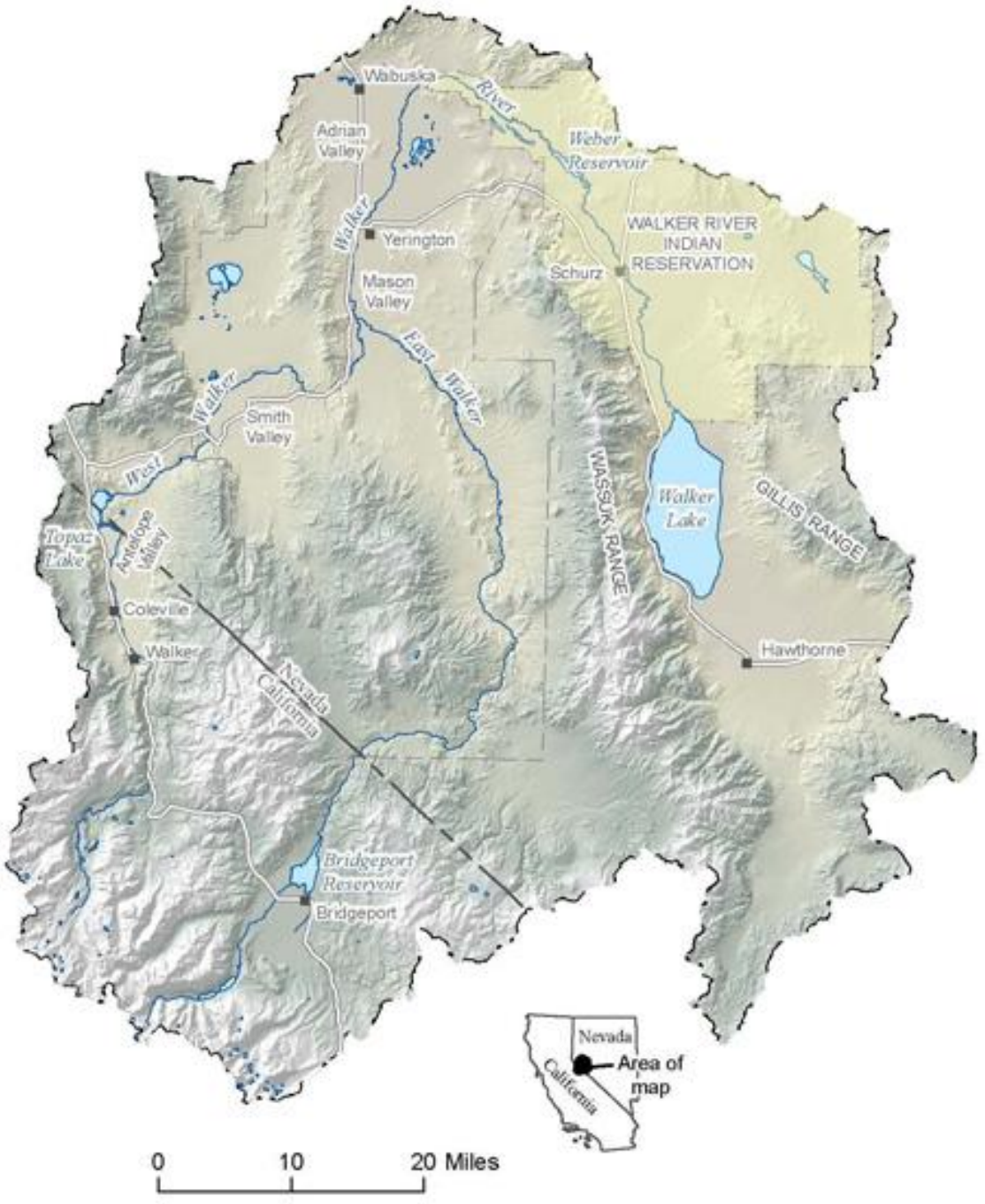
Division of
WATER RESOURCES

Smith Valley Curtailment Hearing

Carson City
October 7, 2015

DEPARTMENT OF
CONSERVATION &
NATURAL RESOURCES



Agenda

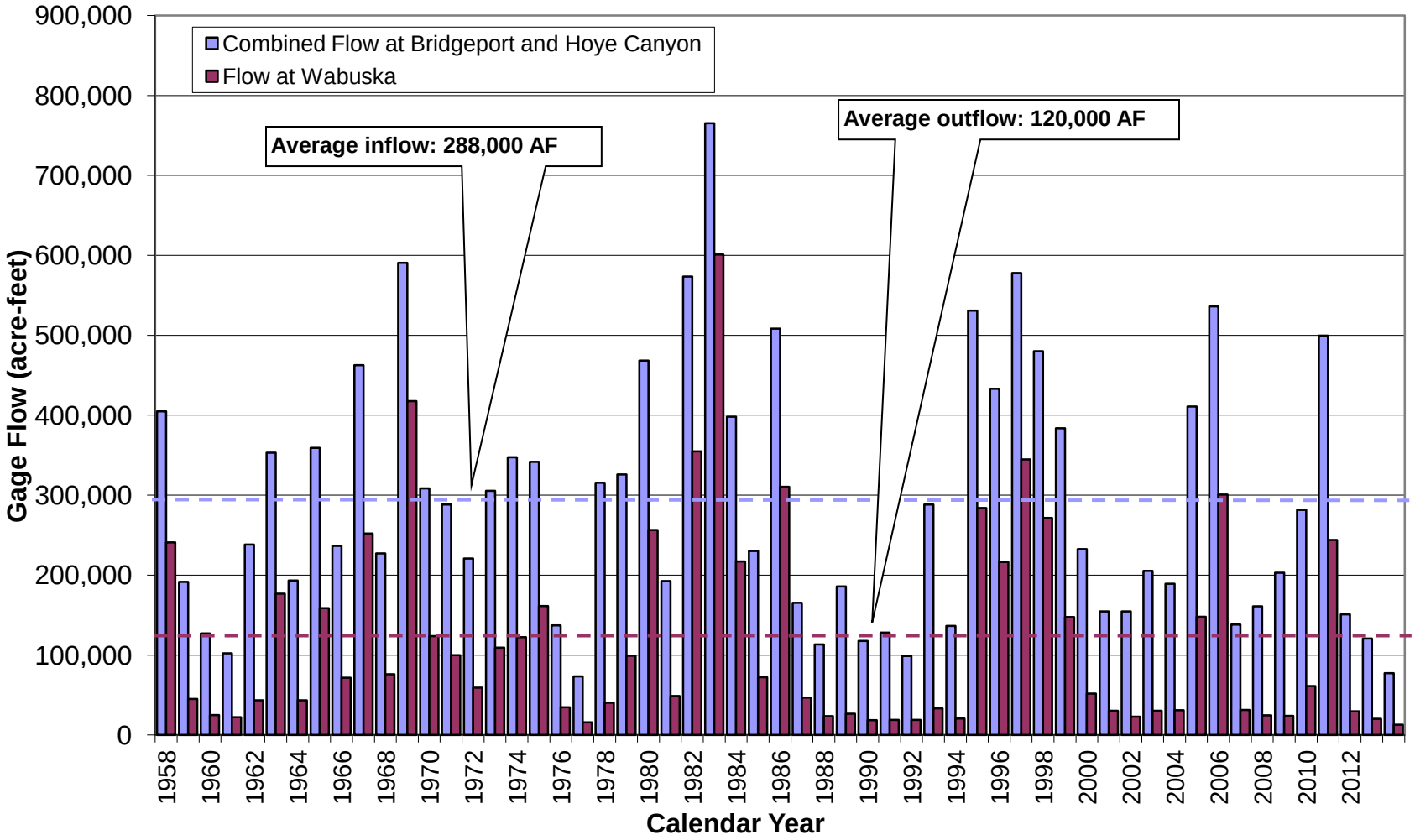
- Review of the issues and actions
- Effects of drought and groundwater pumping
- Climate outlook for winter of 2015-2016
- Recent pumpage tabulations
- Recent DRI modeling results – supplemental rights only
- NRCS streamflow forecast for surface water supply and curtailment
- Curtailment sliding scale
- Q & A

Recent Actions

- Public meetings held January 22, 2015
- Issued Order 1250 on February 3, 2015
  - Called for 50% curtailment of pumping of supplemental groundwater rights
  - Required properly installed and accurate meters
- Order appealed and Preliminary Injunction issued
- Court case is pending
- Workshops held July 15 & 16, 2015
  - Drought worsening
  - Need for new Curtailment Order for 2016
- Workshops held August 27 & 28, 2015
  - Curtailment details presented

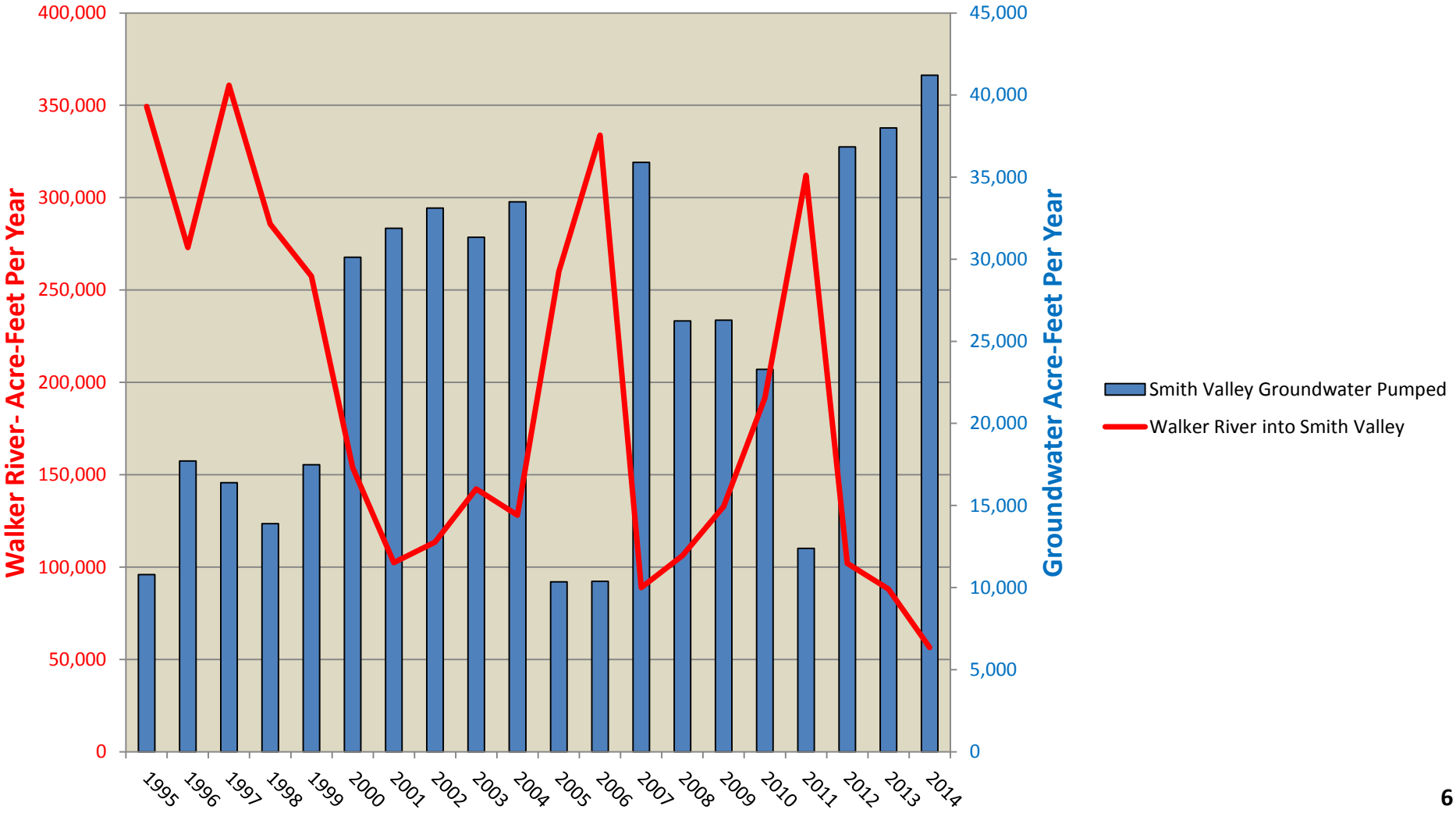
Effects of Drought and Groundwater Pumping

