	18,456	16,438	16,218
	Jul	0	-268	-268	-268	-268	-268	-268	-268
	Aug	0	-76	-76	-76	-76	-76	-76	-76
	Sep	383	382	382	382	347	279	196	168
	Oct	0	-633	-633	-633	-674	-753	-675	-753
	Nov	1,467	1,466	1,466	1,466	1,434	1,372	780	718
	Dec	0	-873	-873	-873	-878	-878	-878	-878

Table 29. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir West Otter and Glen Creeks (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	1,179	1,178	1,178	1,178	1,156	1,115	630	589
	Feb	0	-53	-53	-53	-70	-103	-71	-104
	Mar	4,333	4,332	4,332	4,332	4,293	4,217	3,162	3,046
	Apr	5,605	5,604	5,604	5,604	5,546	5,431	3,837	3,663
	May	5,499	5,498	5,498	5,498	5,424	5,279	3,265	3,045
	Jun	12,608	12,607	12,607	12,607	12,533	12,388	10,370	10,150
	Jul	2,334	2,333	2,333	2,333	2,223	2,005	1,254	1,164
	Aug	1,142	1,141	1,141	1,141	1,052	874	598	524
	Sep	0	-70	-70	-70	-70	-70	-70	-70
	Oct	0	-494	-494	-494	-535	-570	-536	-570
	Nov	1,747	1,746	1,746	1,746	1,714	1,652	934	872
	Dec	264	263	263	263	175	62	109	62
1980	Jan	971	970	970	970	948	907	515	474
	Feb	277	276	276	276	247	191	127	88
	Mar	829	828	828	828	789	713	428	352
	Apr	1,615	1,614	1,614	1,614	1,556	1,441	853	738
	May	37,298	37,297	37,297	37,297	37,223	37,078	35,064	34,844
	Jun	837	836	836	836	762	617	389	244
	Jul	0	-360	-360	-360	-407	-497	-407	-497
	Aug	0	-89	-89	-89	-127	-141	-127	-141
	Sep	0	-382	-382	-382	-382	-382	-382	-382
	Oct	0	-287	-287	-287	-288	-288	-288	-288
	Nov	88	87	87	87	55	21	35	21
	Dec	1,056	1,055	1,055	1,055	967	793	496	322
1981	Jan	0	-370	-370	-370	-371	-371	-371	-371
	Feb	770	769	769	769	740	684	417	394
	Mar	1,075	1,074	1,074	1,074	1,035	959	562	486
	Apr	6,928	6,927	6,927	6,927	6,869	6,754	5,160	4,986
	May	2,700	2,699	2,699	2,699	2,625	2,480	1,426	1,281
	Jun	5,501	5,500	5,500	5,500	5,426	5,281	3,263	3,043
	Jul	1,306	1,305	1,305	1,305	1,195	977	708	618
	Aug	0	-1,030	-1,030	-1,030	-1,068	-1,123	-1,068	-1,123
	Sep	76	75	75	75	47	19	47	19
	Oct	7,594	7,593	7,593	7,593	7,552	7,470	6,345	6,221
	Nov	511	510	510	510	478	416	250	188
	Dec	0	-254	-254	-254	-305	-378	-306	-378
1982	Jan	275	274	274	274	252	211	129	88
	Feb	433	432	432	432	403	347	210	154
	Mar	3,768	3,767	3,767	3,767	3,728	3,652	2,597	2,481
	Apr	1,927	1,926	1,926	1,926	1,868	1,753	1,008	905
	May	13,460	13,459	13,459	13,459	13,385	13,240	11,226	11,006
	Jun	12,729	12,728	12,728	12,728	12,654	12,509	10,491	10,271
	Jul	3,587	3,586	3,586	3,586	3,476	3,258	1,940	1,850
	Aug	0	-57	-57	-57	-95	-116	-95	-116
	Sep	0	-782	-782	-782	-798	-807	-798	-807
	Oct	0	-395	-395	-395	-419	-467	-420	-468
	Nov	402	401	401	401	369	307	190	128
	Dec	0	-34	-34	-34	-85	-187	-86	-188
1983	Jan	752	751	751	751	729	688	394	353
	Feb	1,859	1,858	1,858	1,858	1,829	1,773	1,000	944
	Mar	2,616	2,615	2,615	2,615	2,576	2,500	1,445	1,333
	Apr	1,378	1,377	1,377	1,377	1,319	1,204	705	590
	May	2,298	2,297	2,297	2,297	2,223	2,078	1,200	1,055
	Jun	2,647	2,646	2,646	2,646	2,572	2,427	1,391	1,246
	Jul	665	664	664	664	554	336	354	264
	Aug	386	385	385	385	296	118	180	106
	Sep	0	-124	-124	-124	-124	-124	-124	-124
	Oct	34,945	34,944	34,944	34,944	34,903	34,821	33,696	33,572
	Nov	173	172	172	172	140	78	63	1
	Dec	0	-825	-825	-825	-876	-978	-877	-979

Table 29. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir West Otter and Glen Creeks (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	159	158	158	158	136	95	65	24
	Feb	1,022	1,021	1,021	1,021	992	936	544	488
	Mar	1,721	1,720	1,720	1,720	1,681	1,605	913	837
	Apr	913	912	912	912	854	739	462	347
	May	927	926	926	926	852	707	458	313
	Jun	2,836	2,835	2,835	2,835	2,761	2,616	1,539	1,479
	Jul	814	813	813	813	703	485	407	317
	Aug	224	223	223	223	134	53	86	53
	Sep	0	-759	-759	-759	-759	-759	-759	-759
	Oct	3	2	2	2	1	1	1	1
	Nov	400	399	399	399	367	305	190	128
	Dec	2,022	2,021	2,021	2,021	1,933	1,759	1,031	857
1985	Jan	601	600	600	600	578	537	310	269
	Feb	2,195	2,194	2,194	2,194	2,165	2,109	1,333	1,248
	Mar	5,112	5,111	5,111	5,111	5,072	4,996	3,941	3,825
	Apr	4,148	4,147	4,147	4,147	4,089	3,974	2,380	2,206
	May	986	985	985	985	911	766	495	350
	Jun	9,018	9,017	9,017	9,017	8,943	8,798	6,780	6,560
	Jul	1,045	1,044	1,044	1,044	934	716	562	472
	Aug	800	799	799	799	710	532	452	378
	Sep	5,808	5,807	5,807	5,807	5,772	5,704	4,766	4,663
	Oct	9,854	9,853	9,853	9,853	9,812	9,730	8,605	8,481
	Nov	0	-676	-676	-676	-696	-732	-697	-733
	Dec	0	-1,262	-1,262	-1,262	-1,314	-1,416	-1,315	-1,417
1986	Jan	244	243	243	243	221	180	115	74
	Feb	656	655	655	655	626	570	335	279
	Mar	641	640	640	640	601	525	324	248
	Apr	1,978	1,977	1,977	1,977	1,919	1,804	1,036	967
	May	4,599	4,598	4,598	4,598	4,524	4,379	2,472	2,327
	Jun	4,960	4,959	4,959	4,959	4,885	4,740	2,722	2,527
	Jul	1,166	1,165	1,165	1,165	1,055	837	571	353
	Aug	1,047	1,046	1,046	1,046	957	779	511	333
	Sep	18,782	18,781	18,781	18,781	18,746	18,678	17,740	17,637
	Oct	24,375	24,374	24,374	24,374	24,333	24,251	23,126	23,002
	Nov	5,632	5,631	5,631	5,631	5,599	5,537	4,669	4,575
	Dec	1,246	1,245	1,245	1,245	1,157	983	601	427
1987	Jan	4,355	4,354	4,354	4,354	4,332	4,291	3,714	3,652
	Feb	9,736	9,735	9,735	9,735	9,706	9,650	8,874	8,789
	Mar	3,827	3,826	3,826	3,826	3,787	3,711	2,656	2,540
	Apr	1,520	1,519	1,519	1,519	1,461	1,346	806	691
	May	53,628	53,627	53,627	53,627	53,553	53,408	51,394	51,174
	Jun	5,637	5,636	5,636	5,636	5,562	5,417	3,399	3,179
	Jul	2,403	2,402	2,402	2,402	2,292	2,074	1,220	1,002
	Aug	1,987	1,986	1,986	1,986	1,897	1,719	1,049	1,027
	Sep	977	976	976	976	941	873	525	457
	Oct	277	276	276	276	235	153	121	39
	Nov	0	-414	-414	-414	-433	-469	-434	-470
	Dec	1,661	1,660	1,660	1,660	1,572	1,398	831	657
1988	Jan	5,378	5,377	5,377	5,377	5,355	5,314	4,737	4,675
	Feb	640	639	639	639	610	554	329	273
	Mar	16,647	16,646	16,646	16,646	16,607	16,531	15,476	15,360
	Apr	4,940	4,939	4,939	4,939	4,881	4,766	3,172	2,998
	May	1,085	1,084	1,084	1,084	1,010	865	571	426
	Jun	883	882	882	882	808	663	459	314
	Jul	0	-378	-378	-378	-425	-439	-425	-439
	Aug	0	-217	-217	-217	-255	-294	-255	-294
	Sep	12,483	12,482	12,482	12,482	12,447	12,379	11,441	11,338
	Oct	0	-464	-464	-464	-505	-568	-506	-569
	Nov	61	60	60	60	28	-17	3	-42
	Dec	0	-26	-26	-26	-79	-181	-80	-182

Table 29. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir West Otter and Glen Creeks (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	1,248	1,247	1,247	1,247	1,225	1,184	670	629
	Feb	160	159	159	159	130	74	59	3
	Mar	3,057	3,056	3,056	3,056	3,017	2,941	1,886	1,770
	Apr	498	497	497	497	439	324	233	118
	May	5,206	5,205	5,205	5,205	5,131	4,986	2,972	2,752
	Jun	18,799	18,798	18,798	18,798	18,724	18,579	16,561	16,341
	Jul	0	-1,962	-1,962	-1,962	-2,026	-2,154	-2,027	-2,155
	Aug	389	388	388	388	299	121	148	-30
	Sep	3,063	3,062	3,062	3,062	3,027	2,959	2,021	1,918
	Oct	150	149	149	149	108	26	52	-30
	Nov	0	-1,188	-1,188	-1,188	-1,215	-1,251	-1,216	-1,252
	Dec	0	-1,288	-1,288	-1,288	-1,339	-1,441	-1,340	-1,442
1990	Jan	1,129	1,128	1,128	1,128	1,106	1,065	605	564
	Feb	2,751	2,750	2,750	2,750	2,721	2,665	1,889	1,804
	Mar	13,225	13,224	13,224	13,224	13,185	13,109	12,054	11,938
	Apr	7,968	7,967	7,967	7,967	7,909	7,794	6,200	6,026
	May	13,633	13,632	13,632	13,632	13,558	13,413	11,399	11,179
	Jun	744	743	743	743	669	524	405	260
	Jul	2,785	2,784	2,784	2,784	2,674	2,456	1,530	1,440
	Aug	1,827	1,826	1,826	1,826	1,737	1,559	993	919
	Sep	0	-179	-179	-179	-214	-265	-215	-266
	Oct	0	-1,488	-1,488	-1,488	-1,529	-1,577	-1,530	-1,578
	Nov	1,130	1,129	1,129	1,129	1,097	1,035	593	531
	Dec	0	-421	-421	-421	-474	-531	-475	-531
1991	Jan	21	20	20	20	1	-23	-8	-32
	Feb	0	-58	-58	-58	-81	-114	-82	-115
	Mar	525	524	524	524	485	409	260	184
	Apr	564	563	563	563	505	390	265	150
	May	10,632	10,631	10,631	10,631	10,557	10,412	8,398	8,178
	Jun	25,432	25,431	25,431	25,431	25,357	25,212	23,194	22,974
	Jul	516	515	515	515	405	187	239	149
	Aug	156	155	155	155	81	23	81	23
	Sep	0	-56	-56	-56	-89	-129	-90	-130
	Oct	546	545	545	545	504	422	269	187
	Nov	865	864	864	864	832	770	446	384
	Dec	9,758	9,757	9,757	9,757	9,669	9,495	7,084	6,820
1992	Jan	0	-284	-284	-284	-300	-324	-301	-325
	Feb	290	289	289	289	260	204	138	82
	Mar	851	850	850	850	811	735	443	367
	Apr	1,824	1,823	1,823	1,823	1,765	1,650	959	844
	May	2,964	2,963	2,963	2,963	2,889	2,744	1,580	1,435
	Jun	9,064	9,063	9,063	9,063	8,989	8,844	6,826	6,606
	Jul	2,889	2,888	2,888	2,888	2,778	2,560	1,524	1,306
	Aug	2,600	2,599	2,599	2,599	2,510	2,332	1,373	1,195
	Sep	5,587	5,586	5,586	5,586	5,551	5,483	4,545	4,442
	Oct	0	-829	-829	-829	-870	-945	-871	-946
	Nov	8,039	8,038	8,038	8,038	8,006	7,944	7,076	6,982
	Dec	9,136	9,135	9,135	9,135	9,047	8,873	6,462	6,198
1993	Jan	3,829	3,828	3,828	3,828	3,806	3,765	3,188	3,126
	Feb	3,783	3,782	3,782	3,782	3,753	3,697	2,921	2,836
	Mar	2,876	2,875	2,875	2,875	2,836	2,760	1,705	1,589
	Apr	6,401	6,400	6,400	6,400	6,342	6,227	4,633	4,459
	May	22,678	22,677	22,677	22,677	22,603	22,458	20,444	20,224
	Jun	820	819	819	819	745	600	379	234
	Jul	2,433	2,432	2,432	2,432	2,322	2,104	1,295	1,077
	Aug	1,691	1,690	1,690	1,690	1,601	1,423	876	698
	Sep	321	320	320	320	285	217	148	80
	Oct	0	-574	-574	-574	-608	-656	-609	-657
	Nov	0	-570	-570	-570	-593	-629	-594	-630
	Dec	0	-1,264	-1,264	-1,264	-1,319	-1,421	-1,320	-1,422

Table 29. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir West Otter and Glen Creeks (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	479	478	478	478	456	415	243	202
	Feb	0	-1,410	-1,410	-1,410	-1,431	-1,464	-1,432	-1,465
	Mar	836	835	835	835	796	720	428	352
	Apr	4,689	4,688	4,688	4,688	4,630	4,515	2,921	2,747
	May	1,088	1,087	1,087	1,087	1,013	868	536	391
	Jun	324	323	323	323	249	122	182	122
	Jul	632	631	631	631	521	303	340	250
	Aug	0	-1,165	-1,165	-1,165	-1,203	-1,246	-1,203	-1,246
	Sep	0	-950	-950	-950	-966	-994	-966	-994
	Oct	1,336	1,335	1,335	1,335	1,294	1,212	705	623
	Nov	6,840	6,839	6,839	6,839	6,807	6,745	5,877	5,783
	Dec	0	-451	-451	-451	-506	-506	-507	-506
1995	Jan	256	255	255	255	233	192	119	78
	Feb	0	-90	-90	-90	-116	-100	-117	-100
	Mar	1,600	1,599	1,599	1,599	1,560	1,484	849	773
	Apr	3,403	3,402	3,402	3,402	3,344	3,229	1,826	1,711
	May	8,955	8,954	8,954	8,954	8,880	8,735	6,721	6,501
	Jun	27,802	27,801	27,801	27,801	27,727	27,582	25,564	25,344
	Jul	974	973	973	973	863	645	478	260
	Aug	15,630	15,629	15,629	15,629	15,540	15,362	12,909	12,639
	Sep	13,472	13,471	13,471	13,471	13,436	13,368	12,430	12,327
	Oct	1,300	1,299	1,299	1,299	1,258	1,176	678	596
	Nov	0	-712	-712	-712	-744	-788	-745	-789
	Dec	0	-53	-53	-53	-107	-209	-108	-210
1996	Jan	46	45	45	45	23	-8	4	-27
	Feb	0	-501	-501	-501	-530	-563	-531	-564
	Mar	0	-659	-659	-659	-698	-746	-699	-747
	Apr	0	-904	-904	-904	-962	-1,048	-963	-1,049
	May	0	-1,247	-1,247	-1,247	-1,321	-1,447	-1,322	-1,448
	Jun	7,170	7,169	7,169	7,169	7,095	6,950	4,932	4,712
	Jul	8,320	8,319	8,319	8,319	8,209	7,991	4,975	4,645
	Aug	14,702	14,701	14,701	14,701	14,612	14,434	11,981	11,711
	Sep	3,900	3,899	3,899	3,899	3,864	3,796	2,858	2,755
	Oct	504	503	503	503	462	380	252	170
	Nov	332	331	331	331	299	237	155	93
	Dec	0	-1,792	-1,792	-1,792	-1,851	-1,953	-1,852	-1,954
1997	Jan	0	-394	-394	-394	-413	-437	-414	-438
	Feb	5,709	5,708	5,708	5,708	5,679	5,623	4,847	4,762
	Mar	0	-33	-33	-33	-72	-137	-73	-138
	Apr	15,357	15,356	15,356	15,356	15,298	15,183	13,589	13,415
	May	2,878	2,877	2,877	2,877	2,803	2,658	1,519	1,374
	Jun	602	601	601	601	527	382	285	140
	Jul	0	-517	-517	-517	-627	-821	-628	-822
	Aug	1,216	1,215	1,215	1,215	1,126	948	599	421
	Sep	44	43	43	43	8	-54	4	-58
	Oct	2,214	2,213	2,213	2,213	2,172	2,090	1,187	1,105
	Nov	323	322	322	322	290	228	152	90
	Dec	2,933	2,932	2,932	2,932	2,844	2,670	1,535	1,361
1998	Jan	3,024	3,023	3,023	3,023	3,001	2,960	2,383	2,321
	Feb	6,324	6,323	6,323	6,323	6,294	6,238	5,462	5,377
	Mar	15,379	15,378	15,378	15,378	15,339	15,263	14,208	14,092
	Apr	1,923	1,922	1,922	1,922	1,864	1,749	1,006	891
	May	2,007	2,006	2,006	2,006	1,932	1,787	1,083	938
	Jun	0	-619	-619	-619	-651	-711	-651	-711
	Jul	0	-935	-935	-935	-982	-1,051	-982	-1,051
	Aug	0	-993	-993	-993	-1,031	-1,047	-1,031	-1,047
	Sep	433	432	432	432	397	329	247	219
	Oct	114	113	113	113	72	-10	34	-48
	Nov	428	427	427	427	395	333	204	142
	Dec	0	-1,089	-1,089	-1,089	-1,140	-1,242	-1,141	-1,243

Table 29. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir West Otter and Glen Creeks (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	663	662	662	662	640	599	345	304
	Feb	0	-95	-95	-95	-120	-153	-121	-154
	Mar	2,736	2,735	2,735	2,735	2,696	2,620	1,565	1,449
	Apr	824	823	823	823	765	650	411	296
	May	13,191	13,190	13,190	13,190	13,116	12,971	10,957	10,737
	Jun	6,427	6,426	6,426	6,426	6,352	6,207	4,189	3,969
	Jul	37	36	36	36	-74	-30	-75	-30
	Aug	537	536	536	536	447	269	313	239
	Sep	0	-194	-194	-194	-210	-238	-210	-238
	Oct	1,323	1,322	1,322	1,322	1,281	1,199	700	618
	Nov	0	-793	-793	-793	-802	-802	-802	-802
	Dec	5,879	5,878	5,878	5,878	5,790	5,616	3,205	2,993
2000	Jan	0	-233	-233	-233	-255	-280	-256	-281
	Feb	1,088	1,087	1,087	1,087	1,058	1,002	581	525
	Mar	10,796	10,795	10,795	10,795	10,756	10,680	9,625	9,509
	Apr	8,111	8,110	8,110	8,110	8,052	7,937	6,343	6,169
	May	5,533	5,532	5,532	5,532	5,458	5,313	3,299	3,079
	Jun	3,341	3,340	3,340	3,340	3,266	3,121	1,779	1,634
	Jul	0	-2,114	-2,114	-2,114	-2,224	-2,361	-2,225	-2,362
	Aug	0	-451	-451	-451	-489	-540	-489	-540
	Sep	222	221	221	221	186	136	164	136
	Oct	10,133	10,132	10,132	10,132	10,091	10,009	8,884	8,760
	Nov	22	21	21	21	-4	-40	-14	-50
	Dec	1,333	1,332	1,332	1,332	1,244	1,070	655	481
2001	Jan	3,568	3,567	3,567	3,567	3,545	3,504	2,927	2,865
	Feb	2,907	2,906	2,906	2,906	2,877	2,821	2,045	1,960
	Mar	1,269	1,268	1,268	1,268	1,229	1,153	663	587
	Apr	571	570	570	570	512	397	266	151
	May	16,082	16,081	16,081	16,081	16,007	15,862	13,848	13,628
	Jun	303	302	302	302	228	83	93	-52
	Jul	164	163	163	163	111	25	111	25
	Aug	1,137	1,136	1,136	1,136	1,047	869	619	545
	Sep	98	97	97	97	62	26	54	26
	Oct	0	-785	-785	-785	-803	-818	-803	-818
	Nov	727	726	726	726	694	632	375	313
	Dec	151	150	150	150	62	0	16	0
2002	Jan	165	164	164	164	142	101	70	29
	Feb	544	543	543	543	514	458	281	225
	Mar	1,466	1,465	1,465	1,465	1,426	1,350	785	709
	Apr	6,023	6,022	6,022	6,022	5,964	5,849	4,255	4,081
	May	93	92	92	92	32	9	32	9
	Jun	615	614	614	614	540	395	347	287
	Jul	676	675	675	675	565	347	352	262
	Aug	113	112	112	112	74	4	74	4
	Sep	1,141	1,140	1,140	1,140	1,105	1,037	625	557
	Oct	2,878	2,877	2,877	2,877	2,836	2,754	1,629	1,505
	Nov	465	464	464	464	432	370	227	165
	Dec	2,129	2,128	2,128	2,128	2,040	1,866	1,090	916
2003	Jan	295	294	294	294	272	231	147	106
	Feb	636	635	635	635	606	550	325	269
	Mar	805	804	804	804	765	689	419	343
	Apr	1,036	1,035	1,035	1,035	977	862	533	418
	May	1,333	1,332	1,332	1,332	1,258	1,113	685	540
	Jun	17,515	17,514	17,514	17,514	17,440	17,295	15,277	15,057
	Jul	0	-308	-308	-308	-355	-425	-355	-425
	Aug	2,433	2,432	2,432	2,432	2,343	2,165	1,347	1,273
	Sep	0	-305	-305	-305	-340	-408	-341	-409
	Oct	0	-127	-127	-127	-145	-158	-145	-158
	Nov	0	-235	-235	-235	-236	-236	-236	-236
	Dec	274	273	273	273	185	50	115	50

Table 29. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir West Otter and Glen Creeks (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	1,272	1,271	1,271	1,271	1,249	1,208	685	644
	Feb	1,548	1,547	1,547	1,547	1,518	1,462	840	817
	Mar	8,303	8,302	8,302	8,302	8,263	8,187	7,132	7,016
	Apr	613	612	612	612	554	439	290	175
	May	365	364	364	364	290	145	158	24
	Jun	1,000	999	999	999	925	780	494	349
	Jul	3,301	3,300	3,300	3,300	3,190	2,972	1,730	1,512
	Aug	1,432	1,431	1,431	1,431	1,342	1,164	776	702
	Sep	59	58	58	58	42	14	42	14
	Oct	3,806	3,805	3,805	3,805	3,764	3,682	2,557	2,433
	Nov	12,064	12,063	12,063	12,063	12,031	11,969	11,101	11,007
	Dec	352	351	351	351	263	89	110	-64
2005	Jan	2,818	2,817	2,817	2,817	2,795	2,754	2,177	2,115
	Feb	2,364	2,363	2,363	2,363	2,334	2,278	1,502	1,417
	Mar	656	655	655	655	616	540	329	253
	Apr	130	129	129	129	71	-41	32	-80
	May	1,982	1,981	1,981	1,981	1,907	1,762	1,036	891
	Jun	1,022	1,021	1,021	1,021	947	802	514	369
	Jul	1,618	1,617	1,617	1,617	1,507	1,289	900	810
	Aug	845	844	844	844	755	577	378	200
	Sep	5,456	5,455	5,455	5,455	5,420	5,352	4,414	4,311
	Oct	512	511	511	511	470	388	247	165
	Nov	101	100	100	100	68	6	34	-5
	Dec	216	215	215	215	127	26	74	26
2006	Jan	1,232	1,231	1,231	1,231	1,209	1,168	678	637
	Feb	1,376	1,375	1,375	1,375	1,346	1,290	737	681
	Mar	668	667	667	667	628	552	330	254
	Apr	1,349	1,348	1,348	1,348	1,290	1,175	728	613
	May	1,491	1,490	1,490	1,490	1,416	1,271	777	632
	Jun	60	59	59	59	27	-33	27	-33
	Jul	587	586	586	586	476	287	377	287
	Aug	2,625	2,624	2,624	2,624	2,535	2,357	1,472	1,398
	Sep	126	125	125	125	90	34	59	34
	Oct	1,130	1,129	1,129	1,129	1,088	1,006	584	502
	Nov	153	152	152	152	120	58	72	46
	Dec	1,919	1,918	1,918	1,918	1,830	1,656	974	800
2007	Jan	854	853	853	853	831	790	453	412
	Feb	963	962	962	962	933	877	513	457
	Mar	7,376	7,375	7,375	7,375	7,336	7,260	6,205	6,089
	Apr	1,949	1,948	1,948	1,948	1,890	1,775	1,889	1,774
	May	13,326	13,325	13,325	13,325	13,251	13,106	11,092	10,872
	Jun	31,428	31,427	31,427	31,427	31,353	31,208	29,190	28,970
	Jul	6,155	6,154	6,154	6,154	6,044	5,826	3,298	3,080
	Aug	8,981	8,980	8,980	8,980	8,891	8,713	6,260	5,990
	Sep	2,274	2,273	2,273	2,273	2,238	2,170	1,232	1,156
	Oct	180	179	179	179	138	56	58	-24
	Nov	0	-902	-902	-902	-934	-977	-935	-978
	Dec	1,366	1,365	1,365	1,365	1,277	1,103	670	496
2008	Jan	738	737	737	737	715	674	397	356
	Feb	2,146	2,145	2,145	2,145	2,116	2,060	1,284	1,199
	Mar	13,152	13,151	13,151	13,151	13,112	13,036	11,981	11,865
	Apr	10,590	10,589	10,589	10,589	10,531	10,416	8,822	8,648
	May	1,632	1,631	1,631	1,631	1,557	1,412	869	724
	Jun	919	918	918	918	844	699	543	483
	Jul	1,431	1,430	1,430	1,430	1,320	1,102	790	700
	Aug	1,582	1,581	1,581	1,581	1,492	1,314	852	778
	Sep	0	-14	-14	-14	-49	-95	-50	-96
	Oct	2,552	2,551	2,551	2,551	2,510	2,428	1,374	1,292
	Nov	84	83	83	83	51	-11	23	-39
	Dec	0	-215	-215	-215	-277	-332	-278	-332

