



TROA Operations and Water Supply for Northern Nevada

WSWC Spring 2023 Meeting, Reno, NV

Bill Hauck, Water Supply Supervisor

May 23, 2023

TMWA Facts and Figures

Population Served

- Retail - 460,000 (>135,000 active connections)
- Wholesale > 15,000 (Sun Valley GID)

Statistics

- Current demand - **86,000 AF (2022)**
- Peak Day Demand - **144 MG (2022) ~ 4X Average Wintertime Demand**
- Peak Day Capacity > 200 MGD

Sources

- Surface Water - 3 surface water treatment plants (~ **80-85%** of total supply)
 - Chalk Bluff (90 MGD) and Glendale (37 MGD) WTPs (Truckee River)
 - Mt. Rose Water Treatment Plant 2021 (Whites Creek) - 4 MGD Capacity
- Groundwater - 80+ production wells (~ **15-20%** of total supply)
 - Fish Springs Ranch - Additional 8,000 AF groundwater supply (importation)
 - Aquifer Storage and Recovery (ASR)

Renewable Energy - 3 operating hydroelectric plants (~ \$3.5M revenue in normal year)

TMWA's Sources of Supply

Surface Water Supply (118,000 acre-feet rights) *plus* reservoir storage

- “40” CFS (28,959 AF) decreed
- Hunter Creek (9,847 AF) decreed
- Conversion of Irrigation Rights (approximately 80,000 AF)
- *Approximately 78,000 AF SW produced in 2022*

Reservoir Storage (27,000 acre-feet) *plus* TROA (9,500 AF - 50,000+ AF)

- Independence Lake (17,500 AF)
- Donner Lake (9,500 AF)
- **TROA** (provides for additional storage in federally operated reservoirs)

Groundwater Supply

Approximately 42,000 AF rights available in non-drought years (multiple GW basins)

- *Approximately 10,000 AF pumped in 2022*
- Additional pumping allowed in drought years (Truckee Meadows Basin)
- **Active** (ASR) and **Passive** recharge augments GW supply (25+ years)

TMWA's *Integrated Approach* to Water Management

Considers *all sources of supply as part of a single system* to meet demand providing *flexibility*

- Any one of our **multiple sources of supply** can meet TMWA's customer demand alone (depending on the time of the year), but managed conjunctively we have **increased system redundancy** and **created a drought resilient water supply** for our water customers in Northern Nevada
- Through extensive planning, the acquisition and development of multiple sources of supply over the years and the **coordinated management of those resources**, TMWA will continue to be able to provide its customers with a secure, reliable, drought resistant and **cost-effective** water supply for decades to come
- Despite** the extreme variability in snowpack, runoff, upstream reservoir storage and river flows from year-to-year

2023 Lake Tahoe Basin All-Time Max April 01 Snow Water Equivalent

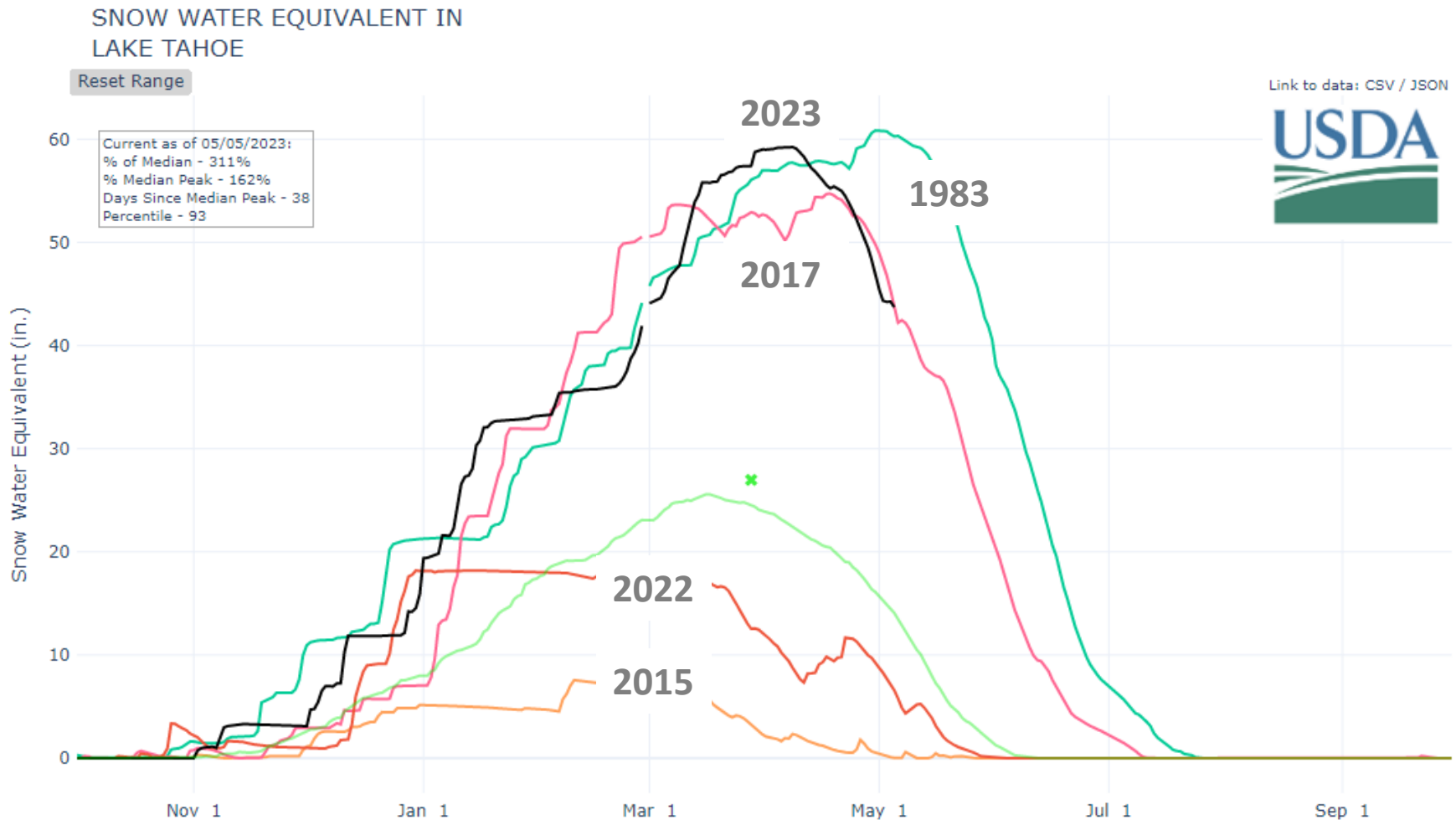




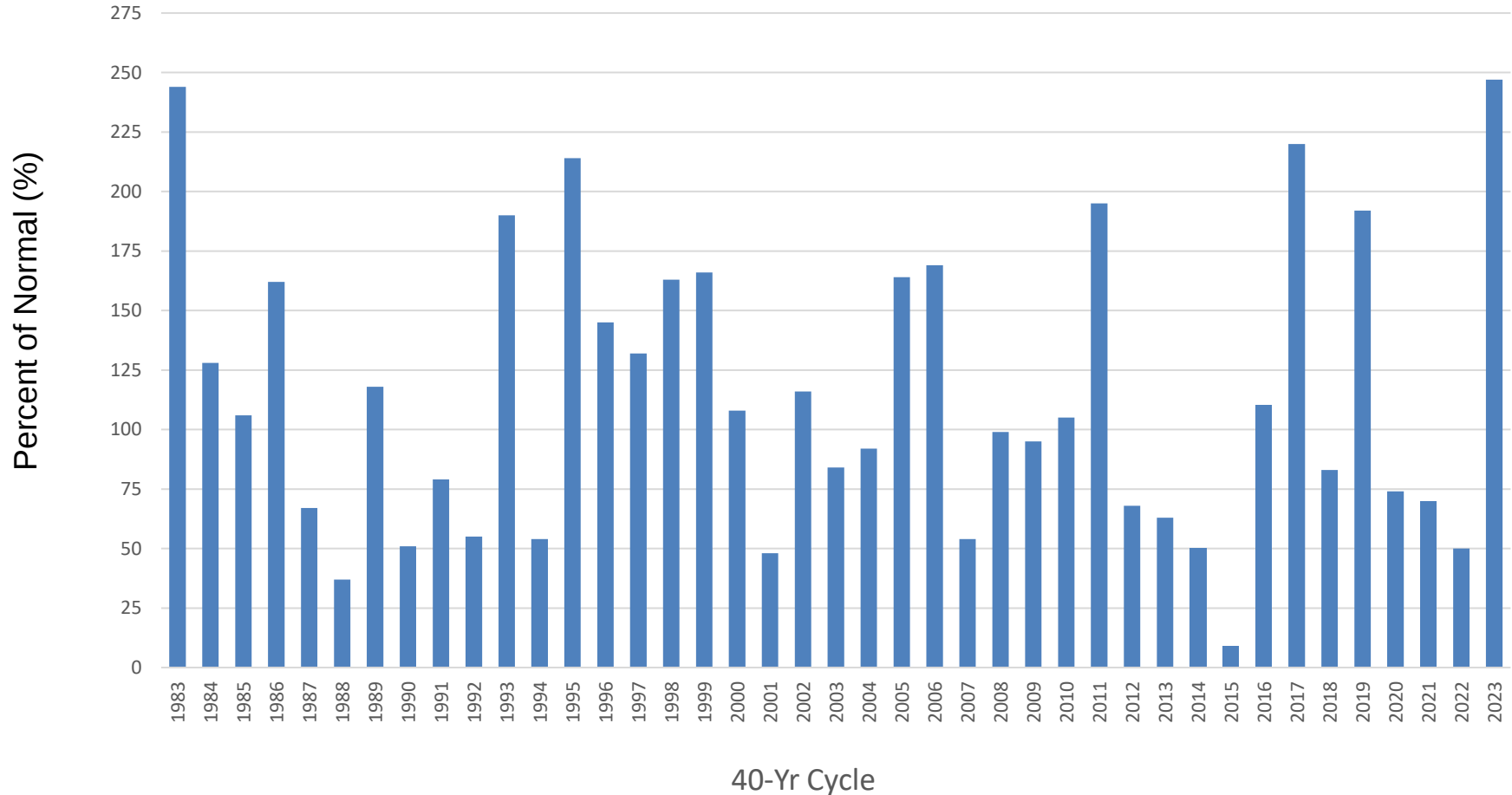
WHEN FLASHING
CHAINS OR
4WD/AWD WITH
SNOW TIRES
REQUIRED

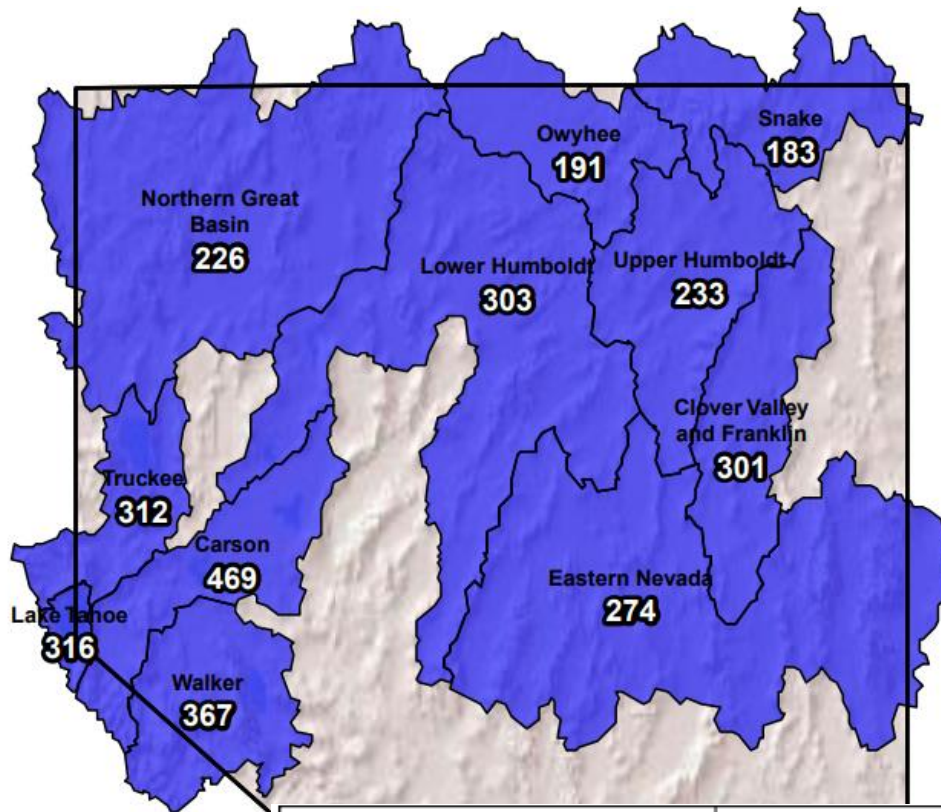


Lake Tahoe Basin Snowpack Comparison

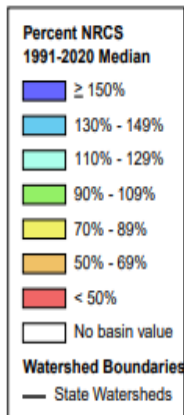


April 1 Lake Tahoe Basin Snowpack (last 40 years)





Snow Water Equivalent	NEVADA & EASTERN SIERRA	May 5, 2023, first of day
Percent NRCS 1991-2020 Median		



May 01, 2023 NRCS Final Streamflow Forecast

- Lake Tahoe Gates Closed Rise (GCR) 30-yr median 1.16'

3.9' (336% Avg.) 05% COE (Apr-High)

3.4' (293% Avg.) 50% COE (Apr-High)

2.9' (250% Avg.) 95% COE (Apr-High)

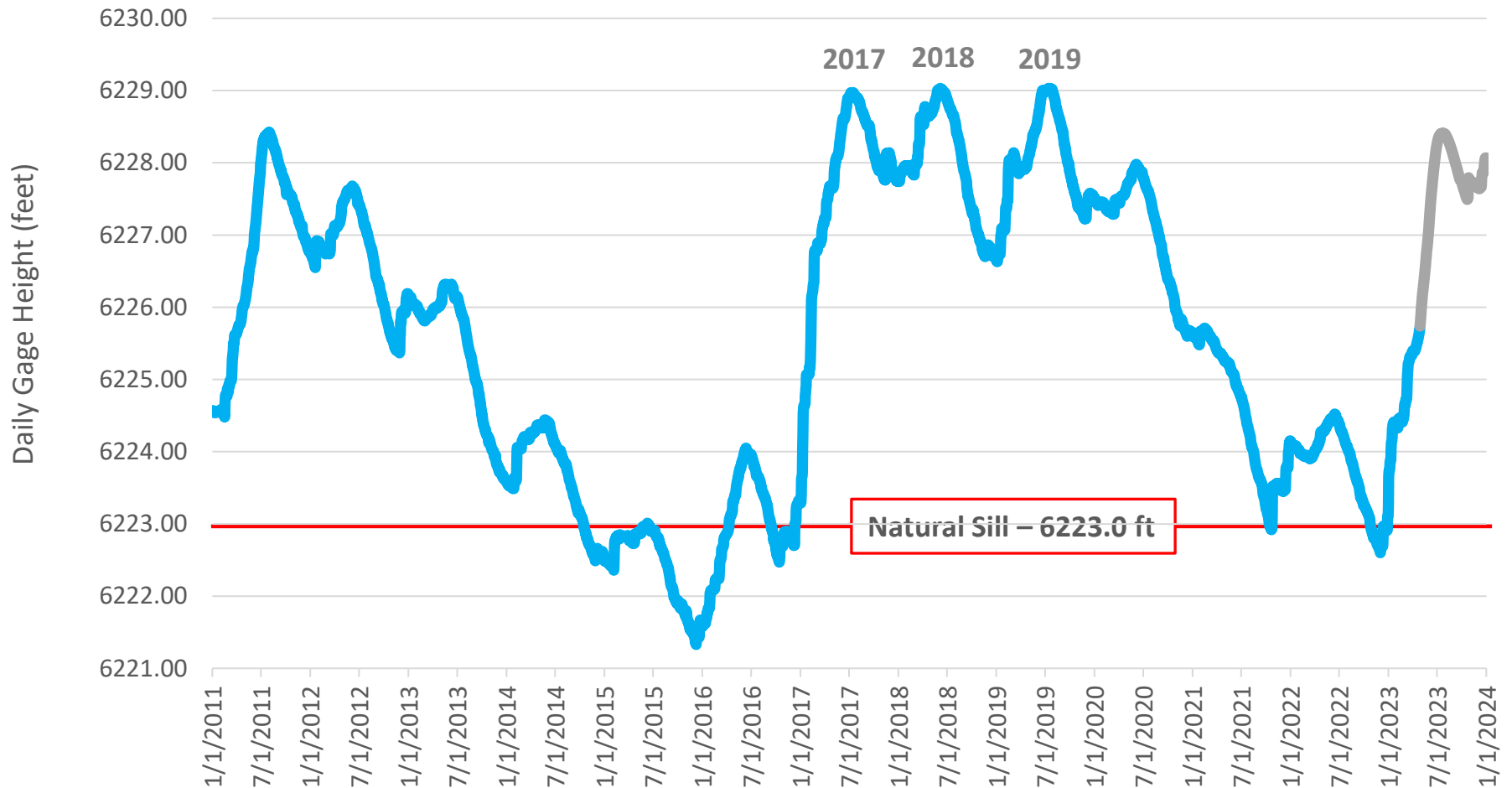
- Truckee River at Farad, CA (A-J) 30-yr median 225 KAF

669 KAF (297% Avg.) 05% COE (Apr-Jul)

630 KAF (280% Avg.) 50% COE (Apr-Jul)

590 KAF (262% Avg.) 95% COE (Apr-Jul)

Actual and Projected Lake Tahoe Elevation through 2023

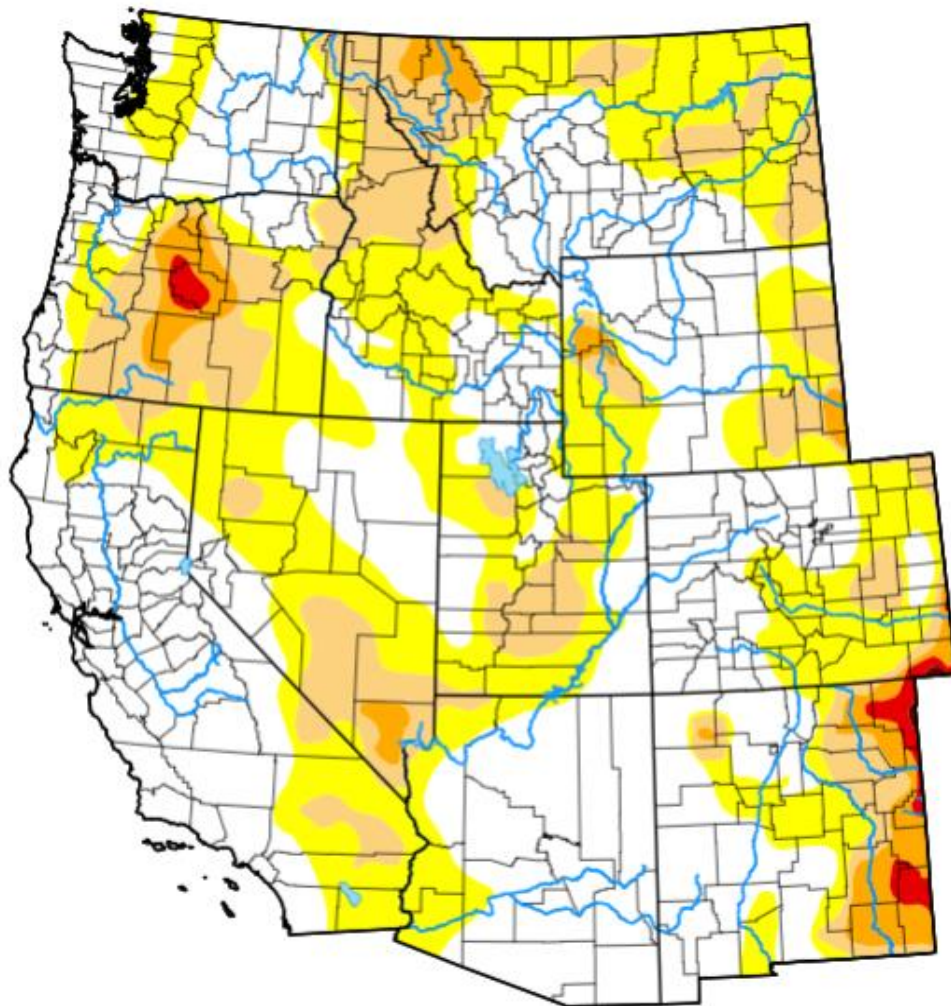


Truckee River System



Drought ?

