The attached document was submitted to the **Washoe County Board of Commissioners** during the meeting held on May 12, 2015.

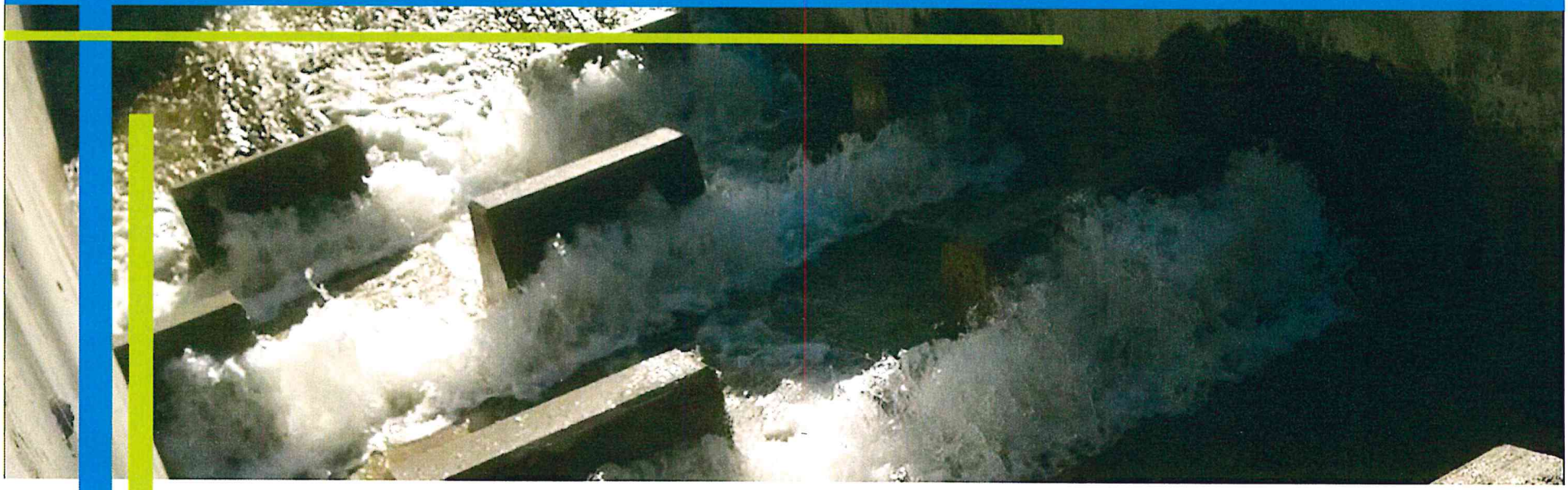
by John Erwin

for Agenda Item No. 6

and included here pursuant to NRS 241.020(7) as amended by AB65 of the 2013 Legislative Session.

TRUCKEE MEADOWS WATER AUTHORITY

Quality. Delivered.