Table 29. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir West Otter and Glen Creeks (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	619	618	618	618	596	555	326	285
	Feb	866	865	865	865	836	780	461	405
	Mar	1,740	1,739	1,739	1,739	1,700	1,624	950	918
	Apr	8,079	8,078	8,078	8,078	8,020	7,905	6,311	6,137
	May	4,649	4,648	4,648	4,648	4,574	4,429	2,500	2,355
	Jun	864	863	863	863	789	644	472	412
	Jul	894	893	893	893	783	565	479	389
	Aug	276	275	275	275	186	104	178	104
	Sep	5,364	5,363	5,363	5,363	5,328	5,260	4,322	4,219
	Oct	2,385	2,384	2,384	2,384	2,343	2,261	1,279	1,197
	Nov	64	63	63	63	31	14	24	14
	Dec	917	916	916	916	828	654	421	247
2010	Jan	2,664	2,663	2,663	2,663	2,641	2,600	2,023	1,961
	Feb	4,152	4,151	4,151	4,151	4,122	4,066	3,290	3,205
	Mar	2,181	2,180	2,180	2,180	2,141	2,065	1,179	1,103
	Apr	769	768	768	768	710	595	368	253
	May	587	586	586	586	512	367	269	124
	Jun	2,418	2,417	2,417	2,417	2,343	2,198	1,302	1,285
	Jul	26,141	26,140	26,140	26,140	26,030	25,812	22,796	22,466
	Aug	781	780	780	780	691	513	457	383
	Sep	2,076	2,075	2,075	2,075	2,040	1,972	1,114	1,046
	Oct	3,681	3,680	3,680	3,680	3,639	3,557	2,432	2,308
	Nov	1,835	1,834	1,834	1,834	1,802	1,740	983	921
	Dec	0	-399	-399	-399	-401	-401	-401	-401
2011	Jan	647	646	646	646	624	583	339	298
	Feb	1,588	1,587	1,587	1,587	1,558	1,502	853	797
	Mar	0	-1,355	-1,355	-1,355	-1,356	-1,356	-1,356	-1,356
	Apr	778	777	777	777	719	604	427	379
	May	2,405	2,404	2,404	2,404	2,330	2,185	1,257	1,112
	Jun	515	514	514	514	440	295	334	274
	Jul	1,009	1,008	1,008	1,008	898	680	643	553
	Aug	576	575	575	575	486	308	378	304
	Sep	28	27	27	27	11	-17	11	-17
	Oct	876	875	875	875	834	752	480	446
	Nov	5,443	5,442	5,442	5,442	5,410	5,348	4,480	4,386
	Dec	209	208	208	208	120	50	78	50
2012	Jan	1,109	1,108	1,108	1,108	1,086	1,045	637	620
	Feb	869	868	868	868	839	783	471	448
	Mar	2,366	2,365	2,365	2,365	2,326	2,250	1,288	1,212
	Apr	4,324	4,323	4,323	4,323	4,265	4,150	2,556	2,382
	May	0	-772	-772	-772	-846	-991	-847	-992
	Jun	1,943	1,942	1,942	1,942	1,868	1,723	1,087	1,027
	Jul	210	209	209	209	162	72	162	72
	Aug	402	401	401	401	312	185	259	185
	Sep	712	711	711	711	676	608	417	389
	Oct	0	-478	-478	-478	-479	-479	-479	-479
	Nov	0	-166	-166	-166	-180	-186	-180	-186
	Dec	302	301	301	301	213	72	130	72
2013	Jan	442	441	441	441	419	378	237	220
	Feb	960	959	959	959	930	874	527	504
	Mar	346	345	345	345	306	230	196	164
	Apr	423	422	422	422	364	249	180	117
	May	3,927	3,926	3,926	3,926	3,852	3,707	2,151	2,091
	Jun	637	636	636	636	562	417	388	328
	Jul	807	806	806	806	696	478	456	366
	Aug	642	641	641	641	552	374	392	318
	Sep	3,239	3,238	3,238	3,238	3,203	3,135	2,197	2,094
	Oct	5,624	5,623	5,623	5,623	5,582	5,500	4,375	4,251
	Nov	0	-304	-304	-304	-323	-359	-324	-360
	Dec	409	408	408	408	320	146	190	118

Table 29. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir West Otter and Glen Creeks (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	706	705	705	705	683	642	418	401
	Feb	385	384	384	384	355	299	200	177
	Mar	723	722	722	722	683	607	423	391
	Apr	147	146	146	146	93	45	93	45
	May	1,066	1,065	1,065	1,065	991	846	525	380
	Jun	6,007	6,006	6,006	6,006	5,932	5,787	3,769	3,549
	Jul	1,097	1,096	1,096	1,096	986	768	595	505
	Aug	592	591	591	591	502	324	290	216
	Sep	76	75	75	75	40	-28	39	-29
	Oct	141	140	140	140	99	47	81	47
	Nov	1,350	1,349	1,349	1,349	1,317	1,255	715	683
	Dec	0	-306	-306	-305	-307	0	0	0
2015	Jan	622	621	621	621	599	558	348	331
	Feb	201	200	200	200	171	115	88	82
	Mar	411	410	410	410	371	295	218	186
	Apr	1,493	1,492	1,492	1,492	1,434	1,319	768	653
	May	82,328	82,327	82,327	82,327	82,253	82,108	80,094	79,874
	Jun	21,048	21,047	21,047	21,047	20,973	20,828	18,810	18,590
	Jul	0	-666	-666	-666	-730	-858	-731	-859
	Aug	0	-2,143	-2,143	-2,143	-2,232	-2,356	-2,233	-2,357
	Sep	1,424	1,423	1,423	1,423	1,388	1,320	799	731
	Oct	0	-365	-365	-365	-406	-477	-407	-478
	Nov	3,470	3,469	3,469	3,469	3,437	3,375	2,507	2,413
	Dec	4,717	4,716	4,716	4,716	4,628	4,454	2,524	2,350
2016	Jan	0	-3,780	-3,780	-3,780	-3,802	-3,843	-3,803	-3,844
	Feb	2,329	2,328	2,328	2,328	2,299	2,243	1,467	1,382
	Mar	4,270	4,269	4,269	4,269	4,230	4,154	3,099	2,983
	Apr	20,986	20,985	20,985	20,985	20,927	20,812	19,218	19,044
	May	0	-218	-218	-218	-261	-346	-262	-347
	Jun	8,054	8,053	8,053	8,053	7,979	7,834	5,816	5,596
	Jul	5,542	5,541	5,541	5,541	5,431	5,213	2,959	2,741
	Aug	1,260	1,259	1,259	1,259	1,170	992	709	635
	Sep	9,125	9,124	9,124	9,124	9,089	9,021	8,083	7,980
	Oct	0	-5,011	-5,011	-5,011	-5,052	-5,134	-5,053	-5,135
	Nov	0	-2,490	-2,490	-2,490	-2,517	-2,553	-2,518	-2,554
	Dec	0	-3,043	-3,043	-3,043	-3,097	-3,199	-3,098	-3,200

Table 30. Monthly inflows into Tom Steed Reservoir from Elk Creek developed using the North Fork Red River SWAM and based on a range of ground- and stream-water development scenarios.

Year	Month	North Fork Red River SWAM Modeled at the Reservoir Elk Creek (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	22	0	0	0	0	0	0	0
	Feb	22	0	0	0	0	0	0	0
	Mar	22	0	0	0	0	0	0	0
	Apr	262	238	238	100	100	0	100	0
	May	5,867	5,838	5,317	4,743	4,391	4,957	6,257	6,257
	Jun	31	0	0	0	0	0	0	0
	Jul	39	0	0	0	0	0	0	0
	Aug	39	0	0	0	0	0	1,282	1,471
	Sep	344	312	312	0	0	0	0	0
	Oct	27	0	0	0	0	0	0	0
	Nov	22	0	0	0	0	0	0	0
	Dec	22	0	0	0	0	0	0	0
1951	Jan	22	0	0	0	0	0	0	0
	Feb	22	0	0	0	0	0	0	0
	Mar	22	0	0	0	0	0	0	0
	Apr	24	0	0	0	0	0	0	0
	May	14,047	14,018	14,018	13,440	13,997	14,515	14,665	14,665
	Jun	31	0	0	0	0	0	1,190	1,805
	Jul	701	662	662	225	0	0	0	0
	Aug	39	0	0	0	0	0	0	0
	Sep	713	681	681	553	0	0	0	0
	Oct	421	394	394	182	182	0	182	0
	Nov	22	0	0	0	0	0	0	0
	Dec	22	0	0	0	0	0	0	0
1952	Jan	22	0	0	0	0	0	0	0
	Feb	22	0	0	0	0	0	0	0
	Mar	22	0	0	0	0	0	0	0
	Apr	2,633	2,609	2,609	2,355	2,355	2,355	2,355	2,355
	May	3,603	3,574	3,574	3,139	3,139	3,098	3,139	3,098
	Jun	31	0	0	0	0	0	0	0
	Jul	39	0	0	0	0	0	0	0
	Aug	39	0	0	0	0	0	0	0
	Sep	32	0	0	0	0	0	0	0
	Oct	27	0	0	0	0	0	0	0
	Nov	22	0	0	0	0	0	0	0
	Dec	22	0	0	0	0	0	0	0
1953	Jan	22	0	0	0	0	0	0	0
	Feb	22	0	0	0	0	0	0	0
	Mar	22	0	0	0	0	0	0	0
	Apr	2,909	2,885	2,885	2,669	2,669	2,552	2,669	2,552
	May	29	0	0	0	0	0	0	0
	Jun	2,762	2,731	2,731	2,607	571	0	571	0
	Jul	1,787	1,748	1,748	1,626	0	0	0	0
	Aug	39	0	0	0	0	0	0	0
	Sep	32	0	0	0	0	0	0	0
	Oct	3,686	3,659	3,659	3,316	3,316	3,316	3,316	3,316
	Nov	348	326	326	166	154	0	154	0
	Dec	963	941	941	780	600	0	600	1
1954	Jan	22	0	0	0	0	0	0	0
	Feb	22	0	0	0	0	0	0	0
	Mar	22	0	0	0	0	0	0	0
	Apr	293	269	269	104	100	0	100	0
	May	6,764	6,735	6,735	6,208	6,208	6,208	6,208	6,208
	Jun	31	0	0	0	0	0	0	0
	Jul	39	0	0	0	0	0	0	0
	Aug	39	0	0	0	0	0	0	0
	Sep	32	0	0	0	0	0	0	0
	Oct	27	0	0	0	0	0	0	0
	Nov	22	0	0	0	0	0	0	0
	Dec	22	0	0	0	0	0	0	0

Table 30. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir (without / with Seniority) Elk Creek (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)
1955	Jan	22	0	0	0	0	0	0	0
	Feb	22	0	0	0	0	0	0	0
	Mar	22	0	0	0	0	0	0	0
	Apr	24	0	0	0	0	0	0	0
	May	15,720	15,691	15,691	14,766	14,766	14,766	14,766	14,766
	Jun	34	0	0	0	1,023	2,368	3,124	2,368
	Jul	43	0	0	0	0	0	0	0
	Aug	42	0	0	0	0	0	0	0
	Sep	34	0	0	0	0	0	0	0
	Oct	7,439	7,412	7,412	7,038	7,272	7,272	7,272	7,272
	Nov	22	0	0	0	0	0	0	0
	Dec	22	0	0	0	0	0	0	0
1956	Jan	22	0	0	0	0	0	0	0
	Feb	22	0	0	0	0	0	0	0
	Mar	22	0	0	0	0	0	0	0
	Apr	24	0	0	0	0	0	0	0
	May	3,329	3,300	3,300	2,941	2,941	2,831	2,941	2,831
	Jun	34	0	0	0	0	0	0	0
	Jul	751	708	708	464	0	0	0	0
	Aug	42	0	0	0	0	0	0	0
	Sep	34	0	0	0	0	0	0	0
	Oct	48	21	21	0	0	0	0	0
	Nov	22	0	0	0	0	0	0	0
	Dec	22	0	0	0	0	0	0	0
1957	Jan	22	0	0	0	0	0	0	0
	Feb	22	0	0	0	0	0	0	0
	Mar	22	0	0	0	0	0	0	0
	Apr	13,568	13,544	13,544	12,883	12,883	12,883	12,883	12,883
	May	29	0	0	0	0	0	2,472	6,591
	Jun	34	0	0	0	0	0	0	0
	Jul	43	0	0	0	0	0	0	0
	Aug	42	0	0	0	0	0	0	0
	Sep	34	0	0	0	0	0	0	0
	Oct	1,058	1,031	1,031	726	726	549	726	549
	Nov	22	0	0	0	0	0	0	0
	Dec	22	0	0	0	0	0	0	0
1958	Jan	22	0	0	0	0	0	0	0
	Feb	22	0	0	0	0	0	0	0
	Mar	115	93	93	0	0	0	0	0
	Apr	120	96	96	0	0	0	0	0
	May	29	0	0	0	0	0	0	0
	Jun	5,197	5,163	5,163	4,616	4,049	3,293	4,049	3,293
	Jul	338	295	295	0	0	0	0	0
	Aug	42	0	0	0	0	0	0	0
	Sep	34	0	0	0	0	0	0	0
	Oct	27	0	0	0	0	0	0	0
	Nov	22	0	0	0	0	0	0	0
	Dec	22	0	0	0	0	0	0	0
1959	Jan	22	0	0	0	0	0	0	0
	Feb	22	0	0	0	0	0	0	0
	Mar	22	0	0	0	0	0	0	0
	Apr	861	837	837	462	462	282	462	282
	May	15,811	15,782	15,782	14,643	14,643	14,643	14,643	14,643
	Jun	1,391	1,357	1,357	710	0	0	0	0
	Jul	43	0	0	0	0	2,172	12,072	12,072
	Aug	69	27	27	0	0	0	0	0
	Sep	4,135	4,101	4,101	3,855	3,895	3,967	5,956	5,956
	Oct	27	0	0	0	0	0	2,559	5,198
	Nov	770	748	748	0	0	0	0	0
	Dec	22	0	0	0	0	0	0	0

Table 30. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir (without / with Seniority) Elk Creek (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)
1960	Jan	1,428	1,406	1,406	0	0	0	0	0
	Feb	1,102	1,080	1,080	0	0	0	0	0
	Mar	3,690	3,668	3,668	1,149	1,190	1,271	1,297	1,375
	Apr	1,855	1,831	1,831	93	93	0	93	0
	May	2,801	2,772	2,772	1,217	1,217	703	1,217	703
	Jun	2,120	2,067	2,067	693	0	0	0	0
	Jul	6,654	6,586	6,586	5,978	3,524	2,640	3,524	2,640
	Aug	367	303	303	0	0	0	0	0
	Sep	109	65	65	0	0	0	0	0
	Oct	3,877	3,850	3,850	3,074	8,052	10,565	14,331	16,626
	Nov	2,464	2,442	2,442	554	554	554	554	554
	Dec	139	117	117	0	0	0	0	0
1961	Jan	2,091	2,069	2,069	62	77	102	80	102
	Feb	1,021	999	999	0	0	0	0	0
	Mar	605	583	583	0	0	0	130	130
	Apr	1,430	1,406	1,406	67	67	0	67	0
	May	1,983	1,954	1,954	1,019	1,019	472	1,019	472
	Jun	53	0	0	0	0	0	0	0
	Jul	2,139	2,071	2,071	1,000	0	0	0	0
	Aug	2,011	1,947	1,947	1,518	0	0	0	0
	Sep	4,502	4,458	4,458	4,057	4,057	3,989	4,057	3,989
	Oct	5,262	5,235	5,235	4,163	4,163	4,163	4,163	4,163
	Nov	815	793	793	0	3,142	3,824	6,638	7,159
	Dec	1,184	1,162	1,162	0	0	0	0	0
1962	Jan	1,576	1,554	1,554	0	0	0	0	0
	Feb	990	968	968	0	0	0	0	0
	Mar	812	790	790	0	0	0	0	0
	Apr	2,821	2,797	2,797	1,611	1,611	1,312	1,611	1,312
	May	4,089	4,060	4,060	3,173	3,173	2,687	3,173	2,687
	Jun	53	0	0	0	0	0	1,443	3,172
	Jul	2,639	2,571	2,571	1,425	0	0	0	0
	Aug	1,355	1,291	1,291	1,064	0	0	0	0
	Sep	7,366	7,322	7,322	6,718	5,974	5,621	5,974	5,621
	Oct	2,992	2,965	2,965	1,992	1,992	1,973	1,992	1,973
	Nov	621	599	599	0	0	0	0	0
	Dec	1,124	1,102	1,102	7	7	0	7	0
1963	Jan	446	424	424	0	0	0	0	0
	Feb	573	551	551	0	0	0	0	0
	Mar	827	805	805	0	0	0	0	0
	Apr	280	256	256	0	0	0	0	0
	May	2,215	2,186	2,186	1,984	1,984	1,427	1,984	1,427
	Jun	9,940	9,887	9,887	8,329	6,247	5,491	6,247	5,491
	Jul	68	0	0	0	0	0	0	0
	Aug	64	0	0	0	0	0	0	0
	Sep	44	0	0	0	0	0	0	0
	Oct	2,917	2,890	2,890	2,843	2,843	2,648	2,843	2,648
	Nov	22	0	0	0	0	0	0	0
	Dec	22	0	0	0	0	0	0	0
1964	Jan	22	0	0	0	0	0	0	0
	Feb	2,358	2,336	2,336	1,967	1,967	1,967	1,967	1,967
	Mar	22	0	0	0	0	0	0	0
	Apr	24	0	0	0	0	0	0	0
	May	1,427	1,398	1,398	952	952	336	952	336
	Jun	2,274	2,196	2,196	1,601	0	0	0	0
	Jul	101	0	0	0	0	0	0	0
	Aug	94	0	0	0	0	0	0	0
	Sep	234	177	177	1	0	0	0	0
	Oct	62	35	35	0	0	0	0	0
	Nov	3,258	3,236	3,236	2,366	2,366	2,366	2,366	2,366
	Dec	236	214	214	0	0	0	0	0

Table 30. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir (without / with Seniority) Elk Creek (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)
1965	Jan	179	107	107	0	0	0	0	0
	Feb	101	29	29	0	0	0	0	0
	Mar	95	23	23	0	0	0	0	0
	Apr	819	745	745	107	107	0	107	0
	May	1,849	1,770	1,770	1,338	1,338	734	1,338	734
	Jun	6,013	5,854	5,854	4,206	1,969	1,264	1,969	1,264
	Jul	192	0	0	0	0	0	0	0
	Aug	180	0	0	0	0	0	0	0
	Sep	10,205	10,082	10,082	9,848	9,848	9,848	9,848	9,848
	Oct	8,694	8,617	8,617	7,874	7,874	7,874	7,874	7,874
	Nov	1,782	1,710	1,710	145	145	145	145	145
	Dec	1,906	1,834	1,834	452	452	0	452	0
1966	Jan	949	877	877	0	0	0	0	0
	Feb	2,634	2,562	2,562	1,558	1,558	1,558	1,558	1,558
	Mar	2,820	2,748	2,748	1,476	1,476	1,476	1,476	1,476
	Apr	173	99	99	0	0	0	0	0
	May	755	676	676	30	30	0	30	0
	Jun	159	0	0	0	0	0	0	0
	Jul	192	0	0	0	0	0	0	0
	Aug	558	378	378	223	0	0	0	0
	Sep	414	291	291	170	0	0	0	0
	Oct	77	0	0	0	0	0	0	0
	Nov	72	0	0	0	0	0	0	0
	Dec	72	0	0	0	0	0	0	0
1967	Jan	83	0	0	0	0	0	0	0
	Feb	83	0	0	0	0	0	0	0
	Mar	83	0	0	0	0	0	0	0
	Apr	4,270	4,183	4,183	3,879	3,879	3,879	3,879	3,879
	May	554	460	460	280	214	0	214	0
	Jun	545	299	299	0	0	0	0	0
	Jul	307	0	0	0	0	0	0	0
	Aug	286	0	0	0	0	0	0	0
	Sep	562	385	385	214	0	0	0	0
	Oct	92	0	0	0	0	0	0	0
	Nov	83	0	0	0	0	0	0	0
	Dec	83	0	0	0	0	0	0	0
1968	Jan	78	0	0	0	0	0	0	0
	Feb	78	0	0	0	0	0	0	0
	Mar	78	0	0	0	0	0	0	0
	Apr	1,165	1,084	1,084	722	722	482	722	482
	May	8,276	8,189	8,189	6,730	6,730	6,324	6,730	6,324
	Jun	9,730	9,545	9,545	8,191	8,191	8,191	8,191	8,191
	Jul	4,389	4,164	4,164	3,559	711	0	711	0
	Aug	3,236	3,026	3,026	2,672	276	0	276	0
	Sep	193	52	52	0	0	0	0	0
	Oct	7,748	7,663	7,663	7,014	7,014	7,014	7,014	7,014
	Nov	5,406	5,328	5,328	3,642	3,642	3,642	3,642	3,642
	Dec	1,003	925	925	0	0	0	0	0
1969	Jan	723	636	636	0	0	0	0	0
	Feb	1,124	1,037	1,037	0	0	0	0	0
	Mar	4,071	3,984	3,984	1,847	1,847	1,847	1,847	1,847
	Apr	2,270	2,178	2,178	309	309	66	309	66
	May	26,251	26,152	26,152	24,370	24,370	24,370	24,370	24,370
	Jun	1,839	1,641	1,641	28	0	0	0	0
	Jul	242	0	0	0	0	0	0	0
	Aug	5,696	5,469	5,469	5,119	2,623	1,904	2,623	1,904
	Sep	1,512	1,358	1,358	705	0	0	0	0
	Oct	115	18	18	0	0	0	0	0
	Nov	187	100	100	0	0	0	0	0
	Dec	119	32	32	0	0	0	0	0

Table 30. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir (without / with Seniority) Elk Creek (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)
1970	Jan	130	39	39	0	0	0	0	0
	Feb	113	22	22	0	0	0	0	0
	Mar	302	211	211	0	0	0	0	0
	Apr	1,220	1,124	1,124	277	277	17	277	17
	May	3,288	3,184	3,184	2,706	2,706	2,156	2,706	2,156
	Jun	554	363	363	53	0	0	0	0
	Jul	233	0	0	0	0	0	0	0
	Aug	220	0	0	0	0	0	0	0
	Sep	1,879	1,726	1,726	1,634	676	399	676	399
	Oct	101	0	0	0	0	0	0	0
	Nov	91	0	0	0	0	0	0	0
	Dec	91	0	0	0	0	0	0	0
1971	Jan	82	0	0	0	0	0	0	0
	Feb	82	0	0	0	0	0	0	0
	Mar	82	0	0	0	0	0	0	0
	Apr	86	0	0	0	0	0	0	0
	May	92	0	0	0	0	0	0	0
	Jun	2,066	1,776	1,776	1,183	0	0	0	0
	Jul	681	315	315	106	0	0	0	0
	Aug	1,531	1,194	1,194	978	0	0	0	0
	Sep	9,986	9,787	9,787	9,391	9,391	9,391	9,391	9,391
	Oct	6,330	6,240	6,240	5,791	5,791	5,791	5,791	5,791
	Nov	723	641	641	218	218	218	218	218
	Dec	1,857	1,775	1,775	901	901	202	901	202
1972	Jan	647	560	560	0	0	0	0	0
	Feb	1,091	1,004	1,004	0	0	0	0	0
	Mar	229	142	142	0	0	0	0	0
	Apr	290	198	198	41	41	0	41	0
	May	3,140	3,041	3,041	1,964	1,964	1,482	1,964	1,482
	Jun	5,163	4,965	4,965	3,759	1,589	995	1,589	995
	Jul	242	0	0	0	0	0	0	0
	Aug	227	0	0	0	0	0	0	0
	Sep	154	0	0	0	0	0	0	0
	Oct	97	0	0	0	0	0	0	0
	Nov	376	289	289	0	0	0	0	0
	Dec	90	3	3	0	0	0	0	0
1973	Jan	1,915	1,824	1,824	1,200	1,200	1,200	1,200	1,200
	Feb	345	254	254	0	0	0	0	0
	Mar	10,988	10,897	10,897	9,047	9,047	9,047	9,047	9,047
	Apr	20,001	19,905	19,905	18,044	18,044	18,044	18,044	18,044
	May	4,086	3,982	3,982	1,898	1,898	1,480	1,898	1,480
	Jun	11,841	11,548	11,548	9,171	7,831	7,075	7,831	7,075
	Jul	1,133	763	763	35	0	0	0	0
	Aug	346	4	4	0	0	0	0	0
	Sep	207	0	0	0	10,846	14,202	14,202	14,202
	Oct	3,078	2,977	2,977	1,627	1,671	5,895	5,895	5,895
	Nov	973	882	882	0	0	0	0	0
	Dec	803	712	712	0	0	0	0	0
1974	Jan	463	372	372	0	0	0	0	0
	Feb	340	249	249	0	0	0	0	0
	Mar	3,956	3,865	3,865	2,493	2,493	2,493	2,493	2,493
	Apr	2,404	2,308	2,308	1,630	1,630	1,396	1,630	1,396
	May	6,599	6,495	6,495	5,046	5,350	6,839	10,749	10,749
	Jun	565	348	348	0	0	0	0	0
	Jul	268	0	0	0	0	0	0	0
	Aug	251	0	0	0	0	0	0	0
	Sep	2,741	2,574	2,574	2,161	1,124	827	1,124	827
	Oct	3,625	3,524	3,524	2,930	2,930	2,930	2,930	2,930
	Nov	9,576	9,485	9,485	7,662	7,662	7,662	7,662	7,662
	Dec	2,182	2,091	2,091	40	40	0	40	0