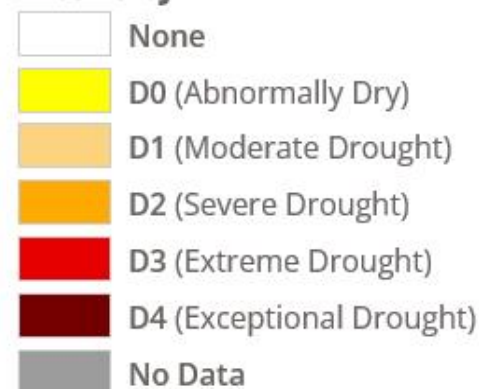




**Map released: Thurs. May 18,
2023**

Data valid: May 16, 2023 at 8 a.m. EDT

Intensity

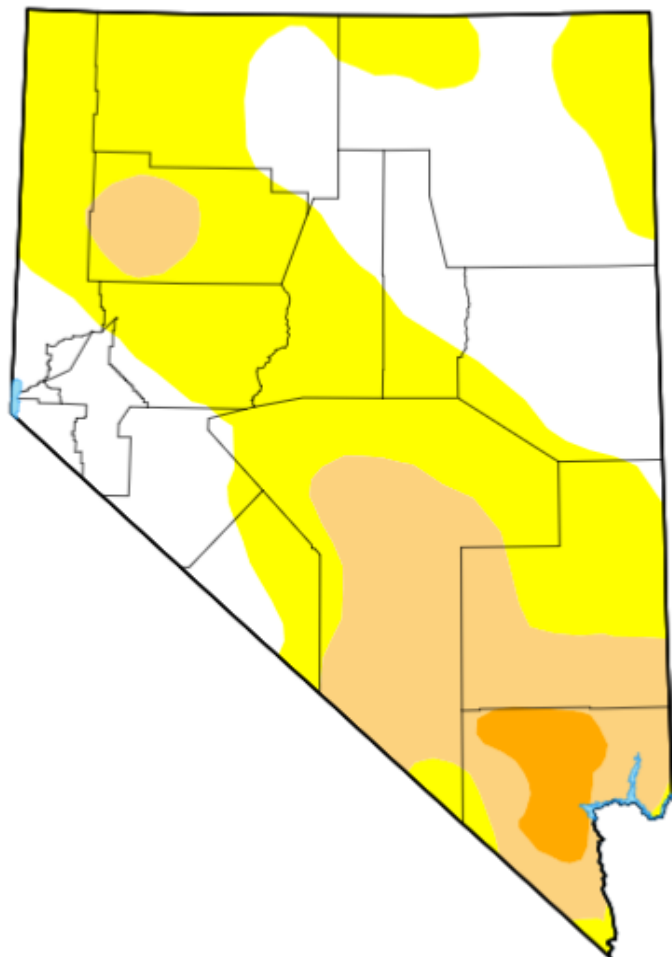


Authors

United States and Puerto Rico Author(s):
Brad Rippey, U.S. Department of Agriculture

Pacific Islands and Virgin Islands Author(s):
Denise Gutzmer, National Drought Mitigation Center

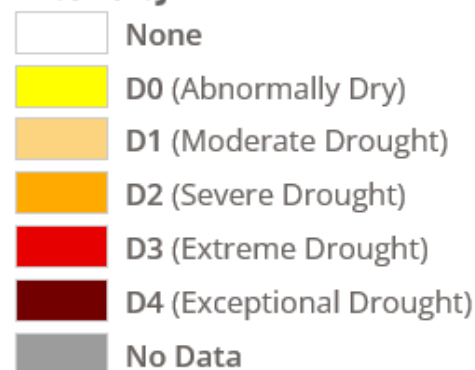
*The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying **text summary** for forecast statements.*



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Truckee River Operating Agreement (TROA)

Definition No. 26 “Drought Situation”

“Means a situation under which it is determined by April 15, based on procedures set forth in Section 3.D, *either* that there will not be sufficient **Floriston Rate Water** to maintain **Floriston Rates** through October 31, *or* the projected amount of **Lake Tahoe Floriston Rate Water** in Lake Tahoe (including **Lake Tahoe Floriston Rate Water** in other **Truckee River Reservoirs** as if it were in Lake Tahoe) on or before the following November 15 will be equivalent to an elevation less than 6223.5 feet Lake Tahoe datum.”

1. April 01 Median NRCS forecast for November 15, 2023 Tahoe Floriston Rate Pool Elevation is 6227.4 ft
2. April 01 Median NRCS forecast shows that Floriston Rates (required rate of flow at CA/NV state line) will be met through the end of December

“Non-Drought” designation took effect on April 15, 2023

TROA

TRUCKEE RIVER OPERATING AGREEMENT

What is TROA?

Signed in 2008 and implemented in December 2015, the Truckee River Operating Agreement (TROA) is a **new** operating agreement developed by TMWA, PLPT, the United States, Nevada and California (and seven other parties) regarding the operation of the Truckee River reservoirs

The **purpose** of TROA is to **create operational flexibility** in water management, storage and usage while ensuring that existing water rights are preserved in accordance with existing decrees, and that flood control and dam safety requirements are met

TROA **provides for** more effective coordination of reservoir operations which creates a more stable water supply, and enhances instream flows for threatened and endangered species and improves the overall water quality throughout the Truckee River system

Operational Flexibility and Storage Under TROA

- Allows for the storage of water in federally-owned upstream reservoirs when not needed, and release when needed during droughts
- Significantly enhances TMWA's municipal drought supply
- Sets allocation between California (10%) and Nevada (90%)
- Sets rules for treated effluent/recycled water use
- Benefits fisheries below reservoirs
- Improved spawning flows in the lower river
- Improved water quality
- Improved riparian habitat
- Gets more water to Pyramid Lake

TROA provides a mechanism for TMWA to more completely exercise water rights

- TMWA can restore and carry-over reservoir storage from **Donner** and **Independence** Reservoirs that would have been lost to the system during the fall and winter months, and use that water during times of drought to meet customer demand
- TMWA can also **establish** and credit store an additional 11,600 acre-feet each year in upstream reservoirs from changed diversion rights even in the driest years
- And because of the relative seniority of TMWA's water rights (and the 12-month season), these rights are **always** exercisable, even in the driest of conditions

Floriston Rates

- **Required** rates of flow in the Truckee River measured at the CA/NV state line (near town of Floriston)
- In place since **1908**
- Water is required to be released from Lake Tahoe (if possible) when natural flow in the river is not sufficient
- Framework of TROA built around these required rates of flow



Farad Gage (USGS # 10346000) - Farad, CA



These required rates of flow at the CA/NV State line have been in place for *115 years* (since 1908)

- The **Truckee River General Electric Company** (TRGEC, predecessor to TMWA) purchased the Lake Tahoe Dam from the **Floriston Pulp and Paper Company**
- They both utilized the water in the Truckee River for their respective operations (hydro-electric power generation and pulp and paper milling)
- TRGEC agreed to provide a fixed rate of flow in the river measured at a gage near the town of Floriston (now measured at Farad, CA)
- These flow rates were **optimal** for both hydro power generation and for pulp and paper manufacturing

AGREEMENT

November 2, 1908

By

Truckee River General Electric Company

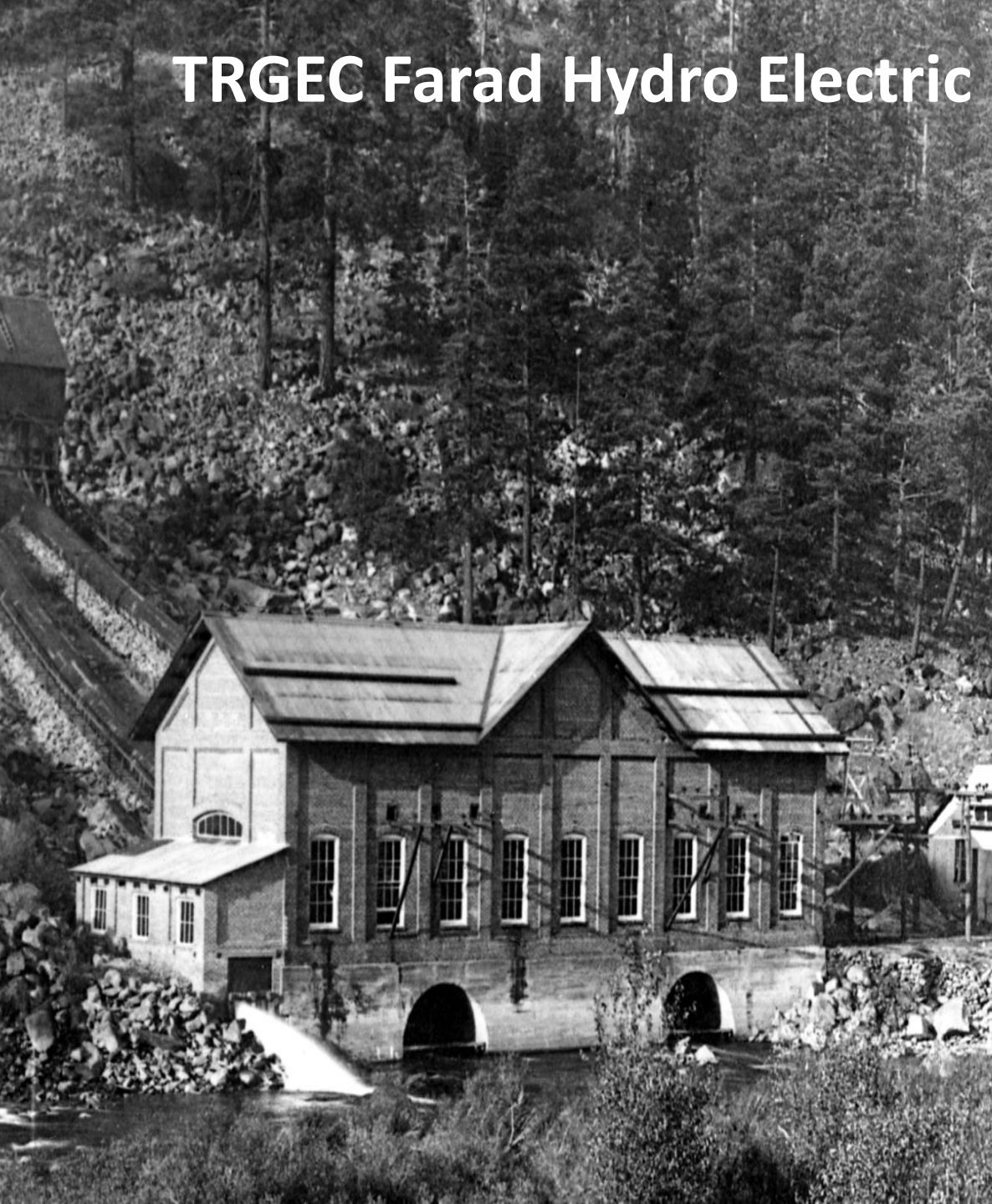
Floriston Land and Power Company

Floriston Pulp and Paper Company

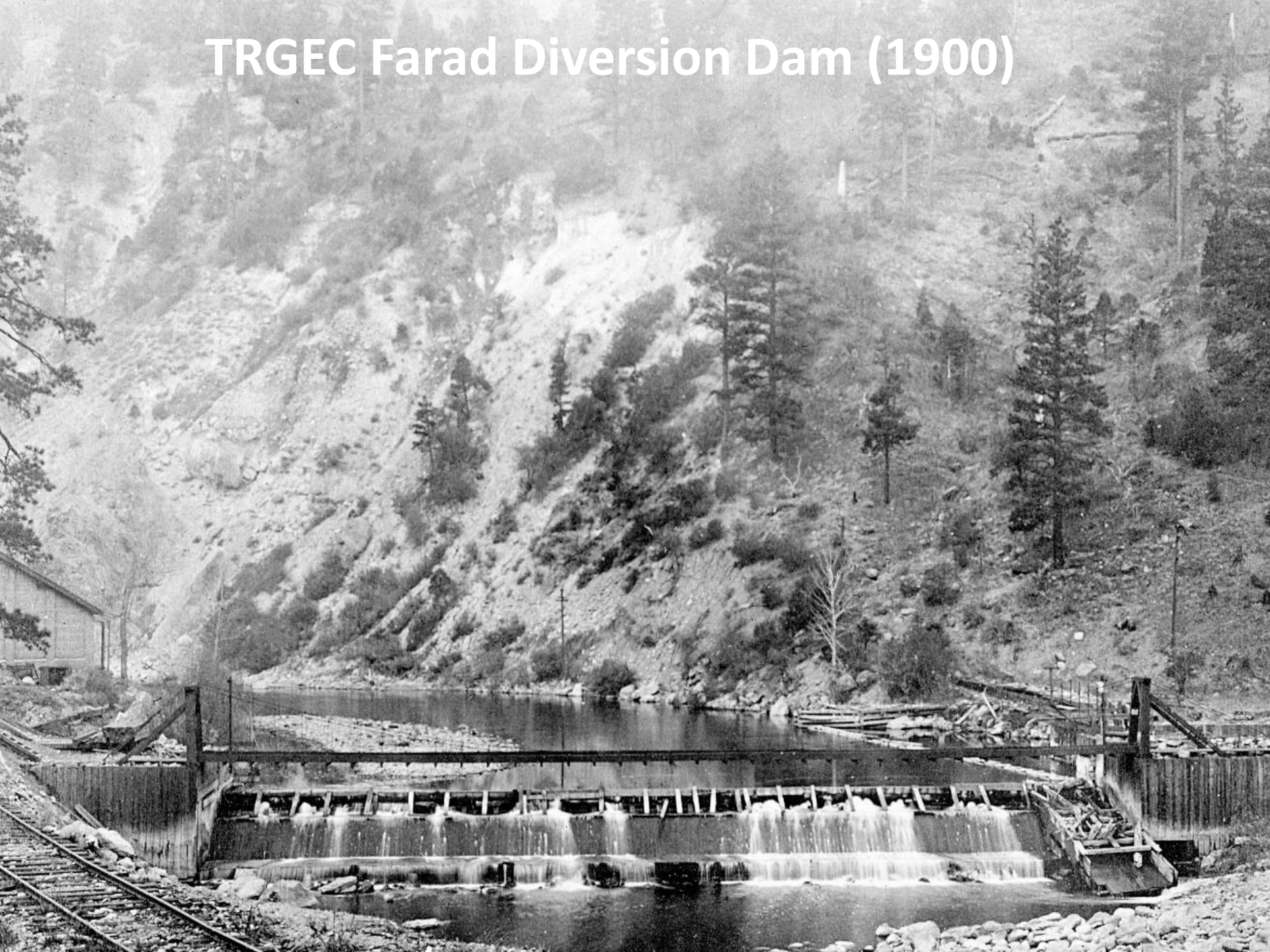
Re

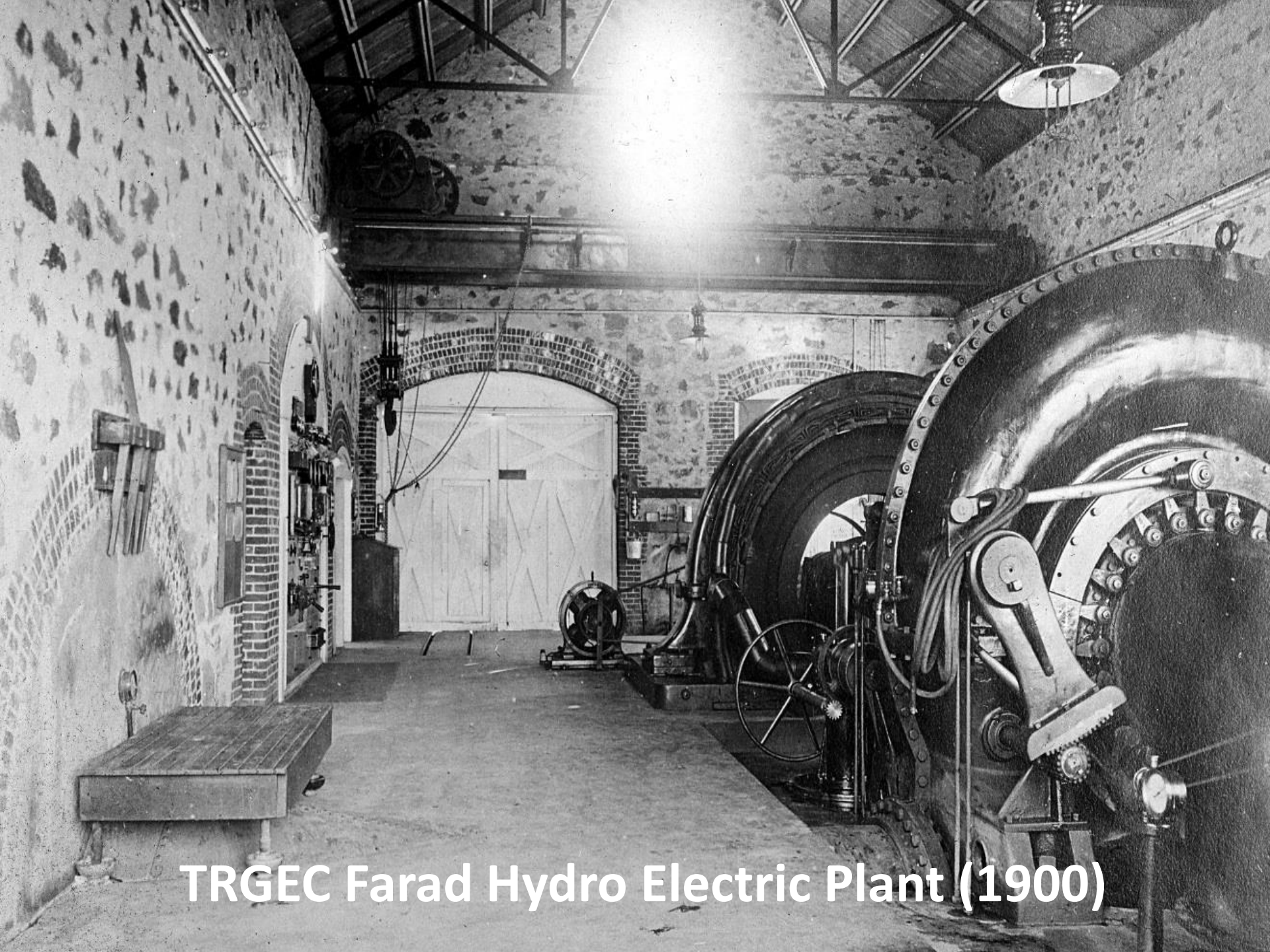
Flow releases from Lake Tahoe

TRGEC Farad Hydro Electric Plant (1900)