Drought and Water Supply for 2015

Presentation by Truckee Meadows Water Authority

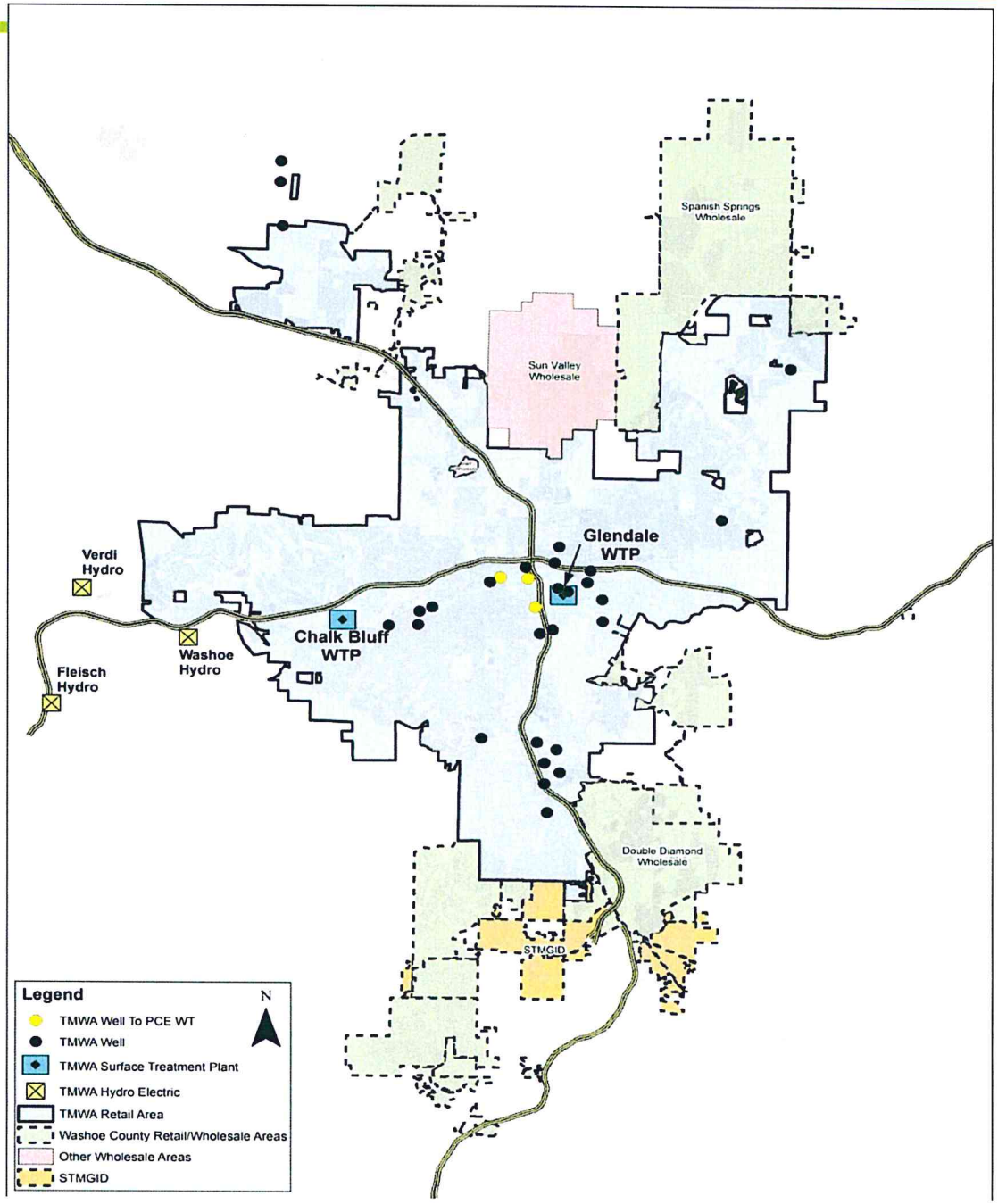
May 12, 2015

PARTNERSHIP FOR SAFE WATER

- **2015 Water Supply**
- **Demand Management Activities**

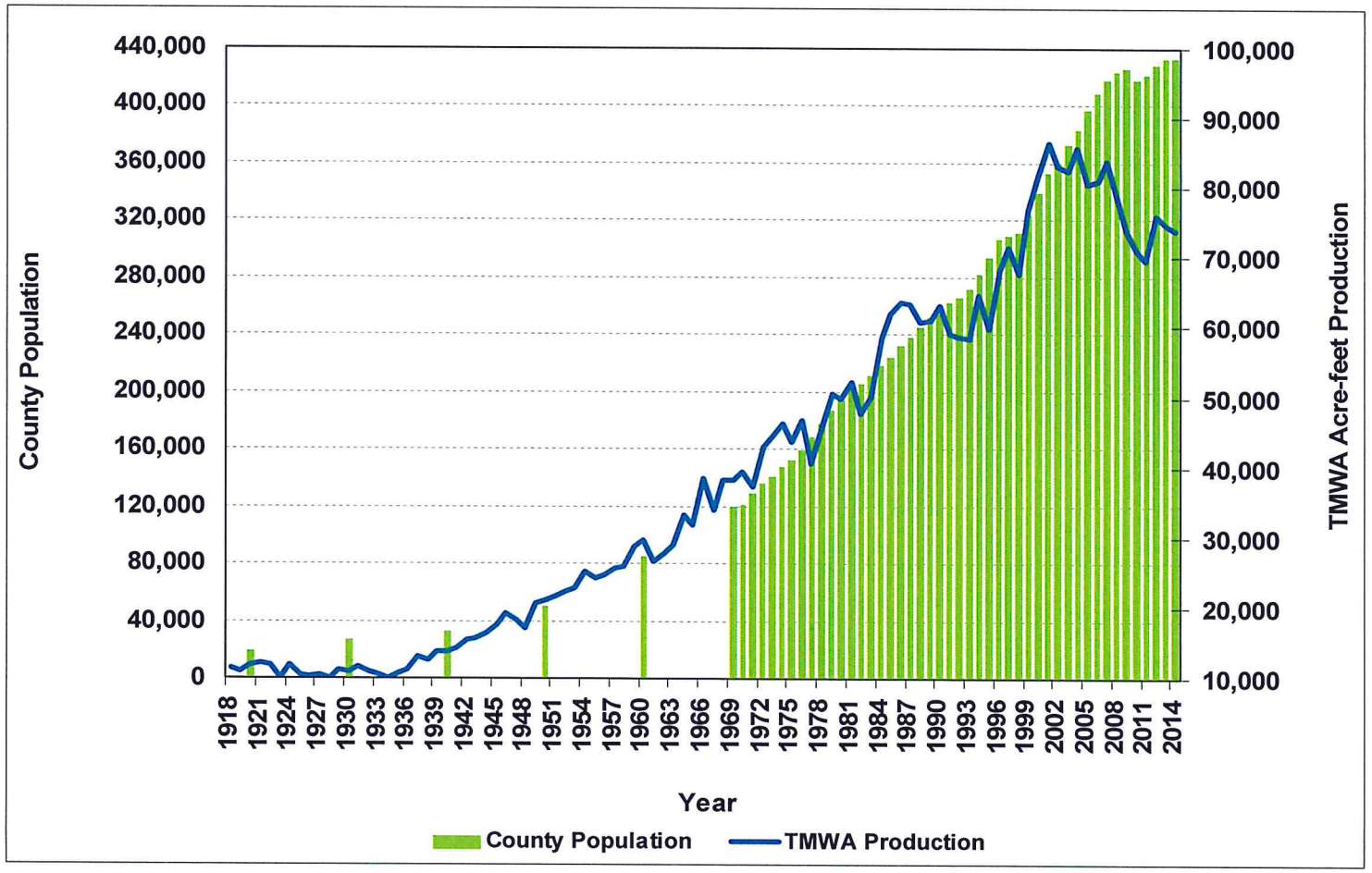
TMWA

Quality. Delivered.



PARTNERSHIP FOR SAFE WATER

Washoe County Population and TMWA Water Production

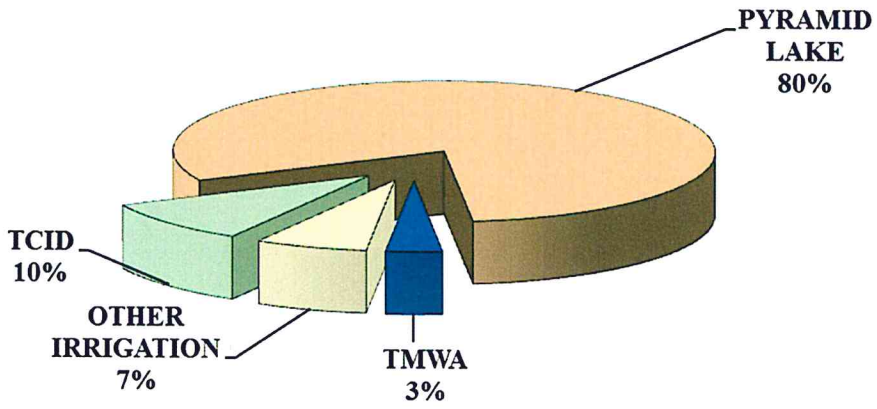


The Truckee and Carson River Systems

A	1983-1,769,000 af AVG - 558,700 af 1931- 133,200 af
B	1983-2,017,000 af AVG - 603,800 af 1992- 114,400 af
C	1983-1,888,800 af AVG - 425,100 af 1992- 17,400 af
D	1978- 287,400 af AVG - 161,400 af 2000- 31,000 af
E	1983- 804,300 af AVG - 276,000 af 1927- 26,300 af