Walker River Flows in Smith, Mason and East Walker Basins



Smith Valley Groundwater & Surface Water History

Less Surface Water Available = More Groundwater Pumped



Smith Valley
Water Level Decline from Nov 2011 to Nov 2014

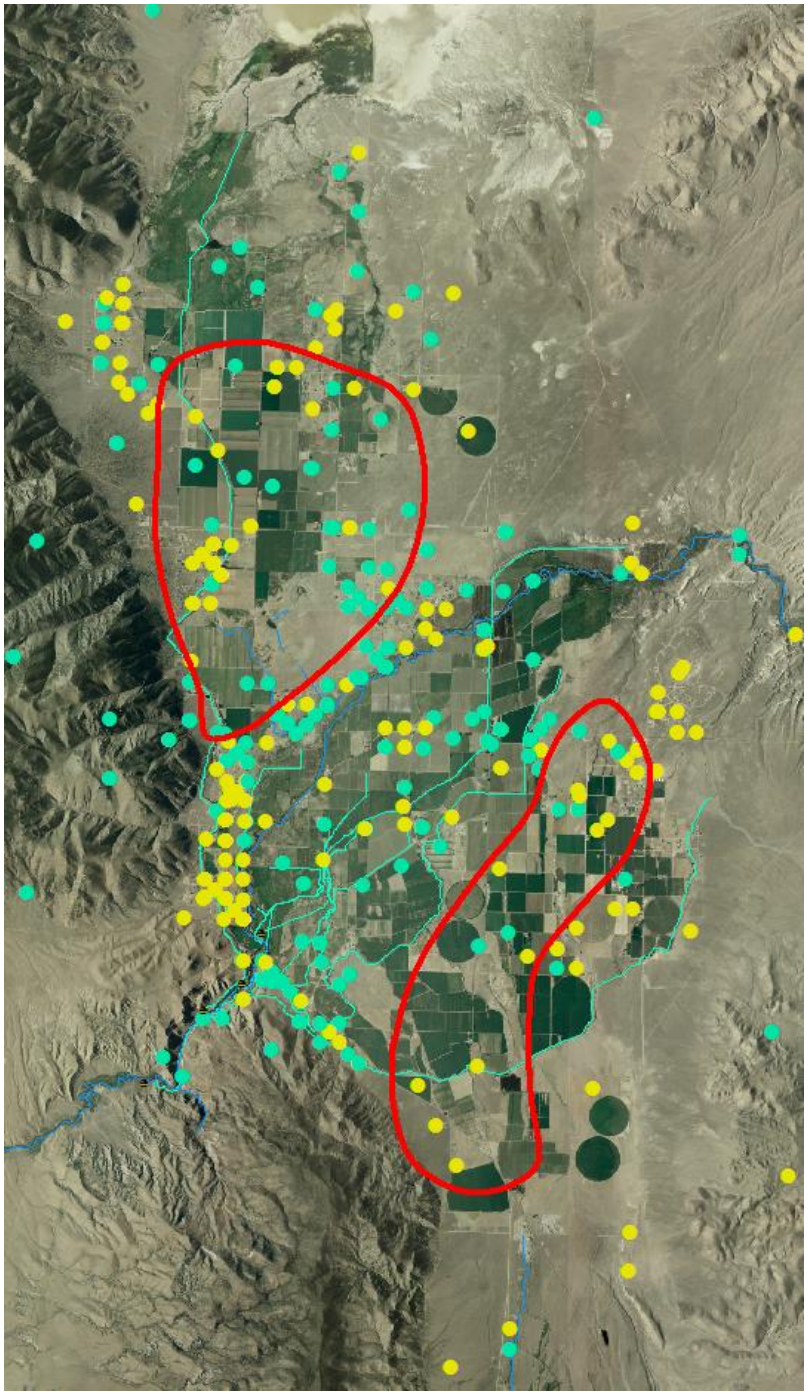
20 - 40 ft

Well Depth

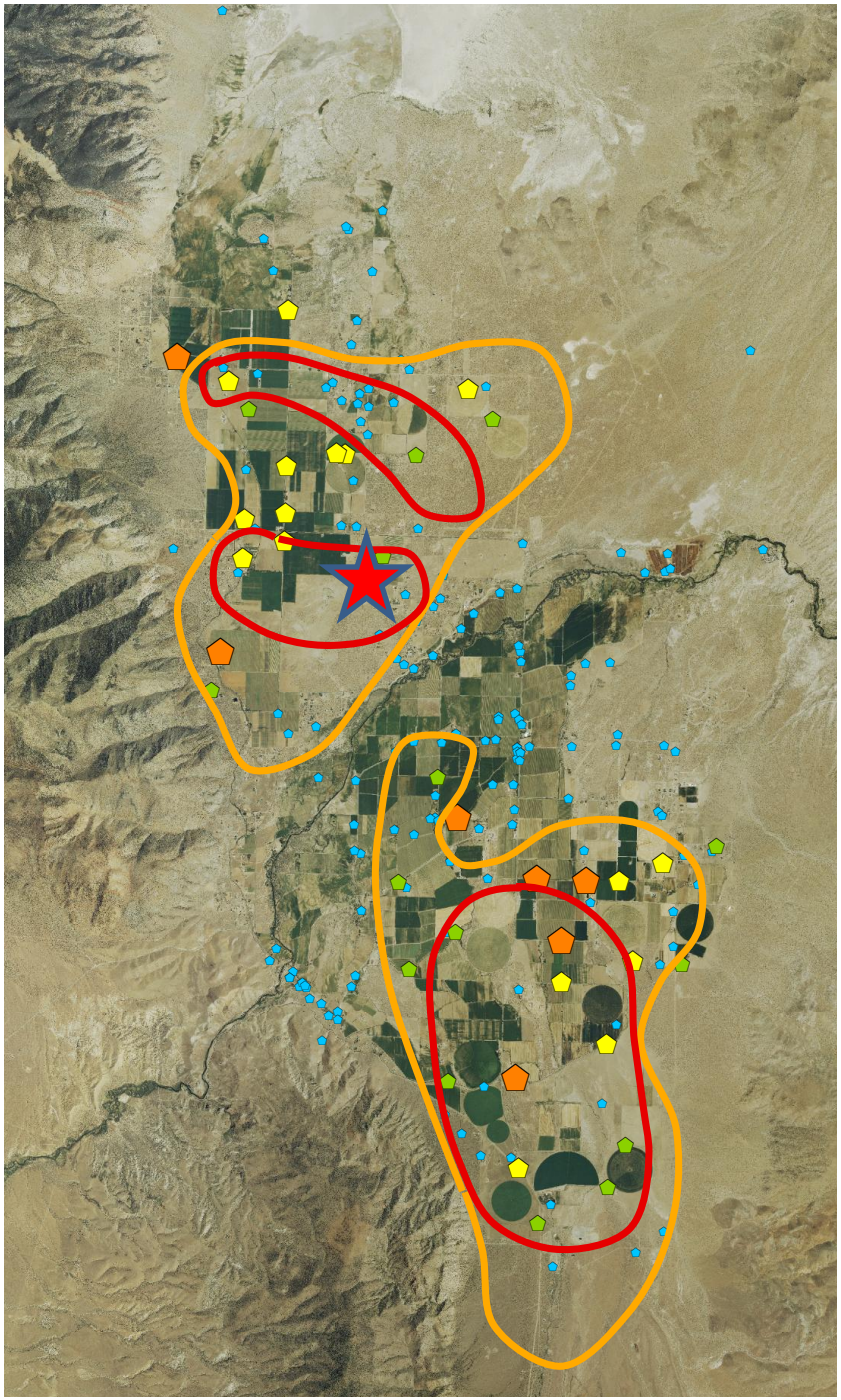
≤ 150 ft

> 150 ft

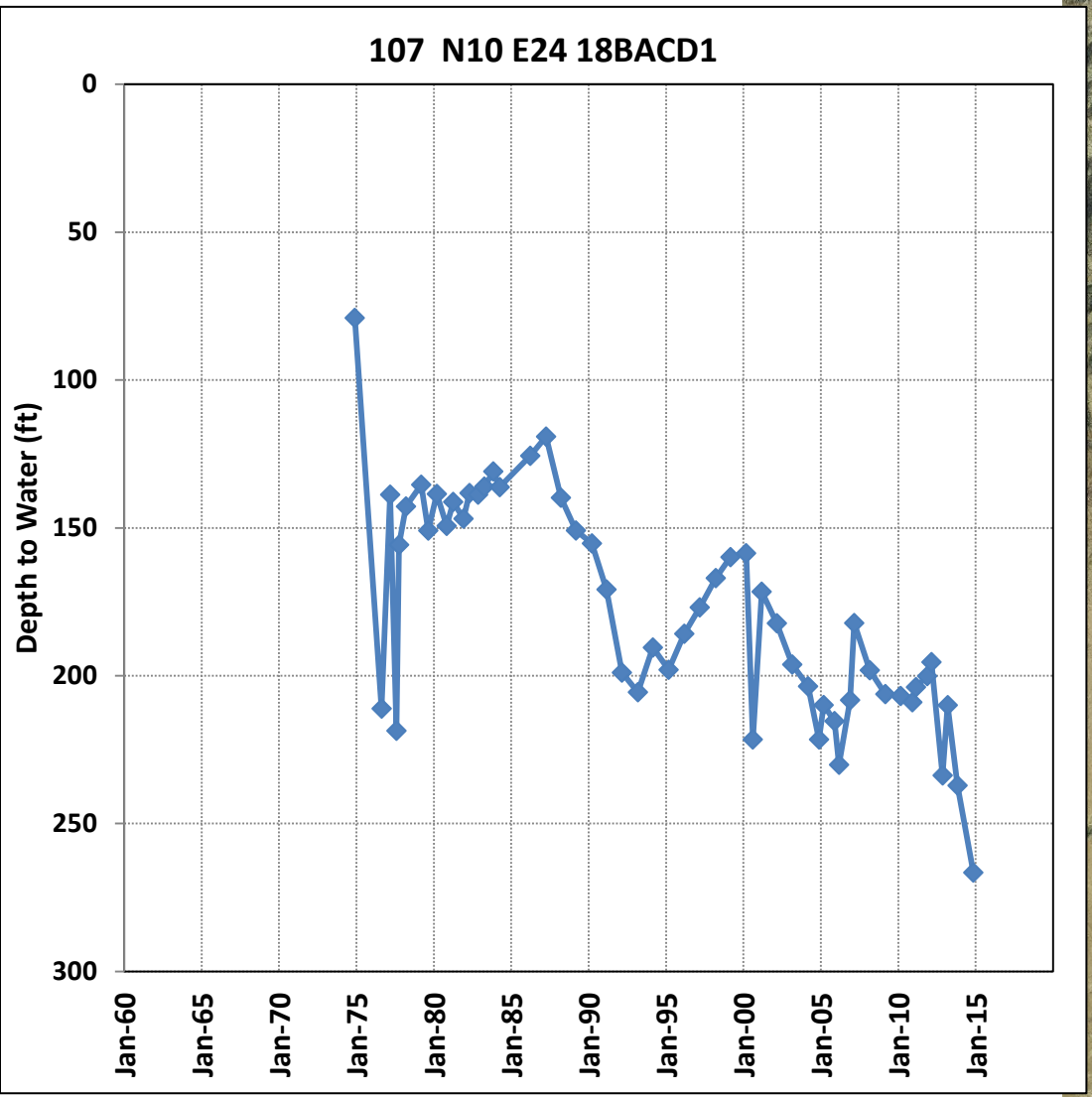
In Smith Valley there are 342 wells that are less than or equal to 150 feet
Of these 269 are domestic.