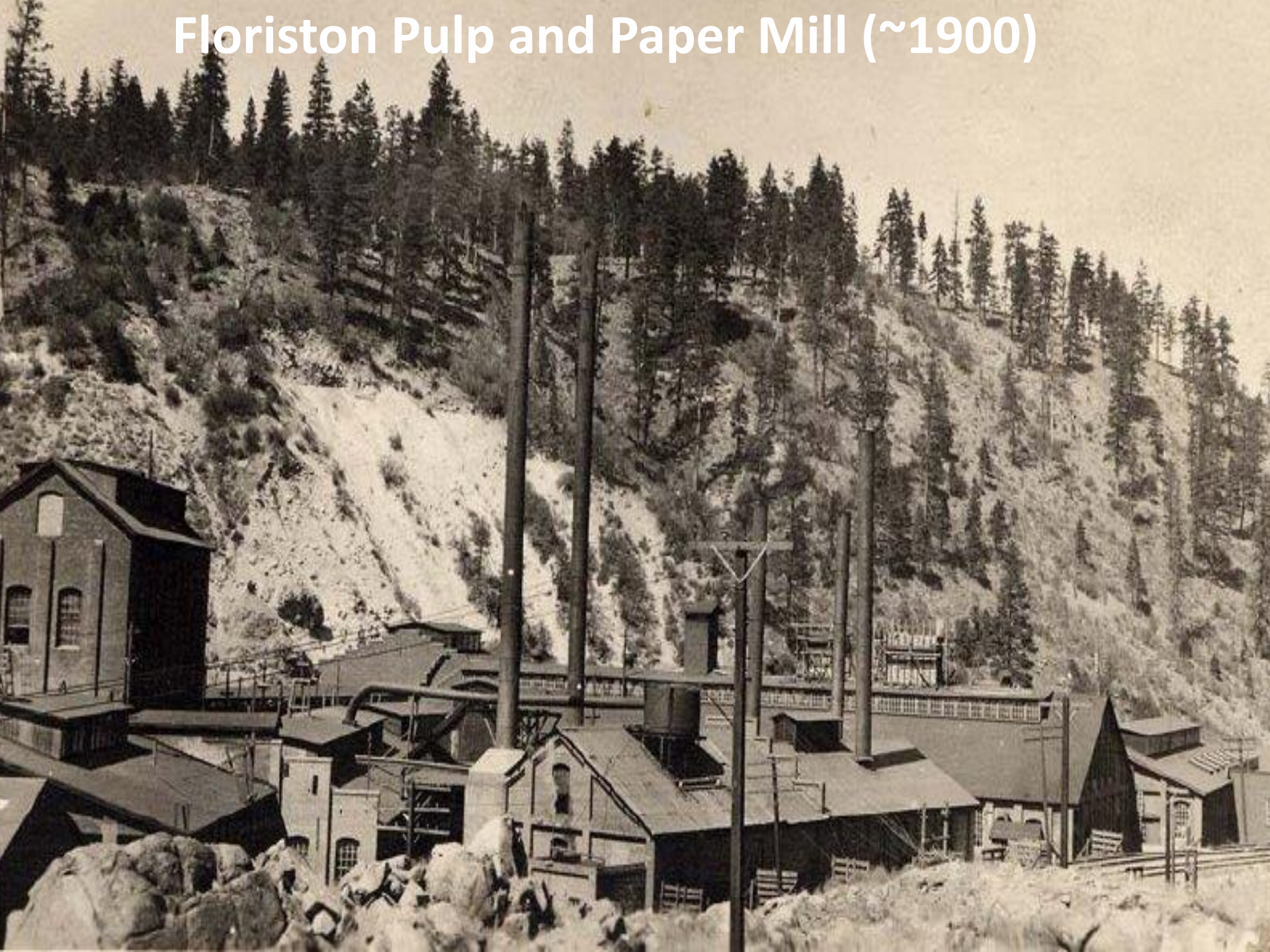
TRGEC Farad Diversion Dam (1900)



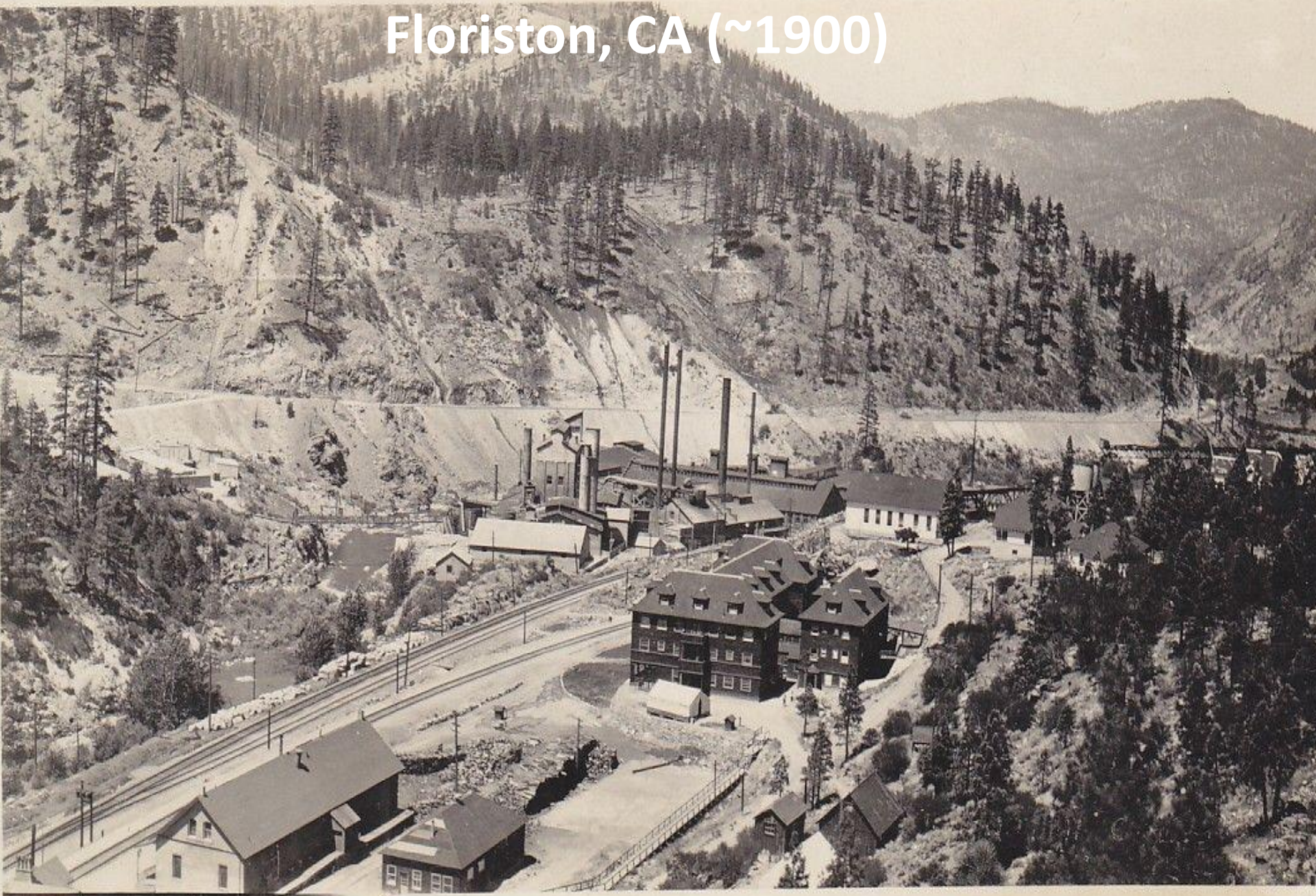


TRGEC Farad Hydro Electric Plant (1900)

Floriston Pulp and Paper Mill (~1900)



Floriston, CA (~1900)



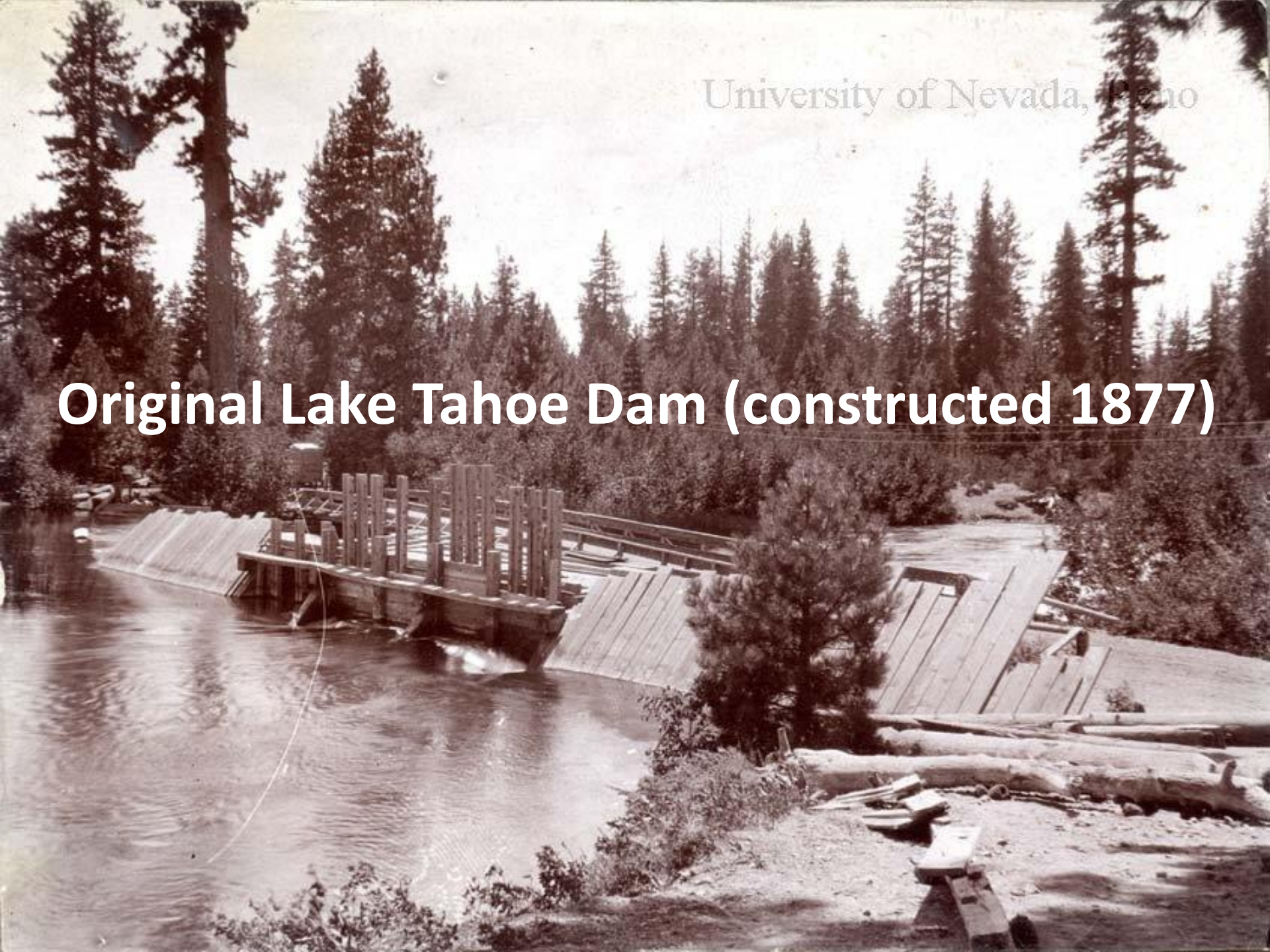
FLORISTON CAL. ELEVATION 5320 Ft

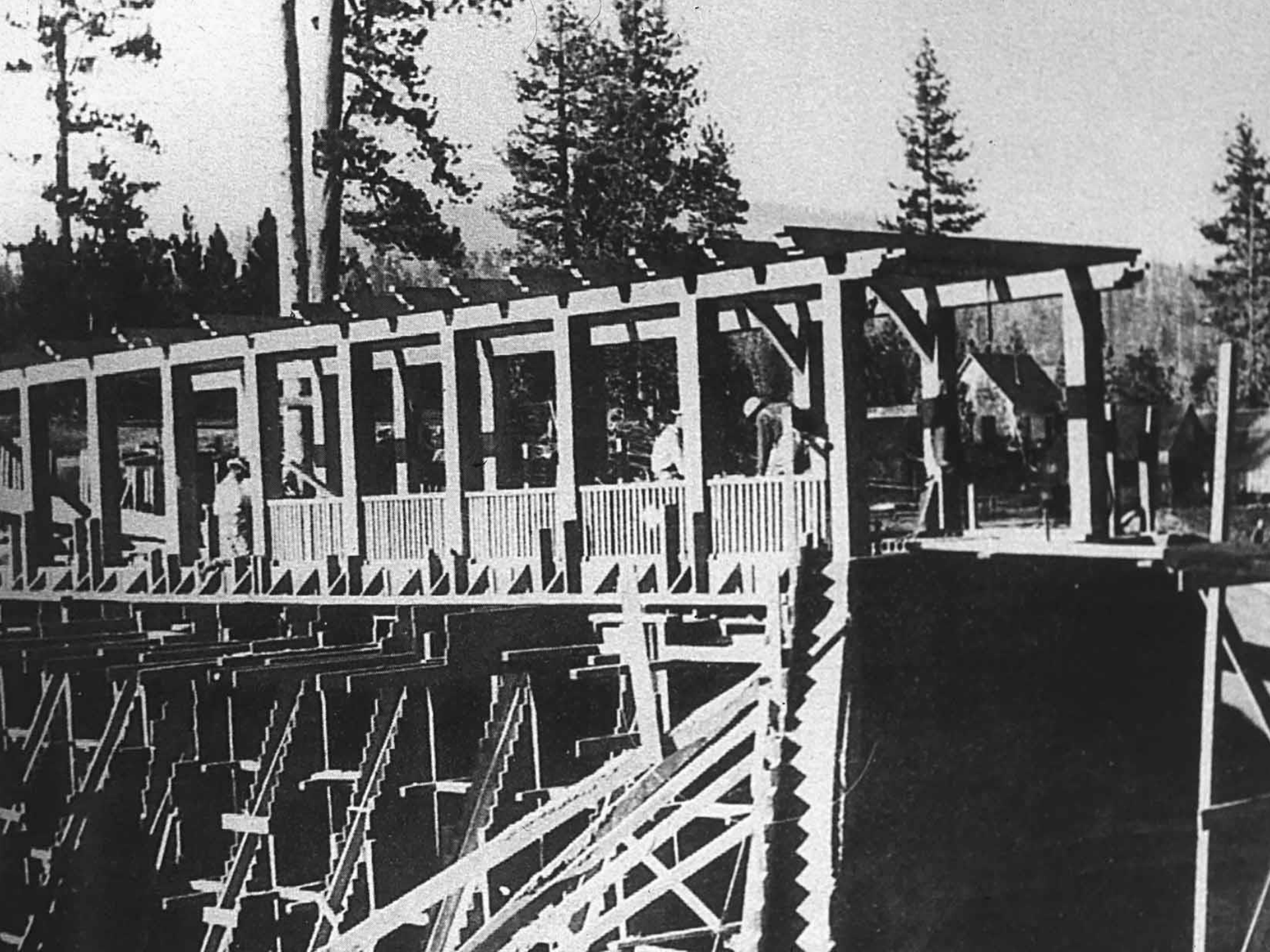
Floriston Rates (the *foundation* for TROA)

“The rate of flow measured at the USGS Farad gage, consisting of average flows of **500 cubic feet per second (CFS)** each day from March 1 through September 30 (**summer flow**), and **400 cubic feet per second** each day from October 1 through the last day of February (**winter flow**)”

University of Nevada, Reno

Original Lake Tahoe Dam (constructed 1877)





Lake Tahoe Dam (Completed 1913)



1902 Reclamation Act (the Newlands Project)

IRRIGATED HOMESTEAD LANDS

Now Open to Entry under
the Truckee-Carson Project
in Churchill County

75 Choice 40- and 80-acre Farms lying west of Fallon open to entry
September 22, 1914

TERMS AND CONDITIONS THE LAND IS FREE

Water Rights furnished by the U. S. Reclamation Service at \$60 per acre, payable in 16 installments in 20 years, Without Interest. First installment of \$3.00 per acre, payable at time of filing. Next payment due 3 years later.

Residence on the land 7 months a year for three years necessary to secure title.

Cultivation of 3-4 of irrigable area in 3 years, and 1-2 in 5 years is required.

Water Supply under the Great Lahontan Reservoir is permanent and assured.

Lands in Private Ownership, with or without water rights, may be purchased Now at attractive prices. As yet there has been no inflation of land values.

CHURCHILL COUNTY

Is one of the best sections in the entire West for dairying, stock raising, truck gardening, sugar beet culture and general farming. Fallon has a half million dollar beet sugar factory which will operate next season, under extremely favorable price conditions. Fallon has the most adequate grammar plan in Nevada, and high grade cereals are brought on the easy payment plan.

The Opportunity of a lifetime for the homeseeker exists RIGHT NOW in Churchill County. For further information, Communicate with

Project Manager U. S. Reclamation Service

or Sec. Churchill County Chamber of
Commerce, Fallon, Nev.