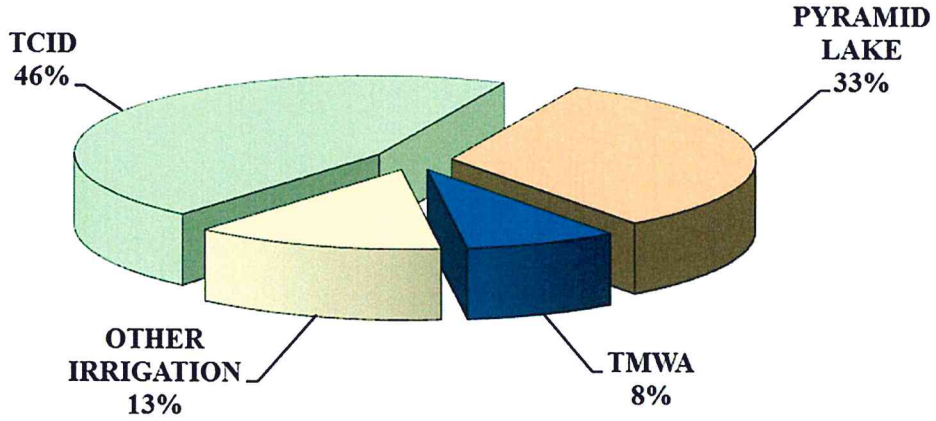
Typical Diversions of the Truckee River

NON-DRY YEAR DIVERSIONS



* 734 KAF Avg. (1985-1986, 1993, 1995-2000, 2005-2006, 2011) at Farad

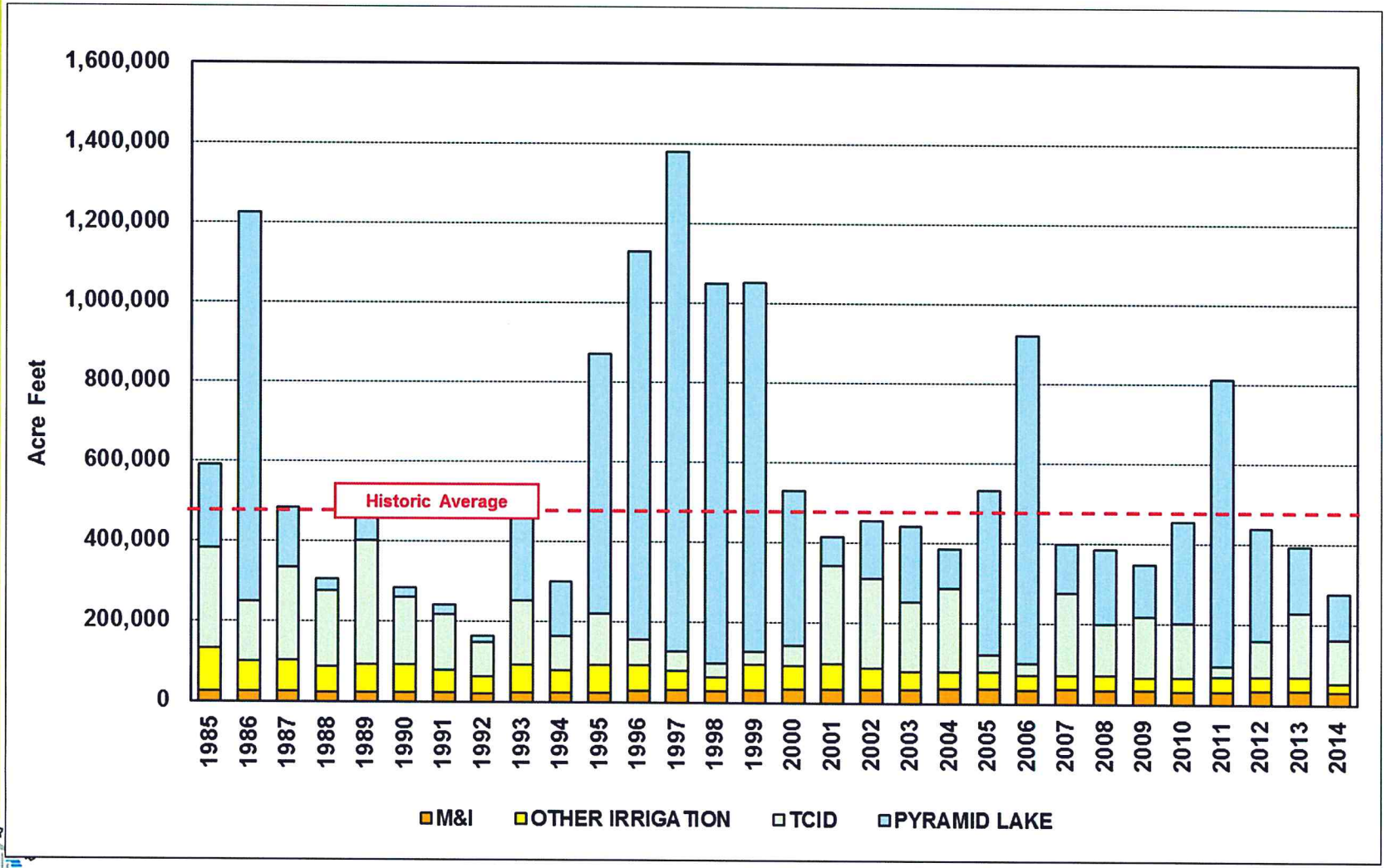
DRY YEAR DIVERSIONS



* 322 KAF Avg. (1987-1992, 1994, 2001-2004, 2007-2010, 2012, 2013, 2014) at Farad

PARTNERSHIP FOR SAFE WATER

Typical Diversions of the Truckee River



Facts and Figures (Consolidated Utility)

Population Served

- Retail – 370,000 (117,000 active service connections)
- Wholesale – 15,000

Surface Water Supply

- "40" CFS (28,959 AF)
- Hunter Creek (9,847 AF)
- Conversion of Irrigation Rights (approximately 70,000 AF)
- Approximately 68,000 AF produced in 2013

TMWA's Resources (Consolidated Utility)

Groundwater Supply

- Approximately 42,000 AF available in non-drought years (multiple GW basins)
    - Approximately 17,000 AF actually pumped in 2013
- Additional 6,150 AF in drought years (Truckee Meadows basin)
- Recharged water

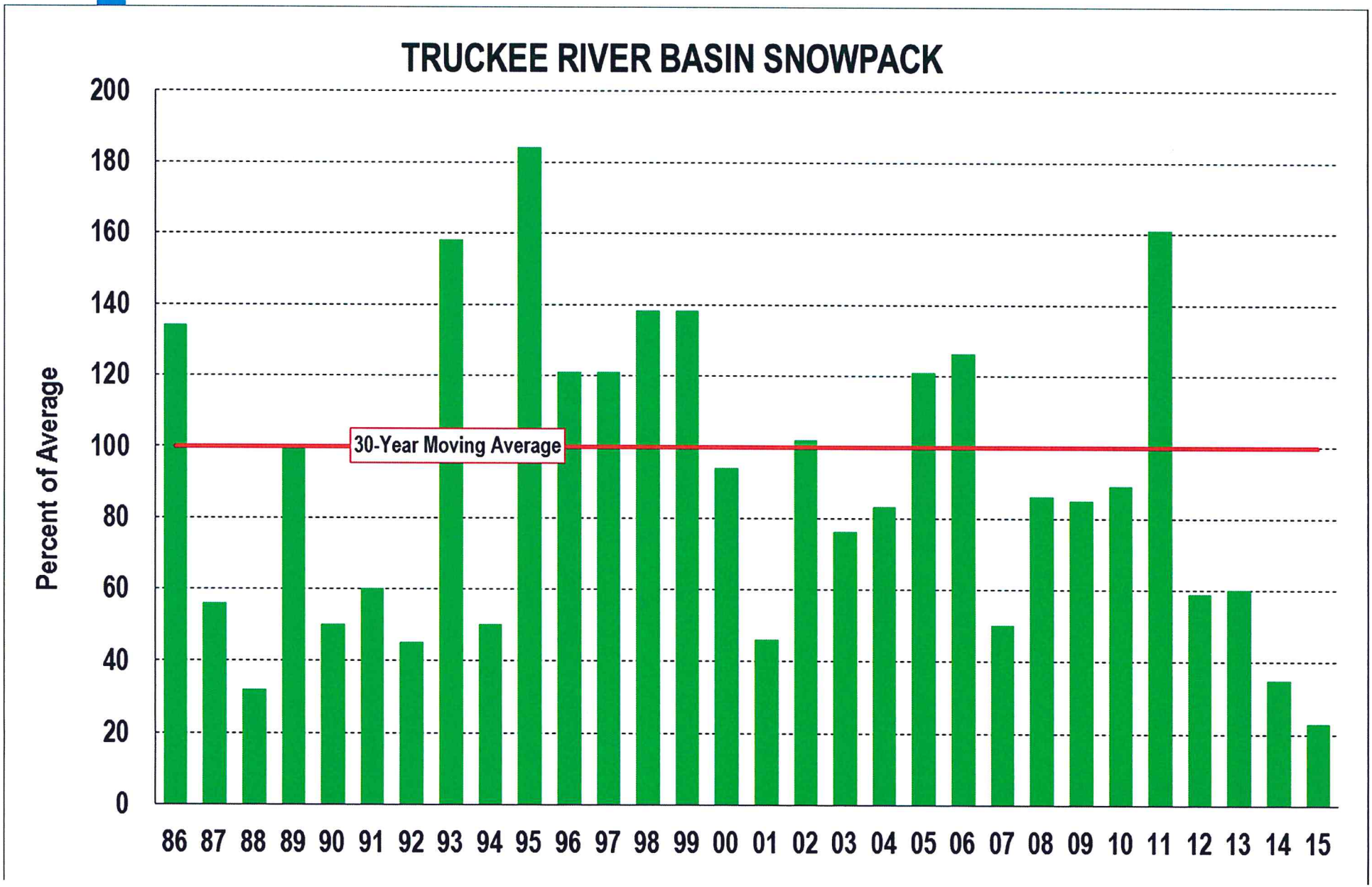
Storage

- Independence Lake (17,500 AF)
- Donner Lake (4,750 AF)
- Interim Storage Agreement (ISA) with BOR
    - 25 year agreement for up to 14,000 AF of storage

CFS – cubic feet per second
AF – acre feet

TMWA

Quality. Delivered.