Table 30. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir (without / with Seniority) Elk Creek (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)
1975	Jan	2,008	1,927	1,927	220	842	842	842	842
	Feb	81	0	0	0	0	0	8,050	8,050
	Mar	2,890	2,809	2,809	290	331	412	5,171	5,171
	Apr	3,788	3,704	3,704	1,637	1,698	1,820	3,983	3,796
	May	91	0	0	0	0	0	0	3,436
	Jun	216	0	0	0	0	0	0	0
	Jul	269	0	0	0	0	0	0	0
	Aug	4,863	4,613	4,613	3,901	3,994	3,728	4,235	3,728
	Sep	1,241	1,080	1,080	264	0	0	0	0
	Oct	2,632	2,544	2,544	1,678	1,678	1,678	1,678	1,678
	Nov	4,063	3,982	3,982	2,183	2,183	2,183	2,183	2,183
	Dec	1,757	1,676	1,676	0	0	0	0	0
1976	Jan	1,435	1,361	1,361	0	0	0	0	0
	Feb	898	824	824	0	0	0	0	0
	Mar	951	877	877	0	0	0	0	0
	Apr	6,787	6,710	6,710	5,261	5,261	5,075	5,261	5,075
	May	5,514	5,432	5,432	3,342	3,714	3,295	3,714	3,295
	Jun	2,573	2,356	2,356	0	0	0	0	0
	Jul	293	25	25	0	0	0	0	0
	Aug	248	0	0	0	0	0	0	0
	Sep	7,460	7,305	7,305	6,892	7,917	11,144	11,883	11,883
	Oct	359	279	279	0	0	0	0	0
	Nov	417	343	343	0	0	0	0	0
	Dec	292	218	218	0	0	0	0	0
1977	Jan	388	315	315	0	0	0	0	0
	Feb	464	391	391	0	0	0	0	0
	Mar	286	213	213	0	0	0	0	0
	Apr	504	429	429	0	0	0	0	0
	May	80	0	0	0	0	0	0	0
	Jun	5,581	5,366	5,366	2,637	2,716	2,870	2,998	3,151
	Jul	1,038	773	773	0	0	0	0	0
	Aug	10,533	10,287	10,287	9,665	7,916	7,000	7,916	7,000
	Sep	2,956	2,803	2,803	2,189	1,304	965	1,304	965
	Oct	203	125	125	0	0	0	0	0
	Nov	567	494	494	0	0	0	0	0
	Dec	686	613	613	0	0	0	0	0
1978	Jan	753	671	671	0	0	0	0	0
	Feb	1,096	1,014	1,014	0	0	0	0	0
	Mar	856	774	774	0	0	0	0	0
	Apr	374	288	288	0	0	0	0	0
	May	93	0	0	0	993	3,728	5,597	6,604
	Jun	238	0	0	0	0	0	0	0
	Jul	358	63	63	0	0	0	0	0
	Aug	274	0	0	0	0	0	0	0
	Sep	172	0	0	0	0	0	0	0
	Oct	163	72	72	0	0	0	0	0
	Nov	257	175	175	0	0	0	0	0
	Dec	82	0	0	0	0	0	0	0
1979	Jan	407	321	321	0	0	0	0	0
	Feb	231	145	145	0	0	0	0	0
	Mar	683	597	597	0	0	0	0	0
	Apr	270	180	180	0	0	0	0	0
	May	3,673	3,575	3,575	2,780	2,780	2,780	2,780	2,780
	Jun	3,990	3,765	3,765	2,996	2,996	2,996	2,996	2,996
	Jul	616	337	337	0	0	0	0	0
	Aug	325	65	65	0	0	0	0	0
	Sep	168	0	0	0	0	0	0	0
	Oct	140	45	45	0	0	0	0	0
	Nov	1,572	1,486	1,486	851	851	851	851	851
	Dec	86	0	0	0	0	0	0	0

Table 30. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir (without / with Seniority) Elk Creek (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)
1980	Jan	218	120	120	0	0	0	0	0
	Feb	133	35	35	0	0	0	0	0
	Mar	354	256	256	0	0	0	0	0
	Apr	374	270	270	0	0	0	0	0
	May	113	0	0	0	0	0	9,984	11,922
	Jun	3,095	2,890	2,890	2,083	0	0	0	0
	Jul	253	0	0	0	0	0	0	0
	Aug	239	0	0	0	0	0	0	0
	Sep	166	0	0	0	0	0	0	0
	Oct	110	0	0	0	0	0	0	0
	Nov	98	0	0	0	0	0	0	0
	Dec	559	461	461	247	247	0	247	0
1981	Jan	83	0	0	0	0	0	0	0
	Feb	83	0	0	0	0	0	0	0
	Mar	425	342	342	77	77	56	77	56
	Apr	413	326	326	7	7	0	7	0
	May	460	367	367	55	55	0	55	0
	Jun	6,773	6,565	6,565	5,772	3,535	2,779	3,535	2,779
	Jul	258	0	0	0	0	0	0	0
	Aug	243	0	0	0	0	0	0	0
	Sep	157	0	0	0	0	0	0	0
	Oct	10,647	10,556	10,556	10,018	10,018	10,018	10,018	10,018
	Nov	1,523	1,440	1,440	854	854	854	854	854
	Dec	214	131	131	0	0	0	0	0
1982	Jan	3,002	2,916	2,916	2,690	2,690	2,690	2,690	2,690
	Feb	2,260	2,174	2,174	1,009	1,009	1,009	1,009	1,009
	Mar	799	713	713	203	203	131	203	131
	Apr	184	94	94	0	0	0	0	0
	May	16,026	15,929	15,929	15,124	19,408	23,267	24,382	24,382
	Jun	197	0	0	0	0	0	0	2,261
	Jul	2,406	2,164	2,164	1,106	0	0	0	0
	Aug	657	429	429	95	0	0	0	0
	Sep	573	420	420	54	0	0	0	0
	Oct	207	112	112	0	0	0	0	0
	Nov	329	243	243	0	0	0	0	0
	Dec	475	389	389	0	0	0	0	0
1983	Jan	507	422	422	0	0	0	0	0
	Feb	709	624	624	0	0	0	0	0
	Mar	3,460	3,375	3,375	2,170	2,170	2,170	2,170	2,170
	Apr	1,495	1,406	1,406	0	0	0	0	0
	May	7,259	7,163	7,163	5,451	5,451	5,256	5,451	5,256
	Jun	11,532	11,377	11,377	8,657	8,657	8,657	8,657	8,657
	Jul	469	283	283	0	0	0	0	0
	Aug	177	0	0	0	0	0	0	0
	Sep	130	0	0	0	0	0	0	0
	Oct	94	0	0	0	0	0	226	1,946
	Nov	2,043	1,958	1,958	429	429	429	429	429
	Dec	1,249	1,164	1,164	0	0	0	0	0
1984	Jan	1,214	1,129	1,129	0	0	0	0	0
	Feb	1,146	1,061	1,061	0	0	0	0	0
	Mar	1,216	1,131	1,131	57	57	57	57	57
	Apr	1,891	1,802	1,802	501	501	247	501	247
	May	249	153	153	0	0	0	0	0
	Jun	1,661	1,489	1,489	302	0	0	0	0
	Jul	209	0	0	0	0	0	0	0
	Aug	198	0	0	0	0	0	0	0
	Sep	140	0	0	0	0	0	0	0
	Oct	93	0	0	0	0	0	0	0
	Nov	875	790	790	519	519	504	519	504
	Dec	1,146	1,061	1,061	831	831	140	831	140

Table 30. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir (without / with Seniority) Elk Creek (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)
1985	Jan	922	845	845	594	594	594	594	594
	Feb	771	694	694	198	198	198	198	198
	Mar	3,846	3,769	3,769	2,751	2,751	2,751	2,751	2,751
	Apr	3,682	3,602	3,602	2,252	2,252	2,027	2,252	2,027
	May	1,079	993	993	350	350	0	350	0
	Jun	2,010	1,860	1,860	934	0	0	0	0
	Jul	182	0	0	0	0	0	0	0
	Aug	172	0	0	0	0	0	0	0
	Sep	1,299	1,176	1,176	981	343	66	343	66
	Oct	11,404	11,320	11,320	10,038	10,038	10,038	10,038	10,038
	Nov	3,679	3,602	3,602	3,168	3,168	3,168	3,168	3,168
	Dec	413	336	336	0	0	0	0	0
1986	Jan	290	199	199	0	0	0	0	0
	Feb	323	232	232	0	0	0	0	0
	Mar	273	182	182	0	0	0	0	0
	Apr	153	58	58	0	0	0	0	0
	May	2,886	2,782	2,782	1,946	1,946	1,473	1,946	1,473
	Jun	13,783	13,617	13,617	11,280	11,280	11,280	11,280	11,280
	Jul	5,525	5,324	5,324	4,092	1,344	460	1,344	460
	Aug	3,364	3,173	3,173	2,485	89	0	89	0
	Sep	141	0	0	0	0	4,566	11,901	11,901
	Oct	101	0	0	0	0	0	0	0
	Nov	91	0	0	0	0	0	0	0
	Dec	765	674	674	0	0	0	0	0
1987	Jan	111	0	0	0	0	0	0	0
	Feb	111	0	0	0	0	0	0	0
	Mar	111	0	0	0	0	0	0	0
	Apr	3,119	3,001	3,001	934	996	1,118	1,691	1,813
	May	130	0	0	0	0	0	0	0
	Jun	198	0	0	0	0	0	0	0
	Jul	4,015	3,774	3,774	2,518	2,021	1,137	2,021	1,137
	Aug	2,540	2,310	2,310	1,598	0	0	0	0
	Sep	5,625	5,454	5,454	4,627	6,004	5,651	6,004	5,651
	Oct	1,822	1,696	1,696	494	494	494	494	494
	Nov	1,277	1,166	1,166	78	78	78	78	78
	Dec	4,080	3,969	3,969	2,296	2,296	1,666	2,296	1,666
1988	Jan	117	0	0	0	0	0	267	2,783
	Feb	1,922	1,805	1,805	0	0	0	0	31
	Mar	117	0	0	0	0	0	0	0
	Apr	125	0	0	0	0	0	0	0
	May	4,728	4,589	4,589	2,420	2,499	2,653	2,965	3,119
	Jun	4,133	3,930	3,930	1,560	0	0	0	0
	Jul	911	663	663	0	0	0	0	0
	Aug	240	1	1	0	0	0	0	0
	Sep	6,248	6,071	6,071	5,443	8,215	9,021	9,627	10,469
	Oct	2,648	2,514	2,514	1,221	1,221	1,221	1,221	1,221
	Nov	3,028	2,911	2,911	1,208	1,208	1,208	1,208	1,208
	Dec	1,923	1,806	1,806	0	0	0	0	0
1989	Jan	1,685	1,616	1,616	93	93	93	93	93
	Feb	1,510	1,441	1,441	0	0	0	0	0
	Mar	2,410	2,341	2,341	737	961	2,011	2,278	2,278
	Apr	3,223	3,152	3,152	1,106	1,106	860	1,106	860
	May	220	145	145	0	0	0	1,186	2,839
	Jun	149	0	0	0	0	0	0	0
	Jul	4,721	4,540	4,540	3,284	536	0	536	0
	Aug	4,552	4,382	4,382	3,670	1,174	455	1,174	455
	Sep	6,703	6,587	6,587	5,787	7,068	7,068	7,068	7,068
	Oct	2,070	1,996	1,996	958	958	958	958	958
	Nov	1,324	1,255	1,255	0	0	0	0	0
	Dec	1,412	1,343	1,343	0	0	0	0	0

Table 30. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir (without / with Seniority) Elk Creek (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)
1990	Jan	4,340	4,269	4,269	2,596	2,596	2,596	2,596	2,596
	Feb	3,004	2,933	2,933	1,233	1,233	1,233	1,233	1,233
	Mar	71	0	0	0	0	0	0	0
	Apr	74	0	0	0	0	0	0	0
	May	78	0	0	0	0	0	0	0
	Jun	5,767	5,591	5,591	3,007	770	118	770	118
	Jul	1,256	1,040	1,040	0	0	0	0	0
	Aug	1,028	826	826	352	0	0	0	0
	Sep	6,127	5,995	5,995	5,641	4,785	4,400	4,785	4,400
	Oct	349	273	273	0	0	0	0	0
	Nov	1,428	1,357	1,357	725	725	725	725	725
	Dec	185	114	114	0	0	0	0	0
1991	Jan	1,051	986	986	0	0	0	0	0
	Feb	836	771	771	0	0	0	0	0
	Mar	706	641	641	0	0	0	0	0
	Apr	526	460	460	0	0	0	0	0
	May	7,536	7,467	7,467	5,879	5,879	5,879	5,879	5,879
	Jun	168	0	0	0	0	0	0	0
	Jul	578	372	372	0	0	0	0	0
	Aug	417	226	226	69	0	0	0	0
	Sep	1,813	1,690	1,690	1,011	237	0	237	0
	Oct	346	278	278	8	8	8	8	8
	Nov	1,850	1,785	1,785	770	770	770	770	770
	Dec	6,593	6,528	6,528	4,811	6,537	7,457	10,100	10,991
1992	Jan	2,376	2,314	2,314	270	287	313	288	314
	Feb	2,496	2,434	2,434	272	303	362	432	489
	Mar	2,695	2,633	2,633	114	155	236	546	626
	Apr	1,700	1,637	1,637	0	0	0	487	609
	May	1,550	1,484	1,484	5	39	0	39	0
	Jun	164	0	0	0	0	0	0	0
	Jul	3,380	3,180	3,180	1,980	2,097	2,329	3,428	3,659
	Aug	3,033	2,846	2,846	2,134	2,157	1,438	2,157	1,438
	Sep	119	0	0	0	0	0	426	1,429
	Oct	218	153	153	0	0	0	0	0
	Nov	62	0	0	0	0	0	0	0
	Dec	62	0	0	0	0	0	0	0
1993	Jan	61	0	0	0	0	0	0	0
	Feb	61	0	0	0	0	0	0	0
	Mar	170	109	109	0	0	0	0	0
	Apr	62	0	0	0	0	0	0	0
	May	64	0	0	0	0	0	0	0
	Jun	4,707	4,547	4,547	1,706	1,784	1,938	2,173	2,176
	Jul	4,805	4,609	4,609	3,512	3,627	3,861	4,719	5,098
	Aug	3,342	3,160	3,160	2,440	0	0	0	0
	Sep	1,534	1,418	1,418	681	0	0	0	0
	Oct	900	837	837	0	0	0	0	0
	Nov	771	710	710	328	161	0	161	0
	Dec	916	855	855	0	0	0	0	0
1994	Jan	843	793	793	0	0	0	0	0
	Feb	697	647	647	0	0	0	0	0
	Mar	1,440	1,390	1,390	0	0	0	0	0
	Apr	1,978	1,928	1,928	254	254	254	254	254
	May	3,198	3,148	3,148	2,283	1,896	1,144	1,896	1,144
	Jun	162	0	0	0	0	0	0	0
	Jul	200	0	0	0	0	0	0	0
	Aug	183	0	0	0	0	0	0	0
	Sep	110	0	0	0	0	0	0	0
	Oct	268	218	218	0	0	0	0	0
	Nov	3,527	3,477	3,477	2,037	2,037	2,037	2,037	2,037
	Dec	424	374	374	0	0	0	0	0

Table 30. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir (without / with Seniority) Elk Creek (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)
1995	Jan	419	354	354	0	0	0	0	0
	Feb	213	148	148	0	0	0	0	0
	Mar	460	395	395	0	0	0	0	0
	Apr	522	455	455	0	0	0	0	0
	May	7,331	7,261	7,261	5,699	5,699	5,699	5,699	5,699
	Jun	169	0	0	0	1,458	5,993	13,093	17,580
	Jul	3,906	3,700	3,700	2,444	0	0	0	0
	Aug	191	0	0	0	0	0	0	0
	Sep	124	0	0	0	0	0	0	0
	Oct	3,007	2,938	2,938	2,536	2,580	2,667	3,196	3,283
	Nov	3,903	3,838	3,838	1,944	1,771	1,447	1,771	1,447
	Dec	2,405	2,340	2,340	0	227	31	226	31
1996	Jan	2,011	1,961	1,961	0	0	639	0	661
	Feb	3,004	2,954	2,954	792	635	347	635	347
	Mar	2,491	2,441	2,441	459	252	0	252	0
	Apr	1,680	1,630	1,630	364	54	0	54	0
	May	889	839	839	0	0	0	0	0
	Jun	4,976	4,850	4,850	2,833	2,833	2,833	2,833	2,833
	Jul	2,307	2,156	2,156	1,322	1,322	1,322	1,322	1,322
	Aug	139	0	0	0	0	0	0	2,078
	Sep	91	0	0	0	0	0	90	199
	Oct	3,430	3,380	3,380	1,920	1,964	2,051	2,187	2,274
	Nov	2,490	2,440	2,440	1,596	1,629	1,695	1,782	1,848
	Dec	4,302	4,252	4,252	1,951	2,013	2,122	2,014	2,123
1997	Jan	2,270	2,200	2,200	156	176	201	177	202
	Feb	70	0	0	0	0	0	0	0
	Mar	3,895	3,825	3,825	1,306	1,347	1,416	1,348	1,417
	Apr	72	0	0	0	0	0	0	0
	May	1,039	963	963	0	0	0	451	605
	Jun	4,235	4,066	4,066	1,225	1,303	1,457	1,560	1,714
	Jul	5,691	5,485	5,485	4,562	1,714	830	1,714	830
	Aug	6,237	6,044	6,044	5,341	8,359	8,487	8,920	8,487
	Sep	5,238	5,111	5,111	4,284	4,321	5,495	4,326	6,050
	Oct	1,495	1,420	1,420	0	5	91	1,050	1,136
	Nov	3,056	2,986	2,986	1,098	1,133	1,198	1,279	1,345
	Dec	70	0	0	0	0	0	0	0
1998	Jan	72	0	0	0	0	0	0	0
	Feb	72	0	0	0	0	0	0	0
	Mar	72	0	0	0	0	0	0	0
	Apr	2,516	2,442	2,442	375	436	558	1,347	1,469
	May	4,033	3,954	3,954	1,728	1,806	1,960	2,703	2,618
	Jun	646	462	462	0	0	0	0	0
	Jul	227	0	0	0	0	0	0	0
	Aug	212	0	0	0	0	0	0	0
	Sep	252	114	114	0	0	0	0	0
	Oct	633	556	556	0	0	0	0	0
	Nov	4,972	4,900	4,900	3,084	2,911	2,587	2,911	2,587
	Dec	1,155	1,083	1,083	0	0	0	0	0
1999	Jan	977	909	909	0	0	0	0	0
	Feb	834	766	766	0	0	0	0	0
	Mar	1,997	1,929	1,929	53	53	53	53	53
	Apr	5,038	4,968	4,968	2,901	2,591	1,995	2,591	1,995
	May	12,285	12,211	12,211	10,355	10,355	10,355	10,355	10,355
	Jun	3,679	3,509	3,509	1,164	3,402	6,313	10,102	13,325
	Jul	2,986	2,776	2,776	1,514	0	0	0	0
	Aug	236	41	41	0	0	0	0	0
	Sep	128	0	0	0	0	0	0	0
	Oct	173	100	100	0	0	0	0	0
	Nov	156	88	88	0	0	0	0	0
	Dec	2,574	2,506	2,506	1,248	1,248	1,248	1,248	1,248

Table 30. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir (without / with Seniority) Elk Glen Creek (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)
2000	Jan	574	507	507	205	98	0	98	0
	Feb	706	639	639	0	0	0	0	0
	Mar	11,682	11,615	11,615	9,212	9,921	9,921	9,921	9,921
	Apr	70	0	0	0	0	0	2,176	3,136
	May	73	0	0	0	0	0	0	0
	Jun	1,281	1,116	1,116	0	0	0	0	0
	Jul	5,476	5,273	5,273	4,017	1,169	285	1,169	285
	Aug	188	0	0	0	0	0	0	0
	Sep	124	0	0	0	0	0	0	0
	Oct	1,155	1,083	1,083	273	273	273	273	273
	Nov	771	704	704	0	0	0	0	0
	Dec	592	525	525	321	321	321	321	321
2001	Jan	915	851	851	0	0	0	0	0
	Feb	3,269	3,205	3,205	1,051	1,051	1,051	1,051	1,051
	Mar	2,390	2,326	2,326	1,190	983	590	983	590
	Apr	987	921	921	130	0	0	0	0
	May	69	0	0	0	0	0	3,082	6,728
	Jun	6,441	6,271	6,271	5,401	3,555	2,799	3,555	2,799
	Jul	207	0	0	0	0	0	0	0
	Aug	223	31	31	0	0	0	0	0
	Sep	828	704	704	260	0	0	0	0
	Oct	68	0	0	0	0	0	0	0
	Nov	572	508	508	283	283	283	283	283
	Dec	374	310	310	226	0	0	0	0
2002	Jan	489	426	426	245	138	0	138	0
	Feb	812	749	749	191	36	0	36	0
	Mar	520	457	457	130	130	130	130	130
	Apr	4,018	3,954	3,954	2,492	2,492	2,492	2,492	2,492
	May	281	214	214	24	0	0	0	0
	Jun	160	0	0	0	0	0	0	0
	Jul	238	41	41	0	0	0	0	0
	Aug	183	0	0	0	0	0	0	0
	Sep	185	66	66	0	0	0	0	0
	Oct	6,460	6,394	6,394	4,925	4,925	4,925	4,925	4,925
	Nov	926	863	863	463	290	0	290	0
	Dec	785	722	722	297	297	297	297	297
2003	Jan	465	400	400	0	0	0	0	0
	Feb	369	304	304	0	0	0	0	0
	Mar	460	395	395	0	0	0	0	0
	Apr	497	431	431	121	121	121	121	121
	May	771	702	702	385	385	385	385	385
	Jun	7,876	7,726	7,726	4,868	4,868	4,868	4,868	4,868
	Jul	179	0	0	0	0	0	0	0
	Aug	169	0	0	0	0	0	0	0
	Sep	2,319	2,206	2,206	1,340	260	0	260	0
	Oct	101	33	33	0	0	0	0	0
	Nov	71	6	6	0	0	0	0	0
	Dec	145	80	80	0	0	0	0	0
2004	Jan	435	375	375	86	86	86	86	86
	Feb	68	8	8	0	0	0	0	0
	Mar	10,394	10,334	10,334	7,899	7,899	7,899	7,899	7,899
	Apr	4,106	4,045	4,045	1,993	1,683	1,087	1,683	1,087
	May	670	607	607	201	0	0	0	0
	Jun	2,785	2,672	2,672	302	0	0	0	0
	Jul	4,890	4,758	4,758	3,502	2,108	1,224	2,108	1,224
	Aug	263	138	138	0	0	0	0	0
	Sep	216	126	126	0	0	0	0	0
	Oct	6,358	6,296	6,296	5,864	5,864	5,864	5,864	5,864
	Nov	19,278	19,218	19,218	17,325	18,531	18,494	18,531	18,494
	Dec	2,168	2,108	2,108	0	0	0	0	0

Table 30. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir (without / with Seniority) Elk Creek (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)
2005	Jan	57	0	0	0	1,734	1,734	1,734	1,734
	Feb	57	0	0	0	257	257	257	257
	Mar	1,205	1,148	1,148	80	0	0	0	0
	Apr	633	575	575	0	0	0	0	0
	May	1,137	1,078	1,078	0	0	0	0	0
	Jun	3,739	3,634	3,634	1,646	0	0	0	0
	Jul	470	349	349	47	0	0	0	0
	Aug	7,487	7,372	7,372	6,690	4,018	3,102	4,018	3,102
	Sep	5,207	5,123	5,123	4,296	4,296	4,296	4,296	4,296
	Oct	2,138	2,079	2,079	623	403	0	403	0
	Nov	367	310	310	24	0	0	0	0
	Dec	321	264	264	7	0	0	0	0
2006	Jan	181	123	123	0	0	0	0	0
	Feb	181	123	123	0	0	0	0	0
	Mar	354	296	296	0	0	0	0	0
	Apr	240	181	181	0	0	0	0	0
	May	2,509	2,448	2,448	1,434	1,047	295	1,047	295
	Jun	109	0	0	0	0	0	0	0
	Jul	126	0	0	0	0	0	0	0
	Aug	948	829	829	385	0	0	0	0
	Sep	975	889	889	110	0	0	0	0
	Oct	5,067	5,006	5,006	3,537	3,317	2,895	3,317	2,895
	Nov	58	0	0	0	0	0	0	0
	Dec	778	720	720	0	0	0	0	0
2007	Jan	478	421	421	0	0	0	0	0
	Feb	331	274	274	0	0	0	0	0
	Mar	10,990	10,933	10,933	8,439	8,232	7,839	8,232	7,839
	Apr	21,607	21,549	21,549	19,482	19,172	18,576	19,172	18,576
	May	60	0	0	0	130	10,730	21,753	23,009
	Jun	202	0	0	0	0	0	0	0
	Jul	251	0	0	0	0	0	872	1,105
	Aug	231	0	0	0	0	0	0	0
	Sep	1,484	1,349	1,349	890	890	890	890	890
	Oct	1,275	1,216	1,216	155	0	0	0	0
	Nov	521	464	464	276	119	0	119	0
	Dec	959	902	902	726	726	419	726	419
2008	Jan	668	609	609	416	416	416	416	416
	Feb	1,560	1,501	1,501	617	617	617	617	617
	Mar	59	0	0	0	0	117	2,730	2,818
	Apr	60	0	0	0	0	0	0	0
	May	1,186	1,124	1,124	397	397	397	397	397
	Jun	285	26	26	0	0	0	0	0
	Jul	328	0	0	0	0	0	0	0
	Aug	623	326	326	157	0	0	0	0
	Sep	3,774	3,607	3,607	3,334	2,176	1,823	2,176	1,823
	Oct	5,844	5,783	5,783	4,726	4,726	4,726	4,726	4,726
	Nov	1,381	1,322	1,322	1,136	963	639	963	639
	Dec	640	581	581	0	0	0	0	0
2009	Jan	398	341	341	0	0	0	0	0
	Feb	153	96	96	0	0	0	0	0
	Mar	73	16	16	0	0	0	0	0
	Apr	1,663	1,605	1,605	0	0	0	0	0
	May	2,628	2,569	2,569	1,876	1,876	1,876	1,876	1,876
	Jun	260	47	47	0	0	0	0	0
	Jul	443	177	177	36	0	0	0	0
	Aug	244	0	0	0	0	0	0	0
	Sep	1,840	1,699	1,699	1,518	1,518	1,518	1,518	1,518
	Oct	600	542	542	122	122	122	122	122
	Nov	57	0	0	0	0	0	0	0
	Dec	282	225	225	105	105	0	105	42