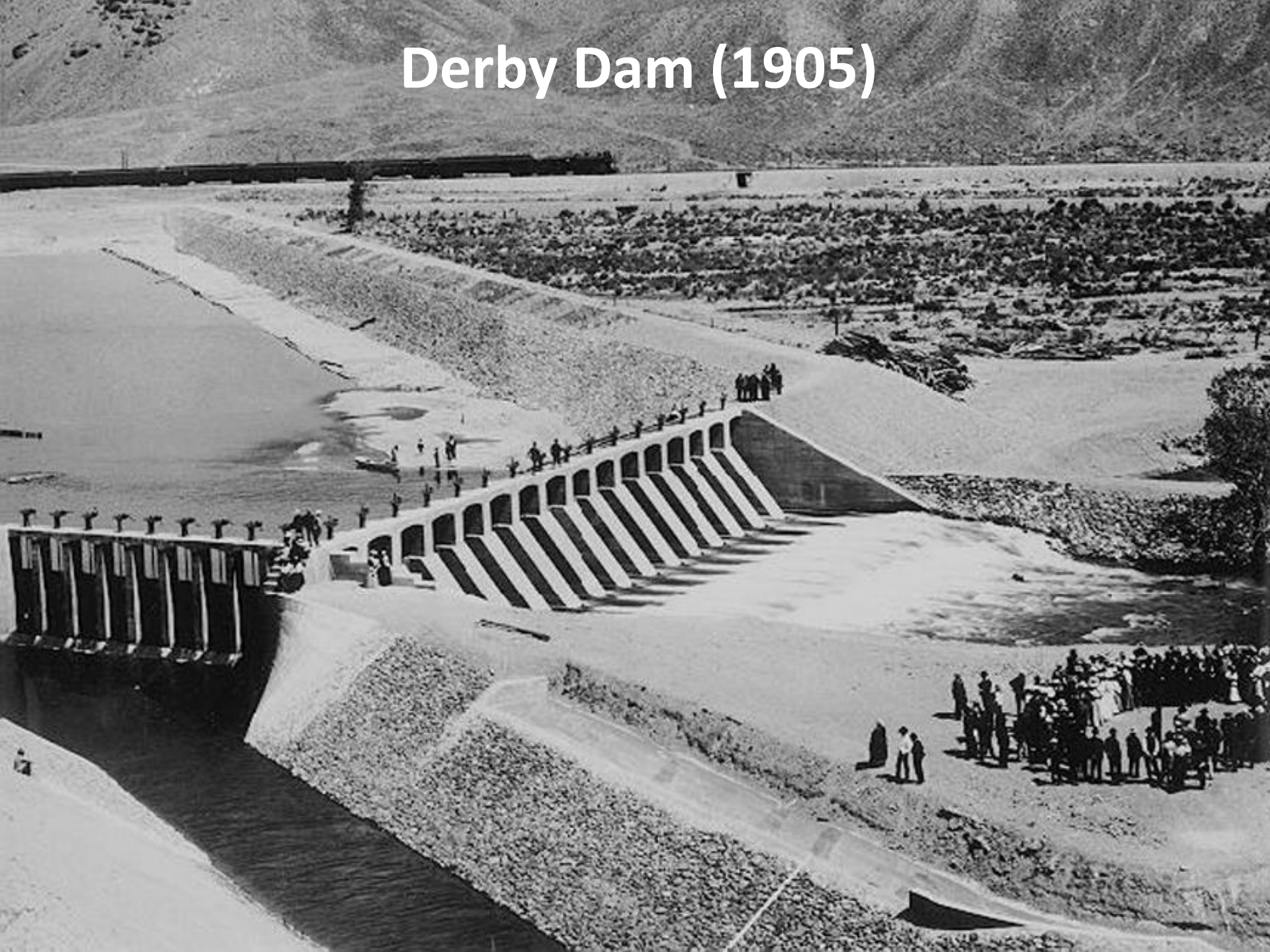
— BUREAU OF —
RECLAMATION

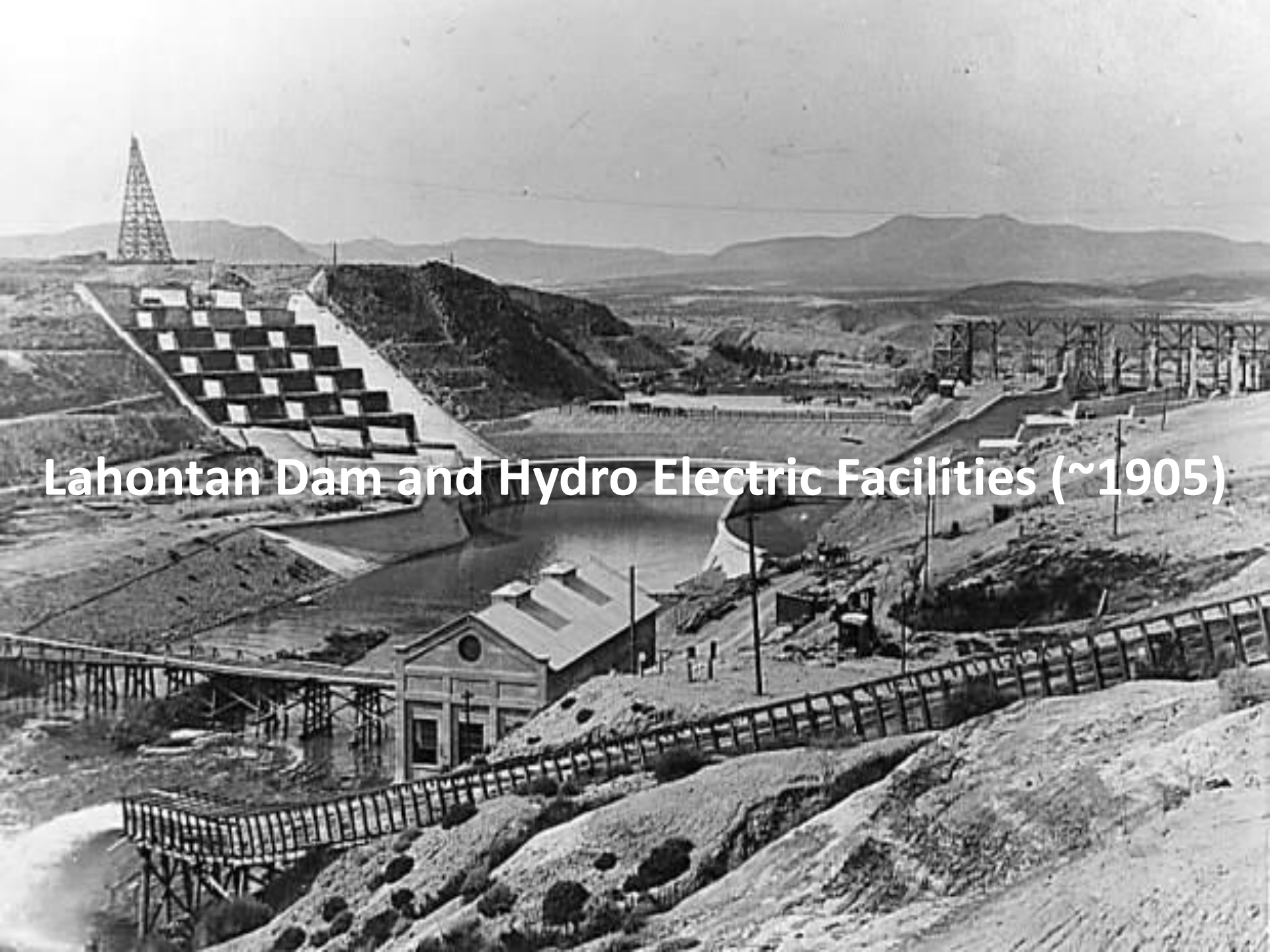


Newlands Reclamation Project

- Completed in 1905 by the U.S. Reclamation Service
- One of the first major Reclamation projects undertaken
- Designed to irrigate the lands around Fallon, NV
- ~73,000 acres later determined irrigable (originally constructed to irrigate >200,000 acres)
- Included construction of Derby Dam, the 32 mile-long Truckee Canal and Lahontan Reservoir (>300,000 acre-foot storage capacity with flashboards in place)
- Situated downstream of the Truckee Meadows area (Reno/Sparks) with its extensive system of ditches where appropriations had been going on since the early 1860's where large amounts of water were put to beneficial use
- When completed, USRS still did not have a firm water supply for the Project

Derby Dam (1905)



A black and white photograph showing the Lahontan Dam and its hydroelectric facilities. The dam is a large concrete structure with a distinctive checkered pattern on its upstream face. To the left of the dam, a tall, slender lattice tower stands on a hill. In the foreground, a small building with a gabled roof and a circular window is visible. The background features a wide river valley and distant mountains under a clear sky.

Lahontan Dam and Hydro Electric Facilities (~1905)

— IN EQUITY, DOCKET No. A₃ —

— VS. —

FINAL DECREE

1944 Final Orr Ditch Decree

- Began in **1913**, the U.S. began “**quiet title**” action in district court between the USRS and all Nevada upstream water users on the Truckee River
- The suit was brought in order to quantify and clarify (adjudicate) the water rights of upstream water users in Nevada in an effort to help secure an adequate supply of water for the Newlands Project farmers
- Litigation and resolution of water rights would take over 30 years to complete with the help of a “Special Master” who adjudicated the rights, and fixed priorities and amounts of water needed by the defendants for hydropower, irrigation, storage and municipal uses, and a reasonable amount for the PLPT Reservation **AND** to allow the U.S. Government to divert, store, and deliver the remainder to the extent needed for the homesteaders and other users on the Newlands project
- A **key element** was the incorporation of the **1935 Truckee River Agreement**
- **Floriston Rates** were assumed to be met, especially during the critical summer months for the purposes of this adjudication process (when FR met, the water rights of all Nevada water right holders are assumed to be satisfied)

1915 Decree

The above entitled action came on regularly for trial before the court sitting without a jury (a trial by jury and findings having been expressly waived by all of the parties) on the 4th day of June, 1915, upon the second amended and supplemental complaint of plaintiff and the answer of defendant The Truckee River General Electric Company thereto, John W. Preston, Esq., United States Attorney, and John F. Truesdell, Esq., Special Assistant to the Attorney General of the United States; appearing for plaintiff, and Messrs. Goodfellow, Eels, Moore & Orrick appearing for defendant; and it appearing to the court that said action is brought by the United States under the authority of th Act of Congress entitled,

1915 Decree

- Immediately after beginning “quiet title” action in 1913, the U.S. began condemnation proceedings in order to gain control of the Lake Tahoe Dam
- On June 4, 1915, the USRS gained **limited control** of the water in Lake Tahoe through a consent decree in federal court (U.S. v. Truckee River General Electric Decree), aka 1915 Decree
- The U.S. was granted an easement to operate the dam and outlet works and the surrounding property “subject to certain restrictions”
- The most important of which was the recognition and guarantee that the **Floriston Rates** which had been in place since 1908 would continue to be made as long as there was water in Lake Tahoe

TRUCKEE RIVER AGREEMENT

Approved as to form by
HAROLD L. ICKES
SECRETARY OF THE INTERIOR
United States of America

June 13, 1935

1935 Truckee River Agreement

- **Incorporated** into the 1944 Final Orr Ditch Decree
- Confirmed Floriston Rates
- Created **Reduced Floriston Rates**
- First 40 CFS right for M&I purposes
- Precautionary drawdown criteria for Lake Tahoe
- Ice fighting provisions for hydro plants and SWTP's
- Ability to modify or reduce required rates of flow during times of drought to extend river flows and water supply
- 69/31 Rule
- Improved the Operational Flexibility of the Truckee River
- **Also Required** the construction of a supplemental reservoir (BOCA) at least 40,000 AF storage capacity

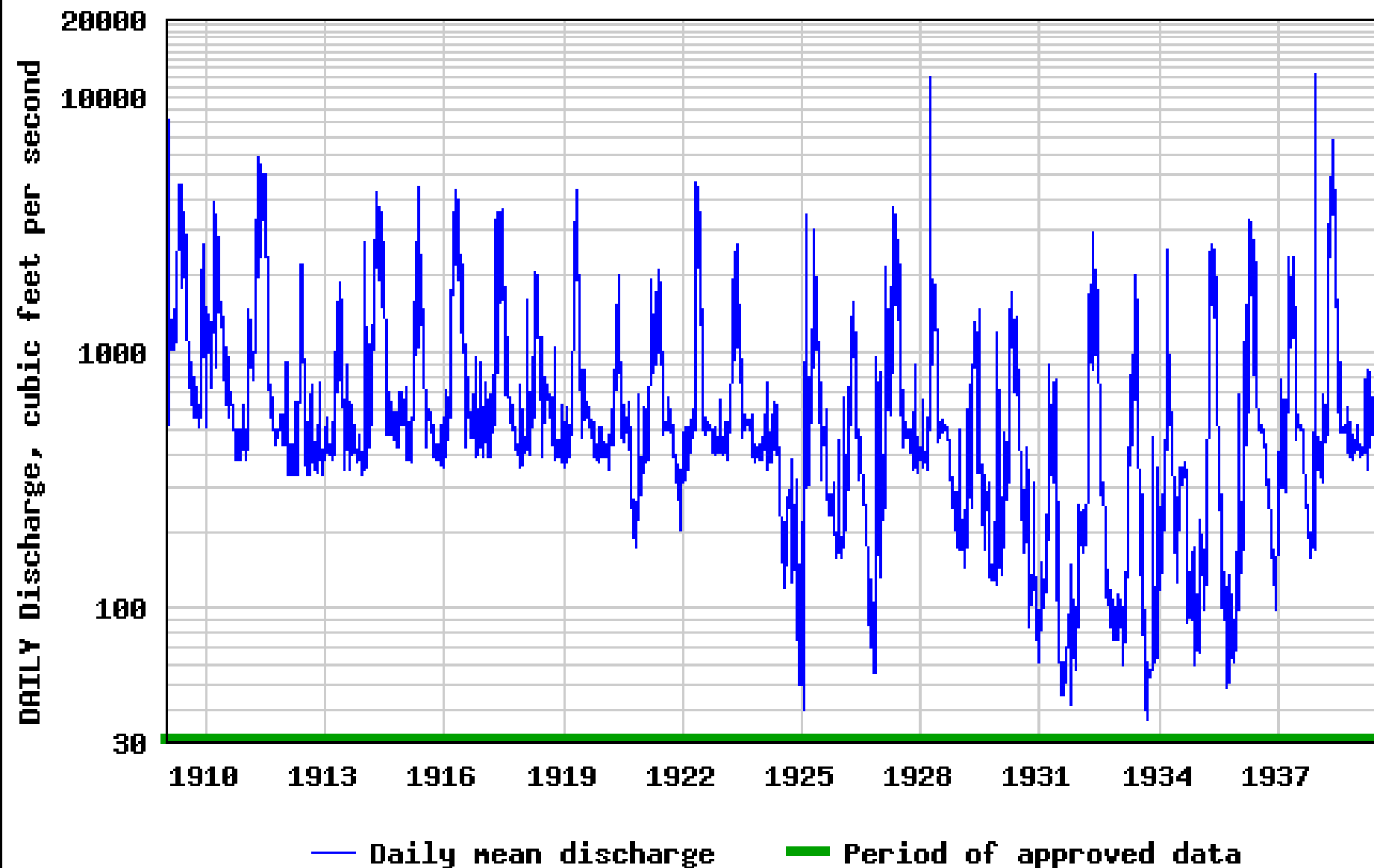
Reduced Floriston Rates

Means the rates of flow measured at the USGS Farad gage, effective and in force from November 1 through March 31 as follows:

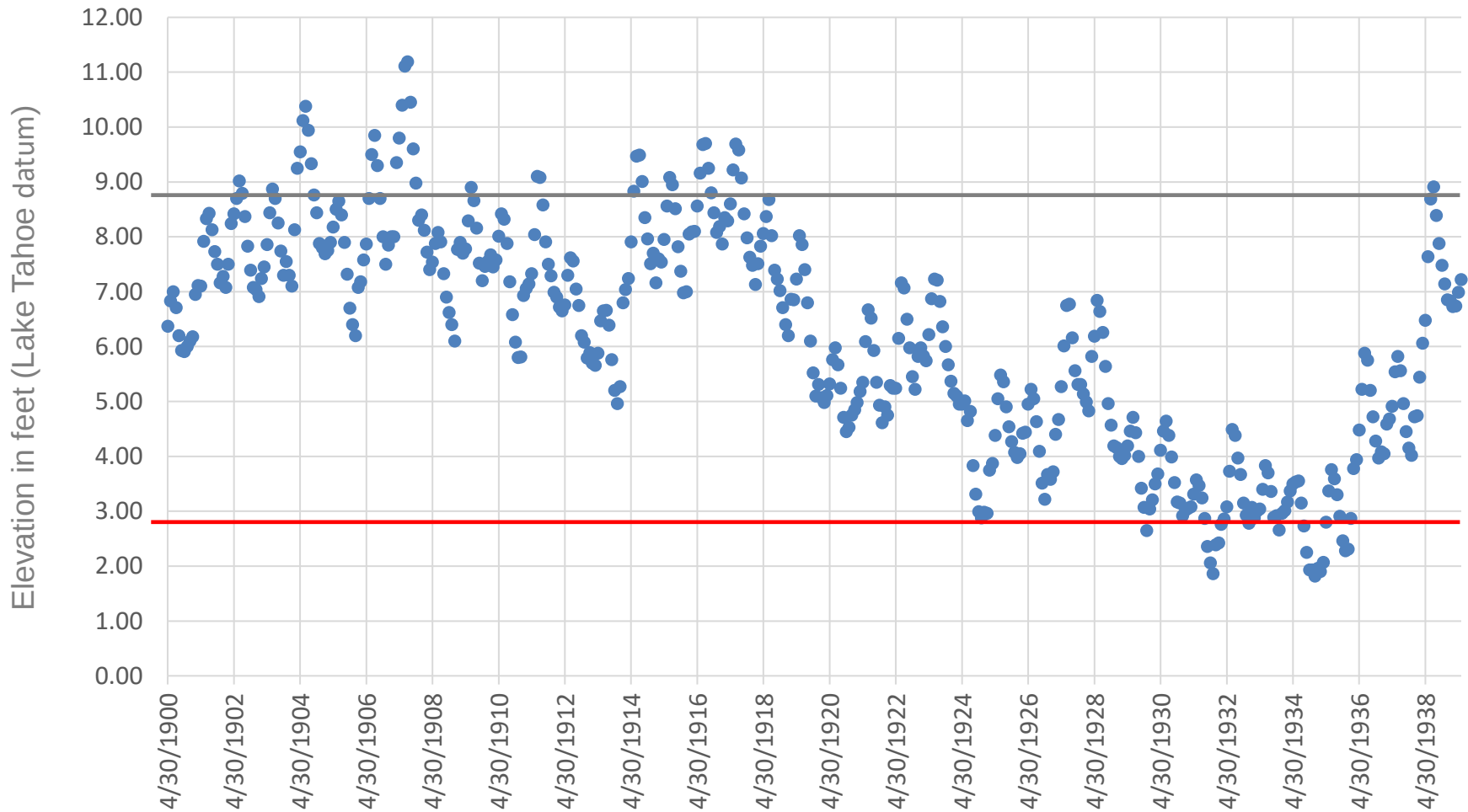
- (1) an average flow of 350 cubic feet per second whenever the elevation of Lake Tahoe is below 6226.0 feet but not below 6225.25 feet; and
- (2) an average flow of 300 cubic feet per second each day whenever the elevation of Lake Tahoe is below 6225.25 feet



USGS 10346000 TRUCKEE R A FARAD CA



Lake Tahoe Elevation (1909-1939)



Boca Dam (completed 1939) – USBR/WCWCD







Independence Lake Dam (1931)



Independence Lake Dam (completed 1939) - TMWA





Independence Lake Dam (2022)





The image shows the spillway of the Donner Lake Dam, a concrete structure with three large, rusted metal gates. Each gate is divided into a grid of rectangular sections. The leftmost gate has the words 'WATERMAN' and the number '48' embossed on it. Above the gates, three large hydraulic rams are mounted on vertical shafts, connected to a network of pipes and valves. The dam's concrete structure features a series of arched openings. The background shows a line of trees under a clear sky.