TMWA

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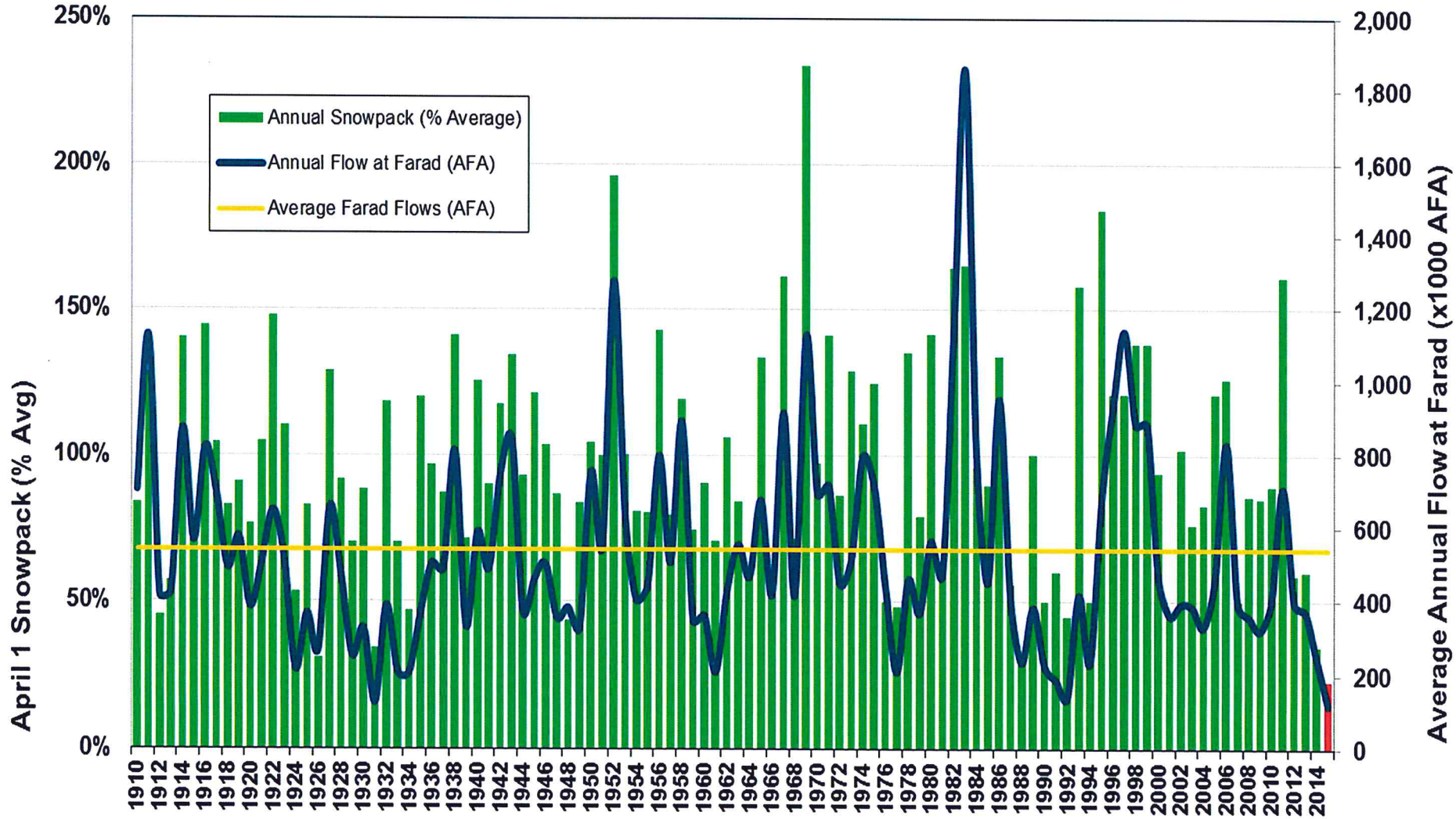
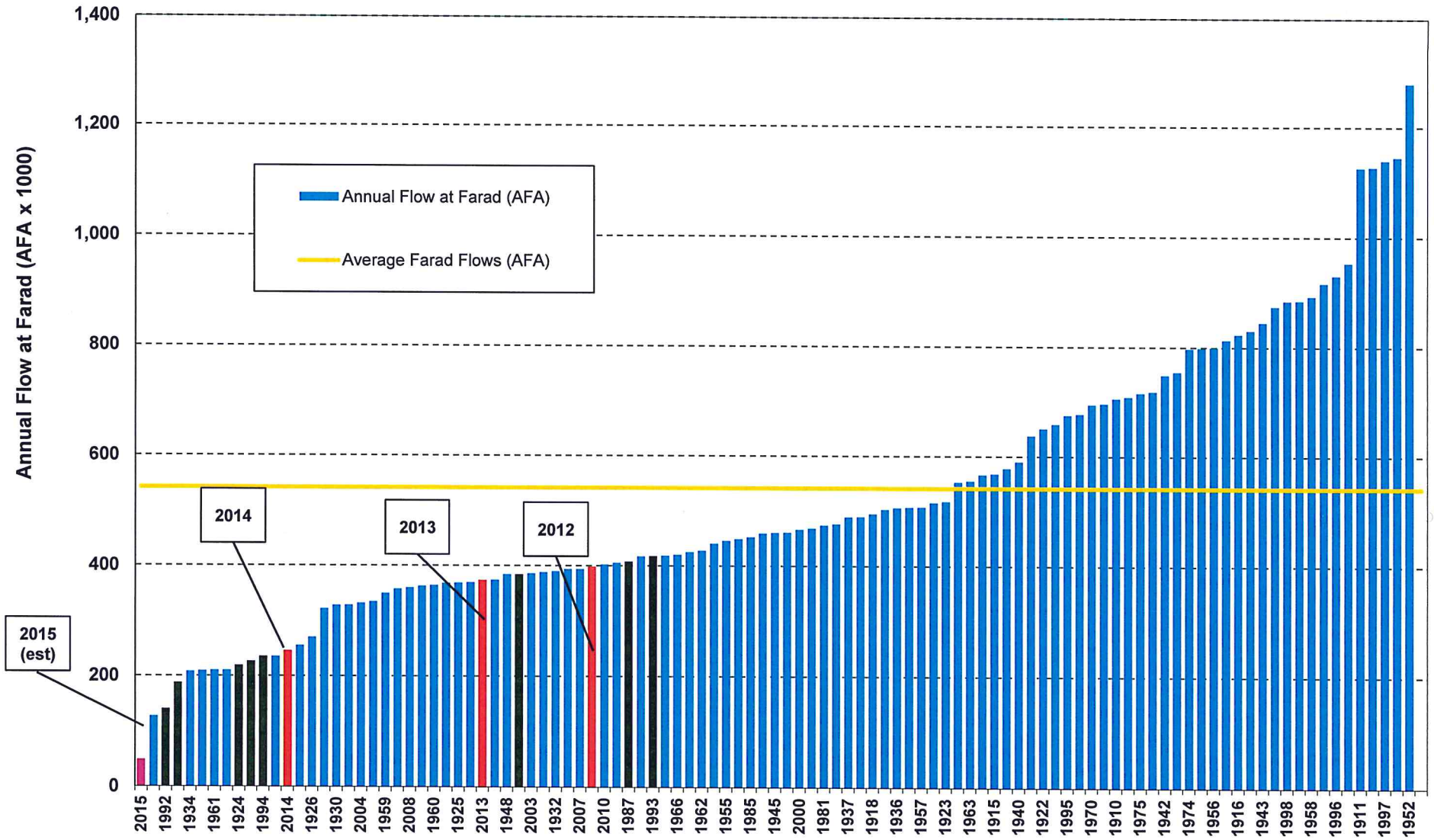
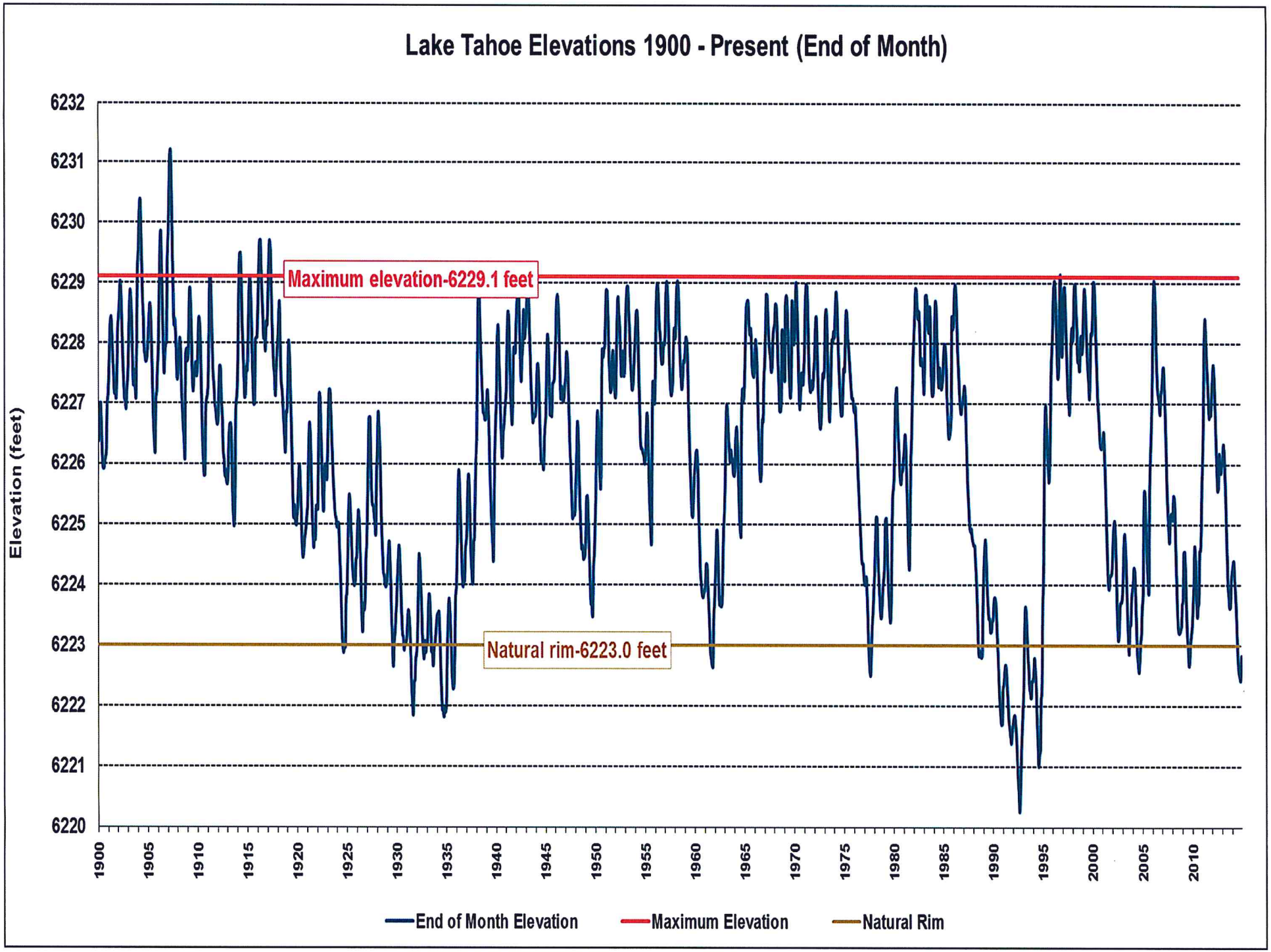
Annual Snowpack % vs Average and Annual Truckee River Flow at Farad