Table 30. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir (without / with Seniority) Elk Creek (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)
2010	Jan	370	313	313	0	0	0	0	0
	Feb	1,464	1,407	1,407	0	0	0	0	0
	Mar	491	434	434	80	80	80	80	80
	Apr	2,673	2,615	2,615	1,119	809	213	809	213
	May	665	606	606	226	0	0	0	0
	Jun	547	264	264	57	0	0	0	0
	Jul	9,449	9,090	9,090	7,870	10,870	10,870	10,870	10,870
	Aug	326	0	0	0	0	0	0	0
	Sep	429	252	252	46	46	46	46	46
	Oct	1,208	1,150	1,150	808	808	808	808	808
	Nov	744	687	687	410	410	410	410	410
	Dec	84	27	27	0	0	0	0	0
2011	Jan	568	516	516	319	319	319	319	319
	Feb	226	174	174	10	10	10	10	10
	Mar	93	41	41	0	0	0	0	0
	Apr	52	0	0	0	0	0	0	0
	May	1,744	1,691	1,691	924	924	924	924	924
	Jun	121	0	0	0	0	0	0	0
	Jul	144	0	0	0	0	0	0	0
	Aug	134	0	0	0	0	0	0	0
	Sep	90	0	0	0	0	0	0	0
	Oct	52	0	0	0	0	0	0	0
	Nov	8,509	8,457	8,457	6,569	6,569	6,569	6,569	6,569
	Dec	105	53	53	0	0	0	0	0
2012	Jan	50	0	0	0	0	0	0	0
	Feb	50	0	0	0	0	0	0	0
	Mar	1,095	1,045	1,045	114	114	114	114	114
	Apr	5,760	5,710	5,710	3,633	3,633	3,570	3,633	3,570
	May	3,139	3,089	3,089	2,389	2,002	1,250	2,002	1,250
	Jun	869	679	679	34	0	0	0	0
	Jul	238	0	0	0	0	0	0	0
	Aug	216	0	0	0	0	0	0	0
	Sep	125	0	0	0	0	0	0	0
	Oct	50	0	0	0	0	0	0	0
	Nov	50	0	0	0	0	0	0	0
	Dec	50	0	0	0	0	0	0	0
2013	Jan	50	0	0	0	0	0	0	0
	Feb	50	0	0	0	0	0	0	0
	Mar	58	8	8	0	0	0	0	0
	Apr	102	52	52	0	0	0	0	0
	May	67	17	17	0	0	0	0	0
	Jun	278	0	0	0	0	0	0	0
	Jul	355	0	0	0	0	0	0	0
	Aug	322	0	0	0	0	0	0	0
	Sep	171	0	0	0	0	0	0	0
	Oct	246	196	196	0	0	0	0	0
	Nov	652	602	602	0	0	0	0	0
	Dec	50	0	0	0	0	0	0	0
2014	Jan	50	0	0	0	0	0	0	0
	Feb	50	0	0	0	0	0	0	0
	Mar	50	0	0	0	0	0	0	0
	Apr	50	0	0	0	0	0	0	0
	May	1,721	1,671	1,671	747	378	0	378	0
	Jun	3,028	2,907	2,907	1,560	1,560	1,560	1,560	1,560
	Jul	302	158	158	0	0	0	0	0
	Aug	134	0	0	0	0	0	0	0
	Sep	1,121	1,032	1,032	847	81	0	81	0
	Oct	50	0	0	0	0	0	0	0
	Nov	77	27	27	0	0	0	0	0
	Dec	50	0	0	0	0	0	0	0

Table 30. Continued…

Year	Month	North Fork Red River SWAM Modeled at the Reservoir (without / with Seniority) Elk Creek (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)
2015	Jan	50	0	0	0	0	0	0	0
	Feb	208	158	158	0	0	0	0	0
	Mar	50	0	0	0	0	0	0	0
	Apr	3,578	3,528	3,528	1,479	1,169	573	1,169	573
	May	7,210	7,160	7,160	6,076	6,510	7,350	9,479	10,396
	Jun	182	0	0	0	0	0	0	0
	Jul	5,469	5,242	5,242	3,986	4,054	3,821	4,055	3,821
	Aug	5,222	5,015	5,015	4,303	1,807	1,088	1,807	1,088
	Sep	3,544	3,423	3,423	2,604	1,446	1,093	1,446	1,093
	Oct	2,647	2,597	2,597	1,137	917	495	917	495
	Nov	5,452	5,402	5,402	4,554	6,007	5,683	6,007	5,683
	Dec	50	0	0	0	0	1,147	2,358	3,102
2016	Jan	4,040	3,990	3,990	1,938	1,819	1,603	1,819	1,603
	Feb	1,531	1,481	1,481	0	0	0	0	0
	Mar	1,397	1,347	1,347	46	46	46	46	46
	Apr	50	0	0	0	0	0	0	0
	May	4,837	4,787	4,787	3,223	2,836	2,084	2,836	2,084
	Jun	233	0	0	0	0	0	0	0
	Jul	1,947	1,654	1,654	1,153	1,270	1,501	2,288	2,288
	Aug	378	112	112	0	0	0	0	0
	Sep	785	638	638	0	97	354	3,178	3,584
	Oct	3,658	3,608	3,608	3,142	2,922	2,500	2,922	2,500
	Nov	5,613	5,563	5,563	3,661	3,488	3,164	3,488	3,164
	Dec	5,737	5,687	5,687	3,811	3,350	2,449	3,350	2,449

6.6. Reservoir Model Operations

The table below includes the water supply accounting for Tom Steed Reservoir assuming 2060 sediment conditions (85 years of sediment accumulation of 14,000 acre-ft) and associated conservation pool storage of 88,881 acre-ft at elevation 1,411 ft as the starting elevation. The demand in the table is equal to the reservoir yield of 14,600 acre-ft per year.

Table 31. Model platform of the inputs and outputs with a demand of 14,600 acre-ft per year.

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)*			
1926	Jan	181	388	569	463	0	992	1,455	0	**-886**	87,995	1410.85
	Feb	-100	620	520	2,315	0	903	3,217	0	**-2,697**	85,297	1410.40
	Mar	7,562	155	7,717	919	0	1,041	1,959	2,174	**3,584**	88,881	1411.00
	Apr	2,538	4,573	7,111	395	0	1,093	1,489	5,622	**0**	88,881	1411.00
	May	8,968	5,968	14,936	1,575	0	1,156	2,731	12,205	**0**	88,881	1411.00
	Jun	9,479	7,208	16,687	3,353	20	1,224	4,597	12,090	**0**	88,881	1411.00
	Jul	633	7,440	8,073	886	25	1,509	2,421	5,652	**0**	88,881	1411.00
	Aug	4,410	10,386	14,796	0	22	1,635	1,657	13,139	**0**	88,881	1411.00
	Sep	12,942	13,873	26,816	0	10	1,462	1,472	25,344	**0**	88,881	1411.00
	Oct	15	12,323	12,338	0	0	1,304	1,304	11,034	**0**	88,881	1411.00
	Nov	-80	310	230	1,417	0	1,161	2,578	0	**-2,349**	86,532	1410.61
	Dec	-15	233	217	0	0	1,073	1,073	0	**-856**	85,677	1410.47
1927	Jan	-15	78	62	161	0	992	1,153	0	**-1,091**	84,586	1410.28
	Feb	-100	233	133	765	0	903	1,669	0	**-1,537**	83,049	1410.02
	March	25	310	335	1,917	0	1,041	2,957	0	**-2,622**	80,427	1409.57
	April	183	4,883	5,066	1,395	0	1,093	2,484	0	**2,582**	83,010	1410.02
	May	-13	853	840	3,537	0	1,156	4,688	0	**-3,849**	79,161	1409.35
	June	5,245	930	6,175	2,536	20	1,224	3,683	0	**2,492**	81,653	1409.79
	July	9,541	5,890	15,431	2,664	25	1,509	4,090	4,114	**7,227**	88,881	1411.00
	Aug	2,211	2,480	4,692	3,116	22	1,635	4,773	0	**-82**	88,799	1410.98
	Sept	344	4,030	4,374	385	10	1,462	1,861	2,431	**82**	88,881	1411.00
	Oct	84	698	782	971	0	1,304	2,275	0	**-1,493**	87,388	1410.75
	Nov	446	310	756	1,444	0	1,161	2,606	0	**-1,850**	85,538	1410.44
	Dec	3,293	155	3,448	501	0	1,073	1,566	0	**1,882**	87,420	1410.76
1928	Jan	52	233	285	1,169	0	992	2,163	0	**-1,878**	85,542	1410.44
	Feb	882	155	1,037	306	0	903	1,208	0	**-171**	85,371	1410.42
	March	809	388	1,197	2,330	0	1,041	3,360	0	**-2,163**	83,208	1410.05
	April	4,373	0	4,373	2,552	0	1,093	3,563	0	**810**	84,017	1410.19
	May	2,685	5,890	8,575	2,017	0	1,156	3,122	590	**4,863**	88,881	1411.00
	June	50	6,355	6,405	2,213	20	1,224	3,456	2,949	**0**	88,881	1411.00
	July	590	1,783	2,372	2,309	25	1,509	3,843	0	**-1,471**	87,410	1410.75
	Aug	1,399	388	1,786	3,261	22	1,635	4,910	0	**-3,123**	84,287	1410.23
	Sept	989	0	989	2,630	10	1,462	4,105	0	**-3,116**	81,170	1409.70
	Oct	293	4,495	4,788	595	0	1,304	1,903	0	**2,885**	84,055	1410.20
	Nov	5,133	388	5,520	33	0	1,161	1,194	0	**4,326**	88,381	1410.91
	Dec	-37	543	506	165	0	1,073	1,242	0	**-736**	87,645	1410.79

Table 31. 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)*			
1929	Jan	-100	233	133	502	0	992	1,508	0	**-1,376**	86,269	1410.57
	Feb	-100	465	365	0	0	903	903	0	**-538**	85,731	1410.48
	March	-100	2,325	2,225	0	0	1,041	1,041	0	**1,184**	86,915	1410.67
	April	3	2,093	2,096	2,350	0	1,093	3,505	0	**-1,409**	85,506	1410.44
	May	-99	6,433	6,334	5	0	1,156	1,162	1,797	**3,375**	88,881	1411.00
	June	478	3,720	4,198	2,731	20	1,224	4,004	194	**0**	88,881	1411.00
	July	8,253	310	8,563	3,302	25	1,509	4,837	3,726	**0**	88,881	1410.99
	Aug	5,753	0	5,753	4,279	22	1,635	5,935	0	**-183**	88,698	1410.97
	Sept	15,056	9,843	24,900	0	10	1,462	1,472	23,245	**183**	88,881	1410.99
	Oct	1,983	1,938	3,920	576	0	1,304	1,880	2,041	**0**	88,881	1411.00
	Nov	231	310	541	152	0	1,161	1,314	0	**-773**	88,108	1410.87
	Dec	1,314	233	1,547	1,185	0	1,073	2,253	0	**-706**	87,402	1410.75
1930	Jan	-100	310	210	0	0	992	992	0	**-782**	86,619	1410.62
	Feb	-74	465	391	1,593	0	903	2,503	0	**-2,111**	84,508	1410.27
	Mar	-100	233	133	2,347	0	1,041	3,398	0	**-3,265**	81,243	1409.72
	Apr	961	620	1,581	1,697	0	1,093	2,778	0	**-1,197**	80,046	1409.51
	May	180	7,518	7,698	1,585	0	1,156	2,737	0	**4,961**	85,007	1410.36
	Jun	1,456	3,565	5,021	2,588	20	1,224	3,801	0	**1,220**	86,227	1410.56
	Jul	1,693	233	1,926	5,363	25	1,509	6,818	0	**-4,893**	81,334	1409.73
	Aug	1,226	0	1,226	4,871	22	1,635	6,475	0	**-5,249**	76,086	1408.82
	Sep	844	0	844	3,092	10	1,462	4,540	0	**-3,697**	72,389	1408.16
	Oct	524	4,650	5,174	0	0	1,304	1,304	0	**3,870**	76,258	1408.85
	Nov	6,145	233	6,377	543	0	1,161	1,694	0	**4,683**	80,941	1409.66
	Dec	13	388	401	153	0	1,073	1,229	0	**-828**	80,113	1409.52
1931	Jan	2,246	233	2,479	378	0	992	1,373	0	**1,106**	81,219	1409.71
	Feb	-40	78	38	418	0	903	1,330	0	**-1,292**	79,927	1409.49
	March	1,009	930	1,939	286	0	1,041	1,330	0	**609**	80,536	1409.59
	April	-84	853	768	1,007	0	1,093	2,120	0	**-1,352**	79,185	1409.36
	May	349	2,325	2,674	1,648	0	1,156	2,829	0	**-155**	79,030	1409.33
	June	16,808	543	17,351	4,115	20	1,224	5,123	2,377	**9,851**	88,881	1411.00
	July	3,434	0	3,434	3,630	25	1,509	5,164	0	**-1,731**	87,150	1410.71
	Aug	-98	0	-98	3,089	22	1,635	4,810	0	**-4,908**	82,242	1409.89
	Sept	1,133	620	1,753	3,599	10	1,462	5,123	0	**-3,370**	78,872	1409.30
	Oct	496	2,093	2,588	599	0	1,304	1,915	0	**673**	79,546	1409.42
	Nov	-100	853	753	0	0	1,161	1,161	0	**-409**	79,137	1409.35
	Dec	3,450	930	4,380	0	0	1,073	1,073	0	**3,307**	82,444	1409.92
1932	Jan	-87	620	533	0	0	992	992	0	**-460**	81,984	1409.84
	Feb	1,209	1,318	2,527	446	0	903	1,354	0	**1,173**	83,158	1410.04
	March	1,758	310	2,068	2,323	0	1,041	3,373	0	**-1,305**	81,853	1409.82
	April	386	543	929	1,780	0	1,093	2,893	0	**-1,964**	79,889	1409.48
	May	1,021	5,735	6,757	1,545	0	1,156	2,708	0	**4,048**	83,937	1410.18
	June	9,253	11,858	21,111	0	20	1,224	1,244	14,924	**4,944**	88,881	1411.00
	July	100	2,170	2,270	3,799	25	1,509	5,334	0	**-3,064**	85,817	1410.49
	Aug	4,692	2,868	7,559	3,477	22	1,635	5,075	0	**2,484**	88,301	1410.90
	Sept	-17	155	138	2,133	10	1,462	3,626	0	**-3,489**	84,813	1410.32
	Oct	55	1,783	1,837	1,572	0	1,304	2,893	0	**-1,055**	83,757	1410.14
	Nov	1,608	78	1,685	1,511	0	1,161	2,685	0	**-1,000**	82,757	1409.97
	Dec	6,604	233	6,837	0	0	1,073	1,073	0	**5,764**	88,521	1410.94
1933	Jan	18	78	95	1,058	0	992	2,068	0	**-1,973**	86,548	1410.61
	Feb	950	78	1,028	193	0	903	1,098	0	**-71**	86,477	1410.60
	March	346	620	966	1,945	0	1,041	3,012	0	**-2,046**	84,431	1410.26
	April	6,279	0	6,279	3,246	0	1,093	4,258	0	**2,020**	86,451	1410.60
	May	8	0	8	2,562	0	1,156	3,746	0	**-3,738**	82,713	1409.97
	June	723	0	723	4,890	20	1,224	6,159	0	**-5,436**	77,277	1409.03
	July	-99	0	-99	3,139	25	1,509	4,707	0	**-4,806**	72,471	1408.18
	Aug	7	1,860	1,867	1,653	22	1,635	3,327	0	**-1,460**	71,011	1407.91
	Sept	-1	2,170	2,170	1,469	10	1,462	2,957	0	**-788**	70,223	1407.77
	Oct	-86	4,960	4,874	425	0	1,304	1,735	0	**3,140**	73,363	1408.34
	Nov	6,855	388	7,243	171	0	1,161	1,330	0	**5,912**	79,275	1409.37
	Dec	4,383	310	4,693	5	0	1,073	1,078	0	**3,615**	82,890	1410.00

Table 31. 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	209	233	442	707	0	992	1,723	0	**-1,281**	81,608	1409.78
	Feb	231	388	619	974	0	903	1,910	0	**-1,291**	80,317	1409.56
	March	60	155	215	1,588	0	1,041	2,683	0	**-2,468**	77,849	1409.13
	April	185	0	185	2,164	0	1,093	3,327	0	**-3,142**	74,707	1408.57
	May	1,294	465	1,759	953	0	1,156	2,128	0	**-369**	74,338	1408.51
	June	11,310	3,100	14,410	3,129	20	1,224	4,188	0	**10,222**	84,559	1410.28
	July	589	0	589	5,765	25	1,509	7,329	0	**-6,740**	77,819	1409.12
	Aug	402	2,945	3,347	4,376	22	1,635	6,066	0	**-2,718**	75,101	1408.64
	Sept	-91	1,473	1,382	2,639	10	1,462	4,141	0	**-2,759**	72,342	1408.15
	Oct	-98	3,565	3,467	734	0	1,304	2,046	0	**1,421**	73,763	1408.41
	Nov	-100	620	520	1,340	0	1,161	2,517	0	**-1,997**	71,765	1408.05
	Dec	698	620	1,318	1,104	0	1,073	2,182	0	**-864**	70,901	1407.89
1935	Jan	1,228	310	1,538	1,164	0	992	2,155	0	**-617**	70,284	1407.78
	Feb	1,198	233	1,430	1,156	0	903	2,056	0	**-626**	69,658	1407.67
	Mar	1,741	620	2,362	2,404	0	1,041	3,425	0	**-1,064**	68,594	1407.48
	Apr	382	0	382	2,730	0	1,093	3,821	0	**-3,439**	65,155	1406.85
	May	1,012	15,036	16,048	0	0	1,156	1,156	0	**14,891**	80,046	1409.51
	Jun	9,173	4,883	14,056	3,308	20	1,224	4,383	838	**8,835**	88,881	1411.00
	Jul	98	465	563	5,272	25	1,509	6,807	0	**-6,244**	82,637	1409.95
	Aug	4,645	155	4,800	5,391	22	1,635	6,923	0	**-2,122**	80,515	1409.59
	Sep	-18	0	-18	1,832	10	1,462	3,315	0	**-3,333**	77,182	1409.01
	Oct	53	0	53	1,416	0	1,304	2,729	0	**-2,675**	74,506	1408.54
	Nov	1,592	0	1,592	0	0	1,161	1,161	0	**431**	74,937	1408.61
	Dec	6,544	78	6,621	43	0	1,073	1,114	0	**5,507**	80,444	1409.58
1936	Jan	16	155	171	1,135	0	992	2,142	0	**-1,970**	78,474	1409.24
	Feb	-99	78	-22	1,438	0	903	2,362	0	**-2,383**	76,091	1408.82
	March	-97	78	-20	3,690	0	1,041	4,783	0	**-4,803**	71,288	1407.96
	April	164	0	164	3,105	0	1,093	4,232	0	**-4,069**	67,219	1407.23
	May	205	10,463	10,668	2,218	0	1,156	3,396	0	**7,272**	74,491	1408.54
	June	278	1,938	2,216	5,689	20	1,224	6,974	0	**-4,758**	69,733	1407.68
	July	1,045	0	1,045	5,537	25	1,509	7,049	0	**-6,004**	63,729	1406.58
	Aug	3,484	0	3,484	5,835	22	1,635	7,378	0	**-3,894**	59,835	1405.84
	Sept	12	13,253	13,265	0	10	1,462	1,472	0	**11,794**	71,629	1408.03
	Oct	1,724	2,480	4,204	1,462	0	1,304	2,762	0	**1,443**	73,072	1408.28
	Nov	351	465	816	1,702	0	1,161	2,879	0	**-2,062**	71,009	1407.91
	Dec	-67	78	11	831	0	1,073	1,914	0	**-1,904**	69,106	1407.57
1937	Jan	257	233	489	536	0	992	1,534	0	**-1,044**	68,061	1407.38
	Feb	-100	310	210	1,743	0	903	2,669	0	**-2,459**	65,603	1406.93
	March	291	78	369	1,391	0	1,041	2,445	0	**-2,076**	63,527	1406.54
	April	-96	0	-96	2,483	0	1,093	3,608	0	**-3,704**	59,822	1405.84
	May	1,489	5,813	7,301	2,700	0	1,156	3,847	0	**3,455**	63,277	1406.50
	June	1,866	2,480	4,346	2,978	20	1,224	4,191	0	**154**	63,432	1406.53
	July	24,187	0	24,187	5,636	25	1,509	6,334	0	**17,853**	81,285	1409.72
	Aug	-99	11,548	11,450	728	22	1,635	2,392	1,462	**7,596**	88,881	1411.00
	Sept	2,429	3,333	5,761	1,908	10	1,462	3,380	2,382	**0**	88,881	1411.00
	Oct	-7	620	613	1,258	0	1,304	2,563	0	**-1,950**	86,931	1410.68
	Nov	89	233	322	1,667	0	1,161	2,831	0	**-2,509**	84,422	1410.26
	Dec	452	388	839	766	0	1,073	1,838	0	**-999**	83,423	1410.09
1938	Jan	-48	233	185	1,459	0	992	2,454	0	**-2,269**	81,154	1409.70
	Feb	-34	1,318	1,283	0	0	903	903	0	**380**	81,534	1409.77
	March	1,105	3,565	4,670	1,983	0	1,041	3,010	0	**1,661**	83,194	1410.05
	April	-83	1,473	1,389	1,786	0	1,093	2,880	0	**-1,491**	81,704	1409.79
	May	386	10,231	10,617	0	0	1,156	1,156	2,283	**7,177**	88,881	1411.00
	June	18,201	5,115	23,317	3,223	20	1,224	4,467	18,850	**0**	88,881	1411.00
	July	3,764	543	4,306	4,364	25	1,509	5,898	0	**-1,592**	87,289	1410.73
	Aug	-97	0	-97	5,911	22	1,635	7,704	0	**-7,801**	79,488	1409.41
	Sept	1,248	1,550	2,798	2,600	10	1,462	4,119	0	**-1,320**	78,167	1409.18
	Oct	551	0	551	2,888	0	1,304	4,262	0	**-3,710**	74,457	1408.53
	Nov	-100	155	55	747	0	1,161	1,930	0	**-1,875**	72,582	1408.20
	Dec	3,758	310	4,068	1,686	0	1,073	2,759	0	**1,309**	73,891	1408.43