Donner Lake Dam (completed 1927)

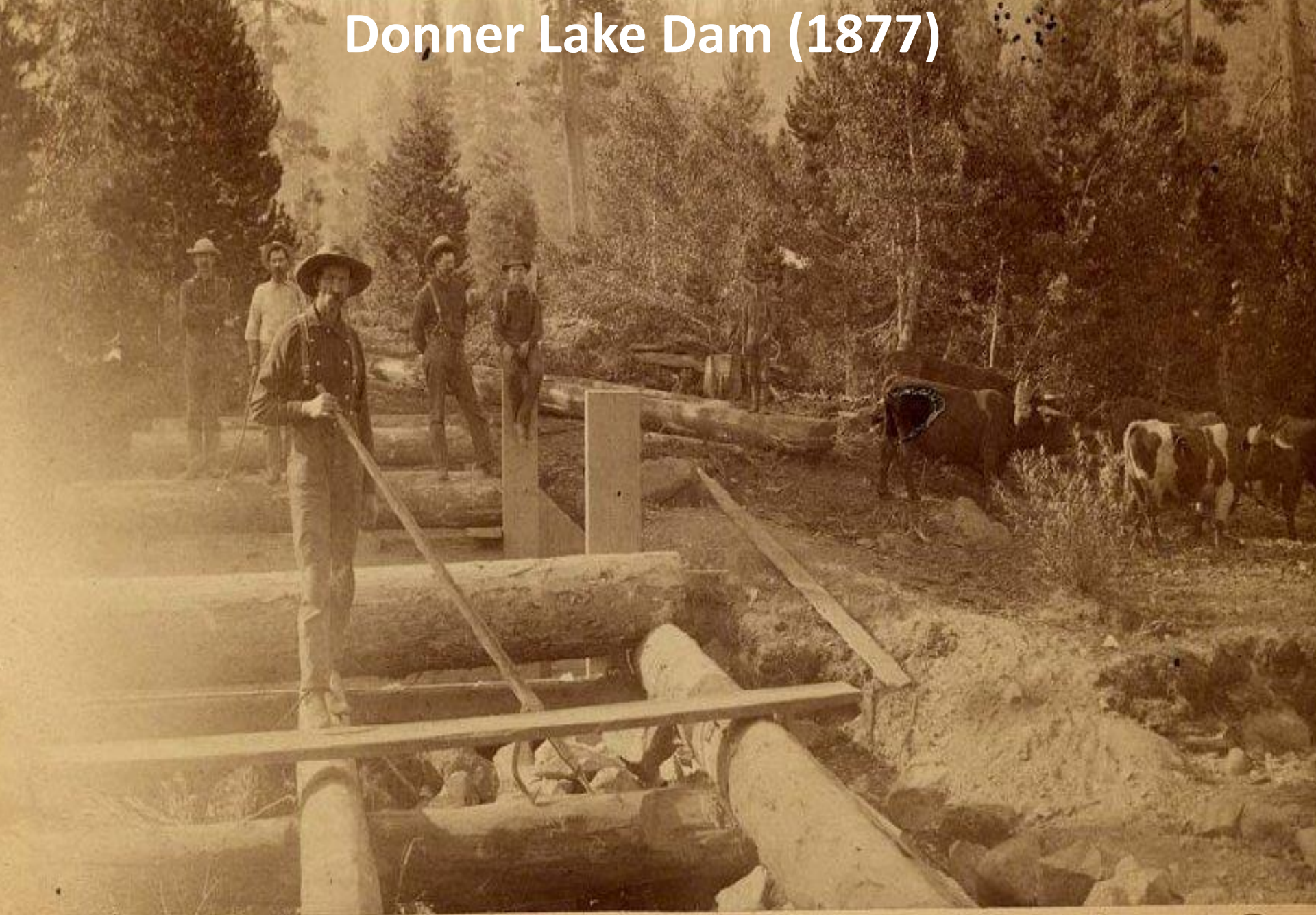
**DANGER
DROWNING HAZARD**
UNDERTOW & STRONG CURRENT
NO SWIMMING, DIVING,
BOATING OR FISHING
WITHIN 100 FEET OF THIS SIGN

**DANGER
DROWNING HAZARD**
UNDERTOW & STRONG CURRENT
NO SWIMMING, DIVING
BOATING OR FISHING
WITHIN 100 FEET OF THIS SIGN





Donner Lake Dam (1877)



Kruger's Dam on Donner Creek 1/4 Mile from Lake

Prosser Creek Reservoir (completed 1962) - USBR



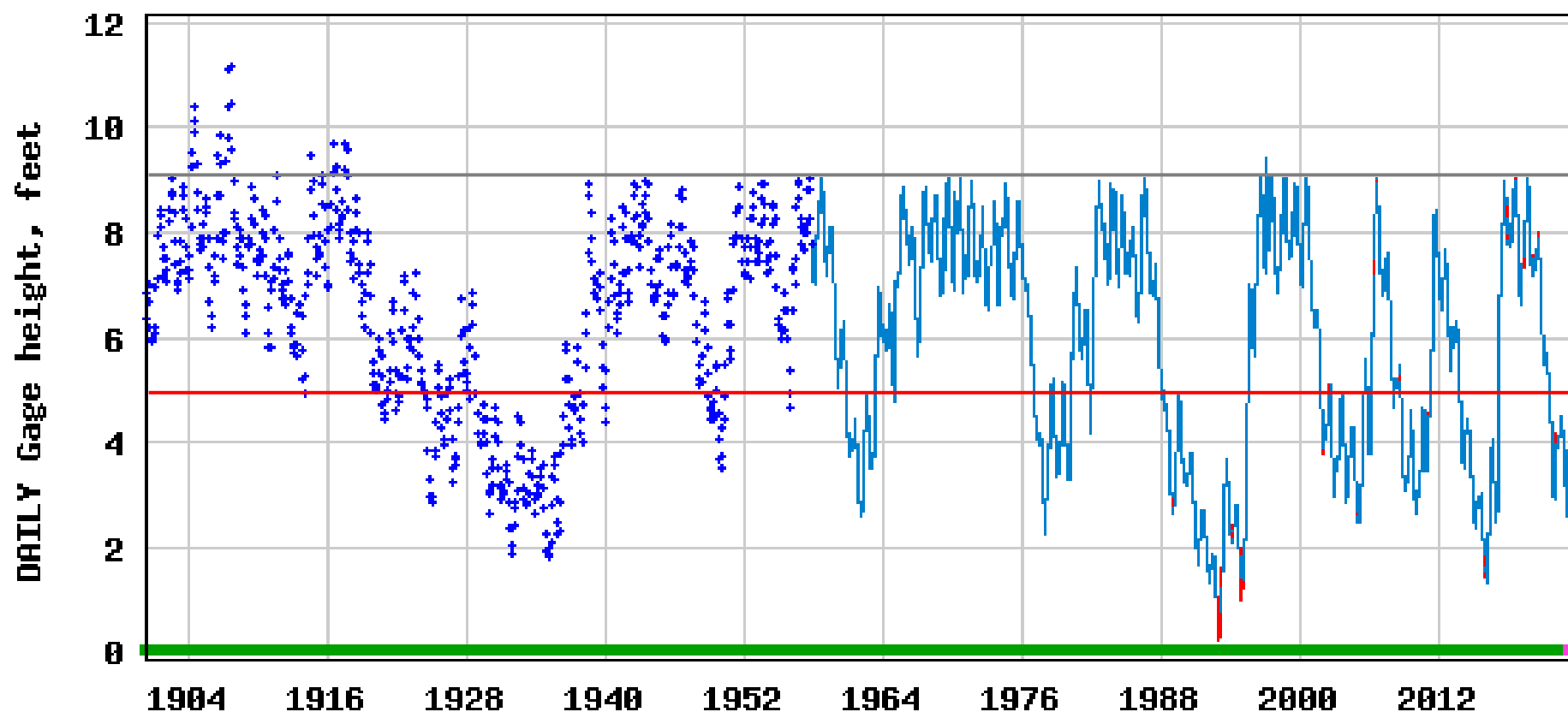
Stampede Reservoir (completed 1970) - USBR



Martis Creek Reservoir (completed 1971) - USACE

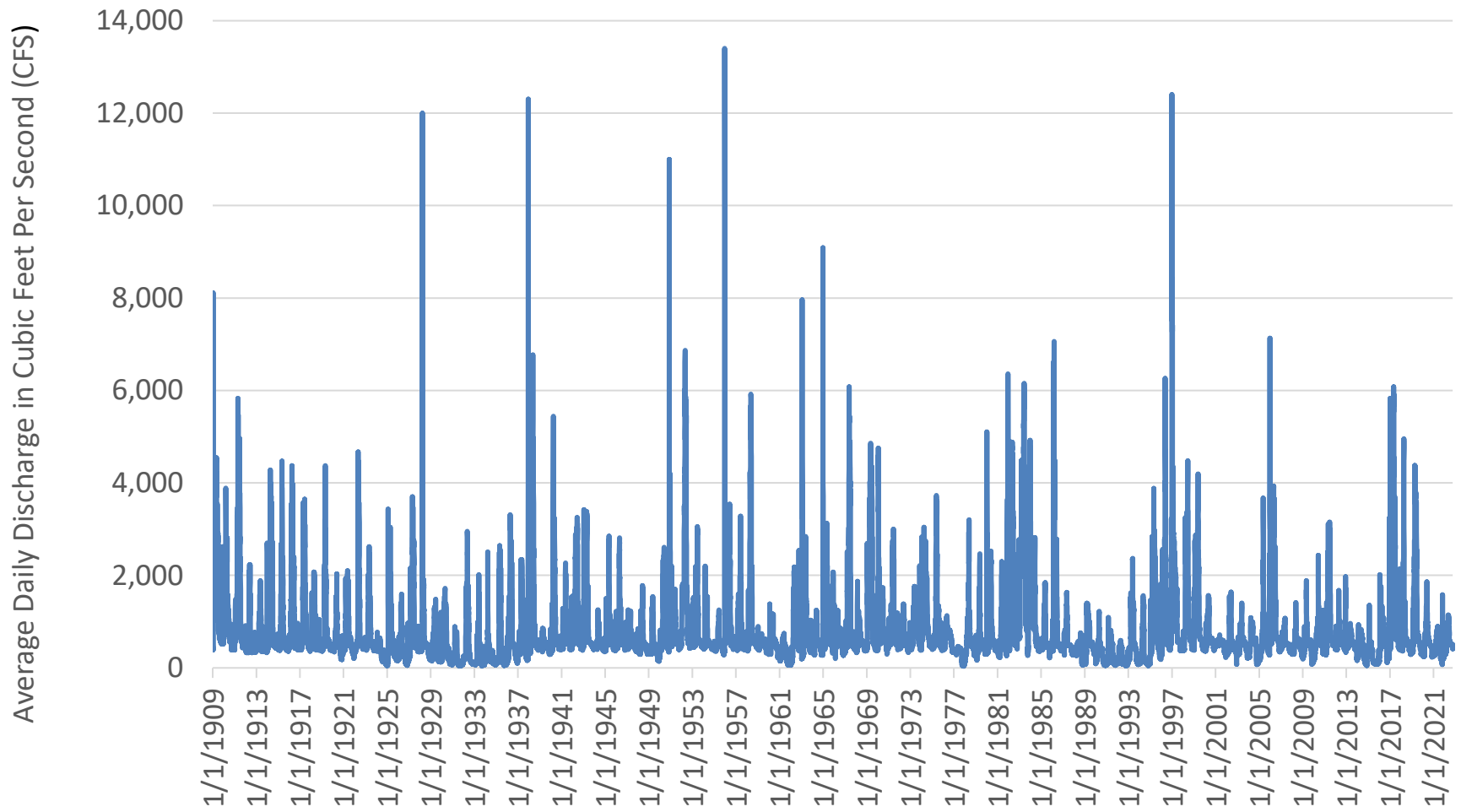


USGS 10337000 LAKE TAHOE A TAHOE CITY CA

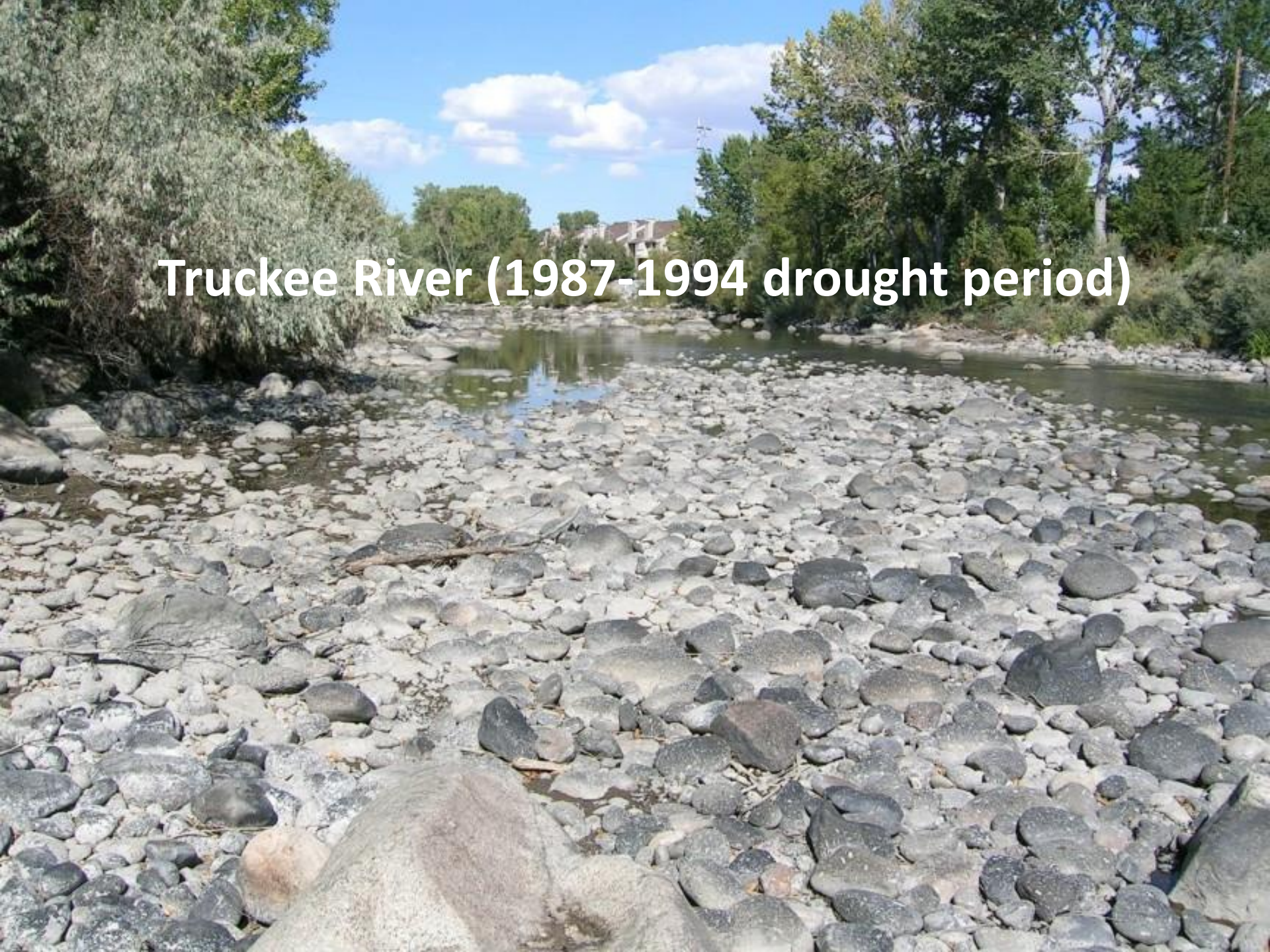


- Daily observation at midnight gage height
- Estimated daily observation at midnight gage height
- * Daily instantaneous gage height
- Period of approved data
- Period of provisional data

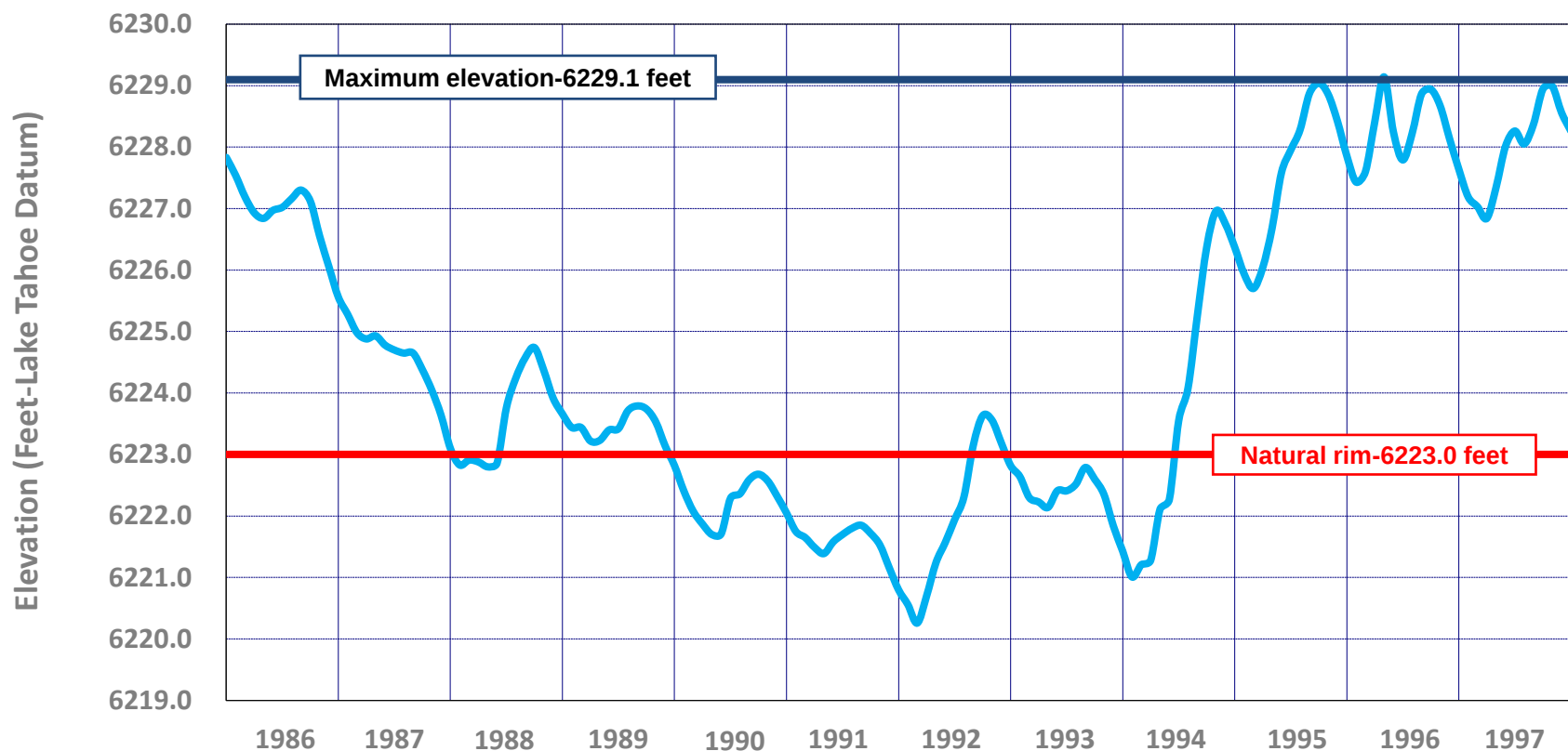
Historical Truckee River Flows @ CA/NV State Line (1909-2022)



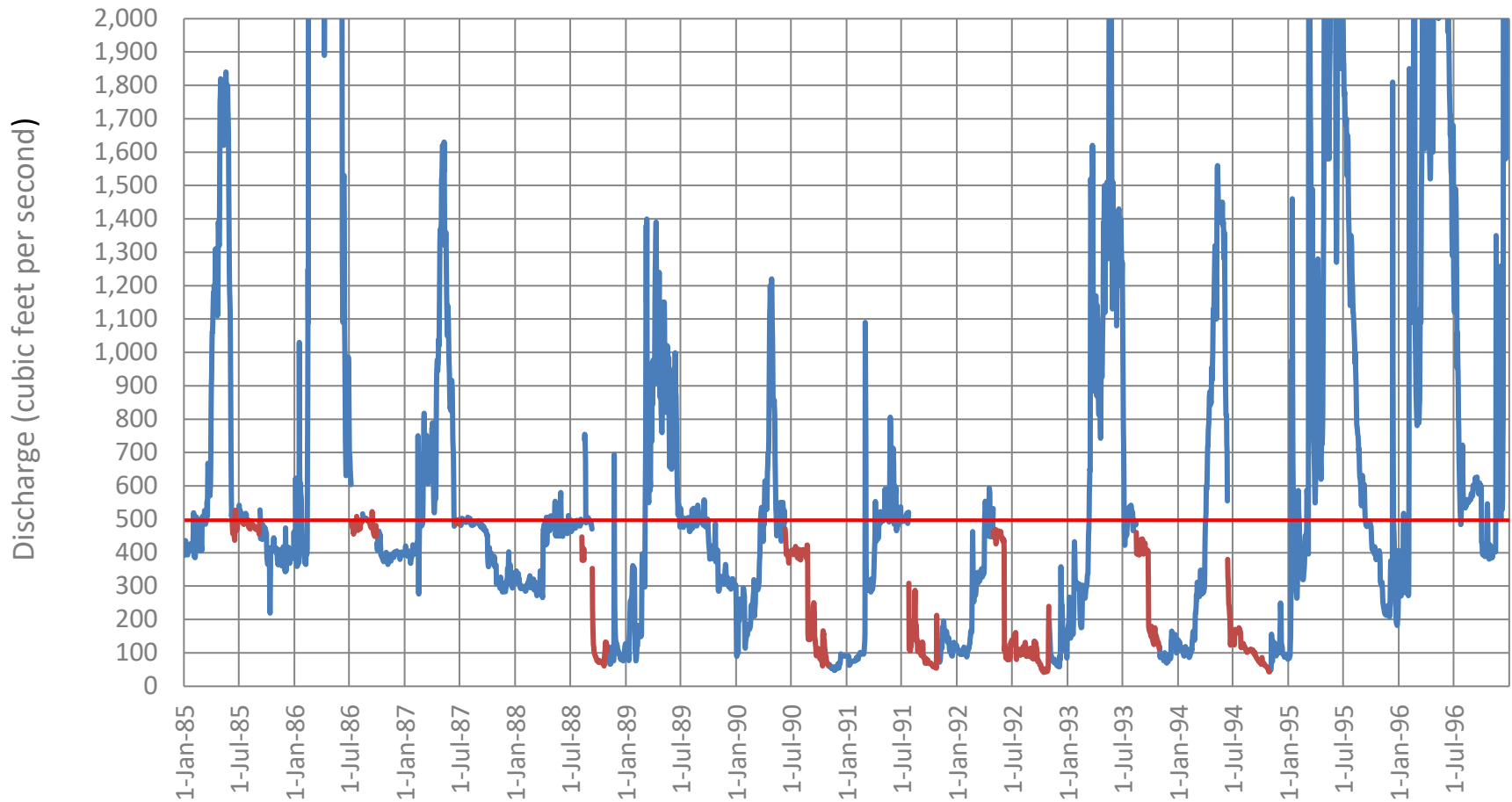
Truckee River (1987-1994 drought period)