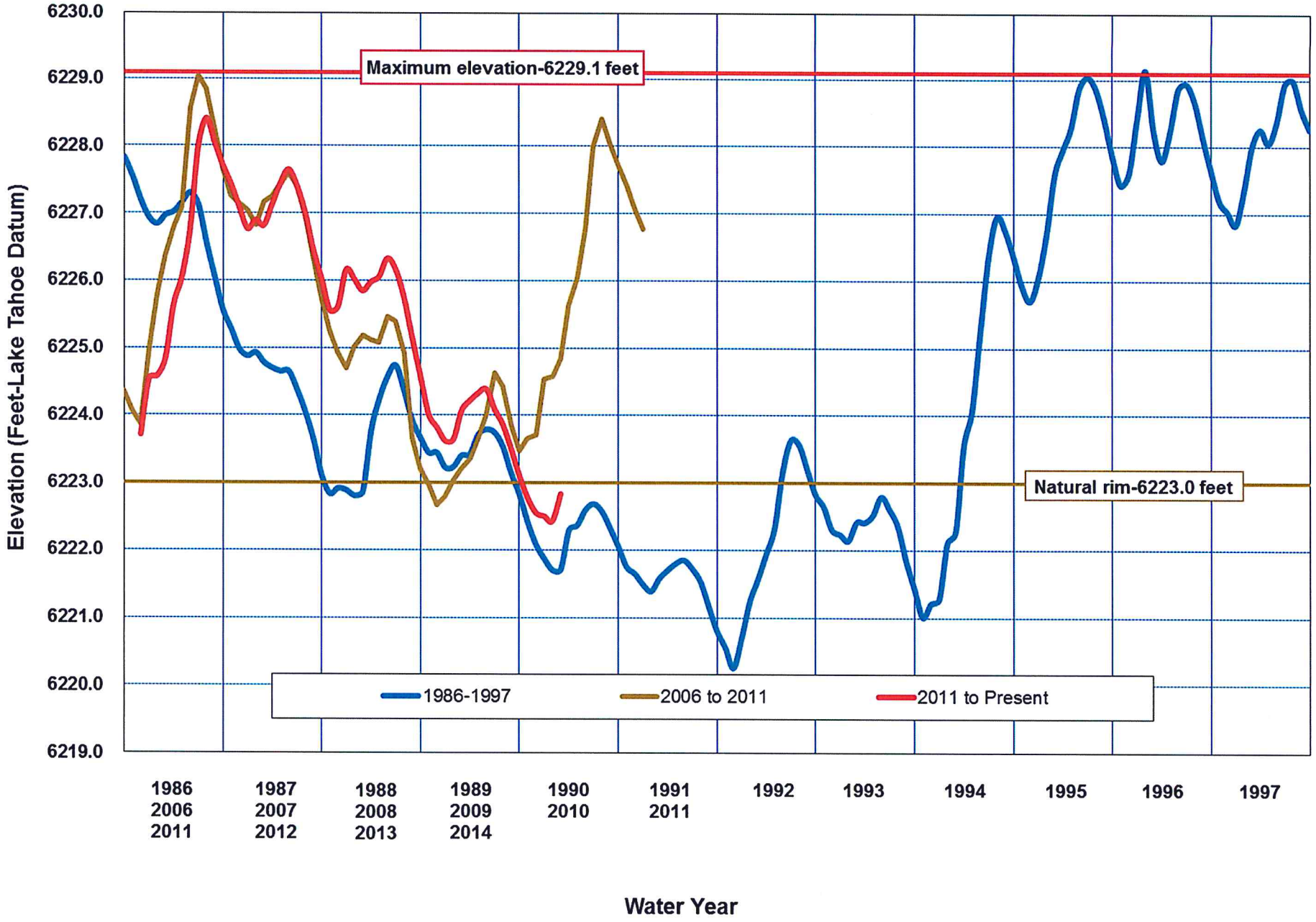
AVERAGE AND ANNUAL TRUCKEE RIVER FLOW

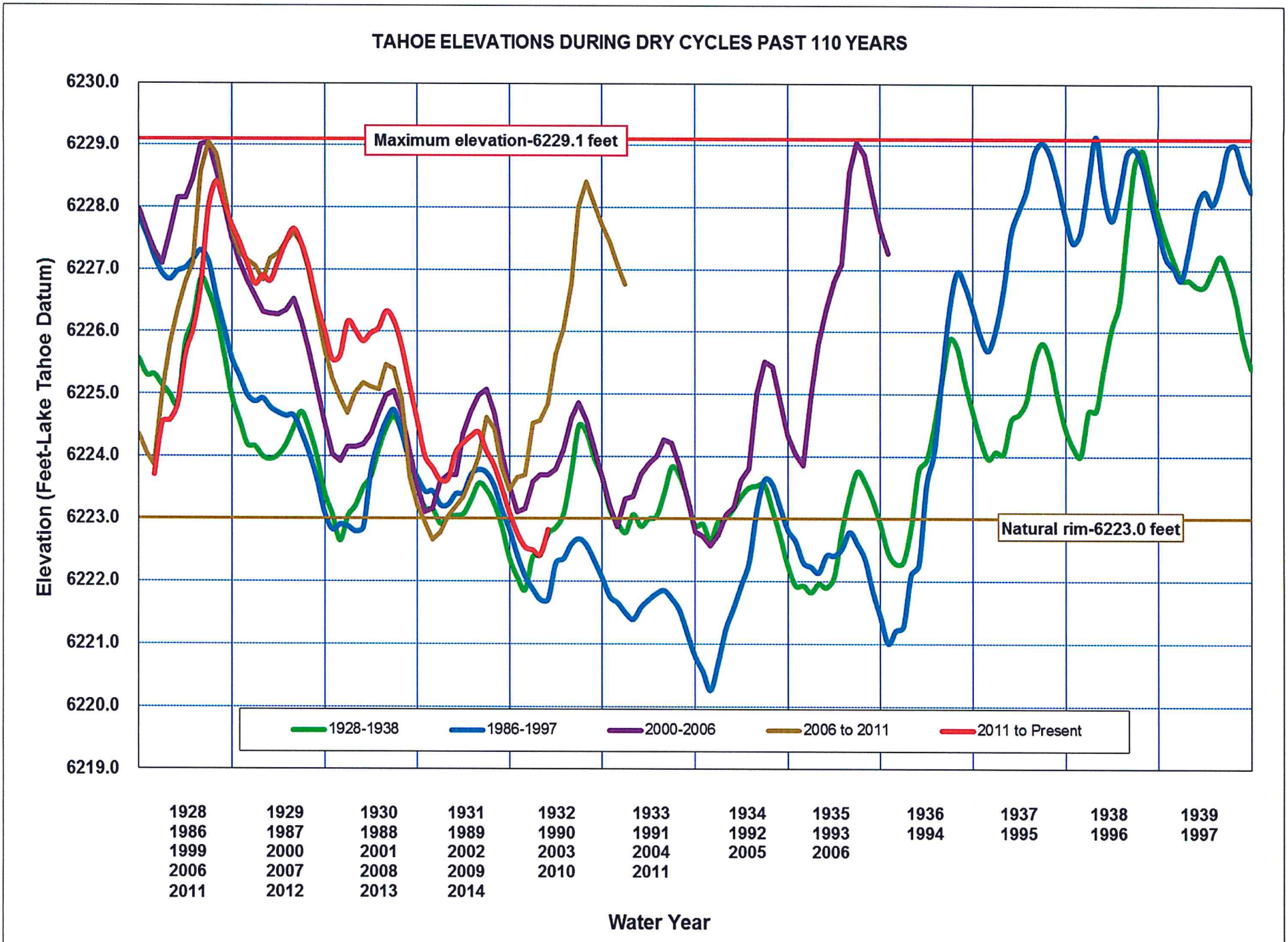


NOTE: Black bars are flows during the 1987 to 1994 Drought which include 2 of the 3 lowest water years of record - 1991 and 1992. The 1987-1994 Droughts lasted 8 years, includes some of the lowest water years, and is the current worst-case time period used for drought cycle planning criteria.Red bars are part of current 4-year drought cycle.


Lake Tahoe Elevations 1900 - Present (End of Month)
Elevation (feet)
6232
6231
6230
6229
6228
6227
6226
6225
6224
6223
6222
6221
6220
Maximum elevation-6229.1 feet
Natural rim-6223.0 feet
1900
1905
1910
1915
1920
1925
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
End of Month Elevation
Maximum Elevation
Natural Rim

Lake Tahoe Elevation 3 Recent Dry Cycle Comparison

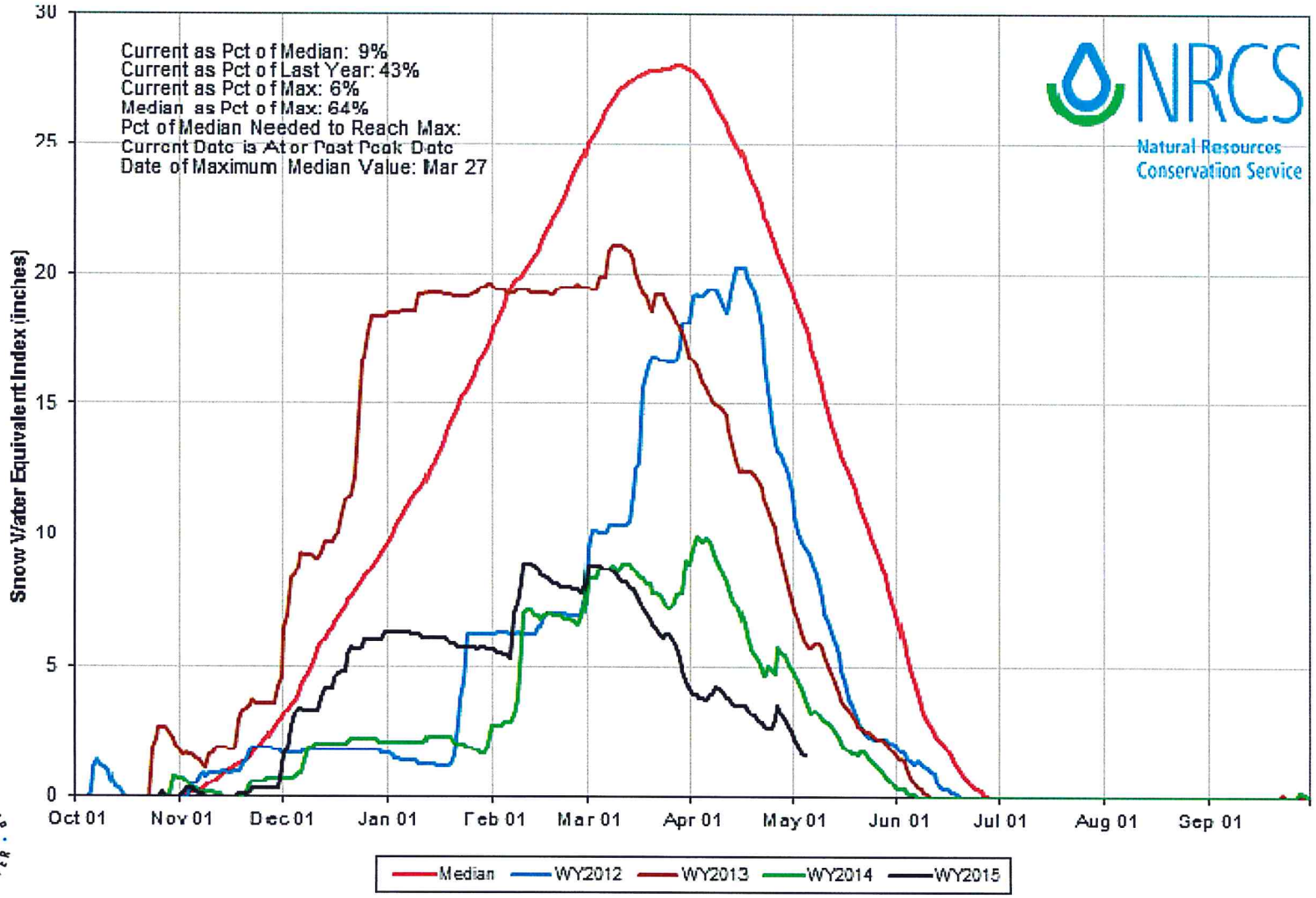



TAHOE ELEVATIONS DURING DRY CYCLES PAST 110 YEARS
Elevation (Feet-Lake Tahoe Datum)
6230.0
6229.0
6228.0
6227.0
6226.0
6225.0
6224.0
6223.0
6222.0
6221.0
6220.0
6219.0
Maximum elevation-6229.1 feet
Natural rim-6223.0 feet
1928-1938
1986-1997
2000-2006
2006 to 2011
2011 to Present
1928 1986 1999 2006 2011
1929 1987 2000 2007 2012
1930 1988 2001 2008 2013
1931 1989 2002 2009 2014
1932 1990 2003 2010
1933 1991 2004 2011
1934 1992 2005
1935 1993 2006
1936 1994
1937 1995
1938 1996
1939 1997
Water Year