Table 31. 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	-86	310	224	0	0	992	992	0	**-769**	73,122	1408.29
	Feb	-74	620	546	1,546	0	903	2,493	0	**-1,948**	71,175	1407.94
	March	471	155	626	1,821	0	1,041	2,902	0	**-2,276**	68,899	1407.53
	April	797	155	952	2,829	0	1,093	3,956	0	**-3,003**	65,895	1406.98
	May	305	3,100	3,405	2,449	0	1,156	3,640	0	**-235**	65,660	1406.94
	June	-79	5,813	5,734	2,310	20	1,224	3,592	0	**2,142**	67,802	1407.33
	July	2,359	698	3,056	5,582	25	1,509	7,021	0	**-3,965**	63,837	1406.60
	Aug	-34	930	896	3,154	22	1,635	4,818	0	**-3,922**	59,915	1405.86
	Sept	-81	0	-81	4,654	10	1,462	6,145	0	**-6,226**	53,689	1404.63
	Oct	-97	1,550	1,453	1,917	0	1,304	3,227	0	**-1,774**	51,915	1404.26
	Nov	471	78	548	1,365	0	1,161	2,529	0	**-1,981**	49,935	1403.85
	Dec	864	155	1,019	984	0	1,073	2,052	0	**-1,033**	48,902	1403.63
1940	Jan	7,884	310	8,194	606	0	992	1,554	0	**6,640**	55,542	1405.00
	Feb	-10	233	223	473	0	903	1,371	0	**-1,148**	54,393	1404.77
	Mar	2,848	233	3,081	3,238	0	1,041	4,153	0	**-1,073**	53,320	1404.55
	Apr	-62	5,503	5,440	958	0	1,093	2,039	0	**3,402**	56,722	1405.23
	May	-84	930	846	3,336	0	1,156	4,446	0	**-3,600**	53,122	1404.51
	Jun	4,682	0	4,682	3,719	20	1,224	4,735	0	**-54**	53,068	1404.50
	Jul	21	3,255	3,277	4,506	25	1,509	5,938	0	**-2,661**	50,407	1403.95
	Aug	-41	853	811	3,300	22	1,635	4,889	0	**-4,077**	46,330	1403.08
	Sep	477	1,628	2,105	1,970	10	1,462	3,393	0	**-1,288**	45,041	1402.79
	Oct	3,863	78	3,940	1,823	0	1,304	3,032	0	**909**	45,950	1402.99
	Nov	-62	543	480	0	0	1,161	1,161	0	**-681**	45,269	1402.84
	Dec	8,816	698	9,514	315	0	1,073	1,359	0	**8,155**	53,424	1404.57
1941	Jan	-58	155	97	437	0	992	1,422	0	**-1,324**	52,100	1404.30
	Feb	402	310	712	0	0	903	903	0	**-191**	51,909	1404.26
	March	697	155	852	1,191	0	1,041	2,201	0	**-1,349**	50,560	1403.98
	April	805	0	805	137	0	1,093	1,226	0	**-421**	50,139	1403.89
	May	12,048	14,106	26,154	0	0	1,156	1,156	0	**24,998**	75,136	1408.65
	June	5,581	11,858	17,439	0	20	1,224	1,244	2,451	**13,744**	88,881	1411.00
	July	9,532	2,248	11,780	4,522	25	1,509	6,056	5,724	**0**	88,881	1411.00
	Aug	5,126	5,580	10,706	2,439	22	1,635	4,096	6,610	**0**	88,881	1411.00
	Sept	1,905	5,115	7,020	1,558	10	1,462	3,030	3,991	**0**	88,881	1411.00
	Oct	14,805	12,323	27,128	0	0	1,304	1,304	25,824	**0**	88,881	1411.00
	Nov	-47	775	728	909	0	1,161	2,070	0	**-1,342**	87,539	1410.78
	Dec	1,462	310	1,772	322	0	1,073	1,392	0	**379**	87,918	1410.84
1942	Jan	431	155	586	1,182	0	992	2,172	0	**-1,586**	86,332	1410.58
	Feb	137	78	214	1,421	0	903	2,322	0	**-2,108**	84,224	1410.22
	March	-100	78	-22	2,280	0	1,041	3,322	0	**-3,344**	80,879	1409.65
	April	1,007	14,881	15,888	0	0	1,093	1,093	6,793	**8,002**	88,881	1411.00
	May	164	3,023	3,186	3,539	0	1,156	4,696	0	**-1,510**	87,371	1410.75
	June	8,768	6,433	15,201	2,896	20	1,224	4,115	9,576	**1,510**	88,881	1411.00
	July	11,196	620	11,816	4,860	25	1,509	6,395	5,421	**0**	88,881	1411.00
	Aug	54	12,788	12,842	786	22	1,635	2,470	10,372	**0**	88,881	1411.00
	Sept	1,541	9,146	10,687	1,343	10	1,462	2,815	7,872	**0**	88,881	1411.00
	Oct	2,486	9,688	12,174	0	0	1,304	1,304	10,870	**0**	88,881	1411.00
	Nov	2,055	465	2,520	1,699	0	1,161	2,861	0	**-340**	88,541	1410.94
	Dec	626	310	936	0	0	1,073	1,073	0	**-137**	88,404	1410.92
1943	Jan	7,532	155	7,687	1,366	0	992	2,355	4,856	**477**	88,881	1411.00
	Feb	-73	78	5	1,577	0	903	2,501	0	**-2,496**	86,385	1410.59
	March	503	78	581	1,644	0	1,041	2,700	0	**-2,119**	84,265	1410.23
	April	846	0	846	2,945	0	1,093	4,046	0	**-3,200**	81,065	1409.68
	May	327	15,656	15,983	0	0	1,156	1,156	7,010	**7,816**	88,881	1411.00
	June	-77	4,108	4,030	3,923	20	1,224	5,167	0	**-1,137**	87,744	1410.81
	July	2,509	310	2,819	4,731	25	1,509	6,235	0	**-3,416**	84,328	1410.24
	Aug	-30	0	-30	6,332	22	1,635	8,049	0	**-8,080**	76,248	1408.85
	Sept	-80	0	-80	3,799	10	1,462	5,312	0	**-5,392**	70,856	1407.89
	Oct	-97	0	-97	2,040	0	1,304	3,367	0	**-3,464**	67,392	1407.26
	Nov	503	0	503	1,487	0	1,161	2,663	0	**-2,160**	65,232	1406.86
	Dec	918	0	918	0	0	1,073	1,073	0	**-154**	65,078	1406.83

Table 31. 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	8,337	0	8,337	0	0	992	992	0	**7,344**	72,422	1408.17
	Feb	1,235	0	1,235	366	0	903	1,270	0	**-35**	72,388	1408.16
	March	1,795	388	2,182	833	0	1,041	1,870	0	**312**	72,700	1408.22
	April	395	1,938	2,333	2,298	0	1,093	3,398	0	**-1,065**	71,635	1408.03
	May	1,042	3,488	4,530	1,834	0	1,156	2,983	0	**1,547**	73,182	1408.30
	June	9,428	5,348	14,776	1,573	20	1,224	2,717	0	**12,059**	85,240	1410.39
	July	104	8,913	9,017	1,876	25	1,509	3,403	1,973	**3,640**	88,881	1411.00
	Aug	4,793	4,495	9,288	3,252	22	1,635	4,909	4,379	**0**	88,881	1411.00
	Sept	-16	3,100	3,085	1,491	10	1,462	2,968	117	**0**	88,881	1411.00
	Oct	58	620	678	1,266	0	1,304	2,574	0	**-1,896**	86,985	1410.68
	Nov	1,641	388	2,029	670	0	1,161	1,831	0	**197**	87,182	1410.72
	Dec	6,736	620	7,356	0	0	1,073	1,073	4,584	**1,699**	88,881	1411.00
1945	Jan	20	233	252	0	0	992	992	0	**-740**	88,141	1410.87
	Feb	1,450	388	1,838	576	0	903	1,477	0	**361**	88,502	1410.93
	Mar	1,545	3,410	4,955	892	0	1,041	1,931	2,646	**379**	88,881	1411.00
	Apr	516	3,410	3,926	56	0	1,093	1,150	2,776	**0**	88,881	1411.00
	May	3,220	310	3,530	4,313	0	1,156	5,469	0	**-1,939**	86,942	1410.68
	Jun	10,122	7,053	17,175	1,490	20	1,224	2,718	12,518	**1,939**	88,881	1411.00
	Jul	526	2,248	2,773	2,546	25	1,509	4,081	0	**-1,307**	87,574	1410.78
	Aug	1,236	4,185	5,422	3,582	22	1,635	5,232	0	**189**	87,763	1410.81
	Sep	2,290	4,263	6,553	1,523	10	1,462	2,986	2,449	**1,118**	88,881	1411.00
	Oct	664	310	975	1,372	0	1,304	2,676	0	**-1,701**	87,180	1410.72
	Nov	1,227	543	1,769	1,540	0	1,161	2,705	0	**-935**	86,244	1410.56
	Dec	293	310	603	1,127	0	1,073	2,208	0	**-1,604**	84,640	1410.29
1946	Jan	349	1,163	1,512	422	0	992	1,417	0	**95**	84,735	1410.31
	Feb	174	1,240	1,414	1,041	0	903	1,951	0	**-537**	84,198	1410.22
	March	809	1,628	2,437	2,618	0	1,041	3,663	0	**-1,226**	82,972	1410.01
	April	11	0	11	3,108	0	1,093	4,220	0	**-4,209**	78,763	1409.29
	May	-100	2,093	1,993	2,026	0	1,156	3,196	0	**-1,204**	77,560	1409.08
	June	1,456	1,085	2,542	2,884	20	1,224	4,111	0	**-1,569**	75,990	1408.80
	July	2,233	0	2,233	5,196	25	1,509	6,635	0	**-4,401**	71,589	1408.02
	Aug	2,936	388	3,323	3,701	22	1,635	5,279	0	**-1,956**	69,633	1407.67
	Sept	769	775	1,544	1,823	10	1,462	3,287	0	**-1,744**	67,889	1407.35
	Oct	4	4,960	4,964	1,921	0	1,304	3,229	0	**1,735**	69,624	1407.66
	Nov	15,441	310	15,751	435	0	1,161	1,575	0	**14,176**	83,800	1410.15
	Dec	-100	853	753	836	0	1,073	1,956	0	**-1,203**	82,597	1409.95
1947	Jan	1,970	310	2,280	607	0	992	1,624	0	**656**	83,252	1410.06
	Feb	805	233	1,038	1,729	0	903	2,713	0	**-1,675**	81,577	1409.77
	March	-90	233	143	1,710	0	1,041	2,842	0	**-2,699**	78,878	1409.31
	April	1,591	10,153	11,744	0	0	1,093	1,093	648	**10,003**	88,881	1411.00
	May	1,750	20,616	22,366	0	0	1,156	1,156	21,210	**0**	88,881	1411.00
	June	171	6,123	6,294	3,263	20	1,224	4,506	1,788	**0**	88,881	1411.00
	July	6,822	698	7,519	4,793	25	1,509	6,327	1,192	**0**	88,881	1411.00
	Aug	3,154	78	3,231	5,473	22	1,635	7,212	0	**-3,981**	84,900	1410.34
	Sept	-44	0	-44	4,317	10	1,462	5,948	0	**-5,992**	78,908	1409.31
	Oct	43	0	43	1,398	0	1,304	2,755	0	**-2,712**	76,196	1408.84
	Nov	-63	78	15	618	0	1,161	1,804	0	**-1,789**	74,407	1408.52
	Dec	-48	155	107	0	0	1,073	1,073	0	**-966**	73,441	1408.35
1948	Jan	-87	155	68	280	0	992	1,284	0	**-1,217**	72,224	1408.13
	Feb	-73	233	160	0	0	903	903	0	**-743**	71,481	1408.00
	March	508	1,240	1,748	741	0	1,041	1,809	0	**-61**	71,420	1407.99
	April	854	0	854	3,415	0	1,093	4,605	0	**-3,751**	67,669	1407.31
	May	330	1,085	1,415	1,912	0	1,156	3,128	0	**-1,713**	65,956	1406.99
	June	-77	1,628	1,550	3,058	20	1,224	4,407	0	**-2,857**	63,099	1406.46
	July	2,533	698	3,231	3,123	25	1,509	4,667	0	**-1,437**	61,662	1406.19
	Aug	-30	4,495	4,465	2,611	22	1,635	4,337	0	**129**	61,791	1406.22
	Sept	-80	388	308	3,096	10	1,462	4,652	0	**-4,345**	57,446	1405.37
	Oct	-97	0	-97	1,477	0	1,304	2,821	0	**-2,918**	54,529	1404.80
	Nov	508	0	508	1,341	0	1,161	2,536	0	**-2,028**	52,501	1404.38
	Dec	927	0	927	1,301	0	1,073	2,399	0	**-1,472**	51,029	1404.08

Table 31. 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	8,410	0	8,410	0	0	992	992	0	**7,418**	58,447	1405.57
	Feb	285	1,395	1,680	151	0	903	1,059	0	**621**	59,069	1405.69
	March	74	698	772	1,104	0	1,041	2,175	0	**-1,403**	57,665	1405.42
	April	-17	620	603	1,074	0	1,093	2,196	0	**-1,593**	56,072	1405.10
	May	1,343	12,556	13,899	0	0	1,156	1,156	0	**12,743**	68,815	1407.52
	June	2,454	6,278	8,732	1,555	20	1,224	2,796	0	**5,936**	74,751	1408.58
	July	18,902	698	19,599	4,934	25	1,509	6,054	0	**13,546**	88,296	1410.90
	Aug	2,798	620	3,418	2,785	22	1,635	4,487	0	**-1,070**	87,227	1410.72
	Sept	5,893	2,248	8,141	1,910	10	1,462	3,384	3,102	**1,654**	88,881	1411.00
	Oct	1,853	370	2,223	437	0	1,304	1,744	479	**0**	88,881	1411.00
	Nov	-100	0	-100	1,815	0	1,161	3,007	0	**-3,107**	85,774	1410.48
	Dec	-100	0	-100	436	0	1,073	1,517	0	**-1,617**	84,157	1410.21
1950	Jan	4	0	4	909	0	992	1,899	0	**-1,895**	82,262	1409.89
	Feb	868	0	868	1,330	0	903	2,229	0	**-1,361**	80,902	1409.66
	Mar	-99	0	-99	3,080	0	1,041	4,106	0	**-4,205**	76,697	1408.92
	Apr	28	200	228	3,118	0	1,093	4,195	0	**-3,967**	72,730	1408.22
	May	4,933	6,921	11,854	1,257	0	1,156	2,405	0	**9,449**	82,178	1409.88
	Jun	4,587	502	5,089	3,371	20	1,224	4,551	0	**538**	82,716	1409.97
	Jul	14,407	16,665	31,072	0	25	1,509	1,535	23,373	**6,165**	88,881	1411.00
	Aug	4,792	5,947	10,739	2,743	22	1,635	4,401	6,338	**0**	88,881	1411.00
	Sep	465	288	753	1,756	10	1,462	3,227	0	**-2,475**	86,406	1410.59
	Oct	-100	0	-100	2,872	0	1,304	4,177	0	**-4,277**	82,129	1409.87
	Nov	-100	0	-100	2,317	0	1,161	3,480	0	**-3,580**	78,550	1409.25
	Dec	-100	0	-100	1,114	0	1,073	2,187	0	**-2,287**	76,263	1408.85
1951	Jan	71	0	71	1,123	0	992	2,116	0	**-2,045**	74,219	1408.49
	Feb	301	0	301	289	0	903	1,192	0	**-891**	73,328	1408.33
	March	1,047	0	1,047	2,114	0	1,041	3,151	0	**-2,104**	71,223	1407.95
	April	188	0	188	2,676	0	1,093	3,757	0	**-3,569**	67,654	1407.31
	May	7,982	16,614	24,596	1,506	0	1,156	2,651	718	**21,227**	88,881	1411.00
	June	3,355	16,875	20,230	2,178	20	1,224	3,423	16,808	**0**	88,881	1411.00
	July	70	1,145	1,214	4,317	25	1,509	5,853	0	**-4,639**	84,242	1410.23
	Aug	1,133	1	1,134	4,252	22	1,635	5,913	0	**-4,779**	79,463	1409.41
	Sept	432	778	1,210	2,614	10	1,462	4,087	0	**-2,876**	76,586	1408.91
	Oct	969	363	1,332	691	0	1,304	1,995	0	**-663**	75,923	1408.79
	Nov	200	0	200	870	0	1,161	2,032	0	**-1,832**	74,091	1408.46
	Dec	-100	0	-100	1,745	0	1,073	2,818	0	**-2,918**	71,174	1407.94
1952	Jan	234	0	234	1,049	0	992	2,041	0	**-1,807**	69,366	1407.62
	Feb	61	0	61	1,152	0	903	2,053	0	**-1,992**	67,374	1407.25
	March	324	0	324	1,647	0	1,041	2,684	0	**-2,359**	65,015	1406.82
	April	1,307	2,433	3,740	1,316	0	1,093	2,404	0	**1,336**	66,351	1407.07
	May	11,413	3,360	14,774	1,920	0	1,156	3,055	0	**11,719**	78,069	1409.16
	June	924	40	963	5,909	20	1,224	6,974	0	**-6,011**	72,058	1408.10
	July	407	0	407	4,382	25	1,509	5,757	0	**-5,350**	66,709	1407.13
	Aug	-91	0	-91	5,630	22	1,635	7,075	0	**-7,166**	59,543	1405.78
	Sept	-98	0	-98	3,449	10	1,462	4,782	0	**-4,880**	54,663	1404.82
	Oct	-100	0	-100	3,070	0	1,304	4,246	0	**-4,346**	50,317	1403.93
	Nov	706	0	706	822	0	1,161	1,951	0	**-1,246**	49,071	1403.67
	Dec	1,240	0	1,240	167	0	1,073	1,234	0	**7**	49,078	1403.67
1953	Jan	-97	0	-97	1,495	0	992	2,421	0	**-2,518**	46,561	1403.13
	Feb	-40	0	-40	1,517	0	903	2,350	0	**-2,390**	44,171	1402.60
	March	1,060	0	1,060	1,516	0	1,041	2,484	0	**-1,424**	42,746	1402.28
	April	1,918	2,688	4,606	1,721	0	1,093	2,724	0	**1,882**	44,628	1402.70
	May	-16	0	-16	2,864	0	1,156	3,848	0	**-3,864**	40,765	1401.82
	June	16,640	2,847	19,487	2,580	20	1,224	3,655	0	**15,832**	56,596	1405.21
	July	574	2,195	2,769	3,044	25	1,509	4,340	0	**-1,571**	55,026	1404.89
	Aug	91	0	91	3,375	22	1,635	4,771	0	**-4,680**	50,345	1403.94
	Sept	-100	0	-100	3,867	10	1,462	5,048	0	**-5,148**	45,198	1402.83
	Oct	10,974	3,427	14,401	0	0	1,304	1,304	0	**13,097**	58,295	1405.54
	Nov	630	303	932	514	0	1,161	1,636	0	**-703**	57,591	1405.40
	Dec	-28	884	856	887	0	1,073	1,889	0	**-1,033**	56,559	1405.20

Table 31. 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	-100	0	-100	904	0	992	1,824	0	**-1,924**	54,635	1404.82
	Feb	-100	0	-100	1,656	0	903	2,425	0	**-2,525**	52,110	1404.30
	March	57	0	57	2,022	0	1,041	2,900	0	**-2,844**	49,267	1403.71
	April	1,550	228	1,778	1,127	0	1,093	2,130	0	**-352**	48,914	1403.63
	May	11,789	6,500	18,289	0	0	1,156	1,156	0	**17,132**	66,046	1407.01
	June	65	210	275	4,646	20	1,224	5,450	0	**-5,174**	60,872	1406.04
	July	-91	0	-91	5,866	25	1,509	6,822	0	**-6,913**	53,959	1404.68
	Aug	105	0	105	4,971	22	1,635	6,118	0	**-6,013**	47,947	1403.43
	Sept	-100	0	-100	3,639	10	1,462	4,740	0	**-4,840**	43,107	1402.36
	Oct	-88	0	-88	2,207	0	1,304	3,284	0	**-3,372**	39,734	1401.57
	Nov	-100	0	-100	1,356	0	1,161	2,371	0	**-2,471**	37,263	1400.97
	Dec	301	0	301	611	0	1,073	1,615	0	**-1,314**	35,949	1400.64
1955	Jan	471	0	471	482	0	992	1,419	0	**-947**	35,002	1400.40
	Feb	930	0	930	467	0	903	1,314	0	**-384**	34,618	1400.30
	Mar	1,197	0	1,197	1,869	0	1,041	2,679	0	**-1,481**	33,137	1399.92
	Apr	-13	0	-13	2,543	0	1,093	3,306	0	**-3,319**	29,818	1399.02
	May	31,125	15,186	46,311	0	0	1,156	1,156	0	**45,154**	74,972	1408.62
	Jun	6,300	5,336	11,636	1,197	20	1,224	2,342	0	**9,294**	84,266	1410.23
	Jul	276	248	525	4,251	25	1,509	5,675	0	**-5,150**	79,116	1409.35
	Aug	679	382	1,062	3,958	22	1,635	5,507	0	**-4,446**	74,670	1408.57
	Sep	3,322	13	3,335	2,094	10	1,462	3,508	0	**-173**	74,497	1408.54
	Oct	5,050	8,238	13,288	0	0	1,304	1,304	0	**11,984**	86,481	1410.60
	Nov	-100	0	-100	1,948	0	1,161	3,083	0	**-3,183**	83,299	1410.07
	Dec	-100	0	-100	2,057	0	1,073	3,102	0	**-3,201**	80,097	1409.52
1956	Jan	-93	0	-93	963	0	992	1,941	0	**-2,034**	78,064	1409.16
	Feb	695	0	695	1,004	0	903	1,892	0	**-1,197**	76,866	1408.95
	March	-76	0	-76	3,385	0	1,041	4,366	0	**-4,442**	72,424	1408.17
	April	-27	0	-27	3,814	0	1,093	4,838	0	**-4,865**	67,559	1407.29
	May	4,810	3,084	7,893	2,460	0	1,156	3,568	0	**4,325**	71,884	1408.07
	June	-55	11	-45	5,009	20	1,224	6,084	0	**-6,128**	65,755	1406.96
	July	1,173	1,420	2,594	3,390	25	1,509	4,806	0	**-2,213**	63,543	1406.55
	Aug	-75	0	-75	5,302	22	1,635	6,774	0	**-6,849**	56,693	1405.23
	Sept	-100	0	-100	4,043	10	1,462	5,364	0	**-5,464**	51,229	1404.12
	Oct	1,299	0	1,299	1,426	0	1,304	2,681	0	**-1,382**	49,847	1403.83
	Nov	-7	0	-7	1,217	0	1,161	2,335	0	**-2,342**	47,505	1403.33
	Dec	943	0	943	359	0	1,073	1,419	0	**-476**	47,029	1403.23
1957	Jan	-93	0	-93	575	0	992	1,544	0	**-1,637**	45,392	1402.87
	Feb	278	0	278	341	0	903	1,230	0	**-953**	44,439	1402.66
	March	3,236	0	3,236	30	0	1,041	1,069	0	**2,167**	46,606	1403.14
	April	11,228	14,072	25,300	0	0	1,093	1,093	0	**24,207**	70,813	1407.88
	May	29,431	34,419	63,850	0	0	1,156	1,156	44,625	**18,068**	88,881	1411.00
	June	4,567	7,349	11,916	2,467	20	1,224	3,711	8,205	**0**	88,881	1411.00
	July	3,887	257	4,144	5,459	25	1,509	6,993	0	**-2,849**	86,032	1410.53
	Aug	-100	0	-100	4,247	22	1,635	5,902	0	**-6,002**	80,029	1409.51
	Sept	2,788	209	2,997	1,603	10	1,462	3,073	0	**-76**	79,953	1409.49
	Oct	1,215	966	2,180	729	0	1,304	2,032	0	**148**	80,102	1409.52
	Nov	797	0	797	499	0	1,161	1,660	0	**-863**	79,239	1409.37
	Dec	-95	0	-95	1,214	0	1,073	2,283	0	**-2,377**	76,861	1408.95
1958	Jan	-34	0	-34	226	0	992	1,218	0	**-1,252**	75,609	1408.73
	Feb	-89	0	-89	590	0	903	1,486	0	**-1,575**	74,034	1408.45
	March	2,751	62	2,813	0	0	1,041	1,041	0	**1,772**	75,806	1408.77
	April	1,826	86	1,912	1,202	0	1,093	2,276	0	**-364**	75,442	1408.70
	May	183	0	183	3,160	0	1,156	4,237	0	**-4,054**	71,387	1407.98
	June	8,060	5,312	13,372	2,173	20	1,224	3,355	0	**10,017**	81,405	1409.74
	July	3,305	922	4,227	3,103	25	1,509	4,523	0	**-296**	81,109	1409.69
	Aug	-41	0	-41	4,227	22	1,635	5,729	0	**-5,771**	75,338	1408.69
	Sept	50	0	50	2,510	10	1,462	3,881	0	**-3,831**	71,507	1408.00
	Oct	-87	0	-87	2,046	0	1,304	3,265	0	**-3,353**	68,154	1407.40
	Nov	-46	0	-46	1,355	0	1,161	2,459	0	**-2,505**	65,650	1406.94
	Dec	-87	0	-87	744	0	1,073	1,785	0	**-1,872**	63,778	1406.59