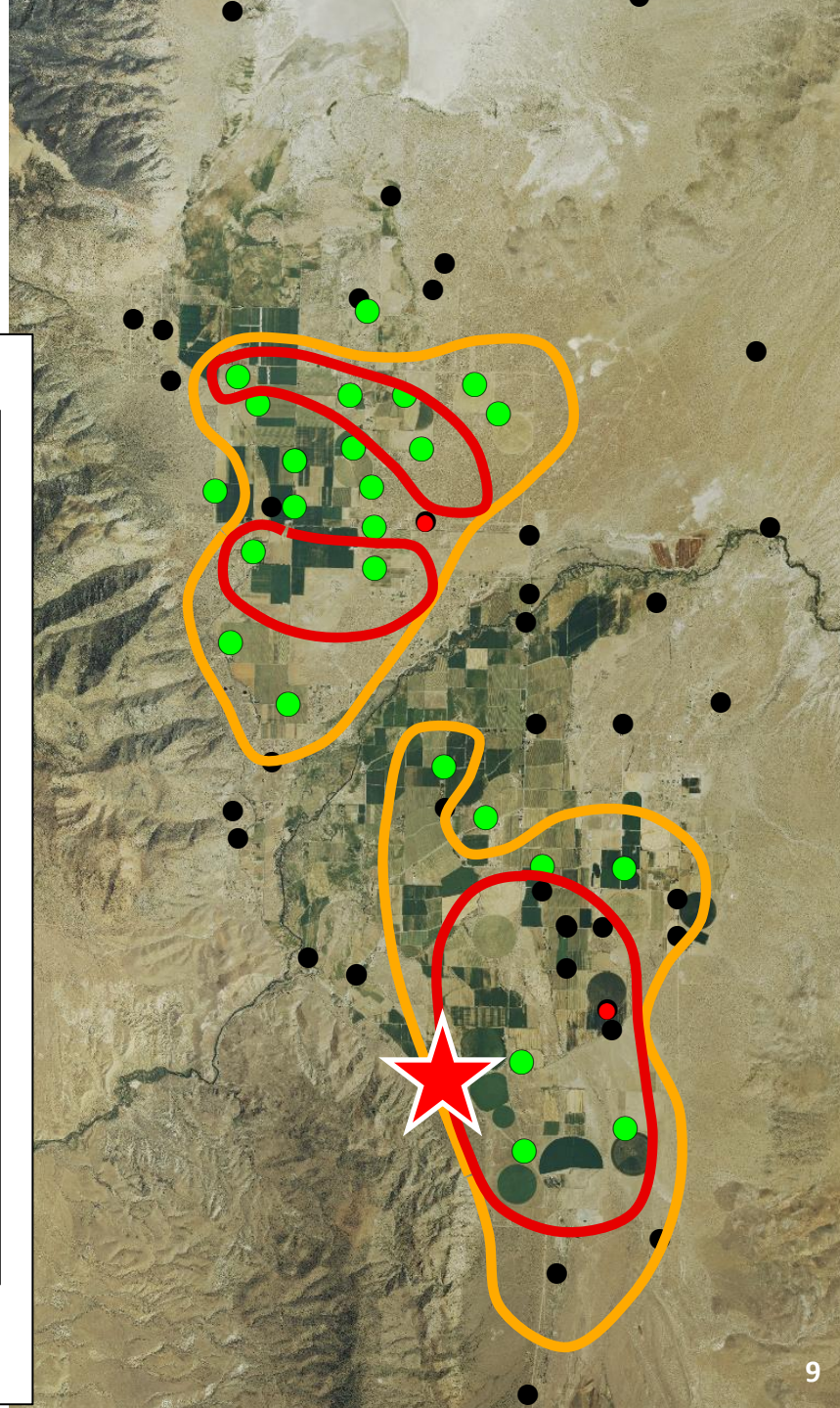


Smith Valley
Water Level Decline from Mar 2014 to Mar 2015



Smith Valley Hydrographs



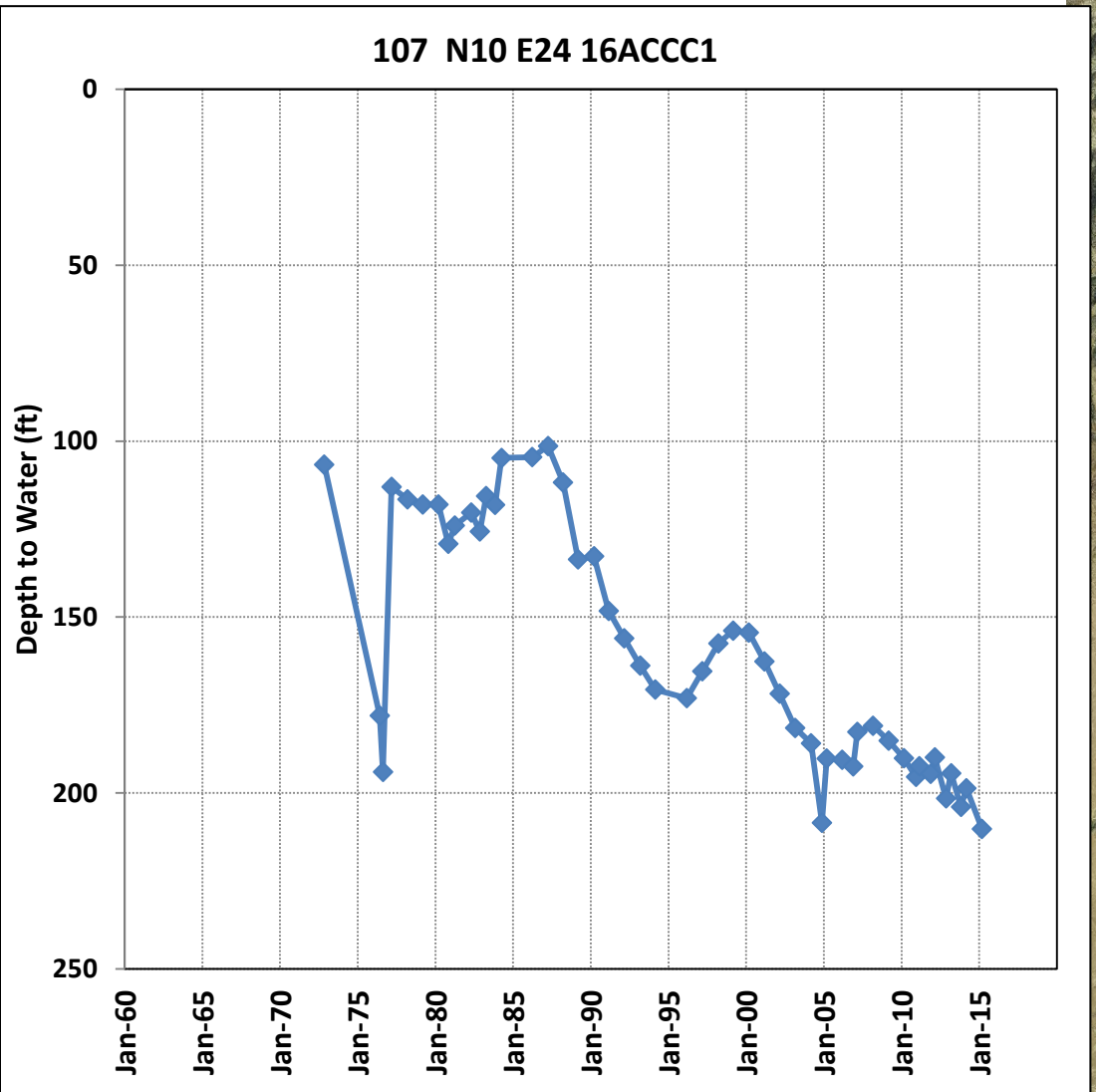


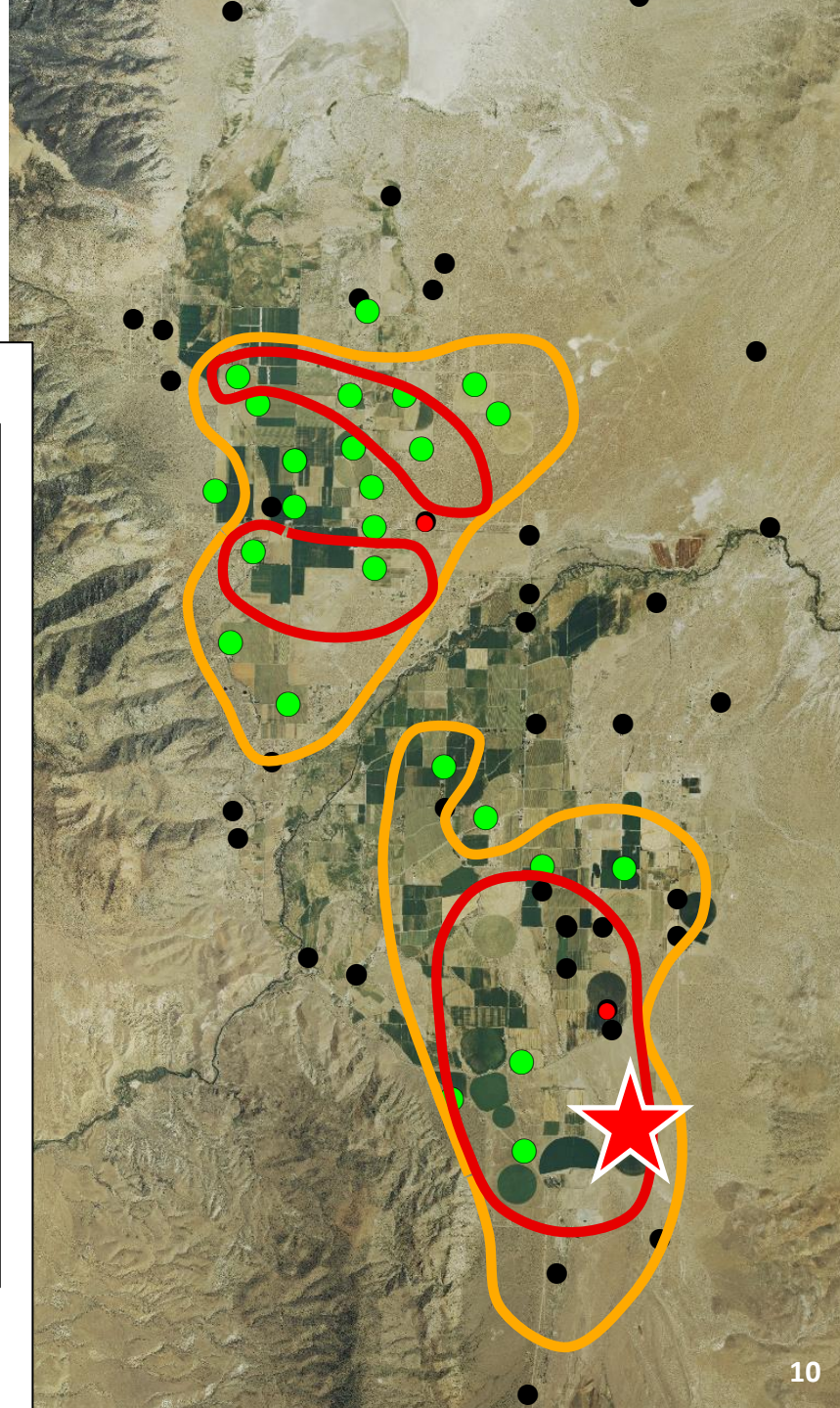
Smith Valley Hydrographs

NDWR Active

NDWR Inactive

Measured well



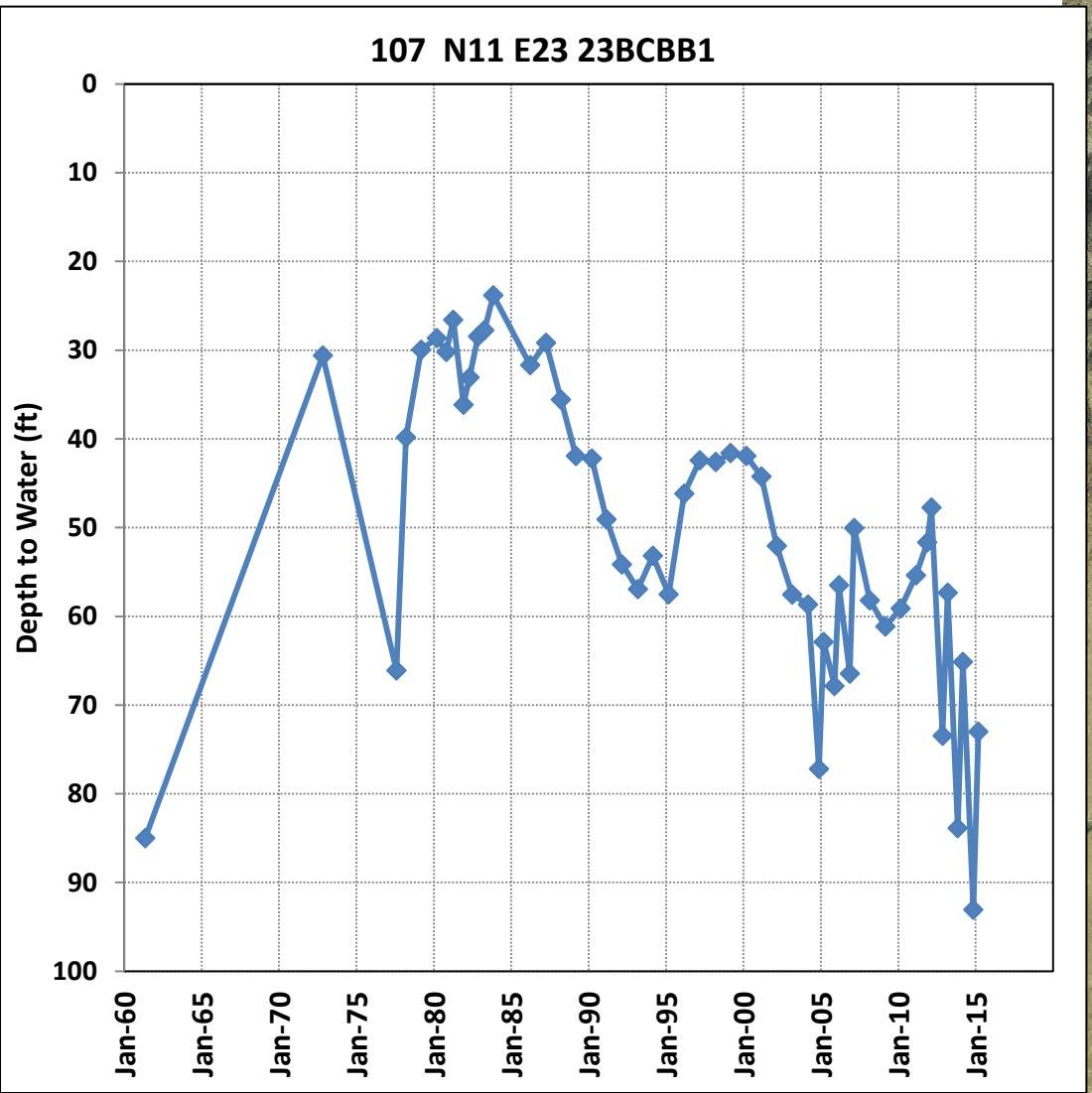


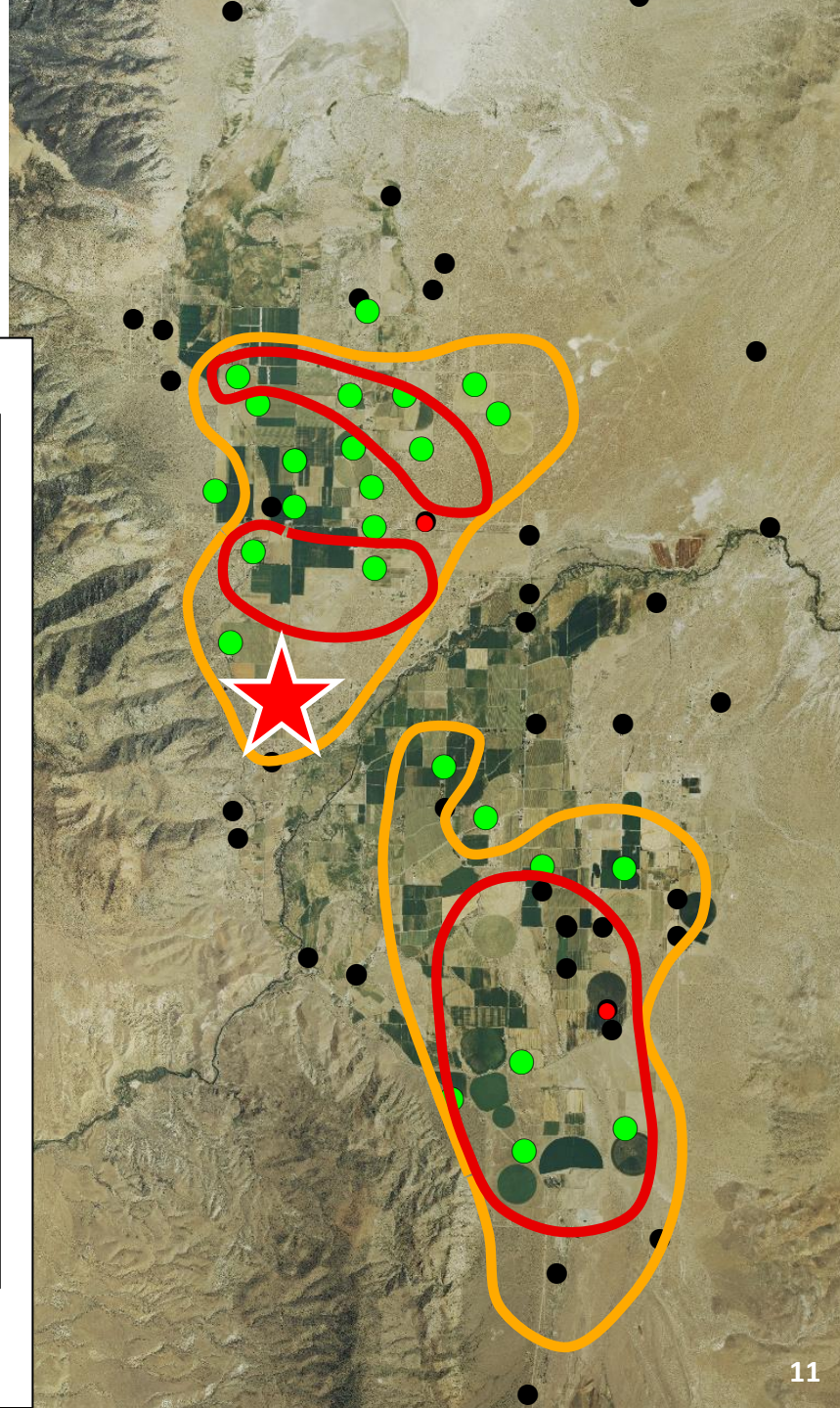
Smith Valley Hydrographs

NDWR Active

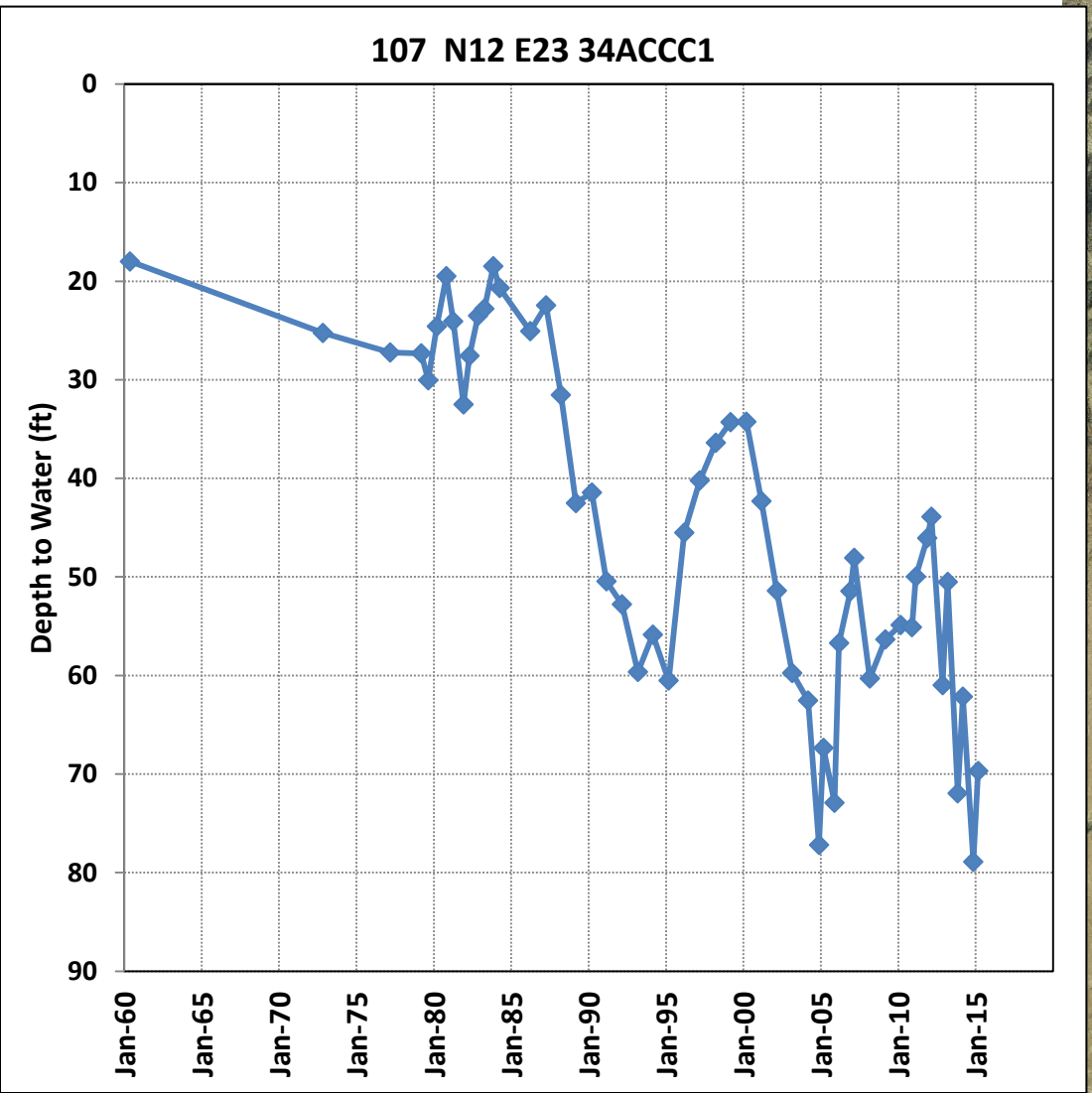
NDWR Inactive