TMWA

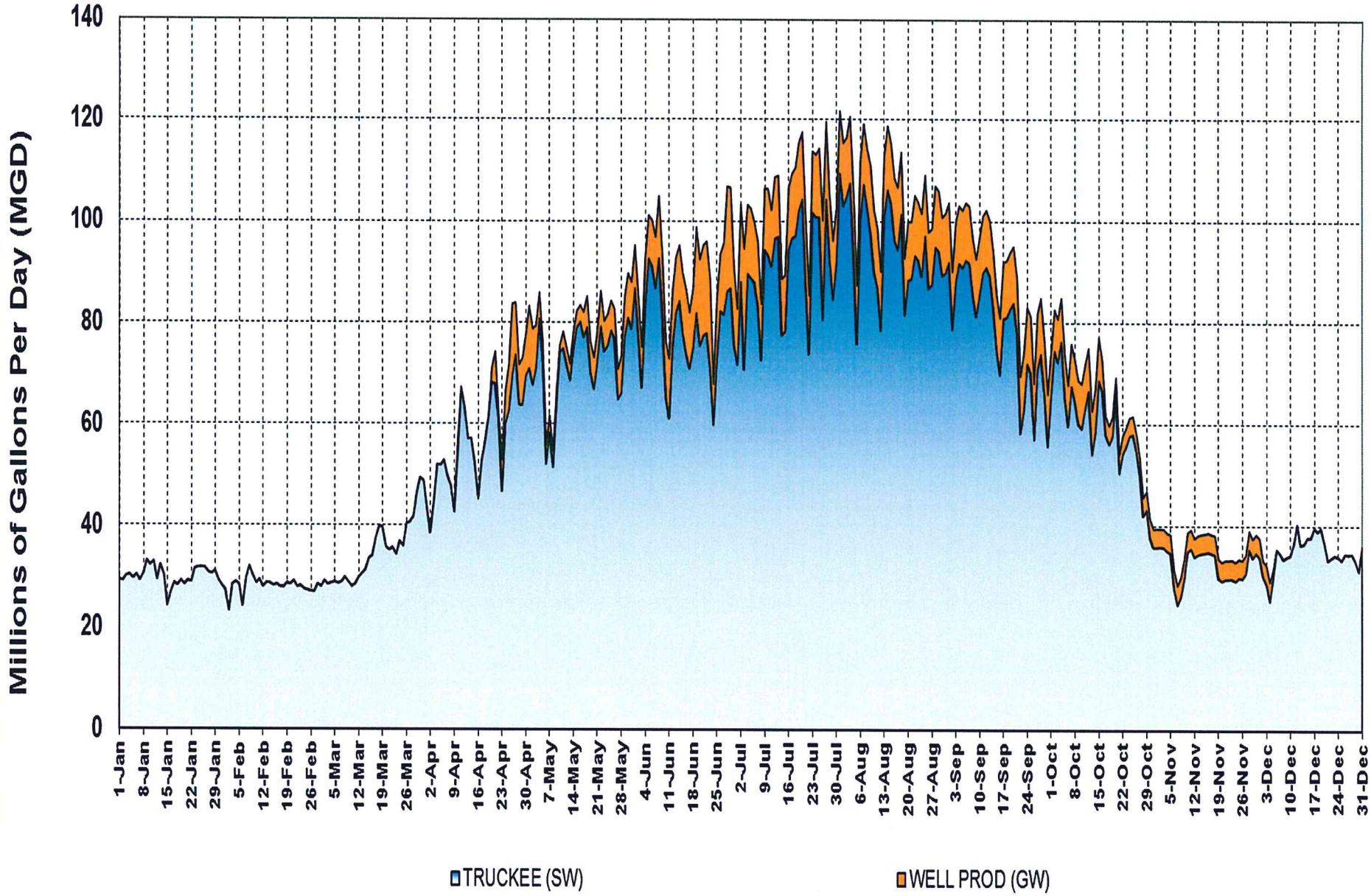
Quality. Delivered.

TRUCKEE RIVER Time Series Snowpack Summary
Based on Provisional SNOTEL data as of May 04, 2015