Table 31. 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)*			
1959	Jan	844	0	844	814	0	992	1,770	0	**-926**	62,852	1406.42
	Feb	-98	0	-98	1,207	0	903	2,064	0	**-2,163**	60,689	1406.00
	March	-100	0	-100	2,824	0	1,041	3,754	0	**-3,854**	56,836	1405.25
	April	388	758	1,146	2,974	0	1,093	3,945	0	**-2,798**	54,037	1404.70
	May	10,952	15,701	26,653	0	0	1,156	1,156	0	**25,496**	79,533	1409.42
	June	1,409	1,382	2,791	1,779	20	1,224	2,942	0	**-151**	79,383	1409.39
	July	8,039	12,827	20,866	152	25	1,509	1,679	9,689	**9,498**	88,881	1411.00
	Aug	-13	448	435	4,200	22	1,635	5,857	0	**-5,423**	83,458	1410.09
	Sept	5,028	5,619	10,647	1,580	10	1,462	3,053	2,171	**5,423**	88,881	1411.00
	Oct	3,874	10,666	14,540	1,968	0	1,304	3,272	11,268	**0**	88,881	1411.00
	Nov	6	584	591	1,521	0	1,161	2,683	0	**-2,092**	86,789	1410.65
	Dec	5,491	6,602	12,093	1,019	0	1,073	2,092	7,909	**2,092**	88,881	1411.00
1960	Jan	2	4,911	4,913	609	0	992	1,601	3,313	**0**	88,881	1411.00
	Feb	908	10,847	11,755	1,217	0	903	2,120	9,635	**0**	88,881	1411.00
	Mar	157	3,438	3,595	2,512	0	1,041	3,553	42	**0**	88,881	1411.00
	Apr	0	1,436	1,436	4,136	0	1,093	5,229	0	**-3,793**	85,088	1410.37
	May	1,555	2,178	3,733	3,987	0	1,156	5,144	0	**-1,410**	83,677	1410.13
	Jun	2,988	1,965	4,953	4,892	20	1,224	6,104	0	**-1,151**	82,527	1409.94
	Jul	3,033	5,919	8,952	4,385	25	1,509	5,852	0	**3,101**	85,627	1410.46
	Aug	868	625	1,493	3,785	22	1,635	5,401	0	**-3,909**	81,719	1409.80
	Sep	104	45	149	2,821	10	1,462	4,261	0	**-4,113**	77,606	1409.08
	Oct	7,916	15,727	23,643	1,829	0	1,304	3,112	9,257	**11,275**	88,881	1411.00
	Nov	0	1,920	1,920	1,664	0	1,161	2,825	0	**-905**	87,976	1410.85
	Dec	2,068	1,958	4,026	896	0	1,073	1,969	1,152	**905**	88,881	1411.00
1961	Jan	4	1,764	1,767	853	0	992	1,846	0	**-79**	88,802	1410.98
	Feb	784	1,395	2,179	983	0	903	1,887	213	**79**	88,881	1411.00
	March	2,366	1,425	3,790	2,383	0	1,041	3,424	367	**0**	88,881	1411.00
	April	488	1,102	1,590	3,521	0	1,093	4,614	0	**-3,024**	85,857	1410.50
	May	921	1,533	2,454	4,289	0	1,156	5,434	0	**-2,980**	82,877	1410.00
	June	18,536	13,352	31,888	3,563	20	1,224	4,780	21,104	**6,004**	88,881	1411.00
	July	1,542	2,159	3,701	4,355	25	1,509	5,889	0	**-2,189**	86,692	1410.64
	Aug	618	2,023	2,641	4,326	22	1,635	5,987	0	**-3,345**	83,347	1410.08
	Sept	2,856	3,937	6,793	3,133	10	1,462	4,608	0	**2,186**	85,533	1410.44
	Oct	1,243	4,550	5,793	2,637	0	1,304	3,948	0	**1,845**	87,377	1410.75
	Nov	2,704	9,327	12,032	1,158	0	1,161	2,325	8,203	**1,504**	88,881	1411.00
	Dec	526	1,708	2,233	616	0	1,073	1,689	544	**0**	88,881	1411.00
1962	Jan	4	1,220	1,224	1,492	0	992	2,484	0	**-1,261**	87,620	1410.79
	Feb	2	758	759	2,373	0	903	3,277	0	**-2,518**	85,102	1410.37
	March	15	616	630	3,445	0	1,041	4,487	0	**-3,857**	81,246	1409.72
	April	2,450	2,199	4,649	3,157	0	1,093	4,253	0	**396**	81,642	1409.78
	May	462	3,194	3,656	5,493	0	1,156	6,599	0	**-2,943**	78,698	1409.27
	June	11,022	22,989	34,010	4,135	20	1,224	5,328	18,500	**10,183**	88,881	1411.00
	July	1,953	2,570	4,523	5,078	25	1,509	6,612	0	**-2,089**	86,792	1410.65
	Aug	114	1,524	1,638	5,615	22	1,635	7,273	0	**-5,634**	81,158	1409.70
	Sept	3,528	5,899	9,427	2,147	10	1,462	3,620	0	**5,806**	86,964	1410.68
	Oct	843	2,331	3,175	2,402	0	1,304	3,708	0	**-533**	86,431	1410.59
	Nov	300	466	766	1,402	0	1,161	2,564	0	**-1,798**	84,632	1410.29
	Dec	267	864	1,131	952	0	1,073	2,026	0	**-895**	83,738	1410.14
1963	Jan	2	328	330	1,529	0	992	2,521	0	**-2,190**	81,548	1409.77
	Feb	24	429	453	1,890	0	903	2,794	0	**-2,341**	79,207	1409.36
	March	1,030	628	1,658	3,005	0	1,041	4,046	0	**-2,388**	76,819	1408.95
	April	303	195	498	3,811	0	1,093	4,897	0	**-4,399**	72,420	1408.17
	May	5,435	1,779	7,214	4,586	0	1,156	5,723	0	**1,491**	73,912	1408.43
	June	967	8,059	9,027	4,567	20	1,224	5,720	0	**3,306**	77,218	1409.02
	July	279	131	410	5,879	25	1,509	7,289	0	**-6,879**	70,339	1407.79
	Aug	1,184	0	1,184	4,500	22	1,635	6,061	0	**-4,877**	65,462	1406.90
	Sept	431	0	431	3,033	10	1,462	4,436	0	**-4,005**	61,457	1406.15
	Oct	160	2,482	2,642	3,251	0	1,304	4,478	0	**-1,836**	59,621	1405.80
	Nov	2,684	0	2,684	1,747	0	1,161	2,870	0	**-186**	59,434	1405.76
	Dec	21	0	21	723	0	1,073	1,776	0	**-1,755**	57,679	1405.42

Table 31. 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	93	0	93	994	0	992	1,958	0	**-1,865**	55,814	1405.05
	Feb	3,044	1,822	4,866	374	0	903	1,267	0	**3,599**	59,413	1405.76
	March	52	0	52	2,695	0	1,041	3,646	0	**-3,595**	55,819	1405.05
	April	16	0	16	3,809	0	1,093	4,768	0	**-4,752**	51,067	1404.09
	May	4,930	1,079	6,009	4,076	0	1,156	5,104	0	**905**	51,972	1404.27
	June	225	2,054	2,279	4,883	20	1,224	5,883	0	**-3,605**	48,367	1403.52
	July	61	0	61	5,283	25	1,509	6,556	0	**-6,495**	41,872	1402.07
	Aug	598	75	673	4,088	22	1,635	5,524	0	**-4,850**	37,021	1400.91
	Sept	4,102	250	4,352	2,200	10	1,462	3,544	0	**808**	37,829	1401.11
	Oct	13	20	33	1,696	0	1,304	2,902	0	**-2,869**	34,960	1400.39
	Nov	9,208	2,545	11,753	885	0	1,161	1,992	0	**9,761**	44,721	1402.72
	Dec	44	163	207	1,076	0	1,073	2,082	0	**-1,876**	42,845	1402.30
1965	Jan	24	80	104	928	0	992	1,862	0	**-1,758**	41,087	1401.89
	Feb	237	19	256	1,143	0	903	1,971	0	**-1,715**	39,372	1401.49
	Mar	348	11	360	1,941	0	1,041	2,849	0	**-2,489**	36,882	1400.88
	Apr	1,900	578	2,478	2,614	0	1,093	3,517	0	**-1,039**	35,844	1400.62
	May	5,609	1,390	6,999	3,054	0	1,156	3,948	0	**3,051**	38,895	1401.37
	Jun	5,264	4,672	9,936	3,735	20	1,224	4,606	0	**5,330**	44,225	1402.61
	Jul	696	2	698	5,646	25	1,509	6,545	0	**-5,847**	38,378	1401.24
	Aug	2,639	0	2,639	4,460	22	1,635	5,590	0	**-2,950**	35,428	1400.51
	Sep	7,375	9,278	16,653	3,528	10	1,462	4,566	0	**12,087**	47,514	1403.33
	Oct	6,184	7,706	13,890	2,086	0	1,304	3,168	0	**10,722**	58,236	1405.53
	Nov	5	1,342	1,347	2,073	0	1,161	3,022	0	**-1,675**	56,561	1405.20
	Dec	4,915	1,440	6,354	2,156	0	1,073	3,001	0	**3,353**	59,914	1405.86
1966	Jan	24	686	711	995	0	992	1,880	0	**-1,169**	58,745	1405.63
	Feb	421	2,015	2,436	1,533	0	903	2,268	0	**168**	58,913	1405.66
	March	60	2,160	2,220	3,139	0	1,041	3,802	0	**-1,582**	57,331	1405.35
	April	986	72	1,057	3,231	0	1,093	3,925	0	**-2,867**	54,463	1404.78
	May	2	527	528	3,907	0	1,156	4,554	0	**-4,026**	50,438	1403.96
	June	462	0	462	4,761	20	1,224	5,383	0	**-4,921**	45,517	1402.90
	July	284	0	284	5,499	25	1,509	6,291	0	**-6,007**	39,510	1401.52
	Aug	4,600	661	5,260	3,638	22	1,635	4,794	0	**466**	39,975	1401.63
	Sept	489	244	733	2,213	10	1,462	3,382	0	**-2,649**	37,327	1400.99
	Oct	50	0	50	2,488	0	1,304	3,439	0	**-3,389**	33,937	1400.13
	Nov	5	0	5	1,933	0	1,161	2,805	0	**-2,801**	31,136	1399.38
	Dec	16	0	16	1,120	0	1,073	2,013	0	**-1,997**	29,139	1398.83
1967	Jan	1	0	1	1,122	0	992	1,924	0	**-1,923**	27,216	1398.28
	Feb	3	0	3	1,408	0	903	2,059	0	**-2,056**	25,160	1397.67
	March	378	0	378	1,837	0	1,041	2,528	0	**-2,150**	23,010	1397.00
	April	298	3,690	3,988	2,182	0	1,093	2,830	0	**1,158**	24,168	1397.36
	May	370	358	728	2,777	0	1,156	3,385	0	**-2,657**	21,511	1396.51
	June	1,555	573	2,128	3,326	20	1,224	3,847	0	**-1,719**	19,792	1395.94
	July	3,492	234	3,727	3,450	25	1,509	4,168	0	**-441**	19,351	1395.78
	Aug	109	0	109	3,559	22	1,635	4,377	0	**-4,268**	15,083	1394.21
	Sept	1,777	319	2,096	1,951	10	1,462	2,915	0	**-819**	14,264	1393.88
	Oct	173	0	173	2,273	0	1,304	2,981	0	**-2,808**	11,456	1392.67
	Nov	32	0	32	785	0	1,161	1,726	0	**-1,694**	9,762	1391.86
	Dec	348	0	348	587	0	1,073	1,486	0	**-1,138**	8,624	1391.27
1968	Jan	1	0	1	191	0	992	1,124	0	**-1,123**	7,501	1390.66
	Feb	1,841	0	1,841	494	0	903	1,223	0	**618**	8,119	1391.00
	March	730	0	730	1,264	0	1,041	1,866	0	**-1,136**	6,982	1390.35
	April	1,111	820	1,932	1,598	0	1,093	2,107	0	**-175**	6,807	1390.25
	May	9,271	6,448	15,720	1,756	0	1,156	2,252	0	**13,468**	20,275	1396.10
	June	336	8,556	8,892	3,053	20	1,224	3,494	0	**5,398**	25,673	1397.82
	July	4,745	3,619	8,363	3,260	25	1,509	4,076	0	**4,288**	29,961	1399.06
	Aug	82	2,733	2,815	3,817	22	1,635	4,727	0	**-1,912**	28,049	1398.52
	Sept	153	38	191	2,732	10	1,462	3,641	0	**-3,449**	24,600	1397.49
	Oct	733	6,771	7,504	1,863	0	1,304	2,747	0	**4,757**	29,357	1398.89
	Nov	6,643	4,196	10,839	158	0	1,161	1,288	0	**9,551**	38,908	1401.37
	Dec	116	724	840	1,133	0	1,073	2,010	0	**-1,169**	37,738	1401.09

Table 31. 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)*			
1969	Jan	1,297	496	1,793	1,213	0	992	1,992	0	**-199**	37,539	1401.04
	Feb	1,612	812	2,424	747	0	903	1,526	0	**899**	38,438	1401.26
	March	1,708	3,135	4,843	1,549	0	1,041	2,329	0	**2,514**	40,951	1401.86
	April	128	1,711	1,839	2,614	0	1,093	3,264	0	**-1,425**	39,526	1401.52
	May	5,307	22,263	27,569	2,860	0	1,156	3,521	0	**24,048**	63,574	1406.55
	June	1,532	1,381	2,913	5,026	20	1,224	5,486	0	**-2,572**	61,002	1406.06
	July	341	80	421	5,711	25	1,509	6,307	0	**-5,886**	55,115	1404.91
	Aug	2,505	4,534	7,039	4,462	22	1,635	5,351	0	**1,688**	56,803	1405.25
	Sept	2,005	1,064	3,069	2,785	10	1,462	3,786	0	**-717**	56,086	1405.11
	Oct	876	8	884	2,126	0	1,304	3,068	0	**-2,184**	53,902	1404.67
	Nov	46	73	119	1,950	0	1,161	2,777	0	**-2,658**	51,243	1404.12
	Dec	192	23	215	1,293	0	1,073	2,142	0	**-1,927**	49,316	1403.72
1970	Jan	9	21	31	1,387	0	992	2,137	0	**-2,106**	47,210	1403.27
	Feb	5	16	21	1,613	0	903	2,231	0	**-2,210**	45,000	1402.78
	Mar	2,424	156	2,580	1,450	0	1,041	2,232	0	**348**	45,347	1402.86
	Apr	1,203	879	2,082	2,678	0	1,093	3,288	0	**-1,205**	44,142	1402.59
	May	2,908	2,502	5,410	3,857	0	1,156	4,293	0	**1,117**	45,259	1402.84
	Jun	87	721	808	4,985	20	1,224	5,262	0	**-4,454**	40,805	1401.83
	Jul	33	0	33	5,139	25	1,509	5,654	0	**-5,621**	35,184	1400.45
	Aug	639	3	642	4,294	22	1,635	5,064	0	**-4,422**	30,761	1399.28
	Sep	565	1,581	2,145	2,931	10	1,462	3,761	0	**-1,616**	29,145	1398.83
	Oct	87	0	87	1,920	0	1,304	2,788	0	**-2,702**	26,444	1398.05
	Nov	108	0	108	1,502	0	1,161	2,300	0	**-2,192**	24,252	1397.39
	Dec	32	0	32	1,133	0	1,073	1,916	0	**-1,884**	22,369	1396.79
1971	Jan	93	0	93	1,031	0	992	1,745	0	**-1,652**	20,717	1396.25
	Feb	274	0	274	1,147	0	903	1,727	0	**-1,453**	19,264	1395.75
	March	0	0	0	2,177	0	1,041	2,575	0	**-2,575**	16,688	1394.82
	April	23	0	23	2,668	0	1,093	2,916	0	**-2,893**	13,795	1393.69
	May	2,436	0	2,436	3,420	0	1,156	3,422	0	**-986**	12,809	1393.27
	June	3,900	1,785	5,685	3,308	20	1,224	3,389	0	**2,296**	15,105	1394.22
	July	2,206	901	3,107	3,564	25	1,509	3,907	0	**-800**	14,305	1393.90
	Aug	5,371	1,544	6,915	2,247	22	1,635	3,154	0	**3,761**	18,066	1395.33
	Sept	9,302	9,219	18,521	2,091	10	1,462	2,944	0	**15,577**	33,643	1400.05
	Oct	2,031	5,878	7,909	1,681	0	1,304	2,674	0	**5,235**	38,878	1401.37
	Nov	255	603	858	1,420	0	1,161	2,339	0	**-1,481**	37,397	1401.00
	Dec	2,214	1,672	3,886	478	0	1,073	1,469	0	**2,417**	39,815	1401.59
1972	Jan	1	527	528	1,290	0	992	2,061	0	**-1,533**	38,281	1401.22
	Feb	12	945	957	1,596	0	903	2,223	0	**-1,266**	37,015	1400.91
	March	197	134	331	2,319	0	1,041	2,956	0	**-2,625**	34,390	1400.24
	April	238	186	425	3,175	0	1,093	3,700	0	**-3,275**	31,114	1399.37
	May	1,991	2,864	4,856	3,105	0	1,156	3,603	0	**1,253**	32,367	1399.71
	June	593	4,762	5,356	3,659	20	1,224	4,133	0	**1,223**	33,590	1400.03
	July	106	446	553	3,974	25	1,509	4,698	0	**-4,145**	29,444	1398.91
	Aug	674	0	674	3,333	22	1,635	4,255	0	**-3,581**	25,864	1397.88
	Sept	5	0	5	2,531	10	1,462	3,397	0	**-3,392**	22,472	1396.83
	Oct	6,064	0	6,064	1,414	0	1,304	2,349	0	**3,715**	26,187	1397.97
	Nov	1,187	273	1,459	791	0	1,161	1,767	0	**-308**	25,879	1397.88
	Dec	512	3	515	1,164	0	1,073	1,961	0	**-1,446**	24,433	1397.44
1973	Jan	1	1,718	1,719	-608	0	992	532	0	**1,187**	25,620	1397.80
	Feb	157	240	396	1,249	0	903	1,823	0	**-1,427**	24,192	1397.37
	March	7,765	10,265	18,031	301	0	1,041	1,260	0	**16,770**	40,963	1401.86
	April	3,791	18,751	22,542	2,165	0	1,093	2,814	0	**19,727**	60,690	1406.00
	May	1,626	3,751	5,378	3,841	0	1,156	4,323	0	**1,055**	61,745	1406.21
	June	1,234	10,878	12,112	4,331	20	1,224	4,847	0	**7,265**	69,010	1407.55
	July	884	1,008	1,893	4,426	25	1,509	5,427	0	**-3,534**	65,475	1406.91
	Aug	21	71	93	475	22	1,635	2,074	0	**-1,981**	63,494	1406.54
	Sept	12,372	13,924	26,296	3,123	10	1,462	4,199	0	**22,098**	85,592	1410.45
	Oct	1,069	6,824	7,894	2,442	0	1,304	3,701	904	**3,289**	88,881	1411.00
	Nov	255	830	1,085	1,806	0	1,161	2,968	0	**-1,882**	86,998	1410.69
	Dec	16	670	686	1,526	0	1,073	2,598	0	**-1,911**	85,087	1410.37

Table 31. 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	0	351	351	1,530	0	992	2,522	0	**-2,171**	82,916	1410.00
	Feb	13	234	247	1,889	0	903	2,790	0	**-2,543**	80,373	1409.56
	March	449	3,640	4,089	2,239	0	1,041	3,276	0	**813**	81,186	1409.71
	April	4,029	2,175	6,204	3,915	0	1,093	4,999	0	**1,204**	82,391	1409.91
	May	2,629	11,490	14,119	4,075	0	1,156	5,171	2,457	**6,490**	88,881	1411.00
	June	277	451	728	4,951	20	1,224	6,195	0	**-5,467**	83,414	1410.09
	July	0	0	0	5,884	25	1,509	7,407	0	**-7,407**	76,007	1408.80
	Aug	4,297	131	4,428	3,737	22	1,635	5,385	0	**-956**	75,051	1408.63
	Sept	4,807	2,425	7,232	2,121	10	1,462	3,582	0	**3,650**	78,701	1409.27
	Oct	1,356	3,319	4,676	1,691	0	1,304	2,984	0	**1,692**	80,392	1409.57
	Nov	274	8,935	9,209	1,116	0	1,161	2,270	0	**6,939**	87,331	1410.74
	Dec	214	1,970	2,184	1,262	0	1,073	2,326	0	**-142**	87,189	1410.72
1975	Jan	1,283	2,401	3,684	565	0	992	1,553	439	**1,692**	88,881	1411.00
	Feb	2,308	9,549	11,857	846	0	903	1,750	10,107	**0**	88,881	1411.00
	Mar	363	7,244	7,607	1,988	0	1,041	3,028	4,578	**0**	88,881	1411.00
	Apr	216	5,699	5,915	2,778	0	1,093	3,871	2,043	**0**	88,881	1410.99
	May	5,587	7,630	13,216	3,197	0	1,156	4,352	8,864	**0**	88,881	1410.99
	Jun	65	5,353	5,418	395	20	1,224	1,639	3,779	**0**	88,881	1411.00
	Jul	7,231	15,157	22,388	1,581	25	1,509	3,115	19,273	**0**	88,881	1411.00
	Aug	719	7,704	8,423	2,987	22	1,635	4,645	3,779	**0**	88,881	1411.00
	Sep	333	1,018	1,350	2,727	10	1,462	4,198	0	**-2,848**	86,033	1410.53
	Oct	3	2,396	2,399	2,477	0	1,304	3,781	0	**-1,382**	84,651	1410.30
	Nov	158	3,751	3,910	1,169	0	1,161	2,330	0	**1,580**	86,231	1410.56
	Dec	78	1,579	1,657	756	0	1,073	1,828	0	**-171**	86,060	1410.53
1976	Jan	-43	1,282	1,239	1,039	0	992	2,031	0	**-792**	85,268	1410.40
	Feb	386	776	1,162	2,088	0	903	2,990	0	**-1,828**	83,440	1410.09
	March	164	826	990	2,350	0	1,041	3,389	0	**-2,399**	81,040	1409.68
	April	1,983	6,321	8,304	1,907	0	1,093	2,999	0	**5,305**	86,346	1410.58
	May	1,273	5,467	6,740	2,024	0	1,156	3,178	1,027	**2,535**	88,881	1411.00
	June	1,806	4,010	5,816	2,659	20	1,224	3,903	1,913	**0**	88,881	1411.00
	July	-67	281	214	3,560	25	1,509	5,095	0	**-4,881**	84,000	1410.19
	Aug	72	0	72	4,343	22	1,635	6,001	0	**-5,929**	78,071	1409.17
	Sept	8,434	11,583	20,018	2,318	10	1,462	3,789	5,419	**10,810**	88,881	1411.00
	Oct	12	263	275	1,652	0	1,304	2,956	0	**-2,681**	86,200	1410.55
	Nov	-181	323	142	107	0	1,161	1,268	0	**-1,126**	85,074	1410.37
	Dec	251	205	457	1,616	0	1,073	2,689	0	**-2,232**	82,842	1409.99
1977	Jan	-55	297	242	36	0	992	1,028	0	**-787**	82,055	1409.85
	Feb	-149	368	220	88	0	903	991	0	**-771**	81,284	1409.72
	March	-674	200	-473	274	0	1,041	1,314	0	**-1,788**	79,496	1409.41
	April	-88	405	316	267	0	1,093	1,360	0	**-1,043**	78,453	1409.23
	May	38,971	37,390	76,361	2,689	0	1,156	3,843	62,090	**10,428**	88,881	1411.00
	June	631	10,527	11,158	4,231	20	1,224	5,476	5,682	**0**	88,881	1411.00
	July	-6	1,095	1,089	4,327	25	1,509	5,862	0	**-4,772**	84,108	1410.20
	Aug	1,533	10,724	12,257	3,935	22	1,635	5,591	1,894	**4,772**	88,881	1411.00
	Sept	-354	2,641	2,286	3,169	10	1,462	4,641	0	**-2,354**	86,527	1410.61
	Oct	178	118	296	2,363	0	1,304	3,667	0	**-3,371**	83,156	1410.04
	Nov	55	466	521	1,136	0	1,161	2,297	0	**-1,776**	81,380	1409.74
	Dec	9	578	586	1,635	0	1,073	2,707	0	**-2,121**	79,259	1409.37
1978	Jan	-376	632	256	687	0	992	1,679	0	**-1,423**	77,836	1409.12
	Feb	1,196	956	2,152	218	0	903	1,121	0	**1,030**	78,866	1409.30
	March	-218	729	511	1,955	0	1,041	2,994	0	**-2,483**	76,383	1408.87
	April	2,261	271	2,533	3,370	0	1,093	4,461	0	**-1,928**	74,455	1408.53
	May	21,448	6,697	28,145	2,984	0	1,156	4,137	9,583	**14,426**	88,881	1411.00
	June	18,459	2,512	20,970	4,540	20	1,224	5,784	15,186	**0**	88,881	1411.00
	July	-184	228	44	5,939	25	1,509	7,474	0	**-7,430**	81,451	1409.75
	Aug	1	0	2	4,215	22	1,635	5,872	0	**-5,871**	75,581	1408.73
	Sept	414	0	414	2,571	10	1,462	4,042	0	**-3,627**	71,953	1408.08
	Oct	-680	68	-612	2,576	0	1,304	3,877	0	**-4,489**	67,464	1407.27
	Nov	1,461	165	1,626	825	0	1,161	1,986	0	**-360**	67,103	1407.21
	Dec	-876	0	-876	755	0	1,073	1,827	0	**-2,703**	64,400	1406.71