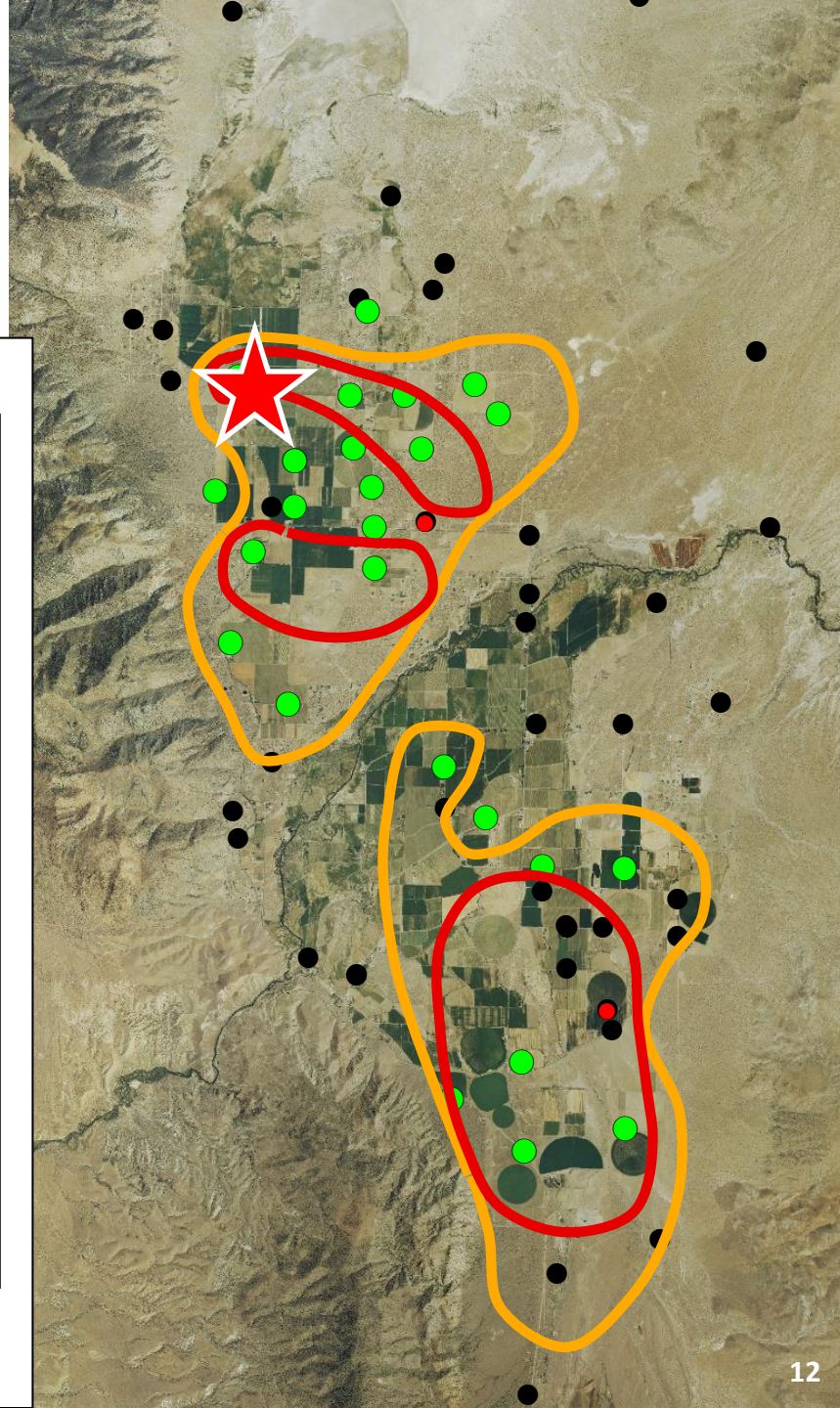
Measured well

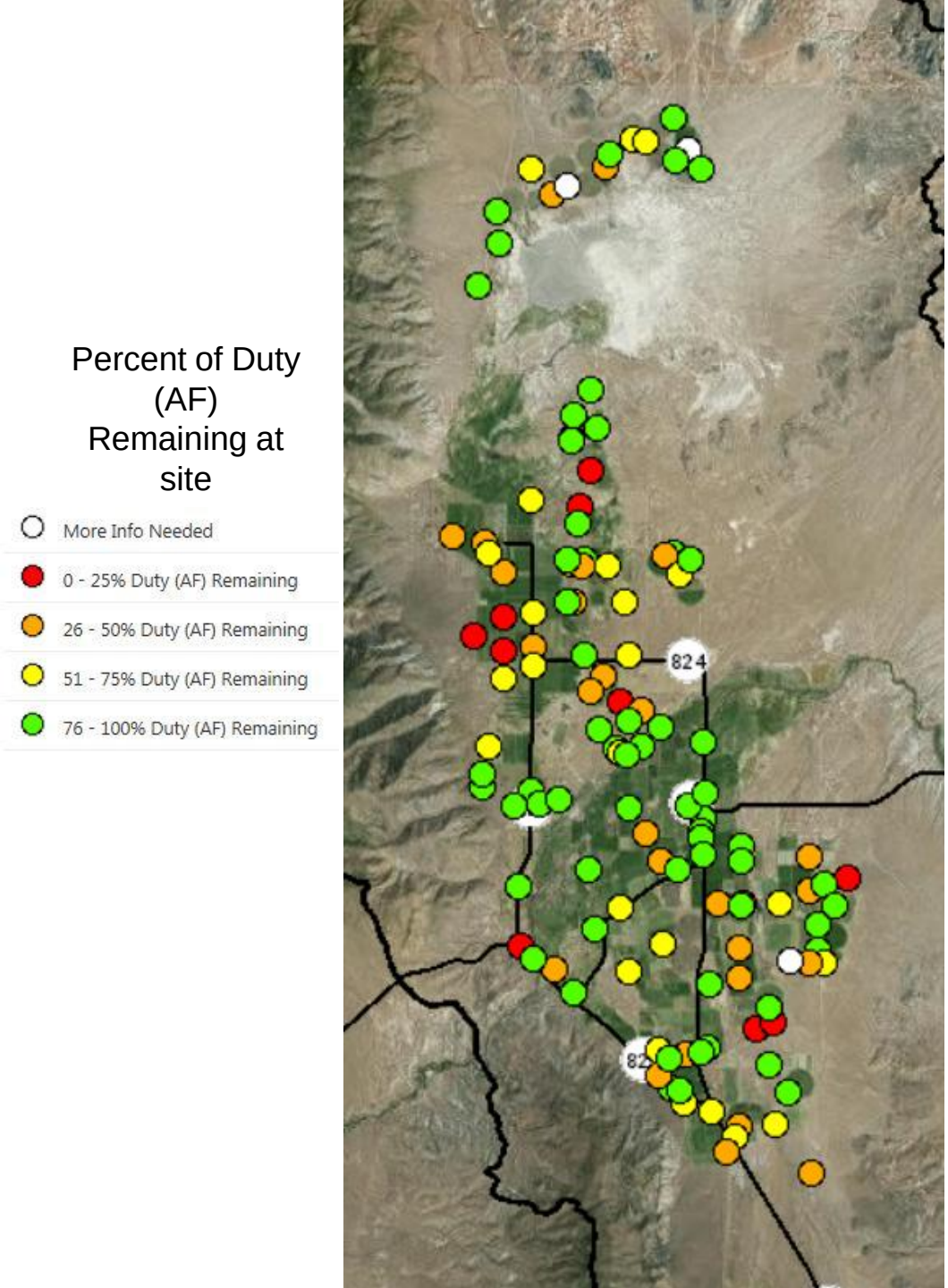




Smith Valley Hydrographs



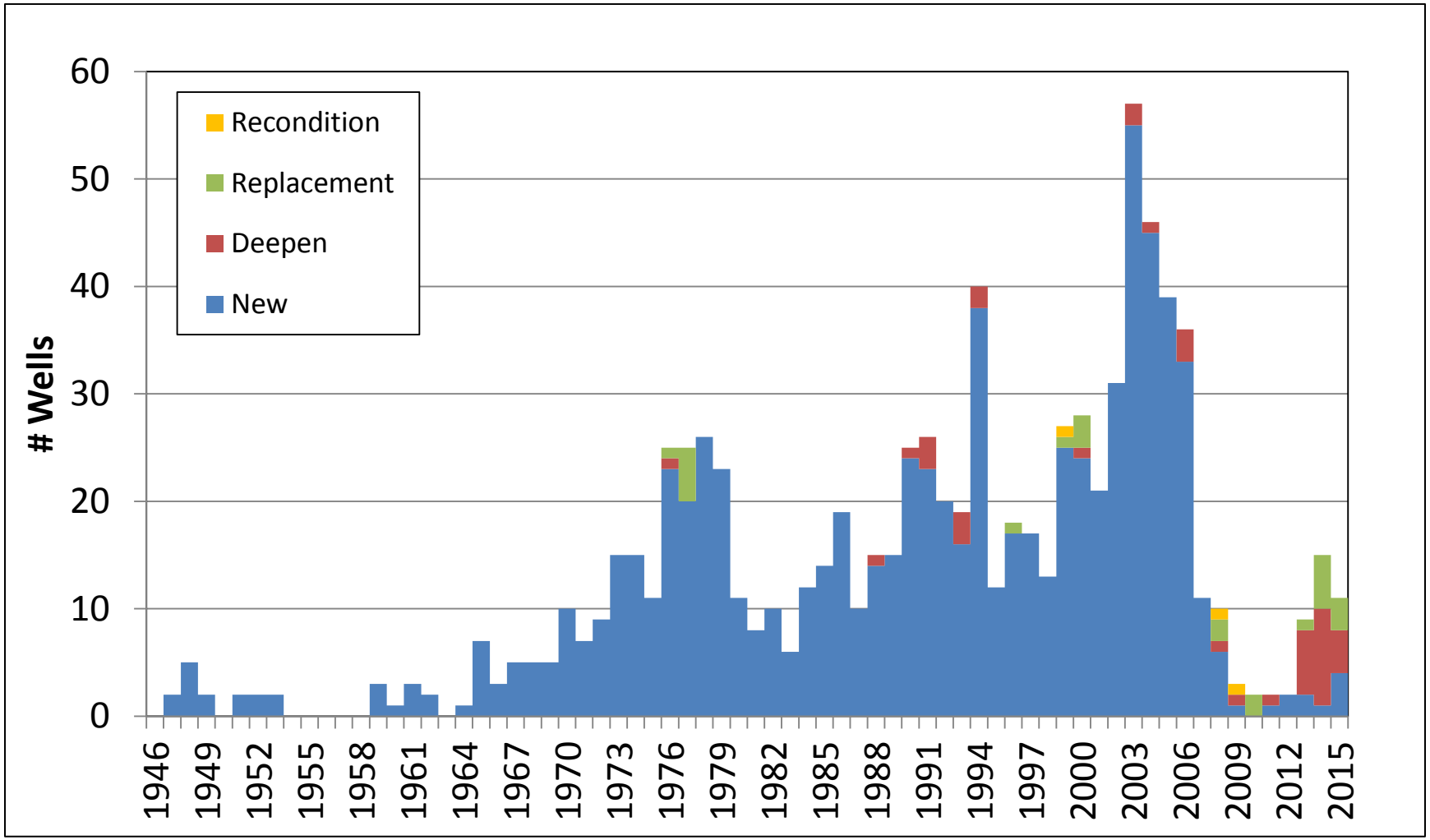




Smith Valley Irrigation Pumpage estimate as of September 30, 2015: **23,500 Acre-Feet**

(2014 Ag pumping ~ 40,000 af)

Smith Valley Domestic Wells



Hydrologic Conditions

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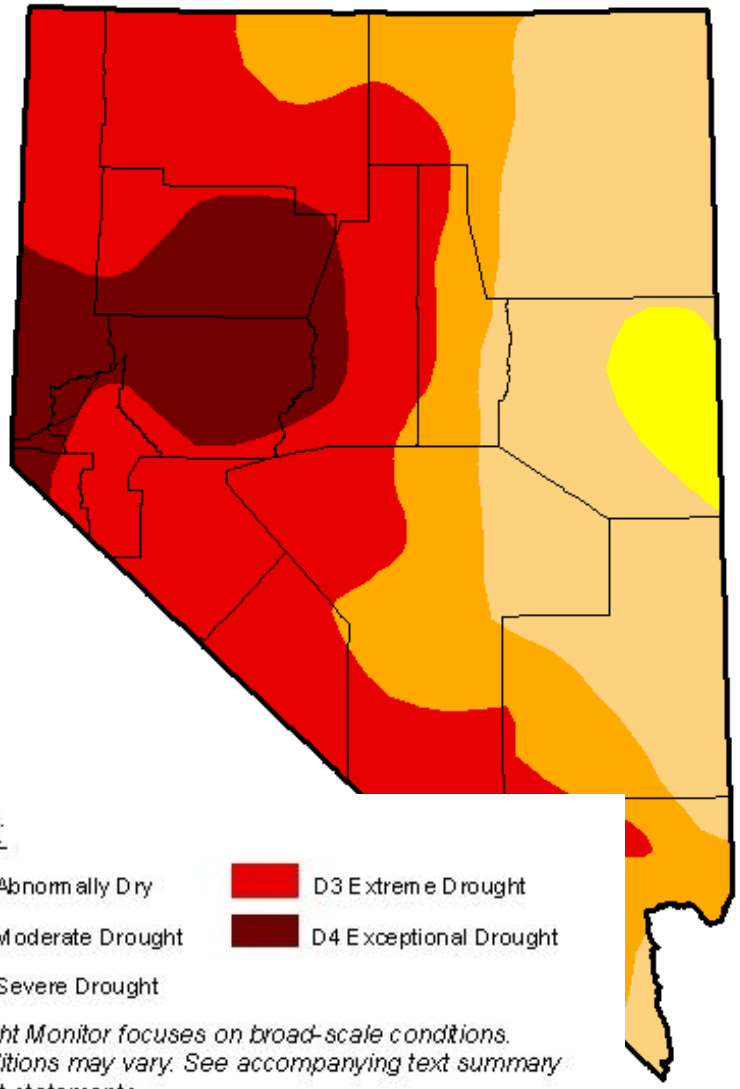
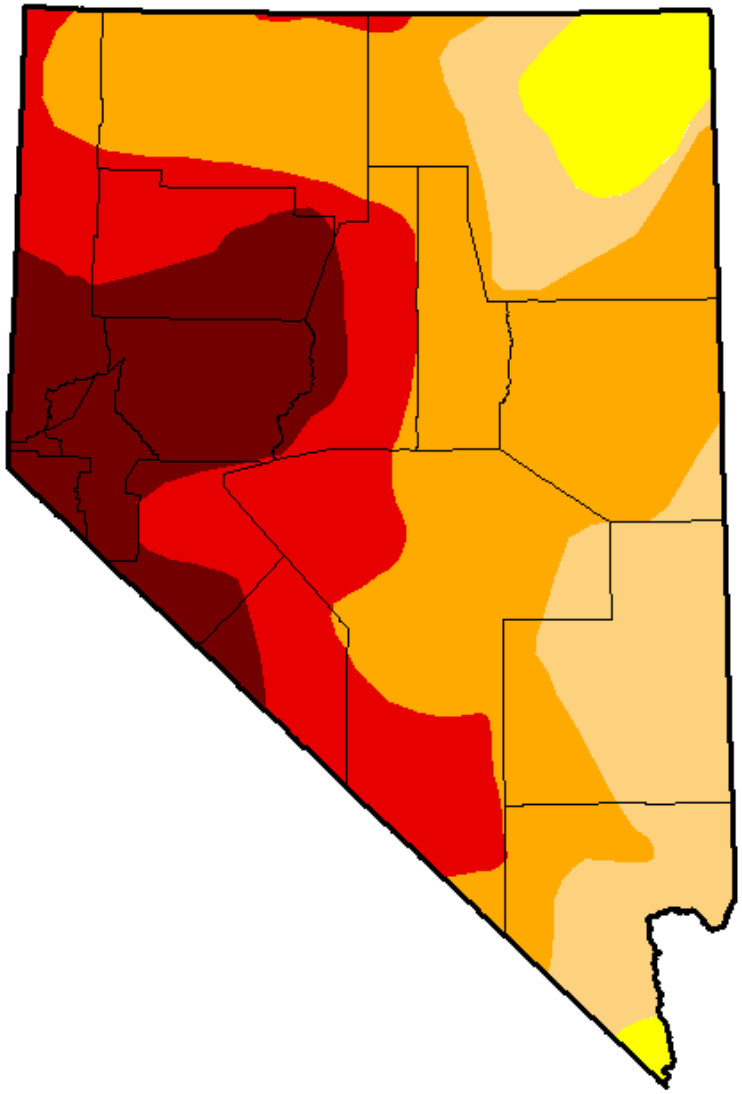
Climate Forecast