Lake Tahoe Elevation (1987-1994 drought period)

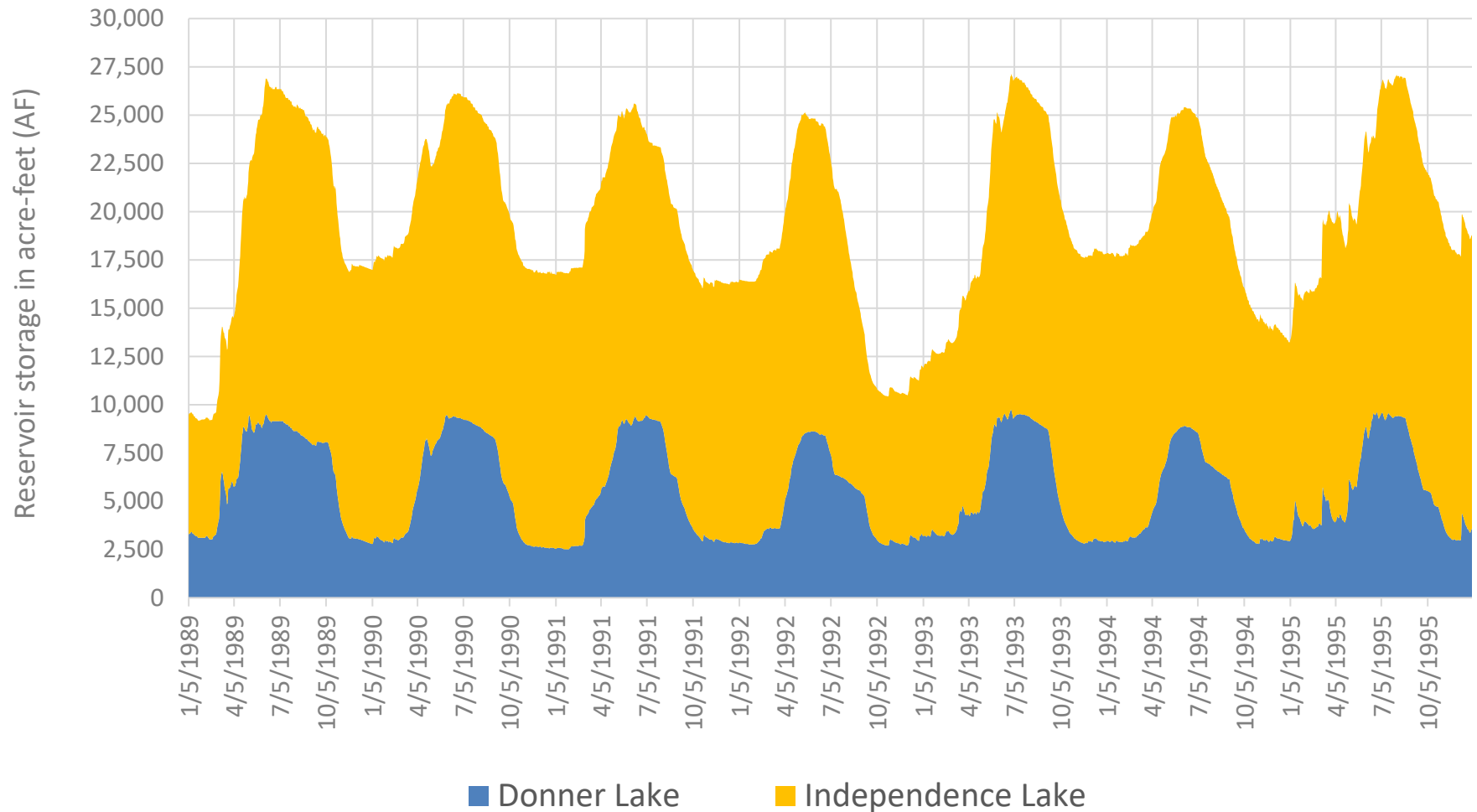


Truckee River Flows at the CA/NV State Line (1987-1994)





Donner and Independence Storage (1989-1995)



- 1987-1994 drought was *also* significant in that it spurred renewed discussions between the two largest stakeholders on the river to come up with a better way to operate the system to meet their multiple objectives
- A negotiated settlement was executed by two Truckee River parties in 1989, the Pyramid Lake Paiute Tribe and Sierra Pacific Power Company (predecessor to TMWA)
- This **Preliminary Settlement Agreement** (PSA) *established the basis for the Truckee River Operating Agreement*
- Central to the PSA was increased drought storage for Reno and Sparks (M&I water supply) and protection for threatened and endangered species through enhanced instream flows and additional water to Pyramid Lake
- The framework of the PSA was adopted and enacted by Congress the following year in 1990

Public Law 101-618 (1990)

TITLE II--TRUCKEE-CARSON-PYRAMID LAKE WATER SETTLEMENT

SEC. 201. SHORT TITLE.

This title may be cited as the 'Truckee-Carson-Pyramid Lake Water Rights Settlement Act'

SEC. 202. PURPOSES.

The purposes of this title shall be to-

- (a) **provide for the equitable apportionment of the waters of the Truckee River, Carson River, and Lake Tahoe between the State of California and the State of Nevada;**
- (b) authorize modifications to the purposes and operation of certain Federal Reclamation project facilities to provide benefits to fish and wildlife, municipal, industrial, and irrigation users, and recreation;
- (c) **authorize acquisition of water rights for fish and wildlife;**
- (d) **encourage settlement of litigation and claims;**
- (e) **fulfill Federal trust obligations toward Indian tribes;**
- (f) **fulfill the goals of the Endangered Species Act by promoting the enhancement and recovery of the Pyramid Lake fishery; and**
- (g) protect significant wetlands from further degradation and enhance the habitat of many species of wildlife which depend on those wetlands, and for other purposes; and
- (h) **Required negotiation of new operating agreement for Truckee River (TROA)**

Interim Storage Agreement (June 1994)

- During the interim period, until the NEW operating agreement (TROA) could be negotiated and finally approved by the courts (knowing full well it could take some time)
- An Interim Storage Agreement was negotiated to get the upstream drought storage that was so desperately needed for Reno and Sparks
- Provided an opportunity to store privately owned stored water (POSW), i.e. Non-Project Water in federally owned and operated reservoirs
- The Agreement was in place for over 25 years as TROA negotiations and ensuing legal challenges seemingly at every turn ran their course
- The storage we had under the ISA proved very beneficial during the 2012-2016 drought

Interim Storage Contract (June 29, 1994 - November 30, 2015)

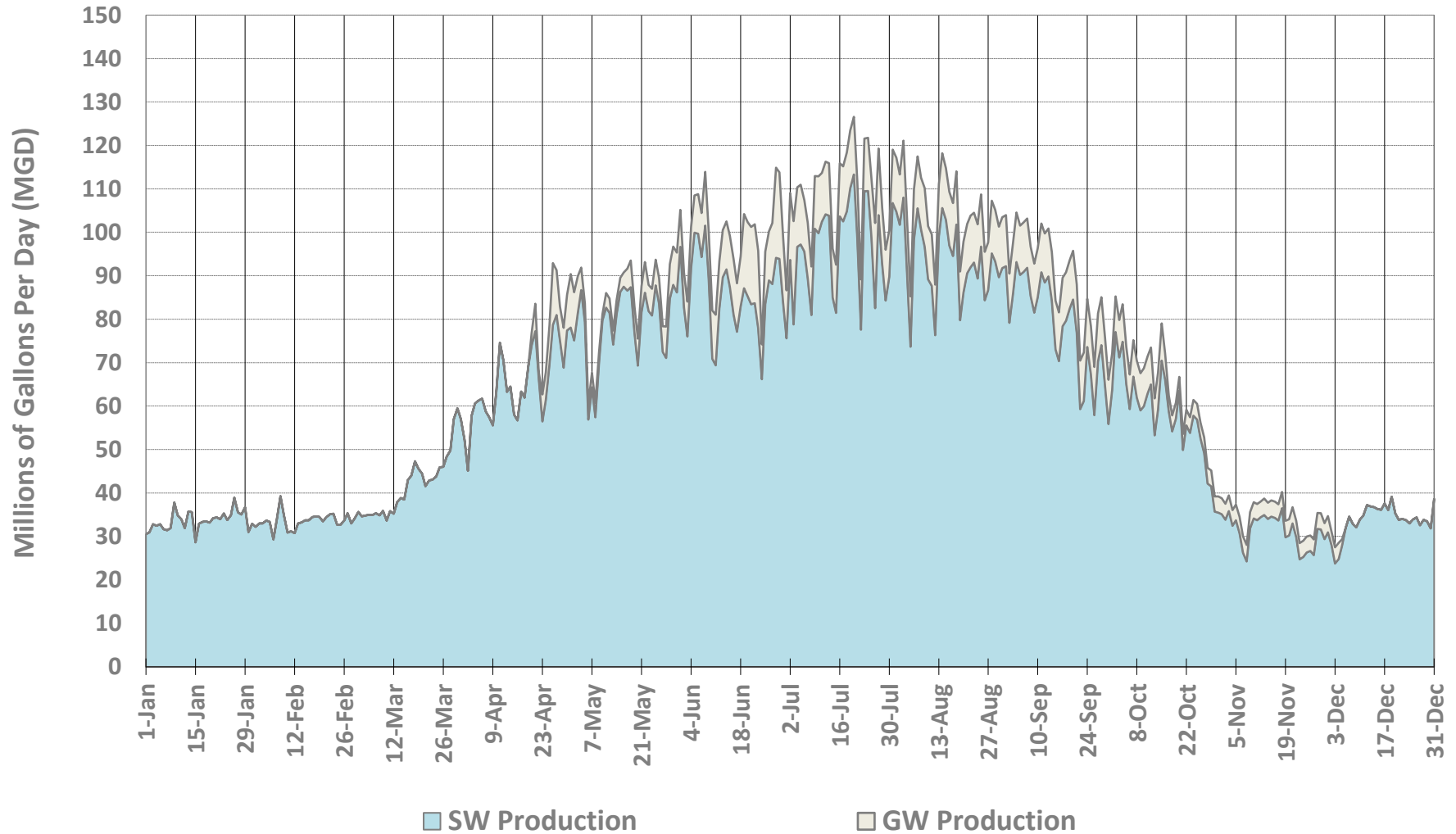
The Secretary of the Interior authorized the use of Boca and Stampede for the storage of Non-Project Water to fulfill the purposes of Public Law 101-618

- DOI entered into a contract with SPPCo. to store water in those reservoirs for M&I purposes when excess capacity was available
- It was an important first step in the utility being able to acquire additional drought storage after 1987-1994 drought

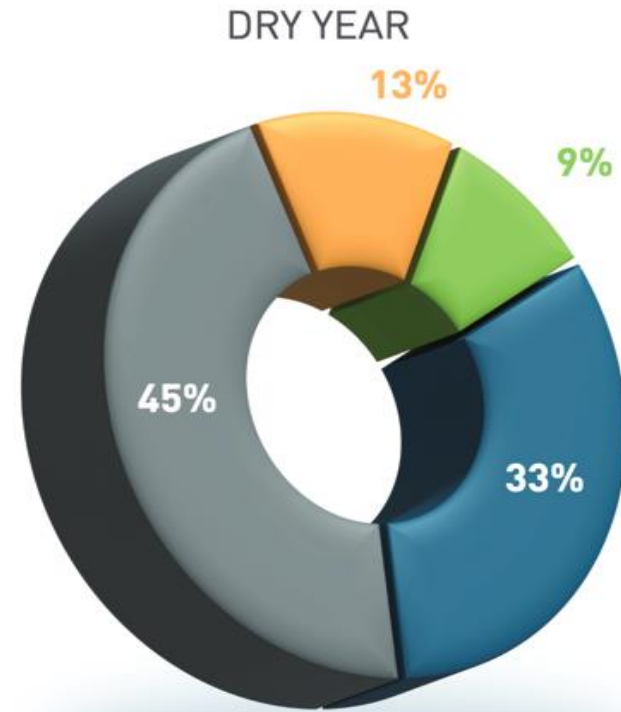
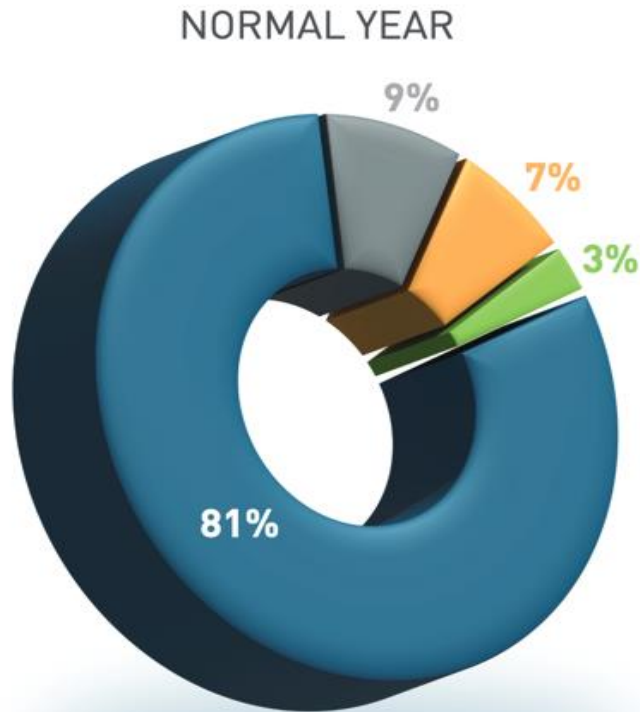
3 ways to get water from Donner and Independence lakes into either Boca or Stampede:

- Independence Lake water could be released directly into Stampede and/or Boca
- POSW from Independence or Donner Lake could be released to support Floriston Rates in lieu of a release for that purpose from Boca in exchange for an equivalent amount of water in Boca
- POSW from Independence or Donner Lake could be released in lieu of a release from Stampede Reservoir for benefit of Cui-ui or LCT in exchange for an equivalent amount of Stampede water storage

2013 TMWA Water Supply Operations

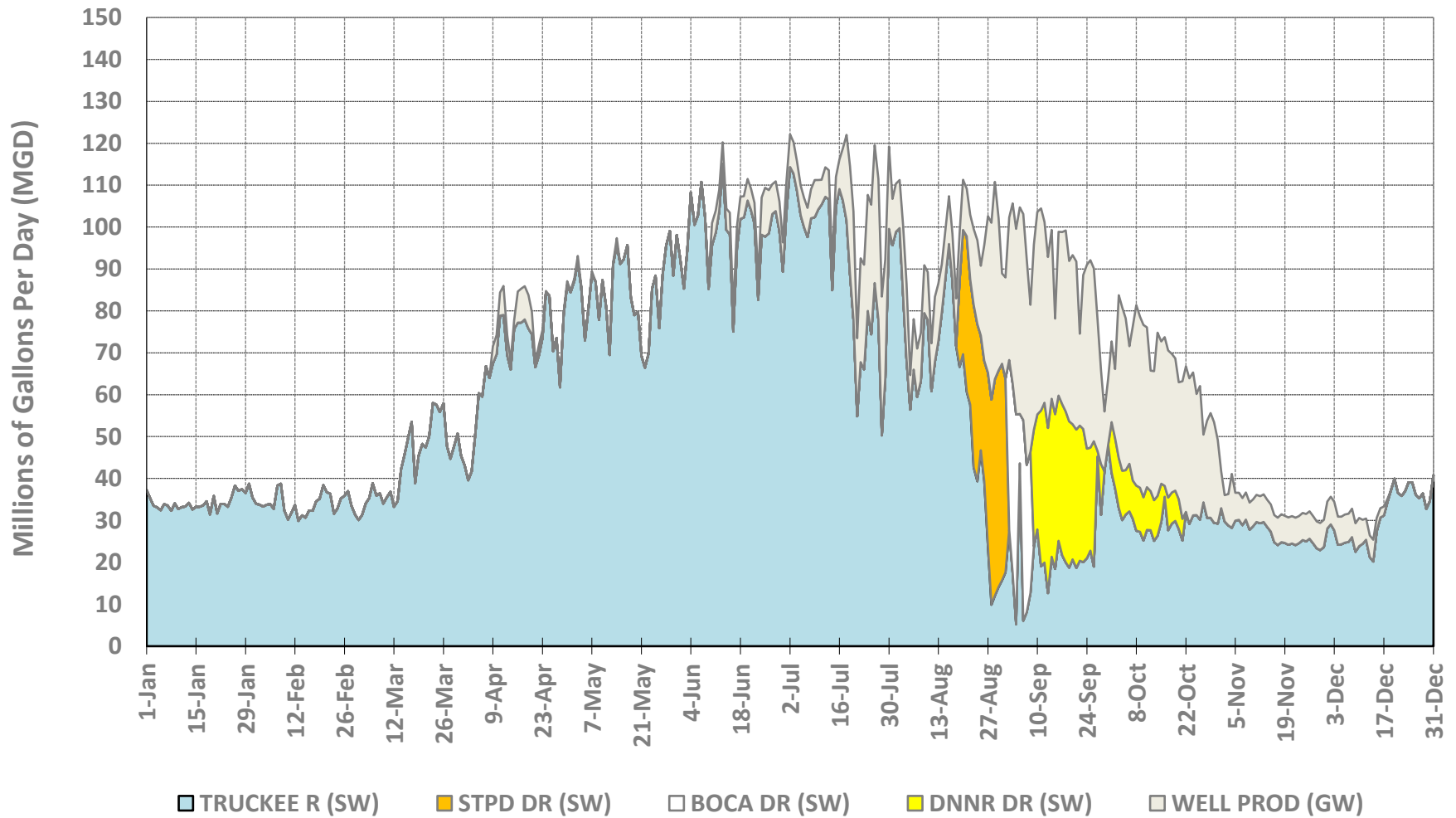


Truckee River Diversions (normal vs. dry years)