Table 31. 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	1,176	303	1,478	165	0	992	1,157	0	**321**	64,722	1406.77
	Feb	-54	136	82	48	0	903	952	0	**-869**	63,852	1406.60
	March	4,337	562	4,900	1,650	0	1,041	2,688	0	**2,211**	66,064	1407.01
	April	5,566	170	5,735	2,063	0	1,093	3,154	0	**2,582**	68,646	1407.49
	May	5,729	3,367	9,097	2,728	0	1,156	3,881	0	**5,216**	73,861	1408.42
	June	12,938	3,546	16,484	3,394	20	1,224	4,632	0	**11,852**	85,714	1410.47
	July	2,311	545	2,856	4,267	25	1,509	5,796	0	**-2,940**	82,773	1409.98
	Aug	1,112	244	1,356	3,829	22	1,635	5,481	0	**-4,124**	78,649	1409.27
	Sept	-94	0	-94	3,238	10	1,462	4,705	0	**-4,798**	73,851	1408.42
	Oct	-513	43	-470	2,879	0	1,304	4,178	0	**-4,648**	69,203	1407.59
	Nov	1,742	1,400	3,142	1,214	0	1,161	2,373	0	**769**	69,972	1407.73
	Dec	261	0	261	877	0	1,073	1,948	0	**-1,687**	68,285	1407.42
1980	Jan	968	113	1,082	662	0	992	1,653	0	**-571**	67,714	1407.32
	Feb	270	33	303	960	0	903	1,860	0	**-1,557**	66,157	1407.03
	Mar	813	241	1,054	1,784	0	1,041	2,820	0	**-1,766**	64,390	1406.70
	Apr	1,584	255	1,839	2,687	0	1,093	3,771	0	**-1,933**	62,458	1406.34
	May	36,844	18,378	55,222	2,534	0	1,156	3,682	25,117	**26,423**	88,881	1411.00
	Jun	1,098	3,567	4,665	4,544	20	1,224	5,788	0	**-1,123**	87,758	1410.81
	Jul	-504	0	-504	5,982	25	1,509	7,515	0	**-8,018**	79,740	1409.46
	Aug	-155	0	-155	4,922	22	1,635	6,579	0	**-6,734**	73,006	1408.27
	Sep	-404	0	-404	3,045	10	1,462	4,515	0	**-4,918**	68,087	1407.38
	Oct	-307	0	-307	2,487	0	1,304	3,789	0	**-4,096**	63,991	1406.63
	Nov	74	0	74	1,139	0	1,161	2,299	0	**-2,225**	61,767	1406.21
	Dec	1,045	435	1,480	767	0	1,073	1,839	0	**-359**	61,407	1406.14
1981	Jan	-383	0	-383	824	0	992	1,815	0	**-2,198**	59,210	1405.72
	Feb	761	0	761	1,186	0	903	2,088	0	**-1,327**	57,883	1405.46
	March	1,197	322	1,519	1,507	0	1,041	2,546	0	**-1,027**	56,856	1405.26
	April	7,139	307	7,446	2,089	0	1,093	3,178	0	**4,267**	61,123	1406.09
	May	2,693	346	3,039	2,706	0	1,156	3,858	0	**-819**	60,304	1405.93
	June	5,435	6,206	11,641	2,965	20	1,224	4,203	0	**7,438**	67,742	1407.32
	July	1,254	0	1,254	4,019	25	1,509	5,546	0	**-4,291**	63,451	1406.53
	Aug	-1,083	49	-1,034	3,527	22	1,635	5,177	0	**-6,210**	57,241	1405.33
	Sept	28	0	28	2,789	10	1,462	4,253	0	**-4,225**	53,016	1404.49
	Oct	6,862	9,944	16,806	1,118	0	1,304	2,420	0	**14,386**	67,402	1407.26
	Nov	396	1,356	1,752	1,057	0	1,161	2,216	0	**-464**	66,939	1407.17
	Dec	-601	123	-478	734	0	1,073	1,805	0	**-2,283**	64,655	1406.75
1982	Jan	-400	2,747	2,346	766	0	992	1,756	0	**590**	65,246	1406.86
	Feb	341	2,048	2,389	620	0	903	1,522	0	**867**	66,113	1407.02
	March	3,606	671	4,277	1,722	0	1,041	2,758	0	**1,519**	67,632	1407.30
	April	1,874	89	1,963	2,732	0	1,093	3,818	0	**-1,855**	65,777	1406.96
	May	12,871	23,726	36,598	2,573	0	1,156	3,721	9,773	**23,104**	88,881	1411.00
	June	12,327	29,194	41,520	3,153	20	1,224	4,397	37,123	**0**	88,881	1411.00
	July	2,908	2,324	5,232	4,362	25	1,509	5,897	0	**-665**	88,215	1410.89
	Aug	-117	595	479	4,610	22	1,635	6,268	0	**-5,789**	82,427	1409.92
	Sept	-798	396	-402	3,618	10	1,462	5,089	0	**-5,491**	76,935	1408.97
	Oct	-402	105	-297	2,584	0	1,304	3,887	0	**-4,184**	72,752	1408.23
	Nov	386	228	615	1,368	0	1,161	2,529	0	**-1,914**	70,838	1407.88
	Dec	-30	367	336	768	0	1,073	1,841	0	**-1,504**	69,333	1407.61
1983	Jan	756	398	1,154	816	0	992	1,808	0	**-654**	68,680	1407.49
	Feb	1,864	588	2,452	649	0	903	1,552	0	**901**	69,580	1407.66
	March	2,604	3,179	5,783	1,457	0	1,041	2,496	0	**3,287**	72,867	1408.25
	April	1,377	1,324	2,701	2,551	0	1,093	3,641	0	**-940**	71,927	1408.08
	May	2,290	6,747	9,038	3,004	0	1,156	4,156	0	**4,882**	76,809	1408.94
	June	2,463	10,717	13,180	3,157	20	1,224	4,396	0	**8,784**	85,593	1410.45
	July	618	614	1,232	5,266	25	1,509	6,794	0	**-5,562**	80,031	1409.51
	Aug	358	0	358	4,600	22	1,635	6,251	0	**-5,893**	74,138	1408.47
	Sept	-177	0	-177	3,741	10	1,462	5,205	0	**-5,382**	68,756	1407.51
	Oct	34,707	13,663	48,370	1,950	0	1,304	3,250	24,995	**20,125**	88,881	1411.00
	Nov	3,028	1,845	4,873	1,308	0	1,161	2,469	2,404	**0**	88,881	1411.00
	Dec	-893	1,097	204	605	0	1,073	1,678	0	**-1,473**	87,408	1410.75

Table 31. 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)*			
1984	Jan	161	1,064	1,225	235	0	992	1,227	0	**-3**	87,405	1410.75
	Feb	1,022	999	2,021	1,791	0	903	2,694	0	**-673**	86,732	1410.64
	March	1,673	1,066	2,739	1,827	0	1,041	2,868	0	**-129**	86,604	1410.62
	April	889	1,697	2,586	3,184	0	1,093	4,276	0	**-1,690**	84,913	1410.34
	May	893	144	1,037	4,292	0	1,156	5,445	0	**-4,408**	80,505	1409.59
	June	2,718	1,592	4,310	4,317	20	1,224	5,558	0	**-1,248**	79,258	1409.37
	July	778	61	840	5,006	25	1,509	6,537	0	**-5,697**	73,560	1408.37
	Aug	170	414	584	4,242	22	1,635	5,893	0	**-5,309**	68,251	1407.41
	Sept	-893	0	-893	3,409	10	1,462	4,875	0	**-5,769**	62,482	1406.35
	Oct	-22	0	-22	1,771	0	1,304	3,073	0	**-3,095**	59,387	1405.75
	Nov	391	744	1,135	1,208	0	1,161	2,367	0	**-1,232**	58,155	1405.51
	Dec	2,015	999	3,014	505	0	1,073	1,577	0	**1,437**	59,593	1405.79
1985	Jan	596	796	1,392	181	0	992	1,173	0	**219**	59,812	1405.84
	Feb	2,183	654	2,837	814	0	903	1,716	0	**1,121**	60,933	1406.05
	Mar	5,073	3,551	8,623	1,341	0	1,041	2,379	0	**6,244**	67,177	1407.22
	Apr	4,131	3,394	7,525	2,546	0	1,093	3,634	0	**3,891**	71,067	1407.92
	May	952	935	1,887	3,511	0	1,156	4,659	0	**-2,771**	68,296	1407.42
	Jun	8,946	1,752	10,698	3,382	20	1,224	4,618	0	**6,080**	74,377	1408.52
	Jul	1,001	0	1,001	4,387	25	1,509	5,912	0	**-4,910**	69,466	1407.64
	Aug	740	100	839	4,423	22	1,635	6,069	0	**-5,230**	64,236	1406.68
	Sep	5,774	1,108	6,883	3,137	10	1,462	4,601	0	**2,282**	66,518	1407.10
	Oct	9,822	10,663	20,485	1,430	0	1,304	2,730	0	**17,755**	84,273	1410.23
	Nov	-679	3,393	2,714	1,042	0	1,161	2,201	0	**513**	84,786	1410.32
	Dec	-1,266	317	-949	515	0	1,073	1,586	0	**-2,536**	82,250	1409.89
1986	Jan	236	187	424	1,556	0	992	2,544	0	**-2,121**	80,130	1409.52
	Feb	649	218	867	1,230	0	903	2,130	0	**-1,263**	78,867	1409.30
	March	626	172	797	2,474	0	1,041	3,508	0	**-2,710**	76,156	1408.83
	April	1,936	54	1,991	3,024	0	1,093	4,108	0	**-2,118**	74,039	1408.46
	May	4,503	2,620	7,123	2,649	0	1,156	3,797	0	**3,326**	77,364	1409.04
	June	4,897	12,827	17,724	3,342	20	1,224	4,574	1,634	**11,517**	88,881	1411.00
	July	1,115	5,376	6,491	5,248	25	1,509	6,782	0	**-291**	88,589	1410.95
	Aug	1,015	2,998	4,012	4,048	22	1,635	5,705	0	**-1,693**	86,897	1410.67
	Sept	18,641	11,911	30,552	2,287	10	1,462	3,758	24,810	**1,984**	88,881	1411.00
	Oct	25,547	45,174	70,721	1,253	0	1,304	2,557	68,165	**0**	88,881	1411.00
	Nov	6,107	18,706	24,813	1,205	0	1,161	2,367	22,446	**0**	88,881	1411.00
	Dec	1,296	8,469	9,765	684	0	1,073	1,757	8,008	**0**	88,881	1411.00
1987	Jan	4,343	8,432	12,775	695	0	992	1,688	11,087	**0**	88,881	1411.00
	Feb	10,773	11,609	22,383	857	0	903	1,761	20,622	**0**	88,881	1411.00
	March	4,887	18,412	23,300	2,007	0	1,041	3,048	20,252	**0**	88,881	1411.00
	April	1,483	6,087	7,570	3,122	0	1,093	4,215	3,355	**0**	88,881	1411.00
	May	49,914	20,150	70,064	3,268	0	1,156	4,424	65,640	**0**	88,881	1411.00
	June	4,655	17,083	21,738	3,631	20	1,224	4,875	16,863	**0**	88,881	1411.00
	July	2,343	5,992	8,335	4,208	25	1,509	5,743	2,592	**0**	88,881	1411.00
	Aug	1,927	2,347	4,275	4,015	22	1,635	5,672	0	**-1,397**	87,483	1410.77
	Sept	949	7,113	8,062	2,764	10	1,462	4,236	2,428	**1,397**	88,881	1411.00
	Oct	261	1,598	1,859	2,351	0	1,304	3,655	0	**-1,796**	87,084	1410.70
	Nov	-436	1,098	662	1,514	0	1,161	2,675	0	**-2,014**	85,071	1410.37
	Dec	1,657	3,739	5,396	824	0	1,073	1,897	0	**3,499**	88,570	1410.94
1988	Jan	5,368	7,417	12,785	493	0	992	1,485	10,989	**311**	88,881	1411.00
	Feb	630	3,879	4,510	1,332	0	903	2,235	2,275	**0**	88,881	1411.00
	March	16,469	17,075	33,545	2,391	0	1,041	3,432	30,113	**0**	88,881	1411.00
	April	5,042	10,924	15,966	2,881	0	1,093	3,974	11,992	**0**	88,881	1411.00
	May	1,023	11,428	12,451	4,078	0	1,156	5,234	7,216	**0**	88,881	1411.00
	June	821	3,712	4,533	4,331	20	1,224	5,575	0	**-1,042**	87,839	1410.82
	July	-412	927	515	4,447	25	1,509	5,981	0	**-5,466**	82,374	1409.91
	Aug	-280	55	-225	4,695	22	1,635	6,350	0	**-6,575**	75,799	1408.77
	Sept	12,400	12,847	25,247	2,721	10	1,462	4,192	7,973	**13,082**	88,881	1411.00
	Oct	-481	2,368	1,887	2,192	0	1,304	3,497	0	**-1,610**	87,271	1410.73
	Nov	57	2,742	2,798	1,485	0	1,161	2,645	0	**153**	87,424	1410.76
	Dec	-29	1,701	1,672	1,043	0	1,073	2,115	0	**-444**	86,980	1410.68

Table 31. 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	1,241	1,522	2,764	1,189	0	992	2,181	0	**583**	87,563	1410.78
	Feb	157	1,357	1,513	416	0	903	1,319	0	**194**	87,758	1410.81
	March	3,010	3,657	6,667	2,400	0	1,041	3,440	2,104	**1,123**	88,881	1411.00
	April	475	2,969	3,444	3,292	0	1,093	4,385	0	**-941**	87,940	1410.84
	May	5,184	7,493	12,677	2,984	0	1,156	4,140	7,596	**941**	88,881	1411.00
	June	19,036	29,046	48,082	2,794	20	1,224	4,037	44,045	**0**	88,881	1411.00
	July	-2,771	4,671	1,900	4,343	25	1,509	5,877	0	**-3,977**	84,904	1410.34
	Aug	356	4,326	4,681	3,439	22	1,635	5,096	0	**-415**	84,489	1410.27
	Sept	3,040	7,412	10,452	3,069	10	1,462	4,540	1,520	**4,392**	88,881	1411.00
	Oct	134	1,880	2,015	2,837	0	1,304	4,141	0	**-2,127**	86,754	1410.65
	Nov	-1,193	1,182	-11	1,613	0	1,161	2,774	0	**-2,785**	83,969	1410.18
	Dec	-1,292	1,265	-27	288	0	1,073	1,361	0	**-1,388**	82,581	1409.94
1990	Jan	1,122	4,022	5,143	1,284	0	992	2,276	0	**2,867**	85,448	1410.43
	Feb	2,742	2,763	5,504	1,675	0	903	2,578	0	**2,927**	88,375	1410.91
	Mar	13,159	10,134	23,292	1,344	0	1,041	2,384	20,402	**506**	88,881	1411.00
	Apr	8,538	7,264	15,802	2,347	0	1,093	3,441	12,361	**0**	88,881	1411.00
	May	13,935	9,478	23,412	3,541	0	1,156	4,697	18,715	**0**	88,881	1411.00
	Jun	650	5,274	5,924	4,746	20	1,224	5,989	0	**-66**	88,815	1410.98
	Jul	2,720	1,338	4,058	4,168	25	1,509	5,700	0	**-1,642**	87,173	1410.72
	Aug	1,790	1,006	2,796	3,210	22	1,635	4,867	0	**-2,071**	85,102	1410.37
	Sep	-197	5,647	5,450	2,647	10	1,462	4,117	0	**1,333**	86,435	1410.59
	Oct	-1,494	257	-1,237	2,305	0	1,304	3,607	0	**-4,844**	81,591	1409.77
	Nov	1,128	1,278	2,406	962	0	1,161	2,123	0	**283**	81,874	1409.82
	Dec	-425	107	-318	665	0	1,073	1,737	0	**-2,055**	79,819	1409.47
1991	Jan	17	929	946	431	0	992	1,423	0	**-477**	79,342	1409.39
	Feb	-65	727	662	1,420	0	903	2,322	0	**-1,660**	77,682	1409.10
	March	510	604	1,114	2,355	0	1,041	3,393	0	**-2,279**	75,403	1408.70
	April	546	433	979	2,629	0	1,093	3,719	0	**-2,740**	72,663	1408.21
	May	10,556	7,034	17,590	2,476	0	1,156	3,629	0	**13,961**	86,624	1410.62
	June	24,750	19,350	44,100	3,144	20	1,224	4,384	37,459	**2,257**	88,881	1411.00
	July	891	633	1,523	4,279	25	1,509	5,814	0	**-4,291**	84,590	1410.29
	Aug	116	430	545	3,541	22	1,635	5,198	0	**-4,653**	79,937	1409.49
	Sept	-68	1,592	1,524	1,788	10	1,462	3,259	0	**-1,735**	78,203	1409.19
	Oct	531	262	794	2,198	0	1,304	3,501	0	**-2,707**	75,495	1408.71
	Nov	861	1,682	2,543	644	0	1,161	1,805	0	**737**	76,233	1408.84
	Dec	9,384	14,113	23,497	567	0	1,073	1,640	9,209	**12,648**	88,881	1411.00
1992	Jan	-288	3,836	3,548	794	0	992	1,787	1,762	**0**	88,881	1411.00
	Feb	277	2,795	3,071	1,573	0	903	2,476	595	**0**	88,881	1411.00
	March	831	7,144	7,975	2,165	0	1,041	3,206	4,769	**0**	88,881	1411.00
	April	1,804	5,171	6,975	2,154	0	1,093	3,247	3,728	**0**	88,881	1411.00
	May	2,930	1,430	4,359	3,051	0	1,156	4,207	152	**0**	88,881	1411.00
	June	9,006	10,850	19,855	2,588	20	1,224	3,832	16,023	**0**	88,881	1411.00
	July	2,823	13,867	16,690	4,137	25	1,509	5,672	11,019	**0**	88,881	1411.00
	Aug	2,556	5,221	7,776	3,410	22	1,635	5,068	2,709	**0**	88,881	1411.00
	Sept	4,294	6,831	11,125	2,873	10	1,462	4,344	6,781	**0**	88,881	1411.00
	Oct	-848	145	-704	2,442	0	1,304	3,746	0	**-4,450**	84,431	1410.26
	Nov	8,013	14,792	22,806	963	0	1,161	2,125	16,231	**4,450**	88,881	1411.00
	Dec	8,971	12,520	21,491	609	0	1,073	1,681	19,810	**0**	88,881	1411.00
1993	Jan	4,198	11,484	15,682	403	0	992	1,395	14,287	**0**	88,881	1411.00
	Feb	3,860	7,843	11,703	751	0	903	1,654	10,049	**0**	88,881	1411.00
	March	2,861	9,651	12,512	1,818	0	1,041	2,859	9,653	**0**	88,881	1411.00
	April	6,350	14,655	21,005	2,391	0	1,093	3,484	17,521	**0**	88,881	1411.00
	May	23,497	43,289	66,786	2,715	0	1,156	3,871	62,915	**0**	88,881	1411.00
	June	1,978	7,536	9,514	3,695	20	1,224	4,938	4,575	**0**	88,881	1411.00
	July	2,341	13,550	15,891	5,007	25	1,509	6,541	9,350	**0**	88,881	1411.00
	Aug	1,642	3,181	4,822	4,062	22	1,635	5,720	0	**-897**	87,984	1410.85
	Sept	312	1,336	1,648	2,615	10	1,462	4,086	0	**-2,438**	85,545	1410.45
	Oct	-581	906	326	1,885	0	1,304	3,189	0	**-2,863**	82,682	1409.96
	Nov	-574	774	200	1,312	0	1,161	2,473	0	**-2,273**	80,409	1409.57
	Dec	-1,230	909	-320	865	0	1,073	1,937	0	**-2,257**	78,152	1409.18

Table 31. 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)*			
1994	Jan	474	820	1,293	738	0	992	1,729	0	**-436**	77,716	1409.10
	Feb	-1,415	714	-701	861	0	903	1,764	0	**-2,465**	75,251	1408.67
	March	826	1,412	2,239	1,876	0	1,041	2,915	0	**-676**	74,574	1408.55
	April	4,668	1,816	6,484	2,852	0	1,093	3,942	0	**2,542**	77,116	1409.00
	May	1,072	3,085	4,157	2,489	0	1,156	3,643	0	**514**	77,630	1409.09
	June	280	869	1,148	4,157	20	1,224	5,396	0	**-4,247**	73,382	1408.34
	July	581	413	994	3,681	25	1,509	5,210	0	**-4,216**	69,167	1407.58
	Aug	-1,211	464	-747	3,938	22	1,635	5,589	0	**-6,337**	62,830	1406.41
	Sept	-977	10	-967	2,705	10	1,462	4,171	0	**-5,138**	57,692	1405.42
	Oct	1,321	205	1,526	1,672	0	1,304	2,972	0	**-1,446**	56,246	1405.14
	Nov	6,813	3,276	10,089	925	0	1,161	2,084	0	**8,005**	64,251	1406.68
	Dec	-456	442	-14	746	0	1,073	1,817	0	**-1,831**	62,419	1406.33
1995	Jan	252	367	619	669	0	992	1,660	0	**-1,041**	61,379	1406.14
	Feb	-98	195	97	1,081	0	903	1,982	0	**-1,885**	59,494	1405.77
	Mar	1,590	372	1,961	1,307	0	1,041	2,344	0	**-383**	59,111	1405.70
	Apr	3,365	429	3,794	1,987	0	1,093	3,074	0	**719**	59,830	1405.84
	May	8,787	6,840	15,627	2,201	0	1,156	3,350	0	**12,277**	72,107	1408.11
	Jun	27,419	33,225	60,644	3,168	20	1,224	4,403	39,468	**16,774**	88,881	1410.99
	Jul	905	4,904	5,809	4,232	25	1,509	5,765	43	**0**	88,881	1411.00
	Aug	14,360	26,181	40,541	3,537	22	1,635	5,194	35,347	**0**	88,881	1411.00
	Sep	12,856	17,783	30,639	2,853	10	1,462	4,325	26,314	**0**	88,881	1411.00
	Oct	-22	5,714	5,692	2,600	0	1,304	3,904	1,788	**0**	88,881	1411.00
	Nov	-724	3,719	2,995	1,683	0	1,161	2,845	151	**0**	88,881	1411.00
	Dec	-57	3,654	3,596	881	0	1,073	1,954	1,642	**0**	88,881	1411.00
1996	Jan	40	3,493	3,533	790	0	992	1,783	1,750	**0**	88,881	1411.00
	Feb	-511	2,888	2,376	1,581	0	903	2,484	0	**-108**	88,773	1410.98
	March	-671	2,403	1,732	2,357	0	1,041	3,398	0	**-1,666**	87,107	1410.70
	April	-926	1,648	721	3,416	0	1,093	4,508	0	**-3,787**	83,319	1410.07
	May	-1,282	912	-370	4,277	0	1,156	5,432	0	**-5,802**	77,517	1409.07
	June	7,141	4,568	11,709	3,726	20	1,224	4,969	0	**6,740**	84,258	1410.23
	July	8,153	2,031	10,184	3,782	25	1,509	5,314	247	**4,623**	88,881	1411.00
	Aug	14,524	8,030	22,554	2,987	22	1,635	4,645	17,909	**0**	88,881	1411.00
	Sept	3,709	19,174	22,884	2,011	10	1,462	3,483	19,401	**0**	88,881	1411.00
	Oct	482	5,461	5,943	2,225	0	1,304	3,529	2,414	**0**	88,881	1411.00
	Nov	323	6,594	6,918	1,336	0	1,161	2,497	4,421	**0**	88,881	1411.00
	Dec	-1,797	10,141	8,344	1,016	0	1,073	2,088	6,256	**0**	88,881	1411.00
1997	Jan	-409	6,435	6,026	577	0	992	1,569	4,457	**0**	88,881	1411.00
	Feb	5,683	18,842	24,525	1,039	0	903	1,943	22,583	**0**	88,881	1411.00
	March	-61	9,453	9,392	2,403	0	1,041	3,443	5,949	**0**	88,881	1411.00
	April	15,224	37,735	52,959	1,909	0	1,093	3,002	49,957	**0**	88,881	1411.00
	May	3,381	21,397	24,778	2,482	0	1,156	3,638	21,140	**0**	88,881	1411.00
	June	559	19,181	19,740	3,035	20	1,224	4,278	15,462	**0**	88,881	1411.00
	July	-580	6,586	6,006	4,287	25	1,509	5,822	184	**0**	88,881	1411.00
	Aug	1,186	13,309	14,496	3,695	22	1,635	5,352	9,144	**0**	88,881	1411.00
	Sept	18	9,954	9,972	3,209	10	1,462	4,680	5,292	**0**	88,881	1411.00
	Oct	2,199	6,543	8,741	2,090	0	1,304	3,394	5,347	**0**	88,881	1411.00
	Nov	307	6,496	6,803	1,837	0	1,161	2,999	3,804	**0**	88,881	1411.00
	Dec	2,897	12,429	15,325	1,106	0	1,073	2,179	13,146	**0**	88,881	1411.00
1998	Jan	3,016	11,099	14,115	1,185	0	992	2,178	11,938	**0**	88,881	1411.00
	Feb	6,310	16,919	23,229	1,110	0	903	2,014	21,215	**0**	88,881	1411.00
	March	15,455	24,318	39,773	1,699	0	1,041	2,740	37,033	**0**	88,881	1411.00
	April	2,624	9,739	12,363	2,999	0	1,093	4,093	8,271	**0**	88,881	1411.00
	May	1,935	5,758	7,693	4,394	0	1,156	5,550	2,143	**0**	88,881	1411.00
	June	-677	1,498	821	5,394	20	1,224	6,637	0	**-5,816**	83,064	1410.03
	July	-1,014	295	-719	5,646	25	1,509	7,181	0	**-7,900**	75,165	1408.65
	Aug	-1,038	99	-940	3,823	22	1,635	5,479	0	**-6,419**	68,746	1407.50
	Sept	400	411	812	2,926	10	1,462	4,395	0	**-3,583**	65,162	1406.85
	Oct	95	640	735	1,801	0	1,304	3,104	0	**-2,369**	62,793	1406.41
	Nov	424	4,721	5,145	985	0	1,161	2,146	0	**2,999**	65,792	1406.96
	Dec	-1,090	1,124	33	635	0	1,073	1,707	0	**-1,674**	64,118	1406.65