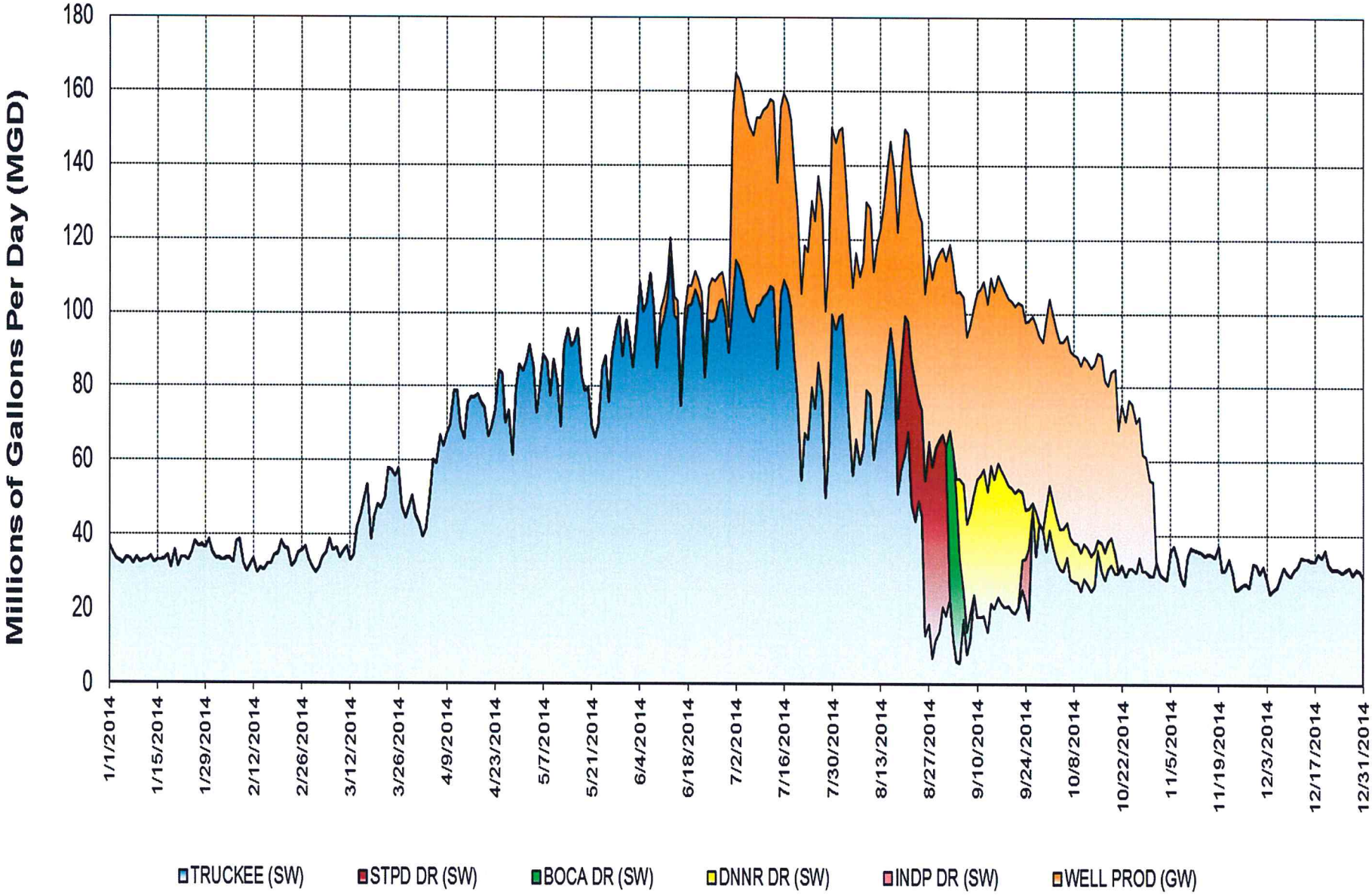


PARTNERSHIP FOR SAFE WATER

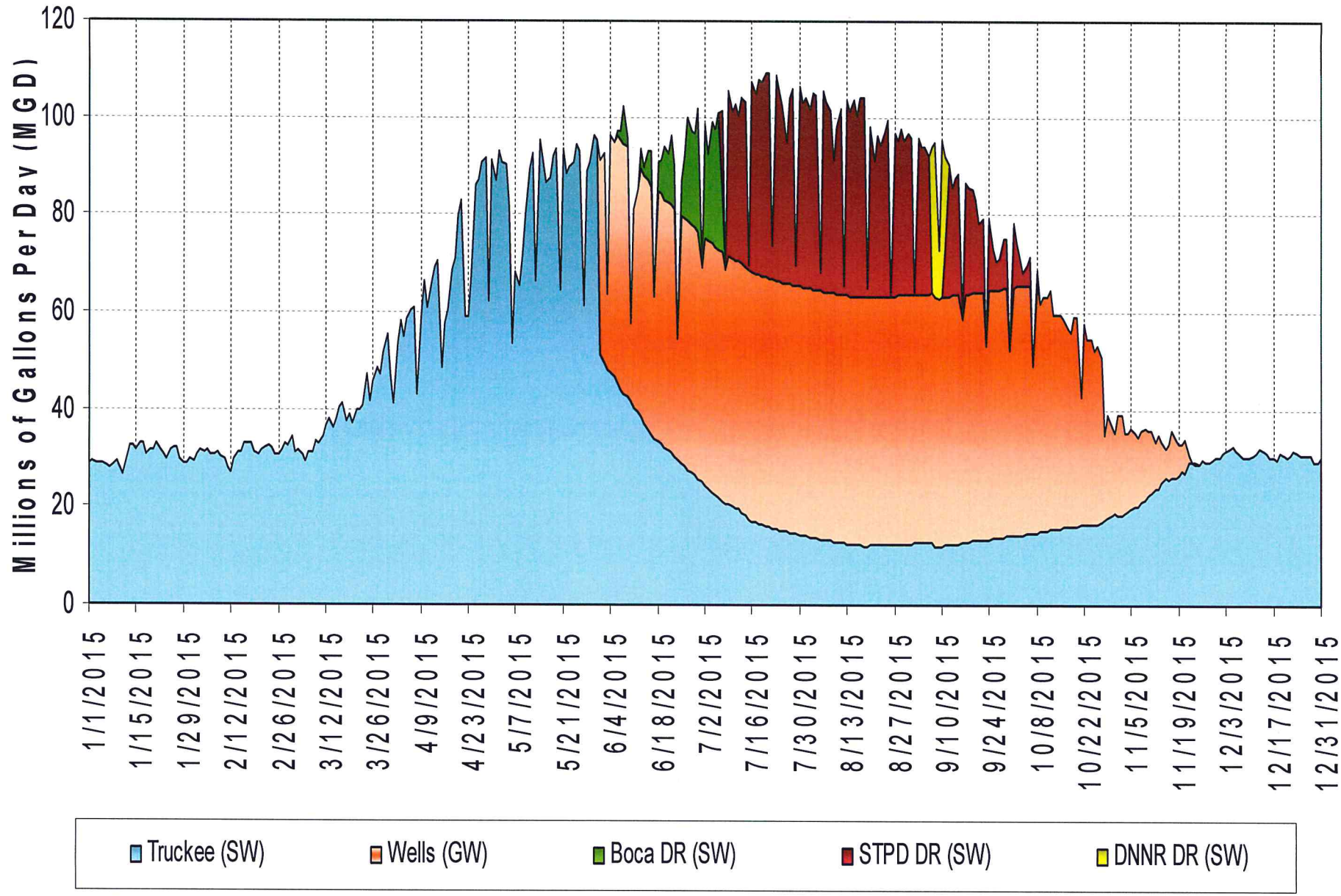
2013 TMWA SOURCES OF SUPPLY



2014 TMWA SOURCES OF SUPPLY



2015 TMWA Actual and Projected Sources of Supply (actual through 4/30)



Water Supply Take-Aways

Truckee River flows = f(snowpack, precipitation); highly variable

Truckee River one of the most highly regulated rivers in the United States

By Federal Court Decree, Lake Tahoe and/or Boca Reservoir ***must*** release water to meet a daily flow at the California-Nevada Stateline

From Sep to Nov, water ***must*** be released from ***all*** upstream reservoirs to make room for the winter storm/flood events and spring runoff

A full Lake Tahoe is at its rim in 3 consecutive below-average snowpacks years, therefore unable to release any water

TMWA's current sources of supply include:

- Annual flow of water from the Truckee River system
- Pumping of groundwater, both native and recharged water
- Releases of water from TMWA's upstream reservoirs

Demand Management

	Non-Drought Situation	*Drought Situation*	
	Supplies are Normal	Supplies are Adequate [River Flows Drop-Off After Labor Day]	Supplies are Impacted [River Flows Drop-Off Before Labor Day]
	a	b	c	d
A *Assigned Day Watering*				
Monday		No water day	No water day	No water day
Even addresses:		Tuesday, Thursday and Saturday	Tuesday, Thursday and Saturday	Tuesday, Thursday and Saturday
Odd addresses:		Wednesday, Friday, and Sunday	Wednesday, Friday, and Sunday	Wednesday, Friday, and Sunday
B *Water Day Time Restrictions*				
Between Memorial Day and Labor Day		12 to 6 PM	12 to 6 PM	11 AM to 7 PM
C *Public Education & Advertising*		Standard programs	Standard programs	Increased programs
D *Water Waste Prevention*		Standard enforcement	Standard enforcement	Increased enforcement
E *Other Actions*				
Though not inclusive, these enhancements could be deployed depending on the severity of the circumstances and the potential impact to supplies				Expand water day time restrictions Reduce the number of watering days Set daily watering allotments Drought rates

NOTE: The term "supplies" refers to (1) Truckee River water available from natural flows plus releases from Federally operated reservoirs to support Floriston Rates and (2) TMWA's Privately Owned Stored Water held in Independence and Donner Lakes and Federal reservoirs.

State of Supply to Truckee Meadows Service Areas		Month					
		May	Jun	Jul	Aug	Spt	Oct
Non-Drought Situation		SDMP	SDMP	SDMP	SDMP	SDMP	SDMP
Drought Situation							
Supplies Adequate (Loss of Floriston rates after Labor Day)		SDMP	SDMP	SDMP	SDMP	SDMP	SDMP
Supplies Impacted	Level 1	SDMP	SDMP	EMB	EDMP	EDMP	SDMP
(Loss of Floriston rates before Labor Day)	Level 2	SDMP	EMB	EDMP	EDMP	EDMP	SDMP
	Level 3	EMB	EDMP	EDMP	EDMP	EDMP	SDMP

SDMP - standard conservation program, upstream reserves not used

EDMP - enhanced conservation program, upstream reserves used

EMB - enhanced message begins at least a month prior to loss of Floriston Rates

DMP Category	Primary Benefit	Target Audience
A. System Management		