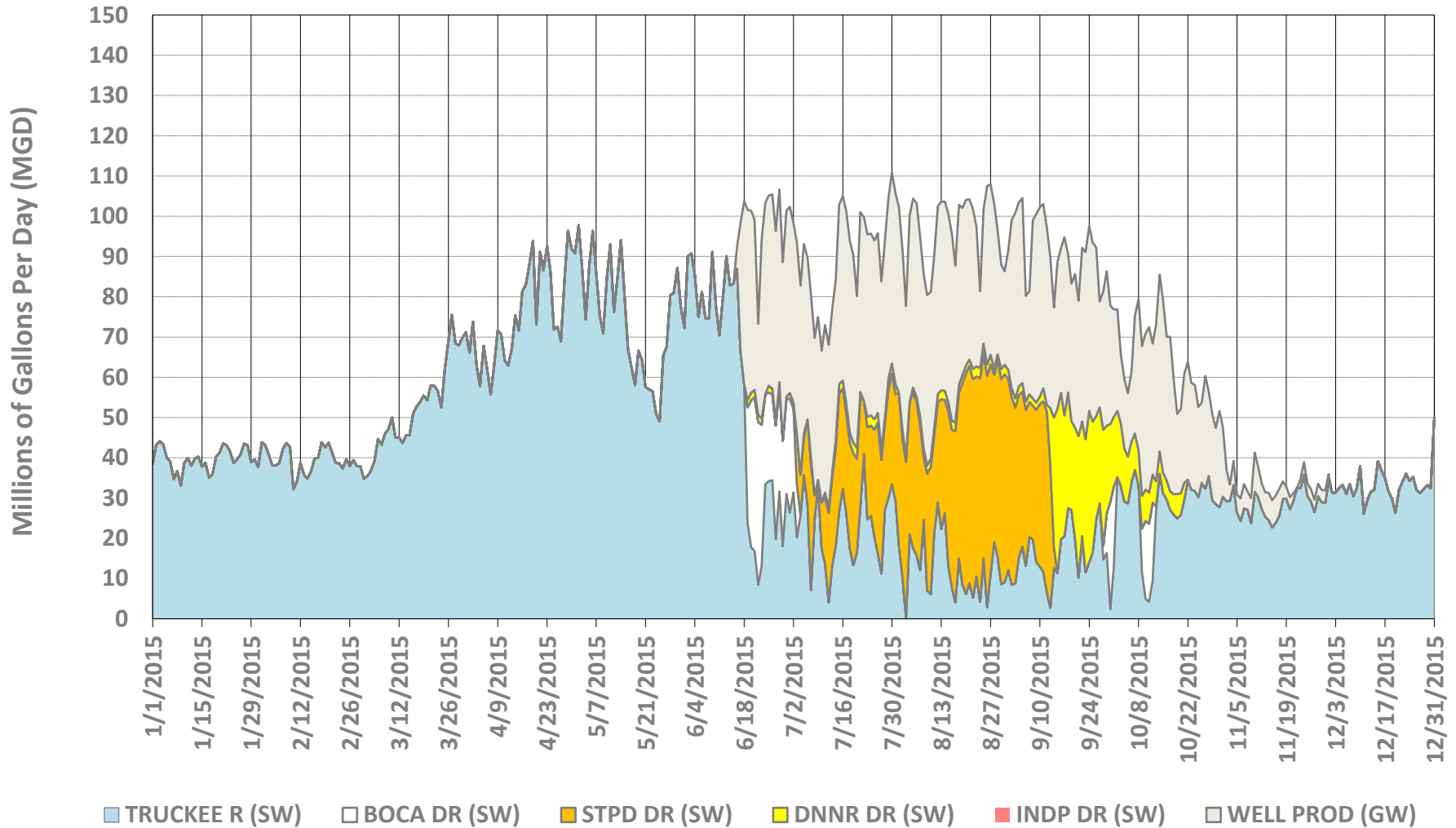


Truckee Carson Irrigation District TMWA Pyramid Lake Paiute Tribe Other

2014 TMWA Water Supply Operations



2015 TMWA Water Supply Operations

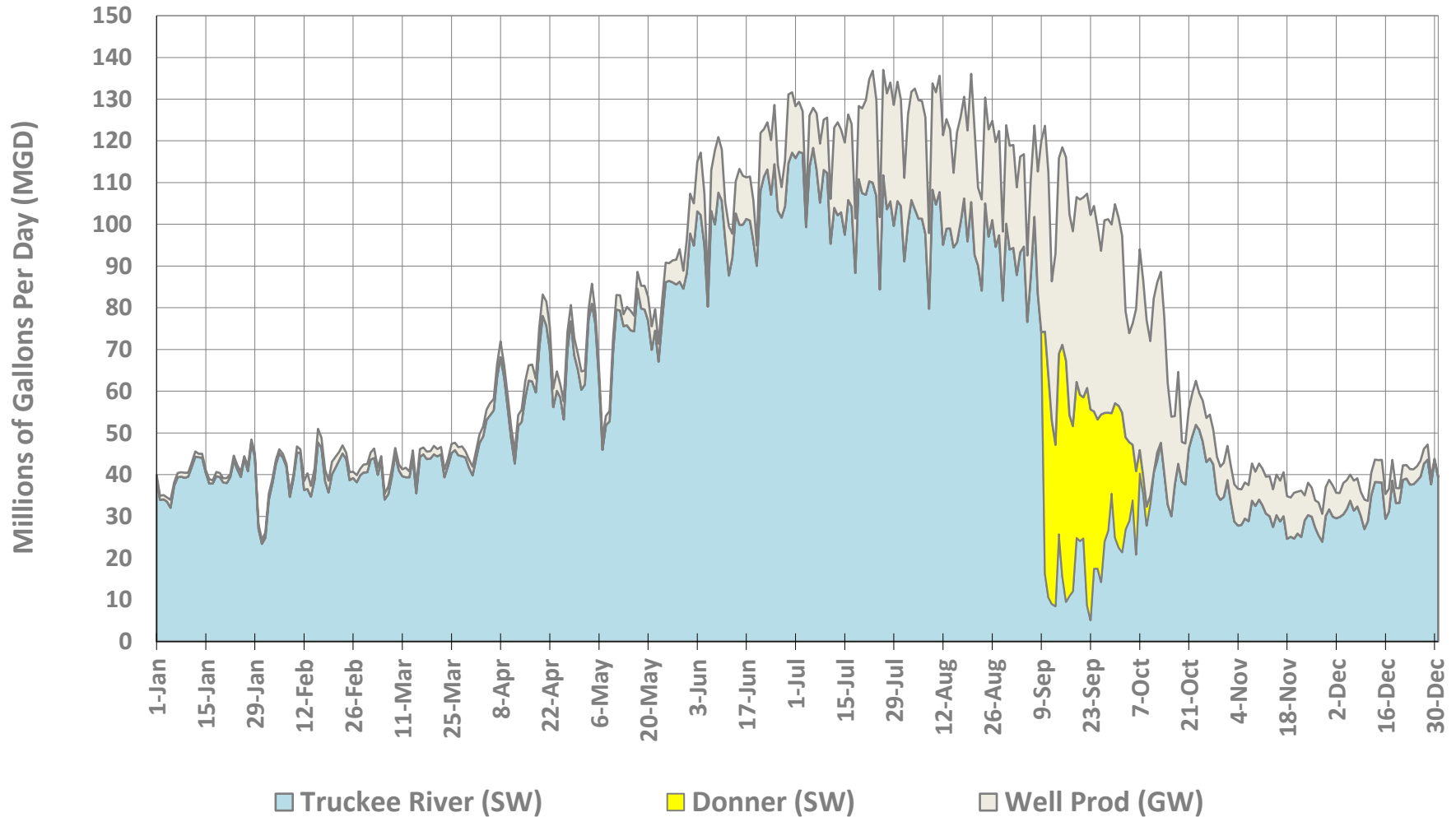




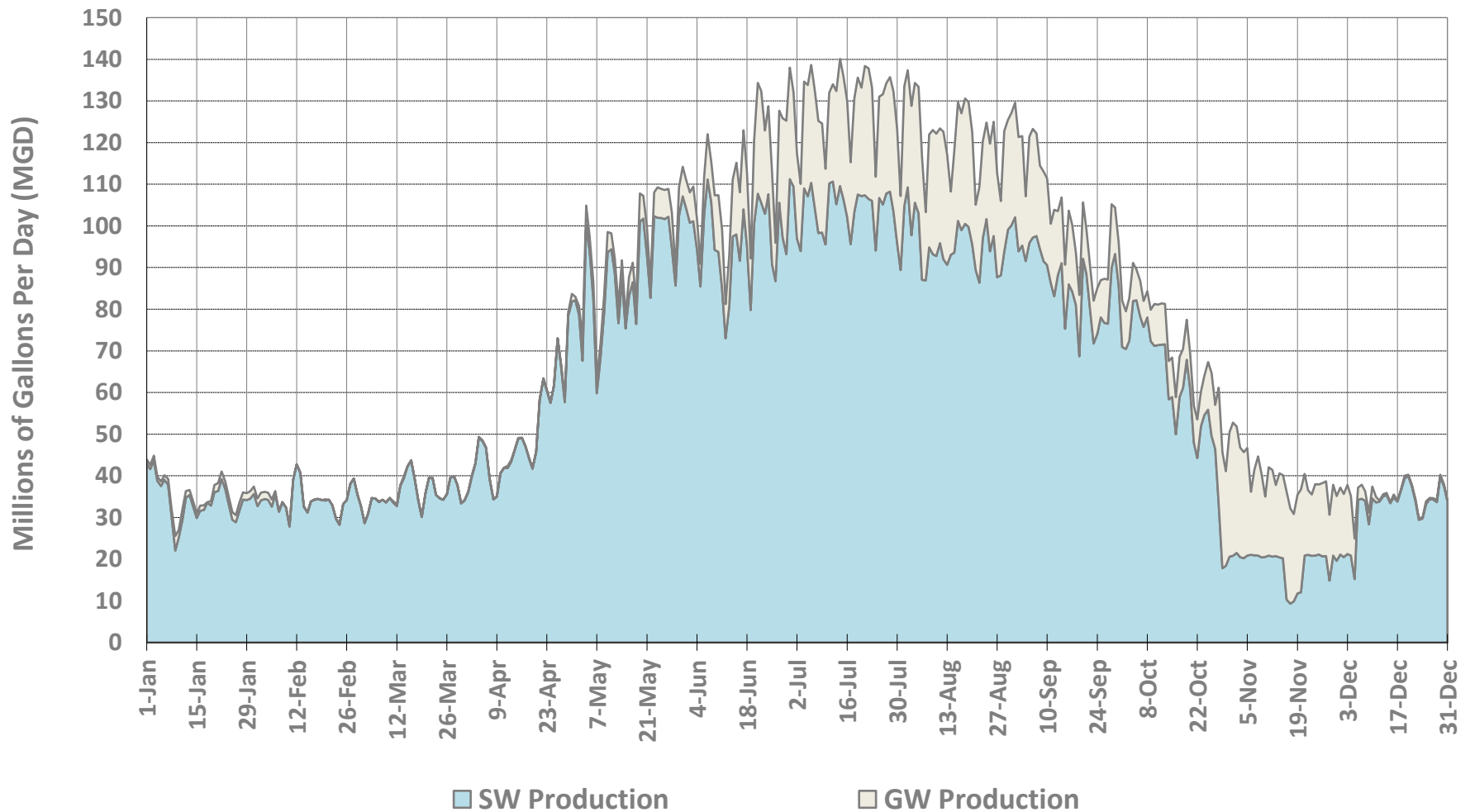
- Officially went into Effect on Dec 01 2015, after 26 years of federally-facilitated negotiations, environmental studies and legal challenges
- It is a new and improved, more flexible version of the 1935 Truckee River Agreement, allowing users to time the release of water to meet their needs instead of having to divert it when it wasn't needed or letting it flow past your diversion because it couldn't be used
- It is a tool to help TROA parties make more efficient use of the water right
- The cornerstone of TROA are the Floriston Rates and the ***Floriston Rate Holdback Concept***

- The **FR Holdback concept** allows TROA parties to hold back a portion of the water that they would have been entitled to divert each day (a fraction of the Floriston Rate) and store it in an upstream reservoir for use at a later date (in priority)
- This water can be traded or exchanged from one reservoir to another to achieve multiple objectives for multiple parties
- This extremely complex 244-page agreement with rules and guidelines for holdback, establishment, filling, storage, releases, spilling, exchanges, trades, etc., provides the flexibility needed for better overall reservoir operations in the Truckee River system
- **For TMWA**, it means additional protection against drought, as storage is able to built up and carried-over from one year to the next leading up to and in the midst of a drought, significantly increasing our reserves and ability to create a water supply for our customers
- **For PLPT**, it means that when water is not needed for drought protection (during normal and big water years), the drought storage gets converted to Fish Credit Water