Table 31. 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	657	856	1,513	902	0	992	1,893	0	**-380**	63,738	1406.58
	Feb	-105	827	722	1,428	0	903	2,329	0	**-1,607**	62,131	1406.28
	March	2,707	1,817	4,524	1,499	0	1,041	2,538	0	**1,986**	64,117	1406.65
	April	803	4,790	5,593	2,281	0	1,093	3,371	0	**2,223**	66,340	1407.06
	May	13,084	11,503	24,587	2,683	0	1,156	3,834	0	**20,753**	87,093	1410.70
	June	6,384	18,792	25,176	3,286	20	1,224	4,526	18,862	**1,788**	88,881	1411.00
	July	-5	4,034	4,029	4,686	25	1,509	6,221	0	**-2,192**	86,689	1410.64
	Aug	471	1,190	1,661	5,083	22	1,635	6,740	0	**-5,079**	81,610	1409.78
	Sept	-235	184	-51	3,259	10	1,462	4,729	0	**-4,780**	76,830	1408.95
	Oct	1,307	94	1,401	2,240	0	1,304	3,544	0	**-2,143**	74,687	1408.57
	Nov	-796	125	-671	1,347	0	1,161	2,507	0	**-3,178**	71,509	1408.00
	Dec	5,856	2,361	8,217	1,540	0	1,073	2,612	0	**5,604**	77,113	1409.00
2000	Jan	-241	578	337	1,495	0	992	2,486	0	**-2,149**	74,964	1408.62
	Feb	1,072	602	1,674	2,042	0	903	2,944	0	**-1,270**	73,694	1408.39
	Mar	10,709	11,609	22,318	1,845	0	1,041	2,884	4,248	**15,187**	88,881	1411.00
	Apr	8,073	5,868	13,940	2,241	0	1,093	3,334	10,607	**0**	88,881	1411.00
	May	5,505	4,511	10,016	3,679	0	1,156	4,835	5,181	**0**	88,881	1411.00
	Jun	3,322	5,420	8,742	2,995	20	1,224	4,239	4,503	**0**	88,881	1411.00
	Jul	-2,151	6,385	4,235	4,445	25	1,509	5,980	0	**-1,745**	87,135	1410.71
	Aug	-507	1	-506	5,592	22	1,635	7,249	0	**-7,755**	79,380	1409.39
	Sep	152	0	152	4,429	10	1,462	5,899	0	**-5,746**	73,634	1408.38
	Oct	10,072	1,020	11,092	1,840	0	1,304	3,143	0	**7,949**	81,583	1409.77
	Nov	11	768	779	758	0	1,161	1,919	0	**-1,140**	80,443	1409.58
	Dec	1,319	495	1,814	1,979	0	1,073	3,050	0	**-1,236**	79,207	1409.36
2001	Jan	3,543	801	4,345	1,366	0	992	2,357	0	**1,988**	81,195	1409.71
	Feb	2,889	3,019	5,908	956	0	903	1,859	0	**4,049**	85,244	1410.40
	March	1,258	2,295	3,553	1,368	0	1,041	2,408	0	**1,145**	86,389	1410.59
	April	555	977	1,533	2,519	0	1,093	3,611	0	**-2,078**	84,311	1410.24
	May	15,883	26,233	42,116	2,610	0	1,156	3,763	33,782	**4,570**	88,881	1410.99
	June	-280	7,332	7,052	4,785	20	1,224	6,028	1,024	**0**	88,881	1411.00
	July	89	651	739	6,085	25	1,509	7,620	0	**-6,881**	82,000	1409.85
	Aug	1,103	522	1,625	4,310	22	1,635	5,968	0	**-4,342**	77,658	1409.09
	Sept	79	1,237	1,315	3,131	10	1,462	4,601	0	**-3,286**	74,372	1408.51
	Oct	-799	0	-799	2,720	0	1,304	4,022	0	**-4,821**	69,551	1407.65
	Nov	719	479	1,198	1,432	0	1,161	2,592	0	**-1,394**	68,156	1407.40
	Dec	140	381	521	1,431	0	1,073	2,503	0	**-1,982**	66,174	1407.03
2002	Jan	160	496	655	780	0	992	1,772	0	**-1,116**	65,058	1406.83
	Feb	527	808	1,335	1,820	0	903	2,722	0	**-1,387**	63,671	1406.57
	March	1,442	430	1,872	2,403	0	1,041	3,441	0	**-1,568**	62,103	1406.27
	April	5,996	3,725	9,721	1,697	0	1,093	2,787	0	**6,933**	69,036	1407.56
	May	70	273	343	2,315	0	1,156	3,468	0	**-3,126**	65,910	1406.99
	June	564	406	970	3,753	20	1,224	4,990	0	**-4,020**	61,890	1406.23
	July	642	284	926	2,928	25	1,509	4,456	0	**-3,530**	58,360	1405.55
	Aug	44	170	214	3,813	22	1,635	5,463	0	**-5,248**	53,112	1404.51
	Sept	1,099	62	1,161	2,599	10	1,462	4,066	0	**-2,905**	50,207	1403.91
	Oct	2,846	6,023	8,869	1,198	0	1,304	2,499	0	**6,370**	56,578	1405.20
	Nov	461	916	1,377	915	0	1,161	2,074	0	**-697**	55,880	1405.07
	Dec	2,124	680	2,804	734	0	1,073	1,805	0	**999**	56,879	1405.26
2003	Jan	281	446	727	1,183	0	992	2,172	0	**-1,445**	55,435	1404.98
	Feb	628	286	915	1,012	0	903	1,913	0	**-998**	54,437	1404.78
	March	782	372	1,154	1,795	0	1,041	2,831	0	**-1,677**	52,760	1404.44
	April	1,007	406	1,413	2,202	0	1,093	3,290	0	**-1,877**	50,883	1404.05
	May	1,298	662	1,959	2,426	0	1,156	3,574	0	**-1,615**	49,268	1403.71
	June	17,356	7,278	24,634	2,153	20	1,224	3,389	0	**21,245**	70,513	1407.82
	July	-370	68	-302	4,215	25	1,509	5,736	0	**-6,038**	64,475	1406.72
	Aug	2,373	0	2,373	3,933	22	1,635	5,577	0	**-3,204**	61,271	1406.12
	Sept	-329	2,651	2,322	2,372	10	1,462	3,836	0	**-1,514**	59,757	1405.83
	Oct	-141	31	-110	1,902	0	1,304	3,199	0	**-3,309**	56,448	1405.18
	Nov	-236	6	-230	641	0	1,161	1,799	0	**-2,030**	54,419	1404.77
	Dec	258	76	333	1,399	0	1,073	2,467	0	**-2,134**	52,285	1404.34

Table 31. 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	1,264	353	1,617	1,117	0	992	2,104	0	**-488**	51,797	1404.24
	Feb	1,539	8	1,547	1,037	0	903	1,935	0	**-389**	51,409	1404.16
	March	8,248	9,734	17,982	1,976	0	1,041	3,008	0	**14,974**	66,383	1407.07
	April	594	3,921	4,515	2,104	0	1,093	3,189	0	**1,326**	67,709	1407.32
	May	325	692	1,017	2,966	0	1,156	4,110	0	**-3,094**	64,615	1406.75
	June	958	3,617	4,575	2,985	20	1,224	4,216	0	**359**	64,974	1406.81
	July	3,242	4,482	7,725	3,624	25	1,509	5,142	0	**2,583**	67,557	1407.29
	Aug	1,401	130	1,531	2,880	22	1,635	4,525	0	**-2,994**	64,562	1406.74
	Sept	22	665	687	2,779	10	1,462	4,238	0	**-3,551**	61,011	1406.07
	Oct	3,768	5,930	9,699	1,313	0	1,304	2,611	0	**7,088**	68,099	1407.39
	Nov	12,008	19,239	31,247	798	0	1,161	1,955	8,510	**20,782**	88,881	1410.99
	Dec	343	2,090	2,432	1,743	0	1,073	2,815	0	**-383**	88,498	1410.93
2005	Jan	2,812	3,570	6,382	1,104	0	992	2,096	3,903	**383**	88,881	1411.00
	Feb	2,357	2,034	4,391	1,178	0	903	2,081	2,310	**0**	88,881	1411.00
	Mar	644	1,186	1,830	1,996	0	1,041	3,036	0	**-1,207**	87,674	1410.80
	Apr	105	652	757	3,124	0	1,093	4,217	0	**-3,460**	84,214	1410.22
	May	1,957	1,015	2,972	2,671	0	1,156	3,827	0	**-854**	83,359	1410.08
	Jun	969	4,479	5,447	3,938	20	1,224	5,180	0	**267**	83,627	1410.12
	Jul	1,544	329	1,872	4,539	25	1,509	6,071	0	**-4,198**	79,429	1409.40
	Aug	863	7,778	8,642	3,472	22	1,635	5,127	0	**3,515**	82,943	1410.01
	Sep	5,425	4,826	10,251	2,982	10	1,462	4,451	0	**5,800**	88,743	1410.97
	Oct	504	2,078	2,582	2,197	0	1,304	3,499	0	**-917**	87,826	1410.82
	Nov	87	379	466	2,029	0	1,161	3,188	0	**-2,722**	85,104	1410.37
	Dec	199	329	528	1,808	0	1,073	2,879	0	**-2,351**	82,754	1409.97
2006	Jan	1,201	115	1,316	2,723	0	992	3,712	0	**-2,396**	80,358	1409.56
	Feb	1,366	116	1,482	2,096	0	903	2,996	0	**-1,514**	78,844	1409.30
	March	668	278	946	1,133	0	1,041	2,172	0	**-1,226**	77,618	1409.09
	April	1,289	170	1,459	3,819	0	1,093	4,906	0	**-3,447**	74,171	1408.48
	May	1,446	2,426	3,872	3,731	0	1,156	4,881	0	**-1,009**	73,162	1408.30
	June	-37	731	695	4,653	20	1,224	5,888	0	**-5,193**	67,969	1407.36
	July	457	48	505	4,886	25	1,509	6,411	0	**-5,906**	62,063	1406.27
	Aug	2,532	780	3,312	3,854	22	1,635	5,504	0	**-2,192**	59,872	1405.85
	Sept	127	1,408	1,535	2,321	10	1,462	3,786	0	**-2,251**	57,621	1405.41
	Oct	1,116	4,834	5,950	1,751	0	1,304	3,050	0	**2,899**	60,520	1405.97
	Nov	157	0	157	1,234	0	1,161	2,391	0	**-2,235**	58,285	1405.54
	Dec	1,914	678	2,592	1,032	0	1,073	2,101	0	**491**	58,777	1405.64
2007	Jan	847	396	1,244	985	0	992	1,974	0	**-730**	58,047	1405.49
	Feb	942	258	1,200	1,279	0	903	2,178	0	**-978**	57,068	1405.30
	March	2,637	10,402	13,039	1,839	0	1,041	2,874	0	**10,166**	67,234	1407.23
	April	-120	20,410	20,290	1,730	0	1,093	2,819	0	**17,471**	84,705	1410.30
	May	11,785	24,638	36,424	2,047	0	1,156	3,197	29,050	**4,176**	88,881	1411.00
	June	25,765	22,656	48,421	2,466	20	1,224	3,709	44,711	**0**	88,881	1411.00
	July	6,115	8,444	14,559	3,568	25	1,509	5,103	9,456	**0**	88,881	1411.00
	Aug	8,926	4,565	13,491	3,813	22	1,635	5,471	8,020	**0**	88,881	1411.00
	Sept	2,269	1,271	3,540	3,082	10	1,462	4,554	0	**-1,014**	87,867	1410.83
	Oct	201	1,263	1,463	2,522	0	1,304	3,826	0	**-2,363**	85,504	1410.44
	Nov	-911	536	-376	1,485	0	1,161	2,646	0	**-3,022**	82,482	1409.93
	Dec	1,358	850	2,208	1,094	0	1,073	2,166	0	**42**	82,524	1409.93
2008	Jan	721	574	1,295	1,910	0	992	2,900	0	**-1,606**	80,918	1409.66
	Feb	2,129	1,414	3,543	1,917	0	903	2,819	0	**725**	81,643	1409.78
	March	13,059	3,629	16,687	2,835	0	1,041	3,874	5,575	**7,238**	88,881	1411.00
	April	10,510	4,209	14,719	2,995	0	1,093	4,089	10,631	**0**	88,881	1411.00
	May	1,577	1,059	2,636	3,904	0	1,156	5,060	0	**-2,425**	86,456	1410.60
	June	837	483	1,320	4,643	20	1,224	5,887	0	**-4,566**	81,890	1409.83
	July	1,365	0	1,365	4,603	25	1,509	6,137	0	**-4,773**	77,117	1409.00
	Aug	1,562	307	1,869	3,455	22	1,635	5,112	0	**-3,243**	73,874	1408.43
	Sept	-25	3,971	3,946	2,498	10	1,462	3,969	0	**-23**	73,851	1408.42
	Oct	2,542	5,447	7,989	1,940	0	1,304	3,243	0	**4,747**	78,598	1409.26
	Nov	69	1,348	1,417	2,249	0	1,161	3,409	0	**-1,992**	76,606	1408.91
	Dec	-222	650	428	1,813	0	1,073	2,884	0	**-2,456**	74,150	1408.48

Table 31. 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	608	322	929	2,039	0	992	3,030	0	**-2,100**	72,050	1408.10
	Feb	847	91	938	2,372	0	903	3,273	0	**-2,335**	69,716	1407.68
	March	1,710	15	1,725	2,750	0	1,041	3,787	0	**-2,062**	67,653	1407.31
	April	8,036	1,512	9,548	2,488	0	1,093	3,578	0	**5,970**	73,623	1408.38
	May	4,737	2,420	7,158	2,205	0	1,156	3,358	0	**3,800**	77,423	1409.05
	June	827	599	1,426	3,763	20	1,224	4,999	0	**-3,573**	73,850	1408.42
	July	848	167	1,015	3,993	25	1,509	5,520	0	**-4,505**	69,345	1407.61
	Aug	199	55	254	4,367	22	1,635	6,016	0	**-5,762**	63,583	1406.55
	Sept	5,335	1,601	6,936	2,113	10	1,462	3,579	0	**3,357**	66,940	1407.18
	Oct	4,044	510	4,554	1,139	0	1,304	2,441	0	**2,114**	69,054	1407.56
	Nov	441	0	441	1,080	0	1,161	2,239	0	**-1,798**	67,255	1407.23
	Dec	911	211	1,123	991	0	1,073	2,061	0	**-938**	66,317	1407.06
2010	Jan	2,656	294	2,950	1,035	0	992	2,025	0	**926**	67,243	1407.23
	Feb	4,143	1,326	5,469	812	0	903	1,713	0	**3,756**	70,998	1407.91
	Mar	2,157	409	2,566	2,539	0	1,041	3,572	0	**-1,006**	69,993	1407.73
	Apr	761	2,576	3,336	1,896	0	1,093	2,984	0	**353**	70,345	1407.79
	May	559	571	1,130	2,988	0	1,156	4,135	0	**-3,005**	67,340	1407.25
	Jun	2,361	249	2,610	3,954	20	1,224	5,185	0	**-2,575**	64,765	1406.77
	Jul	25,979	11,389	37,367	2,973	25	1,509	4,497	8,755	**24,115**	88,881	1411.00
	Aug	690	870	1,559	4,920	22	1,635	6,577	0	**-5,018**	83,863	1410.16
	Sep	2,078	237	2,315	2,908	10	1,462	4,378	0	**-2,063**	81,800	1409.81
	Oct	3,669	1,084	4,752	2,488	0	1,304	3,791	0	**961**	82,761	1409.98
	Nov	1,831	648	2,478	1,378	0	1,161	2,539	0	**-60**	82,701	1409.97
	Dec	-401	43	-358	1,133	0	1,073	2,206	0	**-2,564**	80,138	1409.52
2011	Jan	639	486	1,125	1,389	0	992	2,380	0	**-1,255**	78,882	1409.31
	Feb	1,578	164	1,742	1,639	0	903	2,541	0	**-799**	78,084	1409.17
	March	-1,357	71	-1,287	519	0	1,041	1,559	0	**-2,846**	75,238	1408.67
	April	750	0	750	3,589	0	1,093	4,679	0	**-3,928**	71,310	1407.97
	May	2,399	1,593	3,992	669	0	1,156	1,824	0	**2,168**	73,477	1408.36
	June	413	0	413	6,093	20	1,224	7,330	0	**-6,917**	66,560	1407.11
	July	834	0	834	6,099	25	1,509	7,625	0	**-6,790**	59,770	1405.83
	Aug	450	0	450	4,999	22	1,635	6,648	0	**-6,197**	53,573	1404.60
	Sept	-39	0	-39	3,380	10	1,462	4,846	0	**-4,884**	48,688	1403.59
	Oct	863	0	863	2,178	0	1,304	3,477	0	**-2,614**	46,074	1403.02
	Nov	5,360	7,967	13,327	2,907	0	1,161	4,061	0	**9,266**	55,340	1404.96
	Dec	206	50	256	175	0	1,073	1,247	0	**-991**	54,349	1404.76
2012	Jan	1,043	0	1,043	1,821	0	992	2,809	0	**-1,766**	52,583	1404.40
	Feb	866	0	866	1,393	0	903	2,292	0	**-1,426**	51,157	1404.11
	March	2,324	984	3,308	1,993	0	1,041	3,028	0	**280**	51,437	1404.16
	April	4,273	5,379	9,652	2,279	0	1,093	3,365	0	**6,287**	57,724	1405.43
	May	-830	3,031	2,202	3,303	0	1,156	4,449	0	**-2,247**	55,477	1404.99
	June	1,875	640	2,515	3,464	20	1,224	4,697	0	**-2,182**	53,295	1404.55
	July	39	0	39	4,561	25	1,509	6,081	0	**-6,042**	47,253	1403.28
	Aug	315	0	315	3,633	22	1,635	5,279	0	**-4,964**	42,289	1402.17
	Sept	667	0	667	2,767	10	1,462	4,227	0	**-3,560**	38,729	1401.33
	Oct	-462	0	-462	1,428	0	1,304	2,725	0	**-3,187**	35,542	1400.54
	Nov	-173	0	-173	1,347	0	1,161	2,501	0	**-2,675**	32,867	1399.84
	Dec	304	0	304	1,038	0	1,073	2,104	0	**-1,799**	31,068	1399.36
2013	Jan	439	0	439	889	0	992	1,875	0	**-1,436**	29,632	1398.97
	Feb	941	0	941	1,021	0	903	1,917	0	**-976**	28,656	1398.69
	March	295	7	302	1,628	0	1,041	2,656	0	**-2,354**	26,303	1398.01
	April	420	49	469	1,272	0	1,093	2,355	0	**-1,886**	24,417	1397.44
	May	3,849	16	3,865	2,036	0	1,156	3,172	0	**693**	25,110	1397.65
	June	536	0	536	2,652	20	1,224	3,871	0	**-3,335**	21,775	1396.60
	July	722	0	722	2,417	25	1,509	3,925	0	**-3,203**	18,572	1395.51
	Aug	531	0	531	2,438	22	1,635	4,065	0	**-3,534**	15,038	1394.19
	Sept	3,219	0	3,219	1,615	10	1,462	3,067	0	**152**	15,190	1394.25
	Oct	5,573	184	5,757	1,234	0	1,304	2,522	0	**3,235**	18,425	1395.46
	Nov	16	568	584	577	0	1,161	1,731	0	**-1,147**	17,277	1395.04
	Dec	405	0	405	502	0	1,073	1,568	0	**-1,163**	16,114	1394.61

Table 31. 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	633	0	633	1,201	0	992	2,178	0	**-1,545**	14,569	1394.00
	Feb	387	0	387	672	0	903	1,566	0	**-1,179**	13,390	1393.52
	March	648	0	648	1,260	0	1,041	2,282	0	**-1,634**	11,756	1392.80
	April	95	0	95	1,390	0	1,093	2,459	0	**-2,364**	9,392	1391.67
	May	1,118	1,574	2,692	1,283	0	1,156	2,412	0	**281**	9,673	1391.81
	June	5,905	2,739	8,644	1,595	20	1,224	2,806	0	**5,838**	15,511	1394.37
	July	1,047	149	1,196	1,921	25	1,509	3,430	0	**-2,234**	13,277	1393.47
	Aug	236	770	1,006	2,025	22	1,635	3,652	0	**-2,646**	10,630	1392.28
	Sept	70	972	1,042	1,390	10	1,462	2,819	0	**-1,777**	8,854	1391.40
	Oct	117	0	117	1,088	0	1,304	2,396	0	**-2,279**	6,575	1390.11
	Nov	1,346	25	1,371	660	0	1,161	1,822	0	**-451**	6,124	1389.83
	Dec	-307	0	-307	236	0	1,073	1,309	0	**-1,616**	4,508	1388.75
2015	Jan	592	0	592	444	0	992	1,437	0	**-845**	3,664	1388.11
	Feb	190	164	354	425	0	903	1,328	0	**-974**	2,690	1387.28
	Mar	442	0	442	406	0	1,041	1,445	0	**-1,003**	1,687	1386.30
	Apr	1,452	3,433	4,885	574	0	1,093	1,664	0	**3,221**	4,907	1389.03
	May	81,596	23,859	105,455	791	0	1,156	1,944	19,538	**83,973**	88,881	1410.99
	Jun	20,867	17,825	38,691	5,173	20	1,224	6,415	32,277	**0**	88,881	1410.99
	Jul	-698	10,133	9,435	2,553	25	1,509	4,087	5,348	**0**	88,881	1411.00
	Aug	-2,193	5,995	3,803	3,232	22	1,635	4,890	0	**-1,087**	87,794	1410.82
	Sep	1,357	3,796	5,153	4,034	10	1,462	5,505	0	**-353**	87,441	1410.76
	Oct	-397	2,565	2,168	2,917	0	1,304	4,220	0	**-2,052**	85,389	1410.42
	Nov	3,434	6,725	10,159	1,519	0	1,161	2,680	3,987	**3,491**	88,881	1411.00
	Dec	4,691	4,742	9,433	1,565	0	1,073	2,638	6,796	**0**	88,881	1411.00
2016	Jan	-3,789	3,861	72	1,225	0	992	2,217	0	**-2,145**	86,736	1410.64
	Feb	2,301	1,395	3,696	2,683	0	903	3,585	0	**110**	86,846	1410.66
	March	4,258	1,269	5,528	3,169	0	1,041	4,209	0	**1,319**	88,165	1410.88
	April	20,831	7,083	27,914	2,890	0	1,093	3,982	23,216	**716**	88,881	1411.00
	May	-199	4,632	4,433	3,276	0	1,156	4,432	1	**0**	88,881	1411.00
	June	8,009	7,638	15,647	3,892	20	1,224	5,136	10,511	**0**	88,881	1411.00
	July	5,554	2,627	8,181	5,323	25	1,509	6,857	1,324	**0**	88,881	1411.00
	Aug	1,194	1,287	2,481	4,315	22	1,635	5,972	0	**-3,492**	85,389	1410.42
	Sept	9,012	9,540	18,553	3,286	10	1,462	4,757	10,304	**3,492**	88,881	1411.00
	Oct	-5,040	3,515	-1,525	2,869	0	1,304	4,173	0	**-5,698**	83,183	1410.05
	Nov	-2,504	5,343	2,839	1,916	0	1,161	3,078	0	**-239**	82,944	1410.01
	Dec	-3,053	5,458	2,405	1,367	0	1,073	2,440	0	**-35**	82,909	1410.00

6.7. Bretch Diversion and Canal Expansion Alternatives

The Bretch canal has a capacity of 1,000 cfs and can divert flows from Elk Creek above 10-cfs (Reclamation, 1983). The flow through the canal is controlled by a single radial gate with an invert elevation at 1,455 ft (water stored below this elevation cannot enter the canal by gravity) and a maximum gate opening at elevation 1,465.4 ft. Before entering the canal, flows are regulated in a small reservoir formed by the diversion dam. The diversion dam can store flows in this small reservoir for canal diversions up to elevation 1,465.4 ft. Based on an area-capacity curve plotted using elevation contours extracted from the 10-meter National Elevation Dataset (NED) for Kiowa County, it was determined that the regulating reservoir can store up to 970 acre-ft of streamflow for canal diversions (elevation 1,465.4 ft), with 810 acre-ft of active capacity that could be diverted through the canal (elevation 1,455 ft).

Given that the firm yield update under Method 3 resulted in a firm yield below the District's 16,100 acre-ft/yr water right, the District asked Reclamation to perform an analysis as part of the URRBS to determine if the firm yield of Tom Steed Reservoir could be increased by modifying the Bretch Diversion Dam and Canal to accommodate additional storage and flows. Two storage expansion alternatives were considered: expansion to either 1,390 acre-ft and 2,170 acre-ft. Both options involved excavation of the regulation reservoir or modification of the diversion dam gate structure. In addition, three canal expansion alternatives were considered: expansion to 1,250, 1,500, and 1,750 cfs. Combining storage and conveyance, a total of 11 storage/canal combinations were evaluated.

Using the daily extended flow record for Elk Creek between Oct 1949 and Dec 2016, the 11 storage/canal alternatives were analyzed to determine monthly divertable flows and impacts on reservoir firm yield. The same assumptions related to evaporation and seepage losses used under Method 3 were used in this analysis. Results show that over the entire period of record, infrastructure modifications could potentially increase divertible flows from Elk Creek by between two percent to 15 percent compared to the "No Action" alternative of making no modifications to existing infrastructure. However, none of the 11 alternatives increase divertible flows during the critical drought period between Sep 2010 and Mar 2015, meaning there would

be no impact on reservoir firm yield. These results were the same under the year 2025, 2060, and 2075 sediment conditions (2025, 2060, and 2075; Table 32).

Due to the uncertainty associated with the extended flow record for Elk Creek and variability of future droughts, the daily flow data recorded at the Hobart streamgage from Oct 1949 to Sep 1993 also was analyzed. Although these data include the 1950s and 1960s droughts, they *exclude* the 2010-2015 drought of record and should be viewed with caution. Based on this abbreviated period, reservoir firm yield under the "No Action" is 17,600 acre-ft/yr, 16,700 acre-ft/yr, and 16,400 acre-ft/yr based on year 2025, 2060, and 2075 sediment conditions. Indeed, if this limited flow record is used as a basis of planning and decision-making, then expansion of the system is not needed because the firm yield is sufficient to deliver the District's permitted water right of 16,100 acre-ft/yr. That said, an analysis of the 11 modification alternatives shows that reservoir firm yield could be increased to between 16,500 acre-ft/yr and 19,300 acre-ft/yr depending on the modification and sediment condition (Table 32). Of course, this discussion excludes an analysis of the costs to implement these modifications. Reclamation performed a cost evaluation of all 11 alternatives, but that a presentation of costs is beyond the scope of this report.

*Table 32. Tom Steed Reservoir firm yield under a range of alternatives to expand storage and conveyance of the Bretch Diversion Dam and Canal system. Results are presented under two periods of record and three sediment conditions (Year 2025 is denoted by blue font; Year 2060 is denoted by **bold** font; and Year 2075 is denoted by red font).*

Reservoir Firm Yield (acre-ft/yr) for the following Sediment Conditions: Year 2025 / **Year 2060** / Year 2075		Period of Record (1926-2016) Bretch Diversion Dam Storage Alternatives:		
		970 acre-ft (No Action)	1,390 acre-ft	2,170 acre-ft
Bretch Canal Capacity Alternatives	1,000 cfs (No Action)	15,500 / **14,600** / 14,100	15,500 / **14,600** / 14,100	15,500 / **14,600** / 14,100
	1,250 cfs	15,500 / **14,600** / 14,100	15,500 / **14,600** / 14,100	15,500 / **14,600** / 14,100
	1,500 cfs	15,500 / **14,600** / 14,100	15,500 / **14,600** / 14,100	15,500 / **14,600** / 14,100
	1,750 cfs	15,500 / **14,600** / 14,100	15,500 / **14,600** / 14,100	15,500 / **14,600** / 14,100
Reservoir Firm Yield (acre-ft/yr) for the following Sediment Conditions: Year 2025 / **Year 2060** / Year 2075		Limited Period of Record (1949-1993) Bretch Diversion Dam Storage Alternatives:		
		970 acre-ft (No Action)	1,390 acre-ft	2,170 acre-ft
Bretch Canal Capacity Alternatives	1,000 cfs (No Action)	17,600 / **16,700** / 16,400	17,800 / **16,900** / 16,500	18,000 / **17,100** / 16,800
	1,250 cfs	18,100 / **17,200** / 16,900	18,200 / **17,400** / 17,000	18,500 / **17,600** / 17,200
	1,500 cfs	18,600 / **17,700** / 17,300	18,700 / **17,800** / 17,500	18,900 / **18,100** / 17,700
	1,750 cfs	19,000 / **18,100** / 17,700	19,100 / **18,200** / 17,800	19,300 / **18,500** / 18,100