Current Drought Conditions

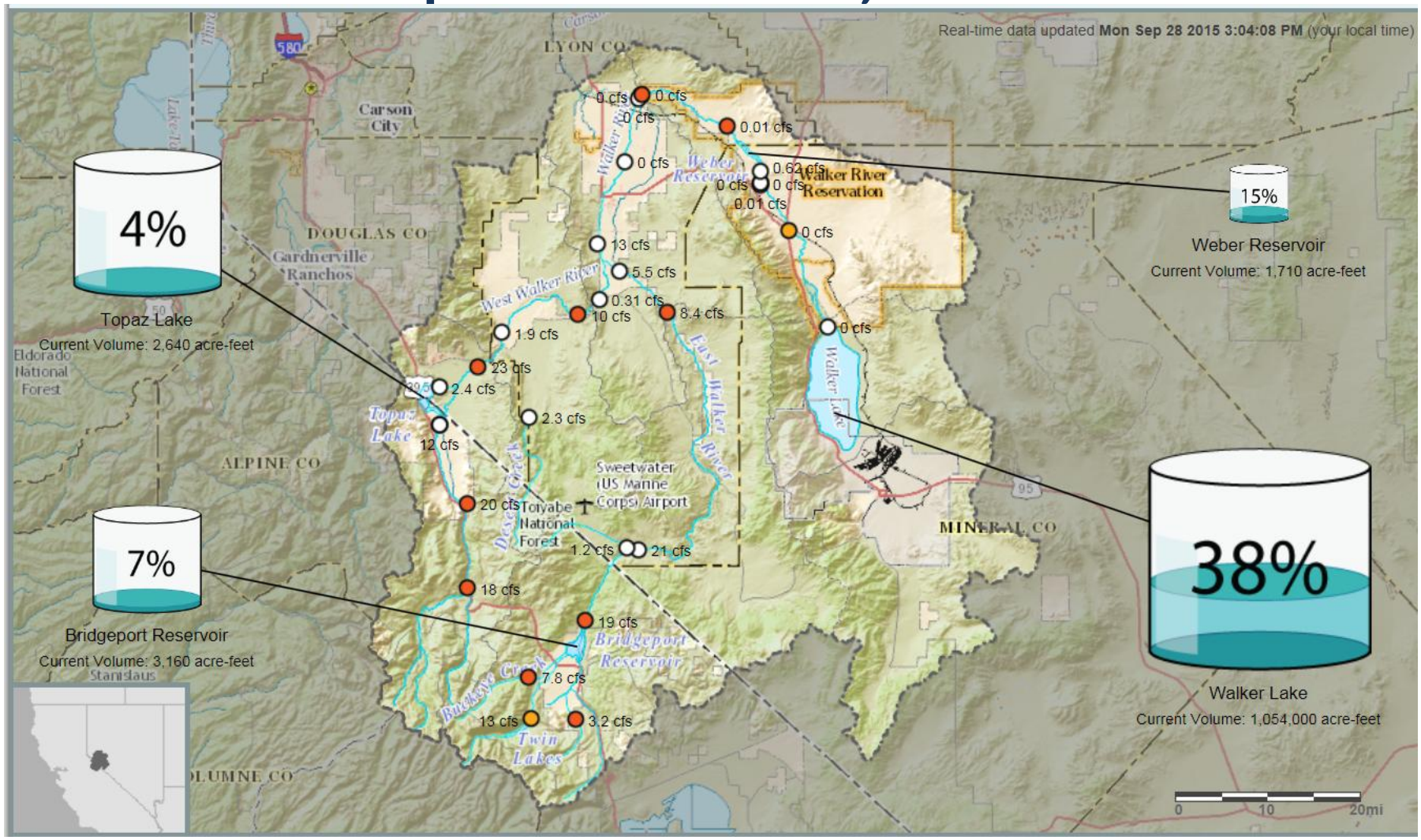
October 7, 2014



September 29, 2015



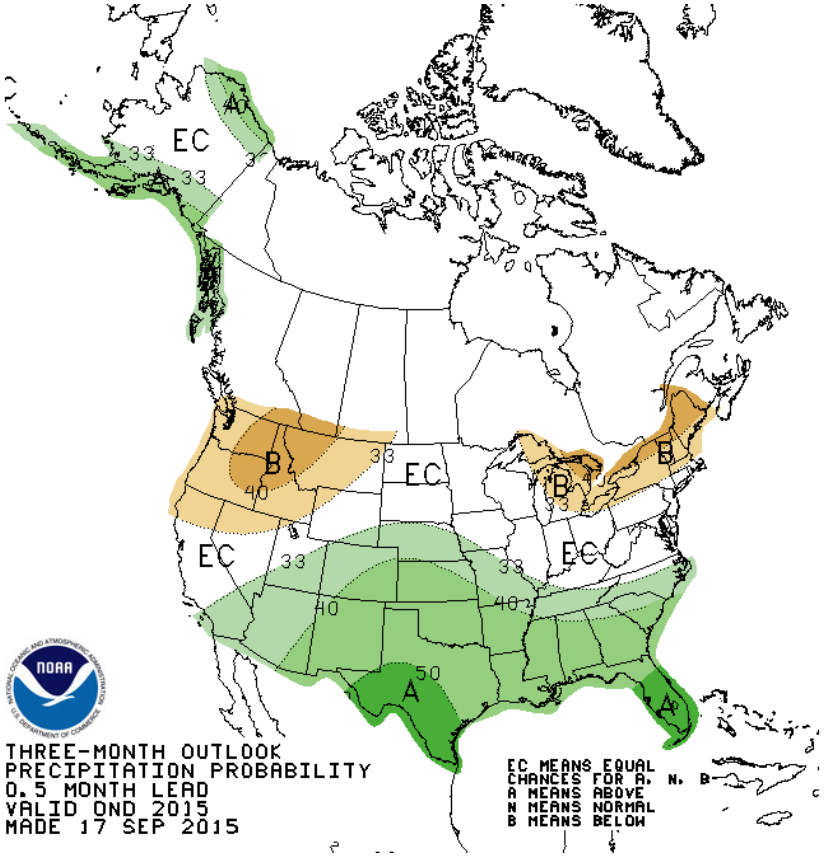
Walker Basin Reservoir Storage September 28, 2015

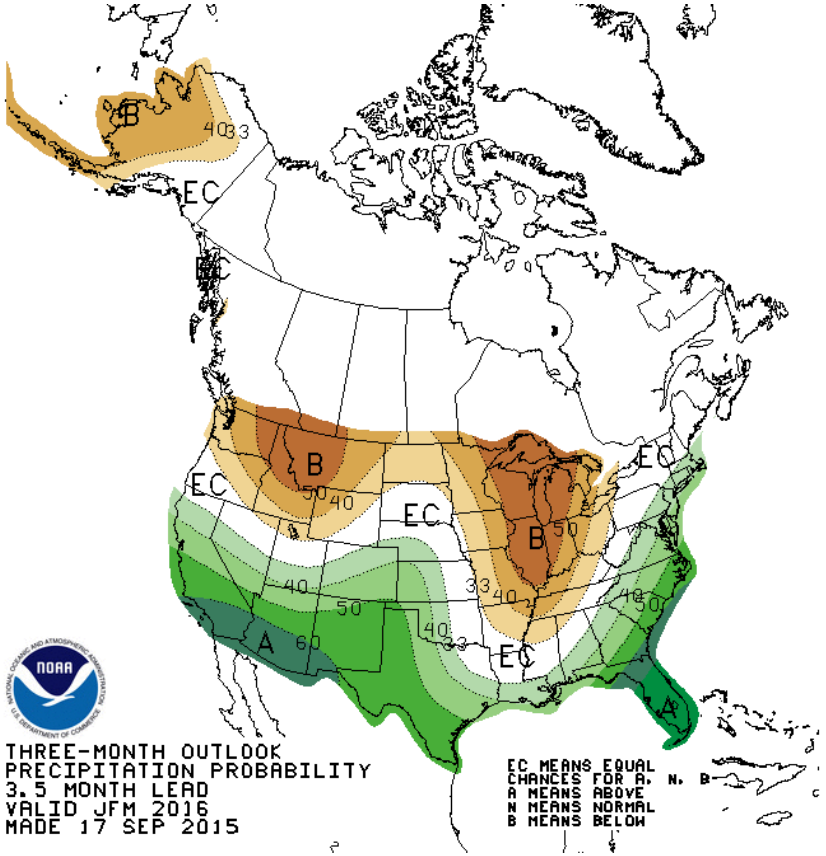


USGS - Walker Basin Hydro Mapper: Home Page. (n.d.). Retrieved September 28, 2015, from http://nevada.usgs.gov/walkerbasinhydromapper/webApp/home.html

Weather/Climate Forecast

Three-Month Outlook - Precipitation

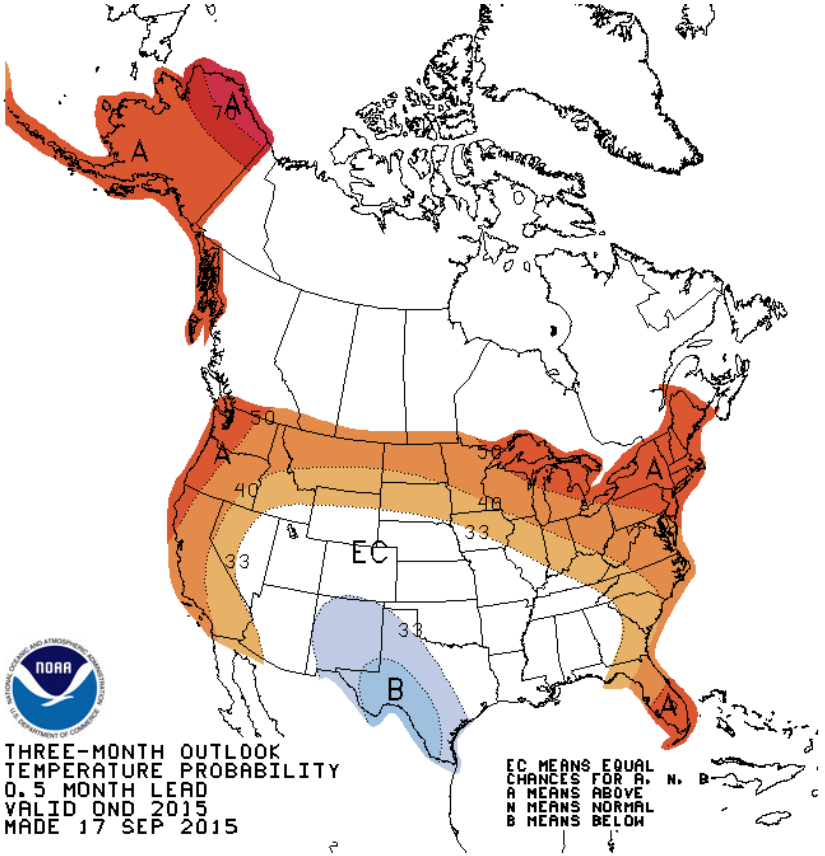


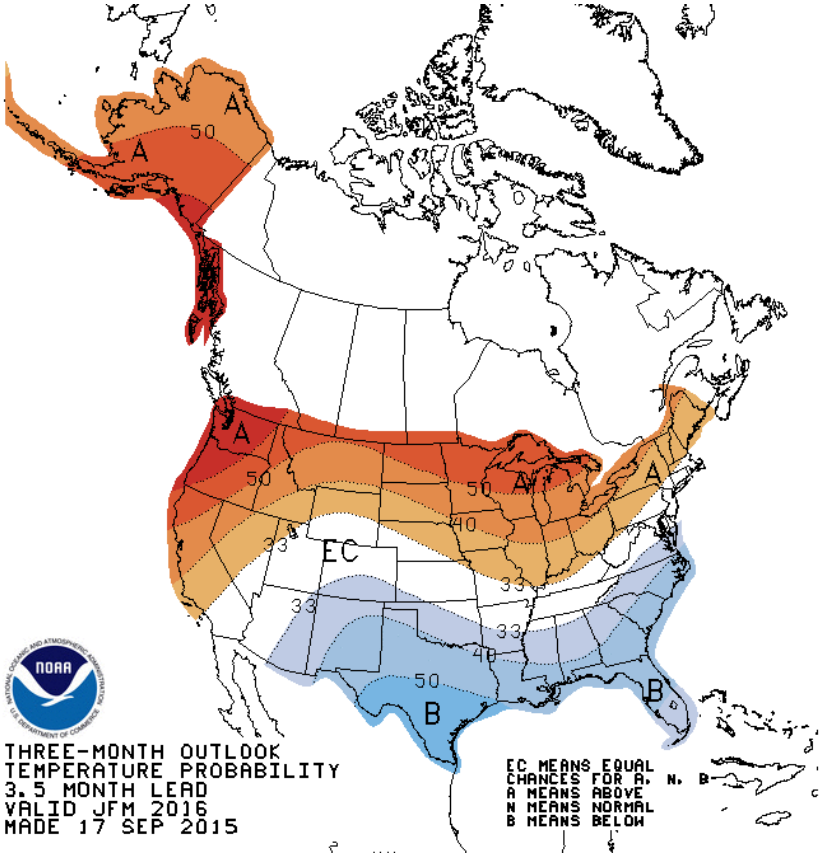


http://www.cpc.ncep.noaa.gov/products/predictions/long_range/

Weather/Climate Forecast

Three-Month Outlook - Temperature





http://www.cpc.ncep.noaa.gov/products/predictions/long_range/

Modeling Results

&

Curtailment Details

2016 Curtailment

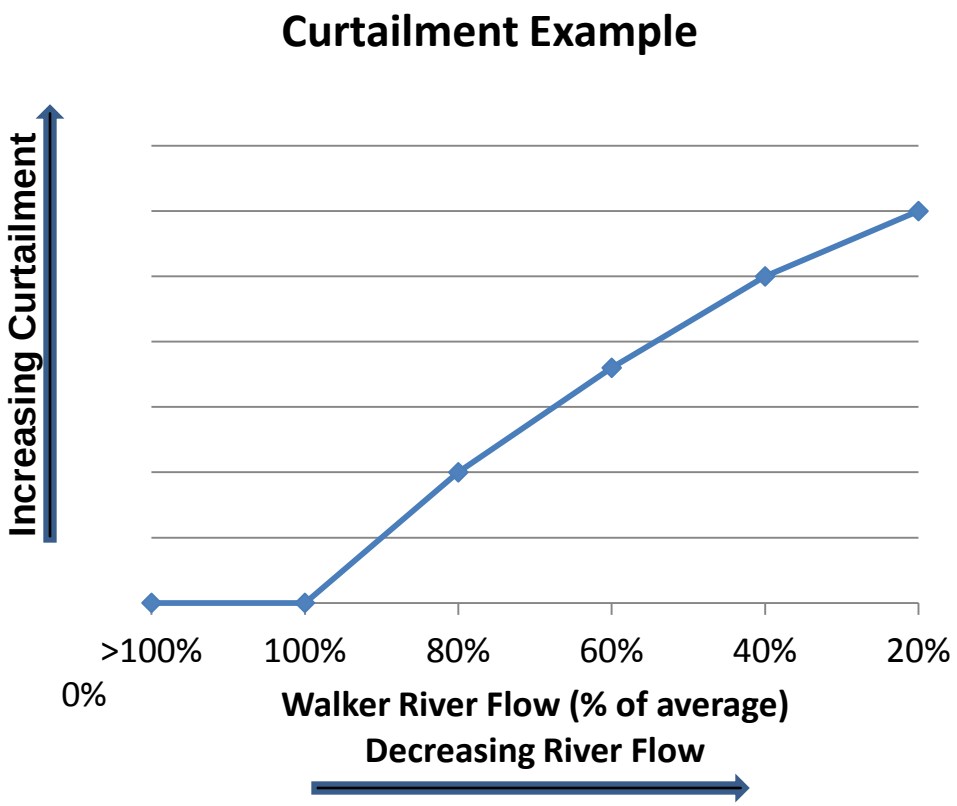
Supplemental Groundwater Only
NOT All Priority Rights
NOT Domestic Wells