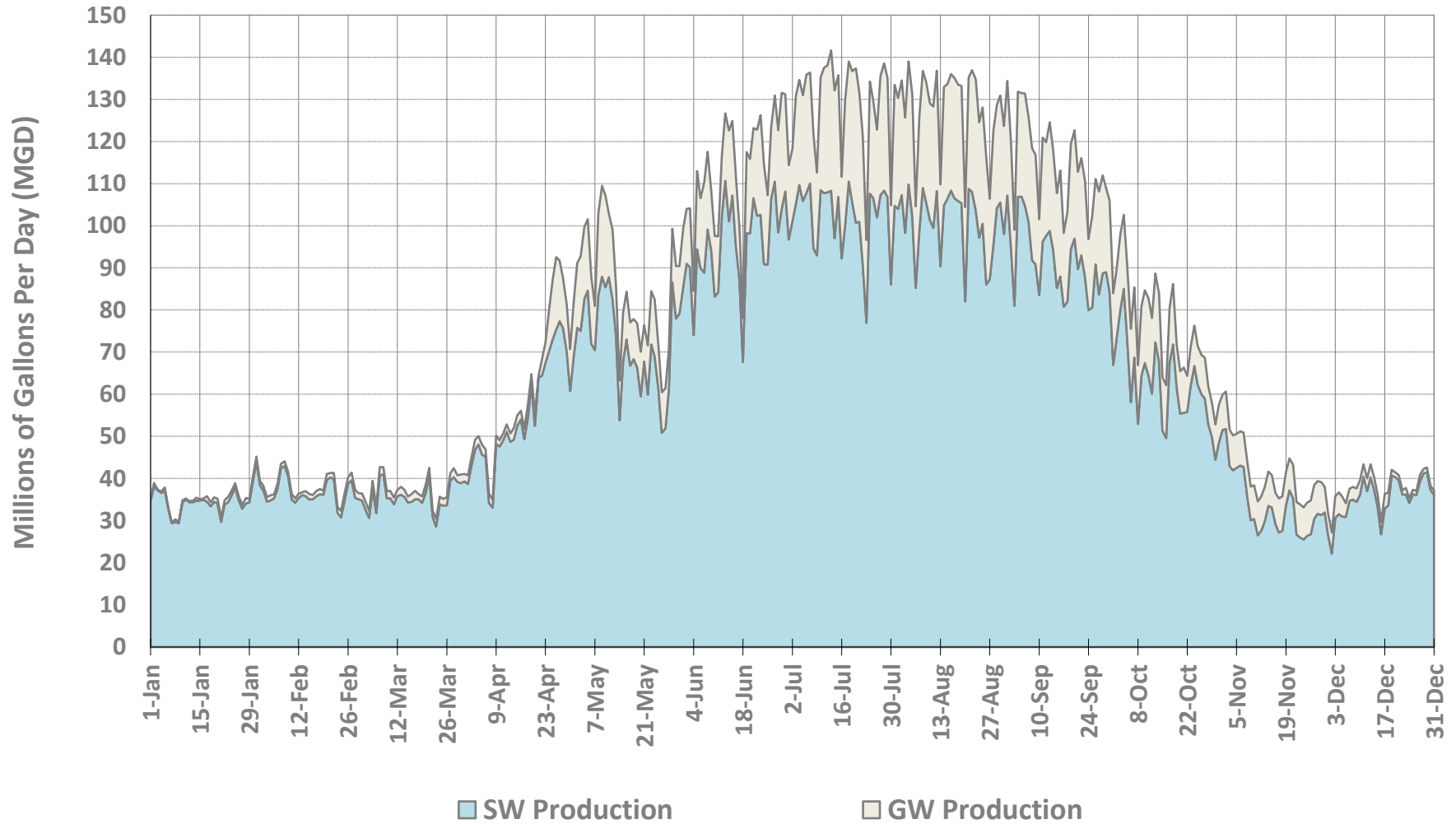
2016 TMWA Water Supply Operations



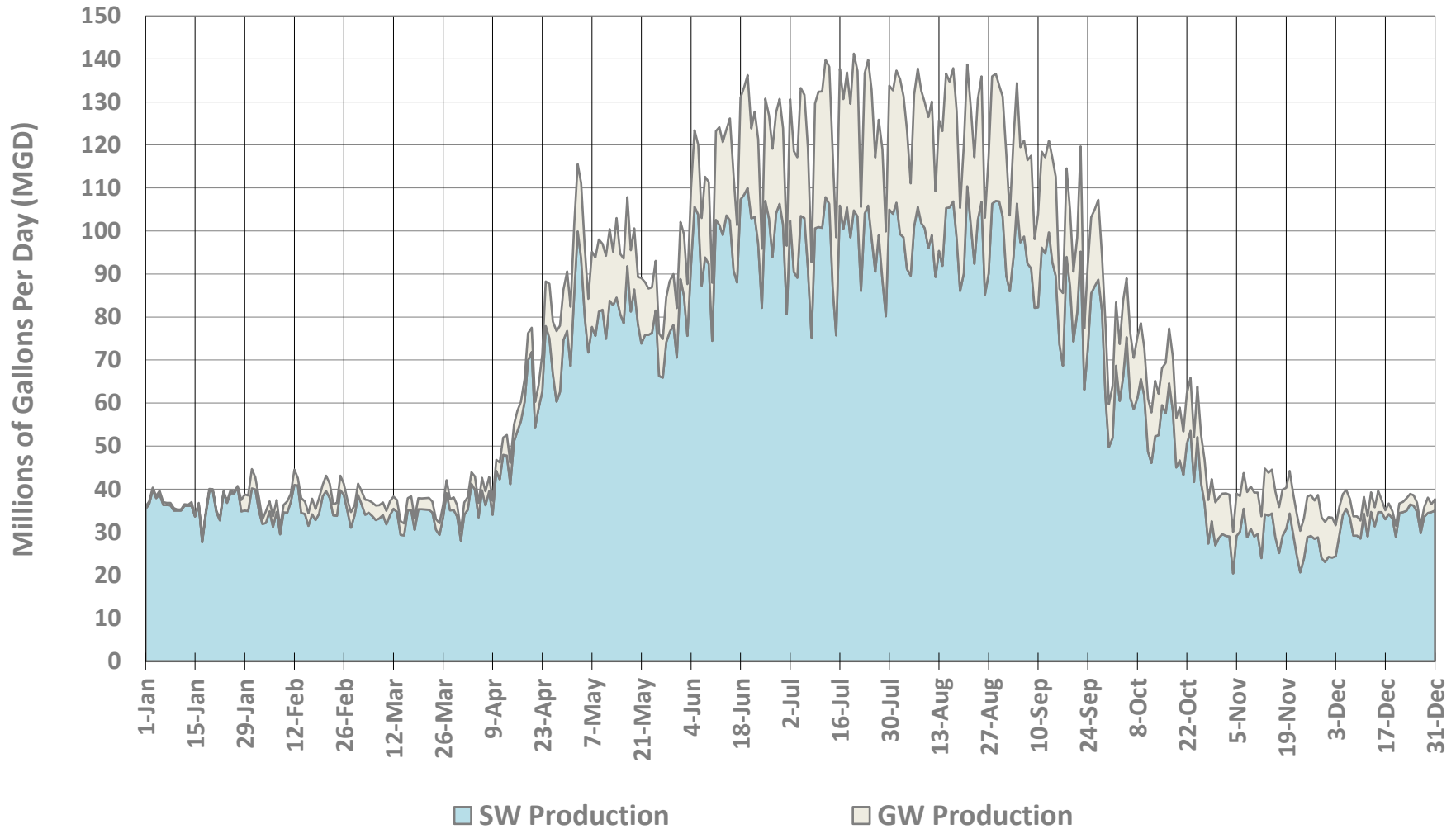
2017 TMWA Actual Sources of Supply



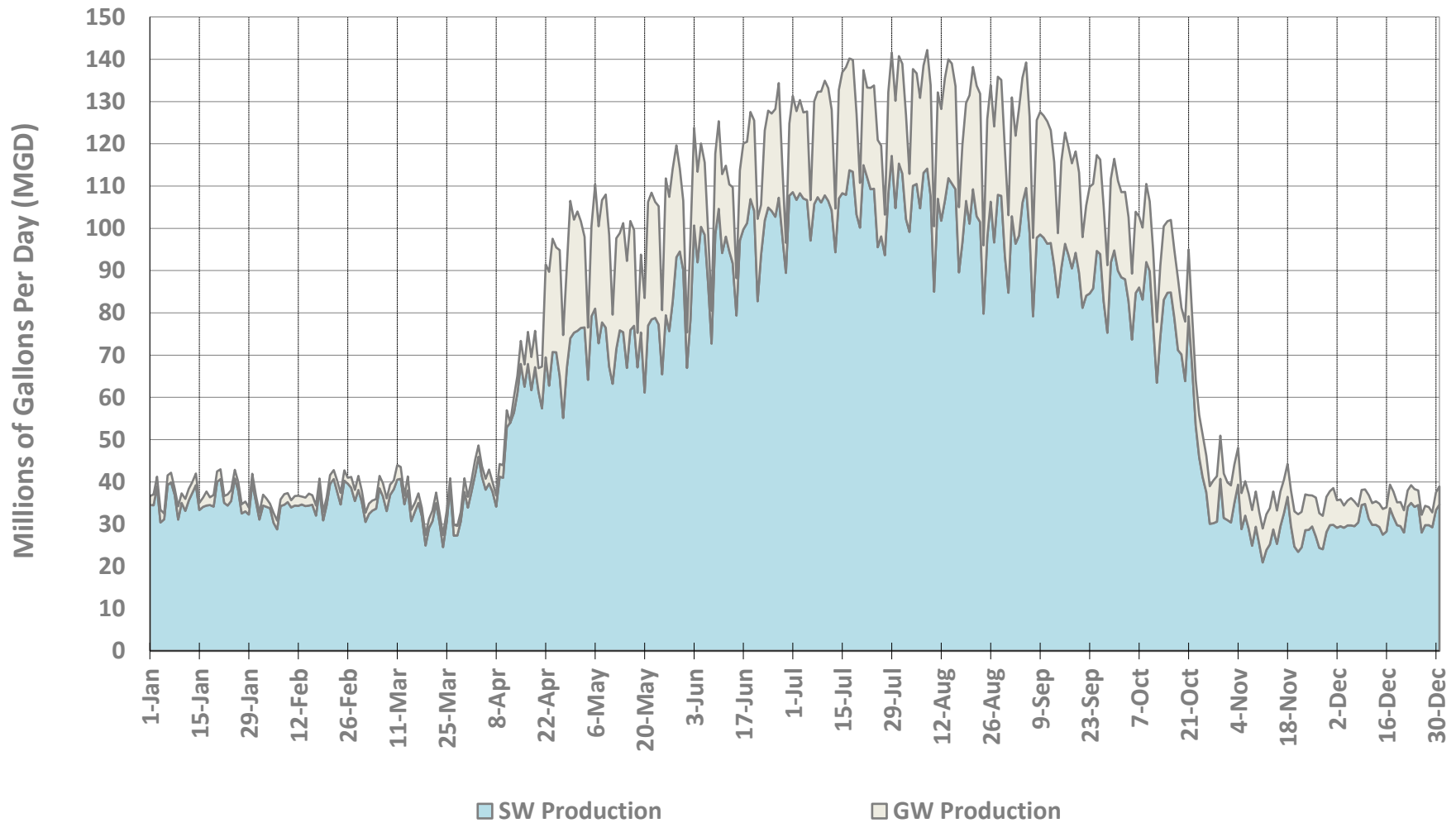
2018 TMWA Actual Sources of Supply



2019 TMWA Actual Sources of Supply



2020 TMWA Actual Sources of Supply



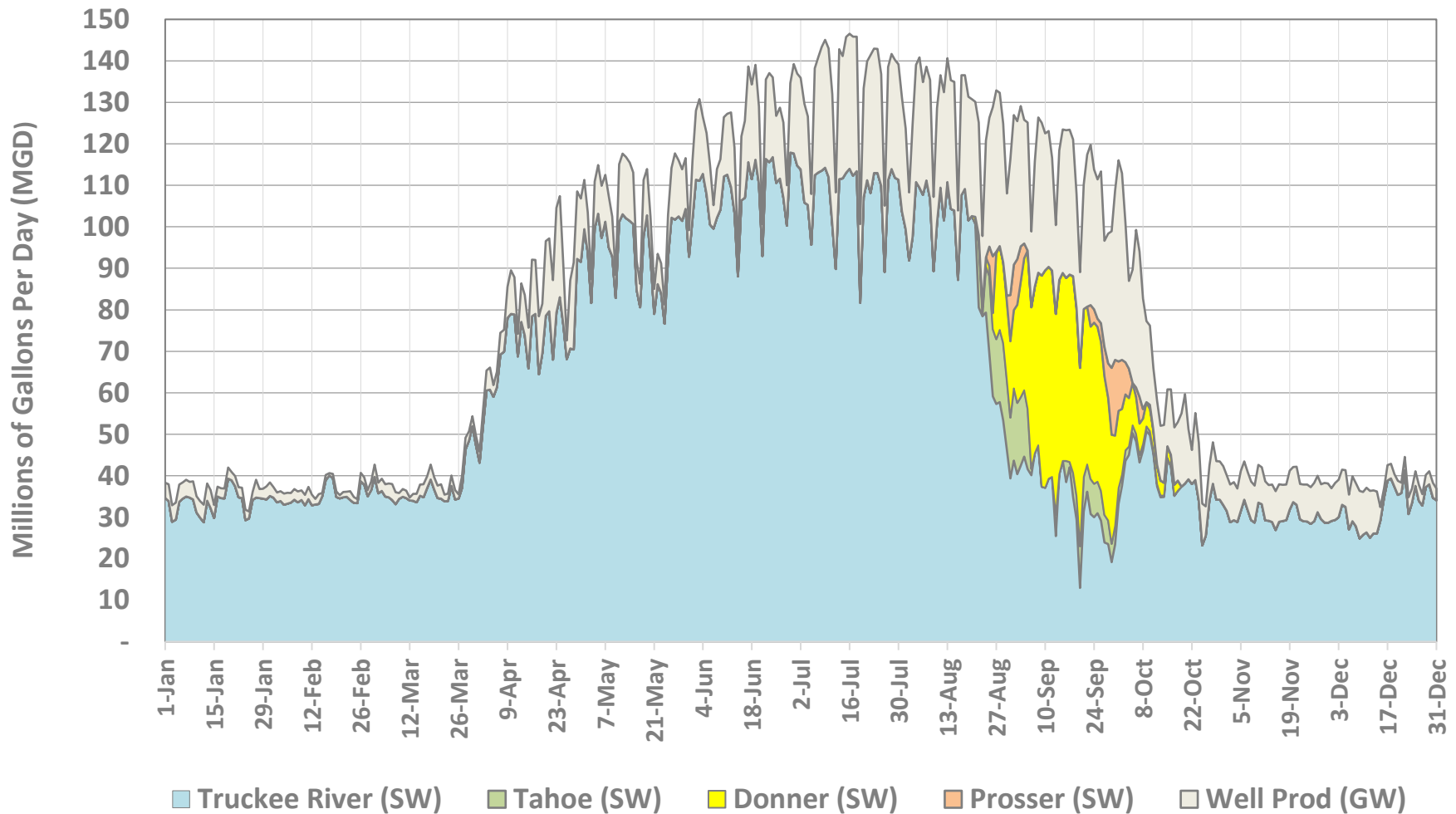


DANGER

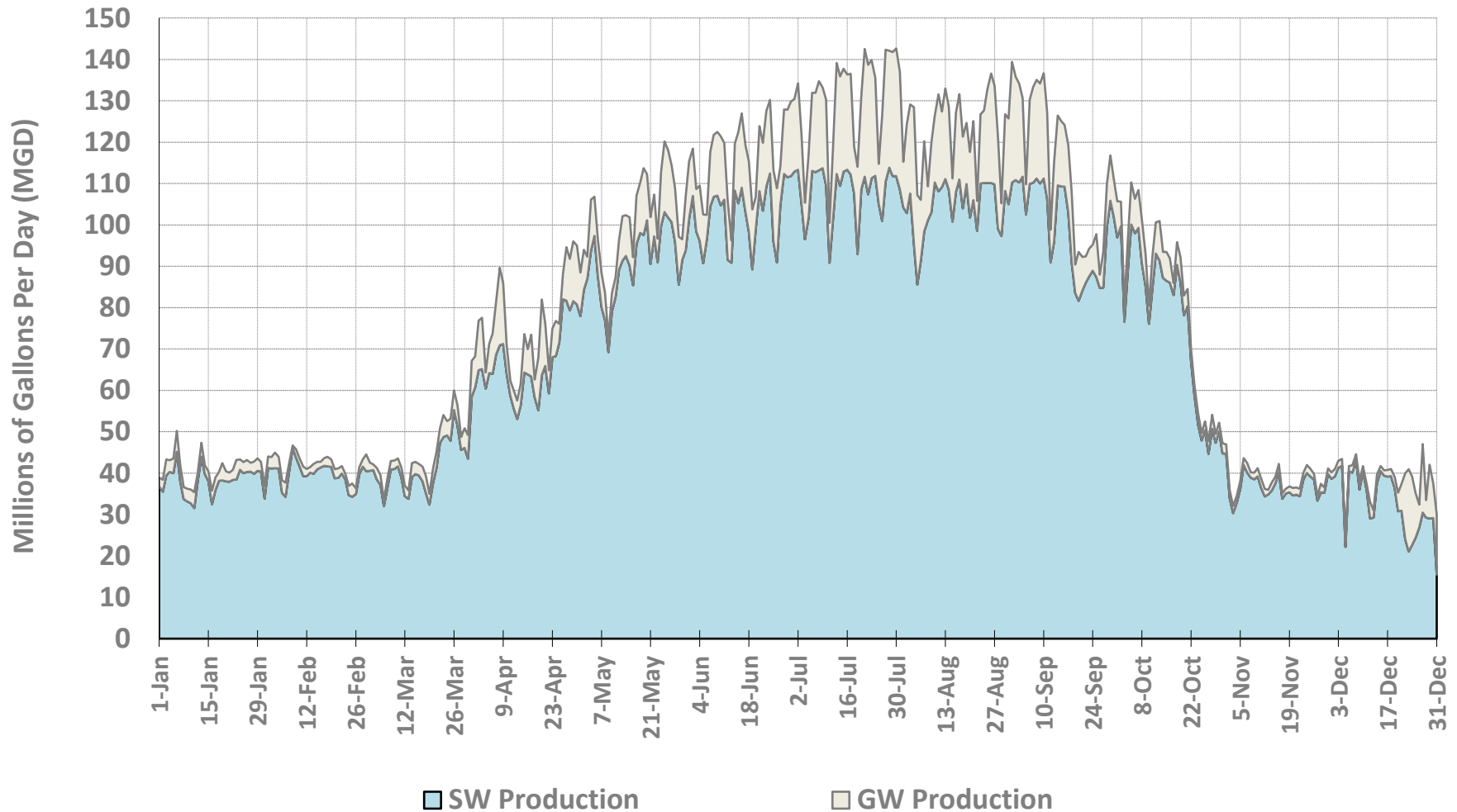


DAM

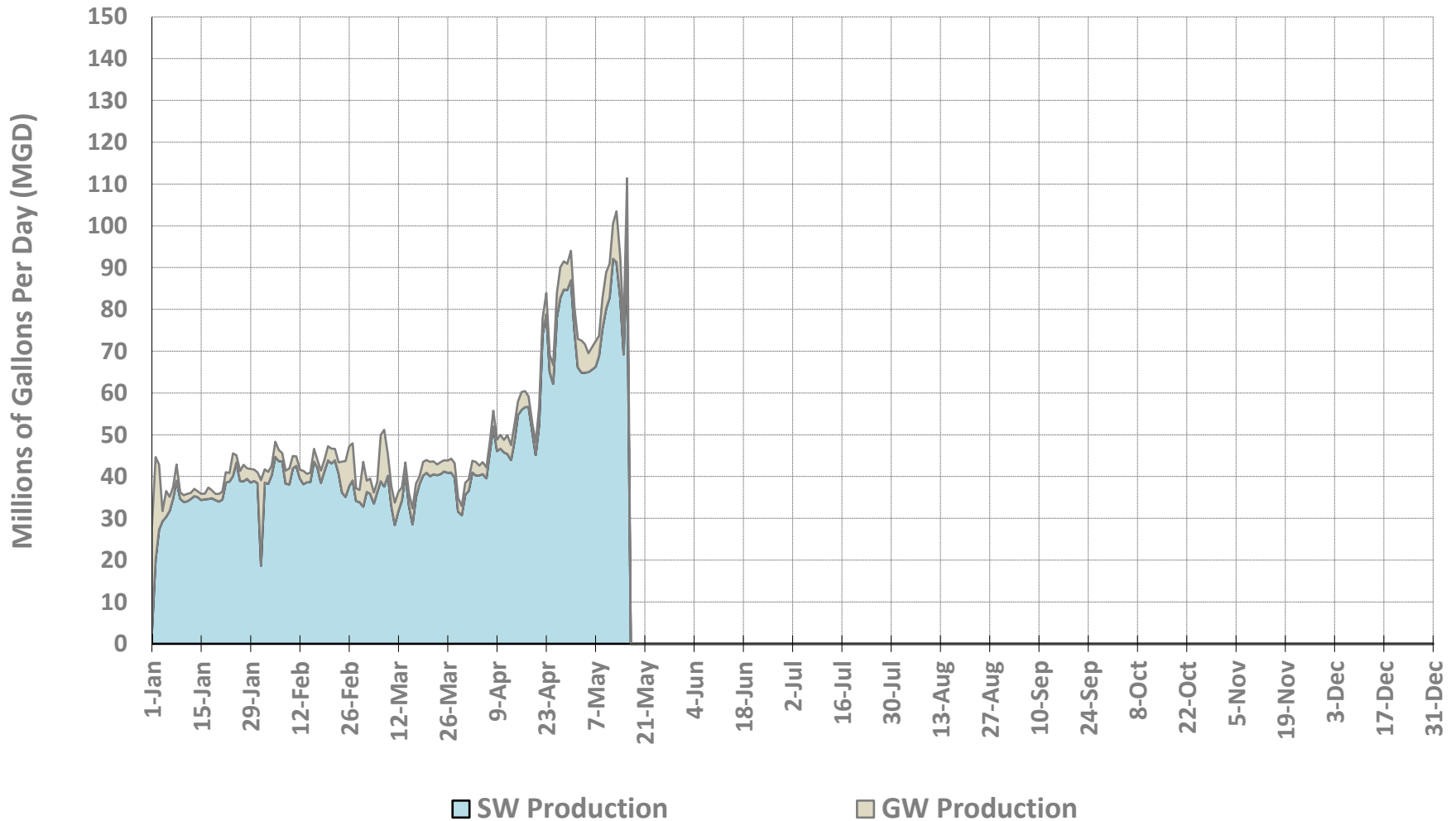
2021 TMWA Actual Sources of Supply



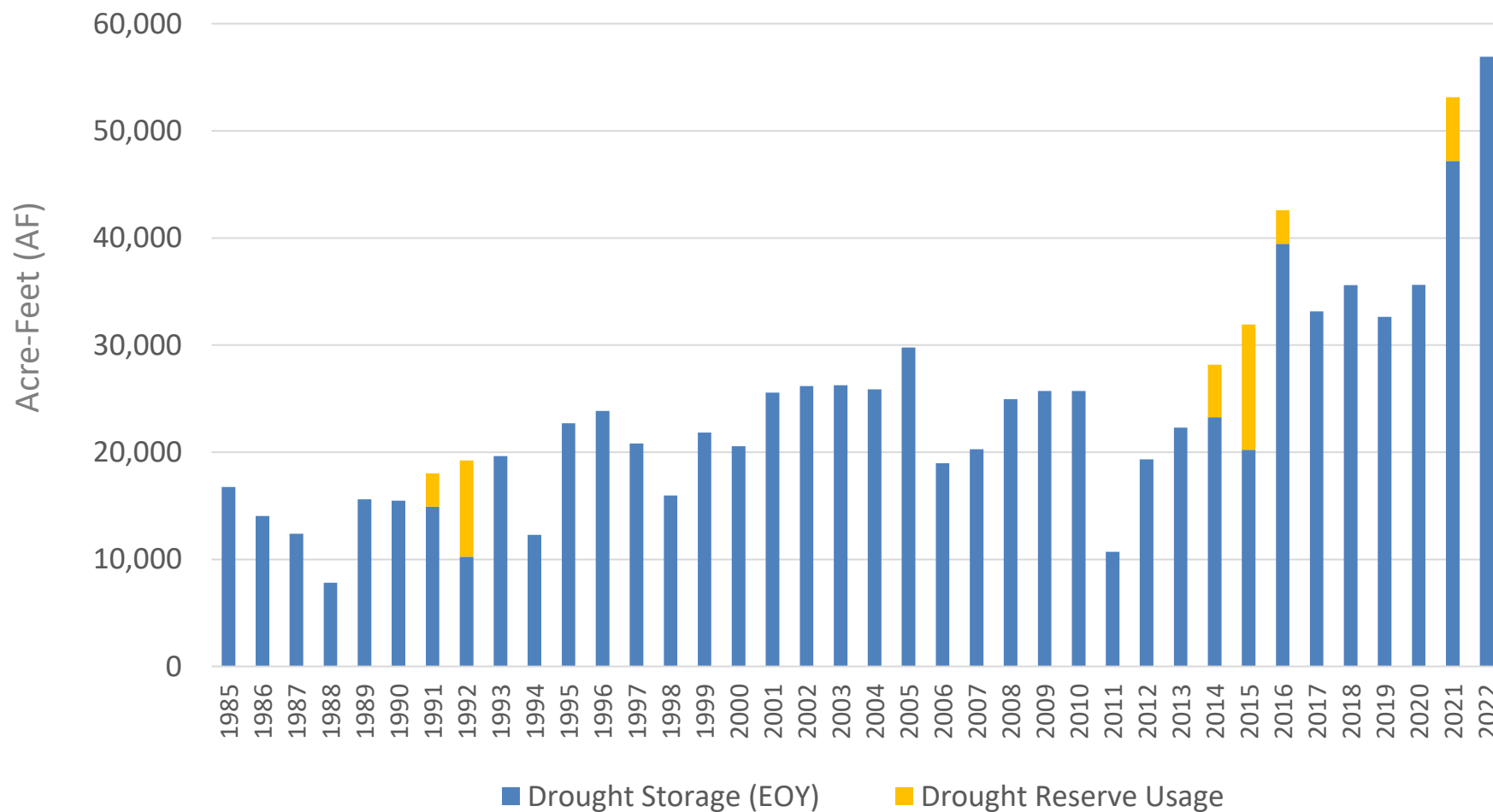
2022 TMWA Actual Sources of Supply



2023 TMWA Actual Sources of Supply



TMWA Drought Storage and Usage









Thank you!

Questions?

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