Coordination of Treated Effluent Use	3, 4	Irrigation
Leaks and System Repairs	1, 4	All users
Meter Replacement	1	All users
Non-Potable Water Service	3, 4	Irrigation
System Pressure Standards	1, 4	All users
Unauthorized Use of Water	1, 4	Construction
B Public Education		
Assigned-Day Watering	1, 2, 3, 4	All users
Distribution of Water Savings Devices & Information	1, 2	Residential
Education Programs for Kids	2	Children
Homeowner Workshops	1, 2	Residential
Landscape Retrofit	1, 3	Irrigation & residential
Water Audits	1, 2	Residential & business
Water Waste Prevention	1	All users
C. Other Measures		
Codes and Ordinances	1	All users
Program Management and Droughts	1, 2, 3, 4	All users
Program Management and Emergency Supply Conditions	1, 2, 3, 4	All users
Water Management Programs	1, 3	Large water users
Water Rates	1, 4	All users

1 - Reduces water waste
2 - Education
3 - Peak day savings
4 - Minimize operation and maintenance to distribution facilities

Demand Reduction Measure

Things to consider ***before*** implementing:

- How much will the measure impact supply?
- What happens with unused water right?
- How much will the measure impact to revenue?
- Equity/fairness: self-selection bias, non-participants
- Funding mechanism: Who pays, who plays?
- Conflicts in code &/or HOA requirements vs individual desire

Example: Rebate Program for Turf Conversion

Xeriscape – landscaping with drought tolerant vegetation and hardscape

Subsidized:

- $0.20 - $1.50/sqft is typical
- Capped at specific amount

Benefits:

- 30% water use reduction
- Per square foot reduction ranges [18-62 gals/yr]
- Highly variable geographically
- Avg of $240/yr savings on water bill (SNWA)
- Return on Investment 1-5 years depending if rebate is offered (SNWA)

Example: Rebate Program for Turf Conversion

Costs:

- Millions to implement (rebate + admin costs)
- Revenue loss as landscape changes are often permanent
- Demand hardening
- Reduces ability for future conservation CIP

Effectiveness:

- Expml: $1 mil program with a $1/sqft rebate reduces overall water usage by 0.1%

NOTE: Pricing mechanisms can achieve similar *if not better* results than other labor/cost intensive measures

Example: Seasonal or Drought Rates

Drought Rates - change rate during the irrigation season or defined drought period

Rate adjustments provide strong incentive to change behavior

Exmpl 1 – Flat to metered conversion results in 40% reduction

Exmpl 2 – Price increase of **10%** = water use decrease of **2%**

- Study conducted by Dept. of Economics at UNR

Benefits:

- Effective – applies to all users
- Efficient – allows resident to decide how to change behavior
  - Reduces potential for demand hardening
- Equitable – targets high water usage
- Flexible – seasonal, apply to specific tier(s), adjust tiers thresholds, additional tiers…

NOTE: Must consider revenue neutrality

Conservation Action Take-Aways

- Timing of implementation to actually reduce water production
- Effectiveness of the measure
- Impact to revenues
- Equity/fairness: participants vs non-participants
- Funding

Q & A