DRI Models - Water Level Changes Caused by Pumpage

- DRI groundwater models for Mason and Smith Valleys
- To be used to quantify amount of curtailment needed to achieve targeted water-levels
- Use 2010 as proxy for average flow and diversions
- Uses March 2005 as baseline for water levels
- Simulating water-level changes for range of scenarios:
  - River flows of 20%, 40%, 60%, 80%, 100% of average
  - Pumpage curtailed by priority by 0%, 25%, 50%, and 75% of duty
  - Additional simulations where needed

July Workshop Example of Possible Curtailment in 2016

- Sliding scale
- Less curtailment if river flow is higher
- Priority dates determined for each curtailment



Smith Valley
Water Level Decline from Mar 2014 to Mar 2015
35% of Median Flow

Water Level Decline Rates

> 8 feet/year

> 4 feet/year

Pumped 2014 AF/Y

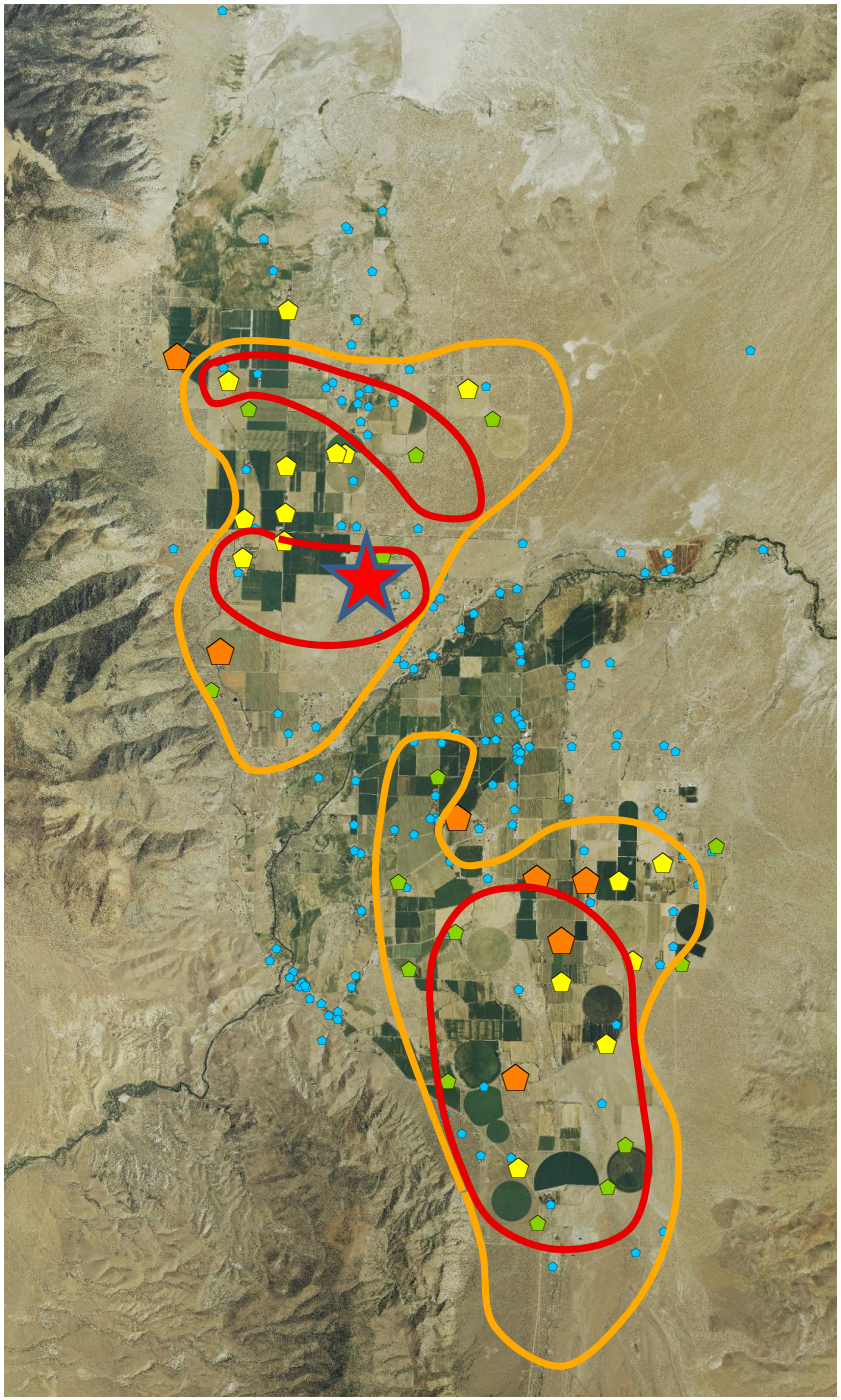
2000 - 3270

1000 - 2000

500 - 1000

200 - 500

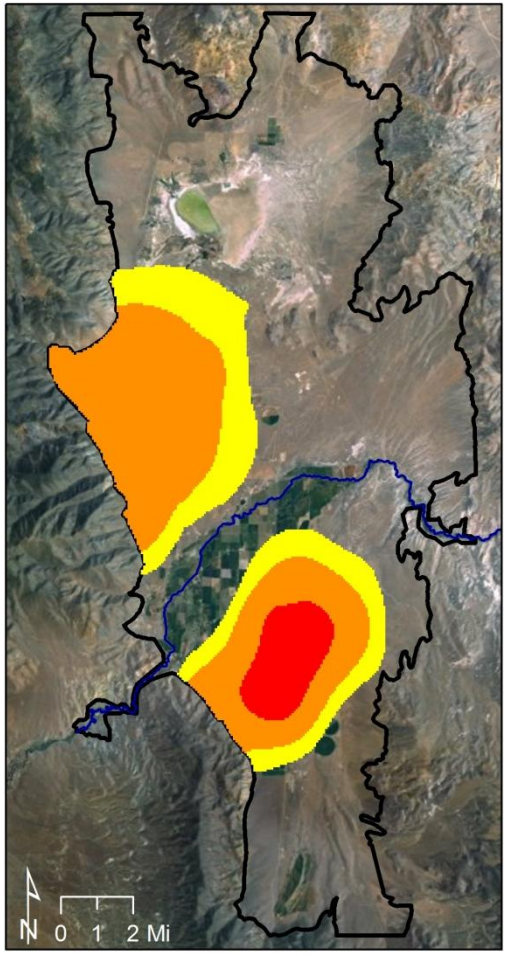
0 - 200



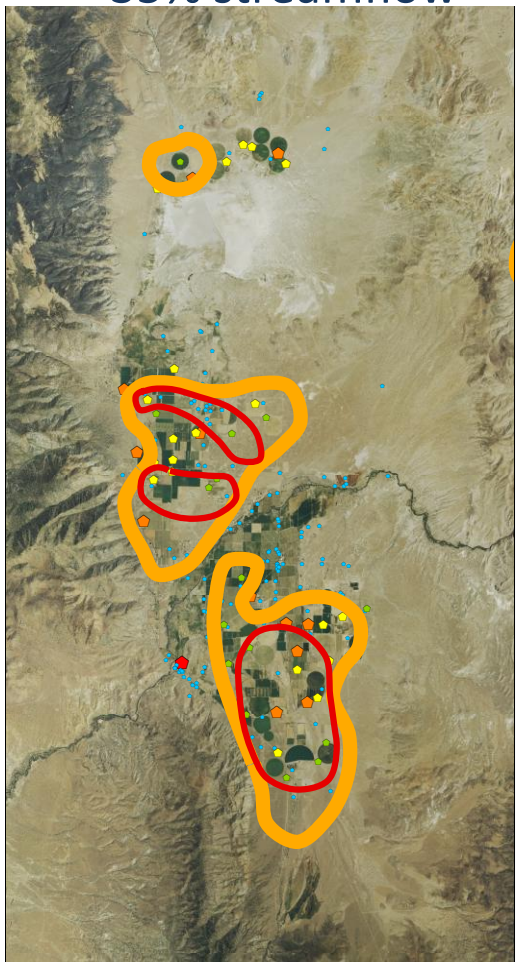
DRI Models - Water Level Changes

Smith Modeled Versus Observed

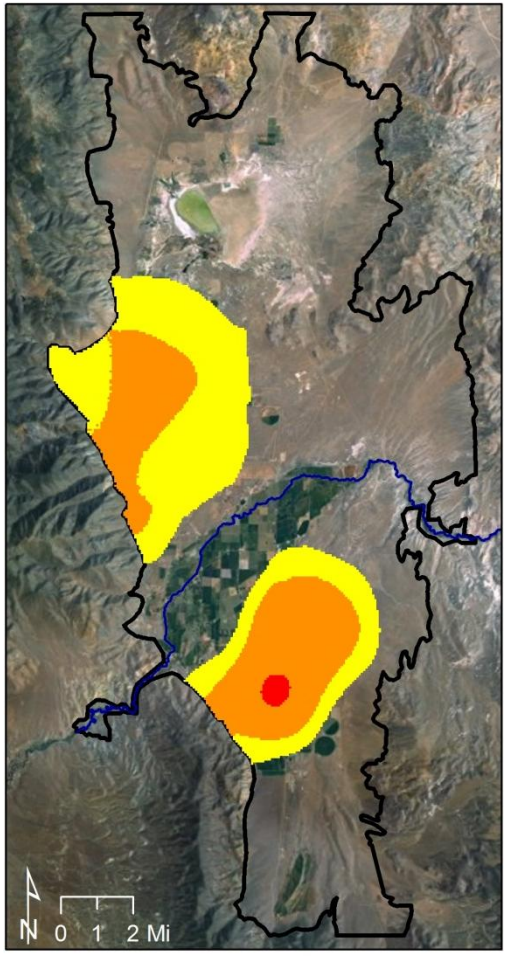
20% Streamflow



Measured Drawdown
35% streamflow



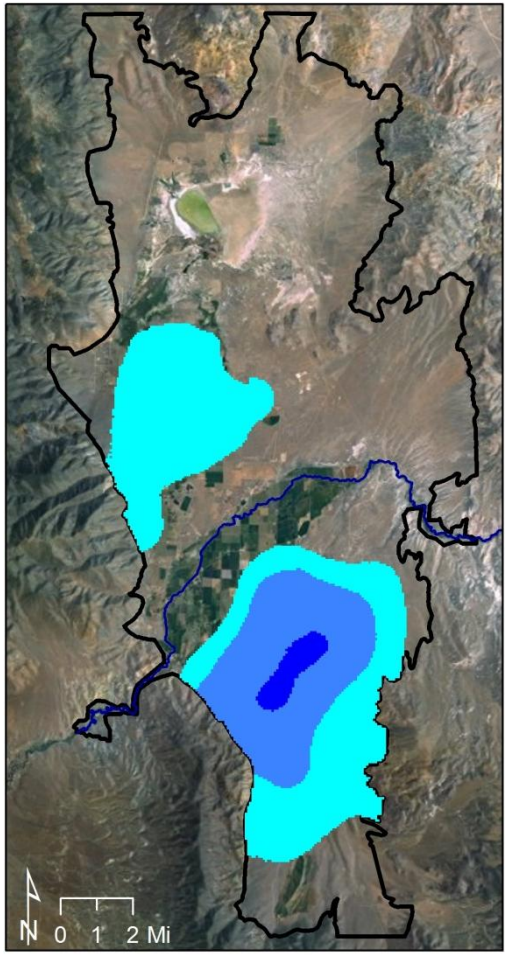
40% Streamflow



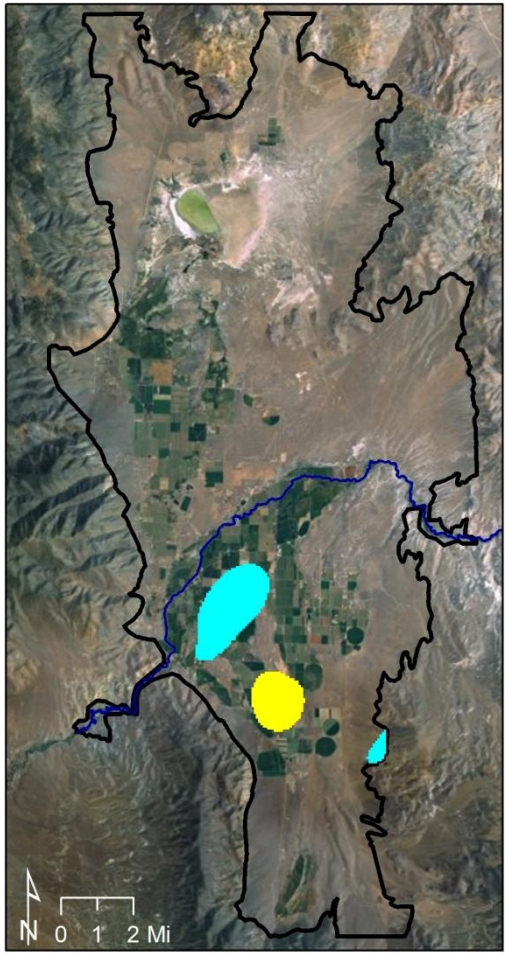
Smith - March to March Drawdown

Streamflow shown, No curtailment

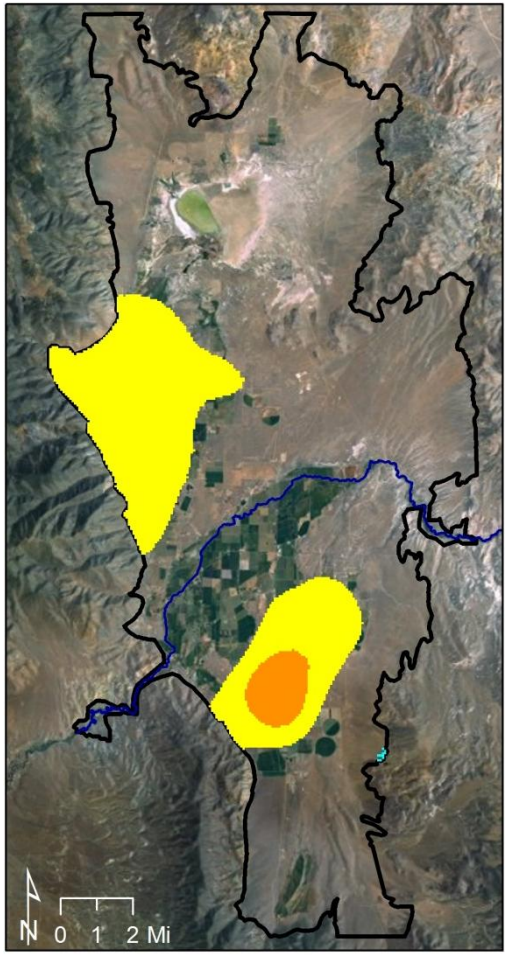
100%



80%



60%



Drawdown

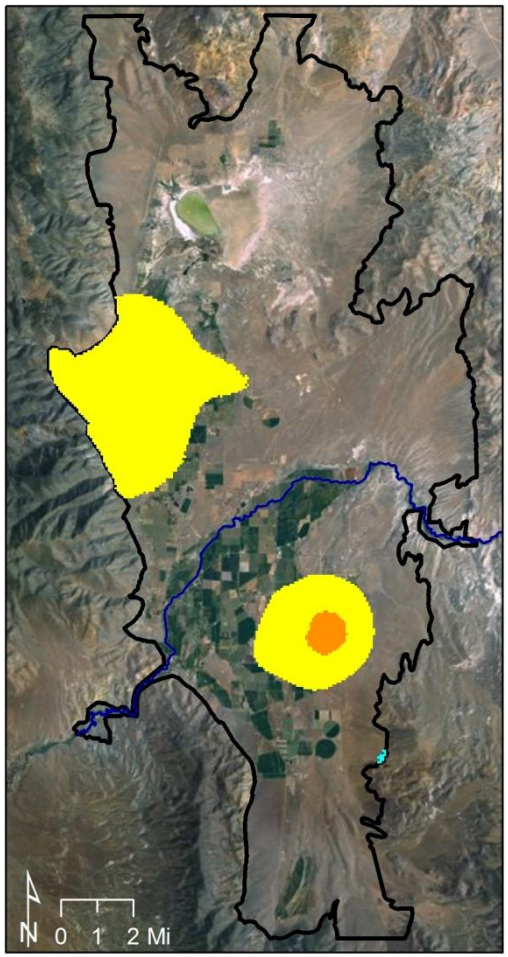
- <-8
- -8 to -4
- -4 to -2
- -2 to 2
- 2 to 4
- 4 to 8
- >8

* negative drawdown indicates rising water levels

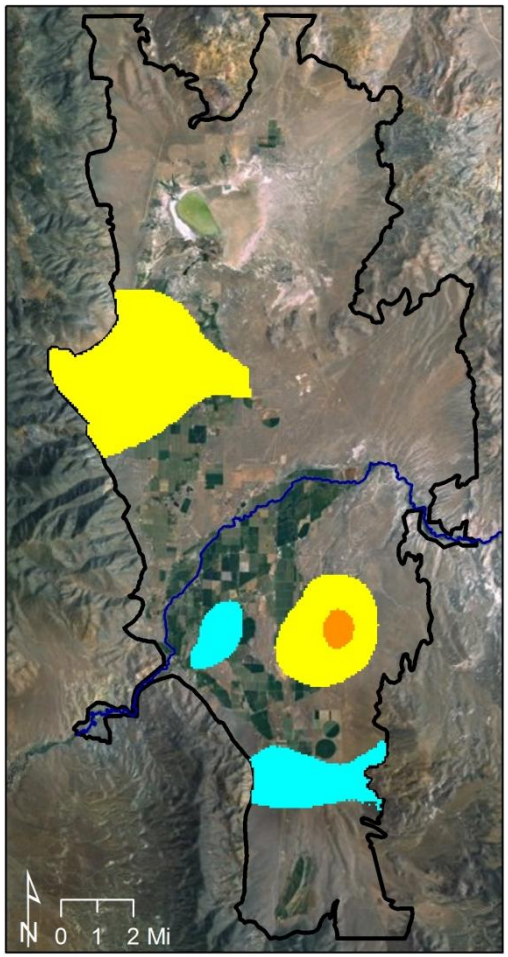
Smith - March to March Drawdown

Streamflow = 60%

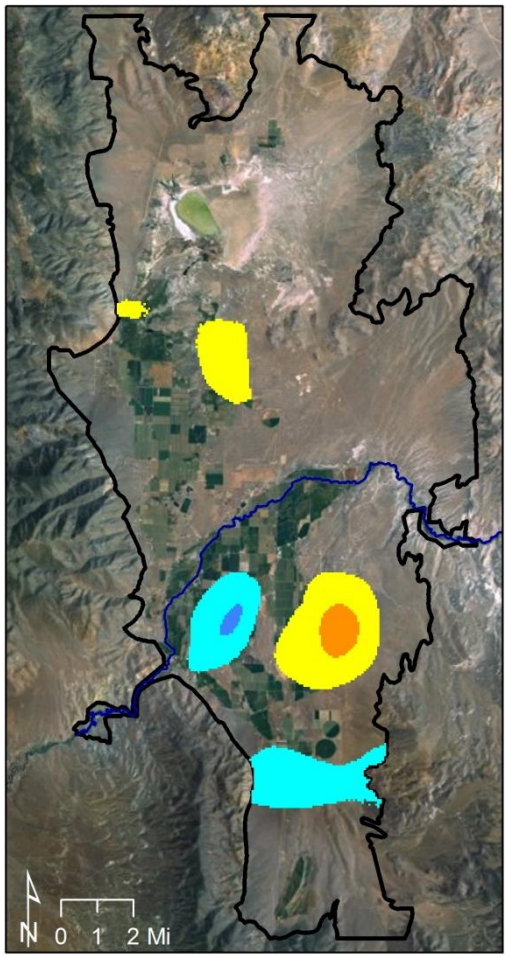
25%



50%



75%



Drawdown

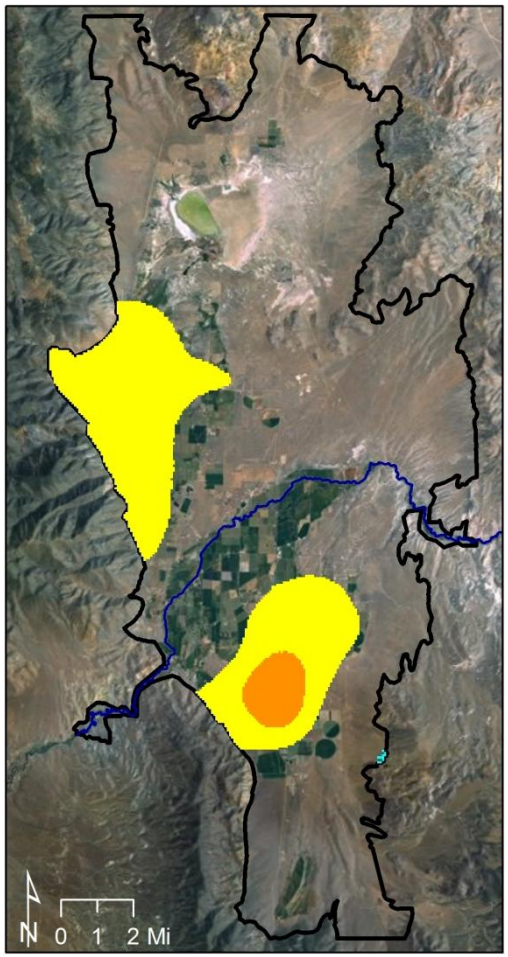
- <-8
- -8 to -4
- -4 to -2
- -2 to 2
- 2 to 4
- 4 to 8
- >8

* negative drawdown indicates rising water levels

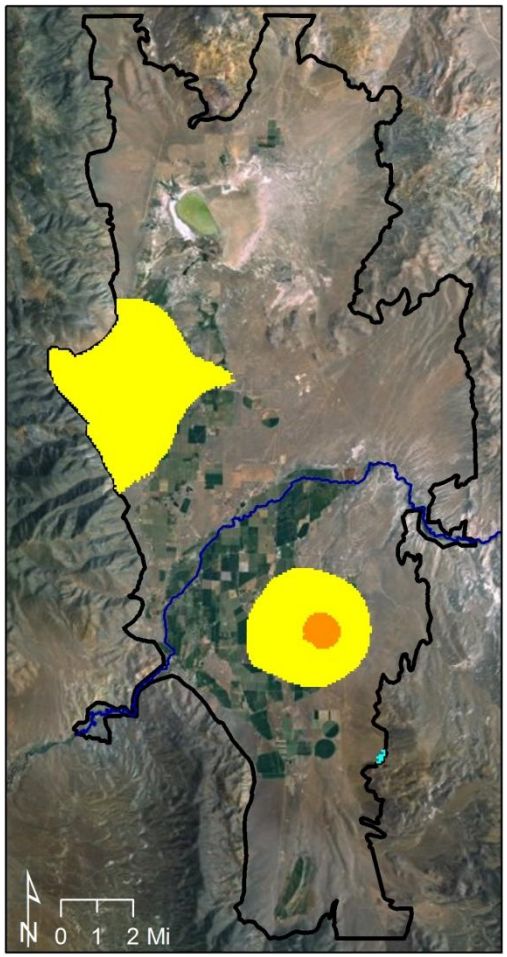
Smith - March to March Drawdown

Streamflow = 50%

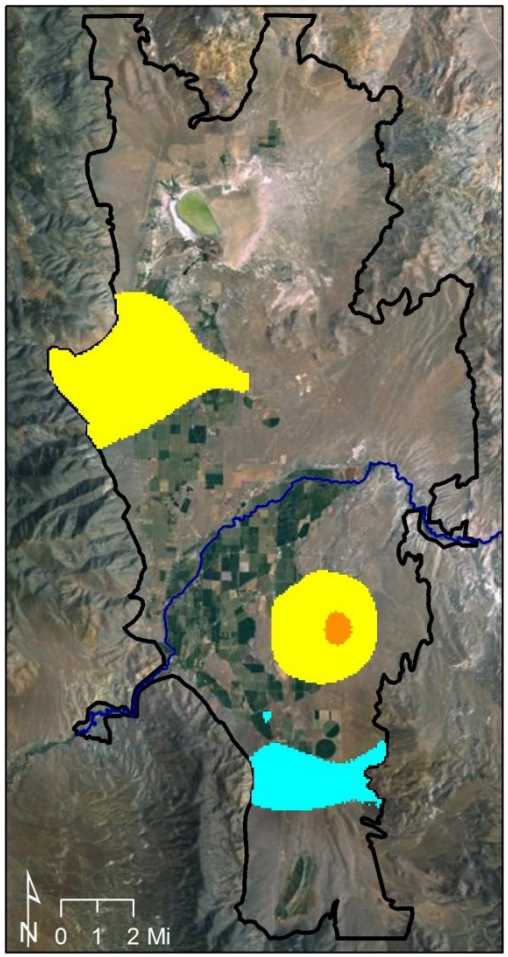
No Curtailment



25%



50%



Drawdown

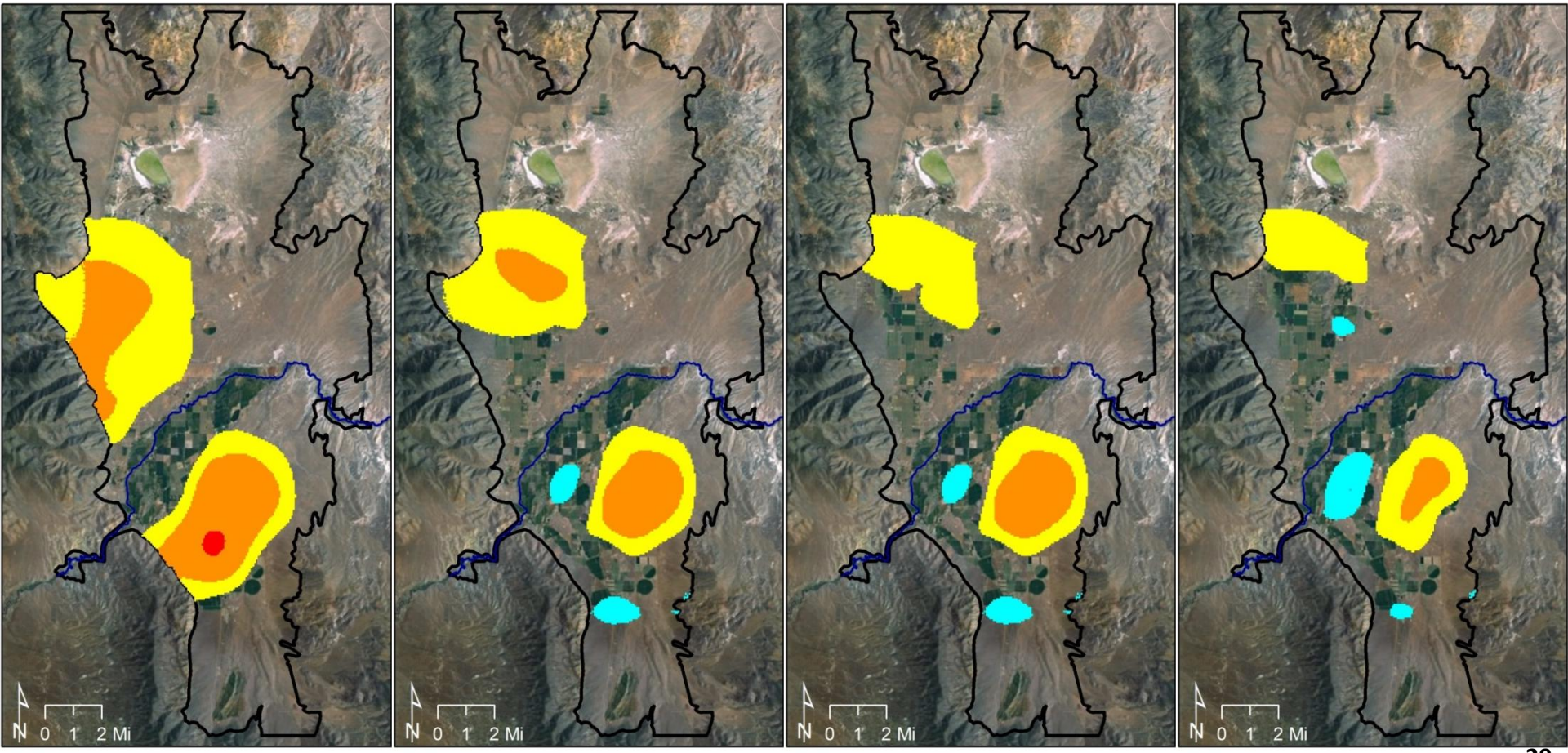
- <-8
- -8 to -4
- -4 to -2
- -2 to 2
- 2 to 4
- 4 to 8
- >8

* negative drawdown indicates rising water levels

Smith - March to March Drawdown

Streamflow = 40%

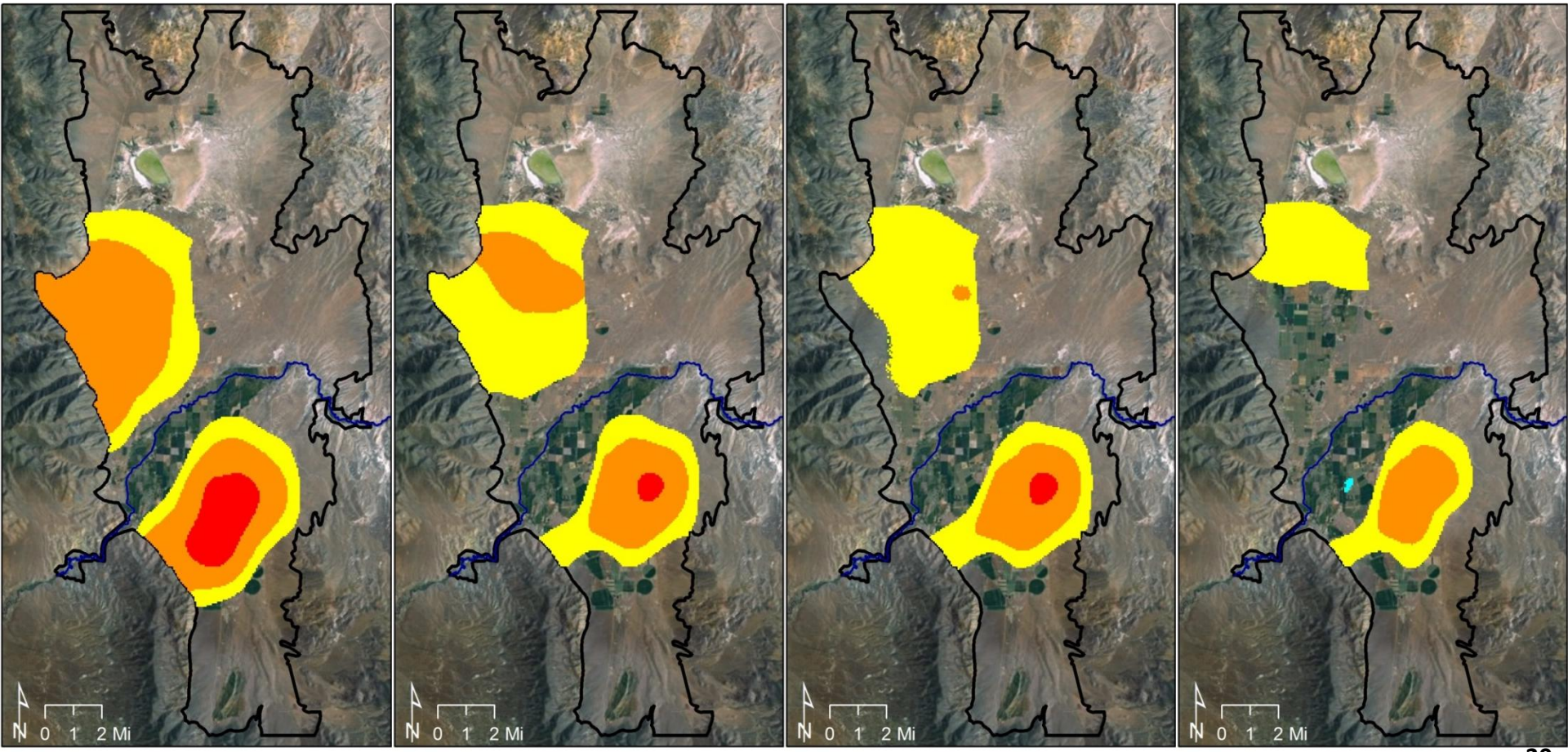
No Curtailment | 70% | 75% | 100%



Smith - March to March Drawdown

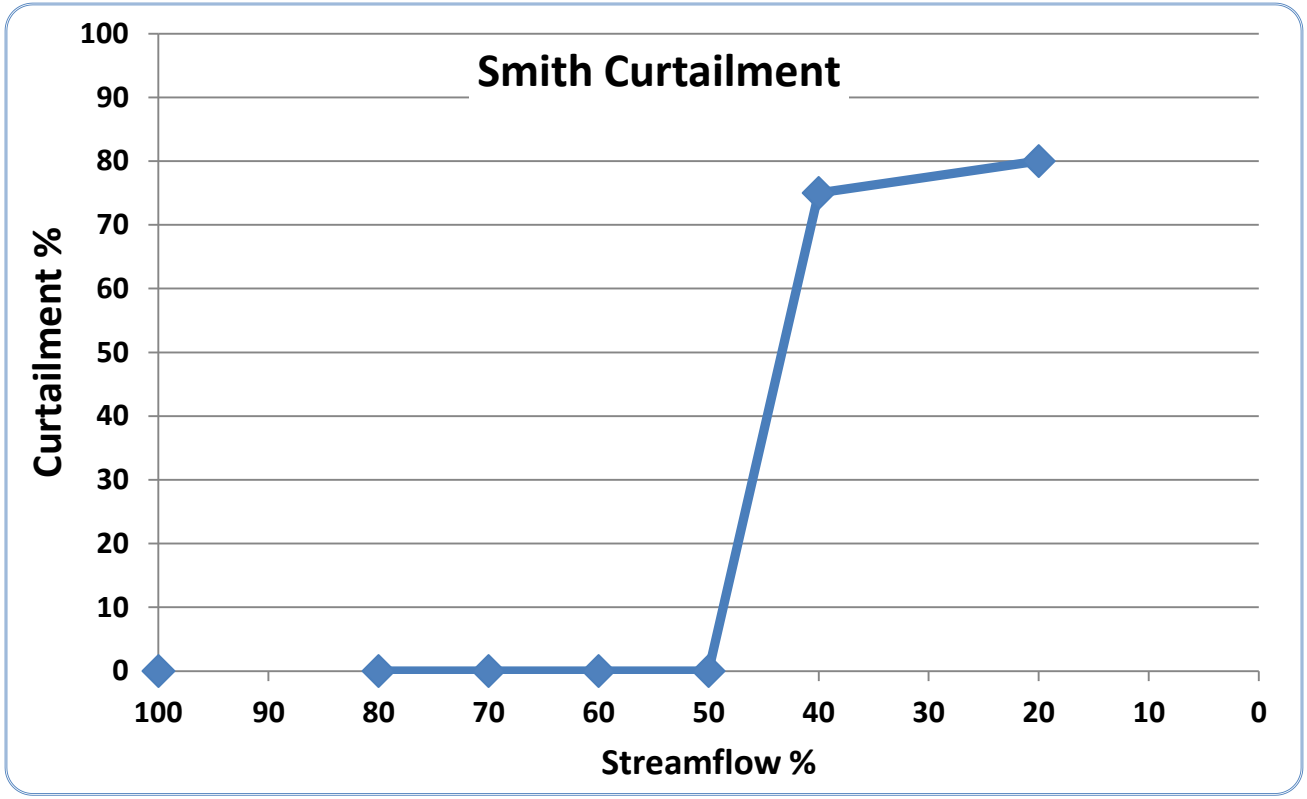
Streamflow = 20%

No Curtailment | 75% | 80% | 100%



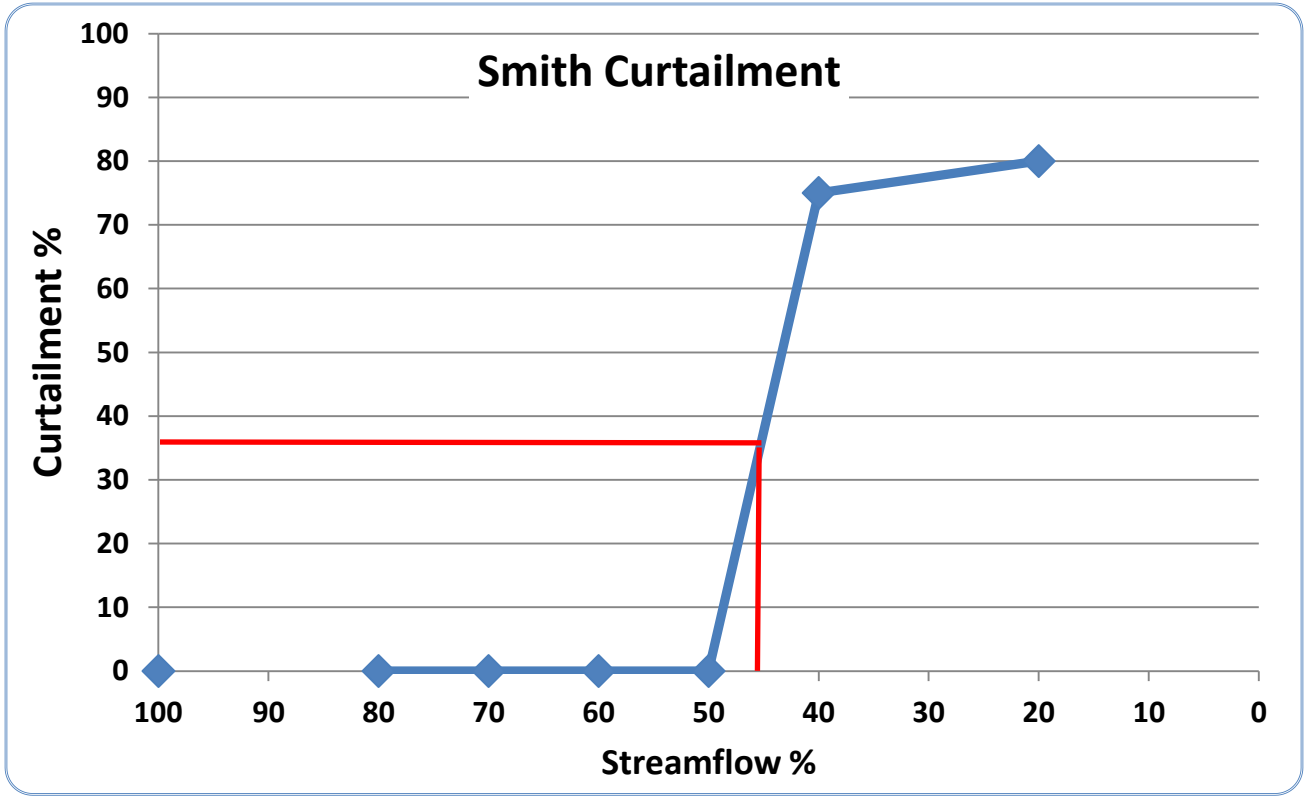
Curtailment Sliding Scale

- Sliding scale
- Less curtailment if river flow is higher
- Priority dates determined for each curtailment
- No curtailment at near normal or greater river flows

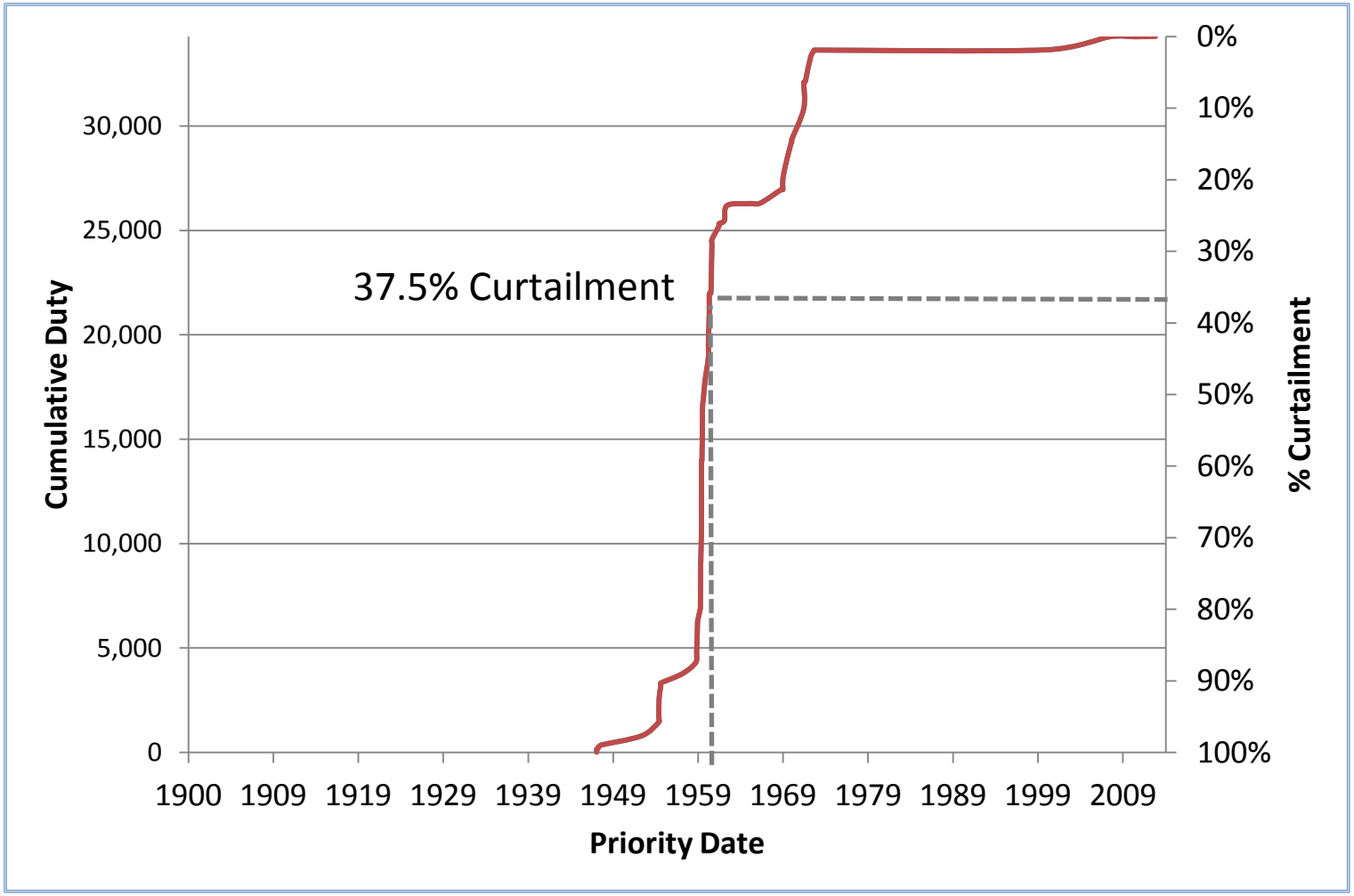


Curtailment Sliding Scale Example

- April 1 forecast is for 45% of average streamflow
- Curtailment for 45% streamflow is 37.5%



Supplemental Water Rights in Smith Valley



Curtailment Table

- If Curtailment is 37.5%
- Water Rights dated 6/3/61 and later are curtailed

Smith Valley Supplemental Underground Rights Priority Table

Relative Seniority[1]	Priority Date	Permit	NDWR Point of Diversion Site Name
23.27%	9/12/1969	60817	107 N11 E24 33BACC2
23.34%	4/13/1967	23800	107 N11 E23 02DDDB1
23.60%	1/10/1966	61183	107 N11 E24 32ACAB1
25.70%	5/16/1963	21279	107 N11 E23 15CCDC1
26.16%	1/18/1963	20977	107 N10 E23 02BBDC1
28.37%	5/28/1962	57495	107 N11 E23 03ABCC1
	5/28/1962	20491	107 N11 E23 03DCBC1
32.19%	7/28/1961	77431	107 N10 E24 17CCAA1
	7/28/1961	77430	107 N10 E24 20ABAA1
	7/28/1961	61987	107 N10 E24 18DACB1
	7/28/1961	20014	107 N10 E24 20BDDD1
35.87%	7/11/1961	19983	107 N11 E24 32BBDD2
35.87%	6/16/1961	58876	107 N11 E24 32ACAB2
35.95%	6/3/1961	19919	107 N11 E23 36CBCA1
42.70%	4/7/1961	84910T	107 N10 E23 02ACCB1
	4/7/1961	19734	107 N10 E23 02ACCB1
44.91%	2/28/1961	19602	107 N11 E24 31CCDB1
48.13%	2/24/1961	19600	107 N11 E23 11BBBC1

Streamflow Forecasts

NRCS April 1 Forecast for Water Supply

- Gages: West Walker nr Coleville and East Walker nr Bridgeport
- Best available forecast of water supply for Smith and Mason Valleys
- Data considered:
  - SNOTEL
  - Snow course
  - Total precipitation
  - Soil moisture

- Forecast updated monthly beginning January 1.
- http://www.nrcs.usda.gov/wps/portal/nrcs/main/nv/snow/

Nevada_WSOR_Apr-2015.pdf - Adobe Acrobat

File Edit View Window Help

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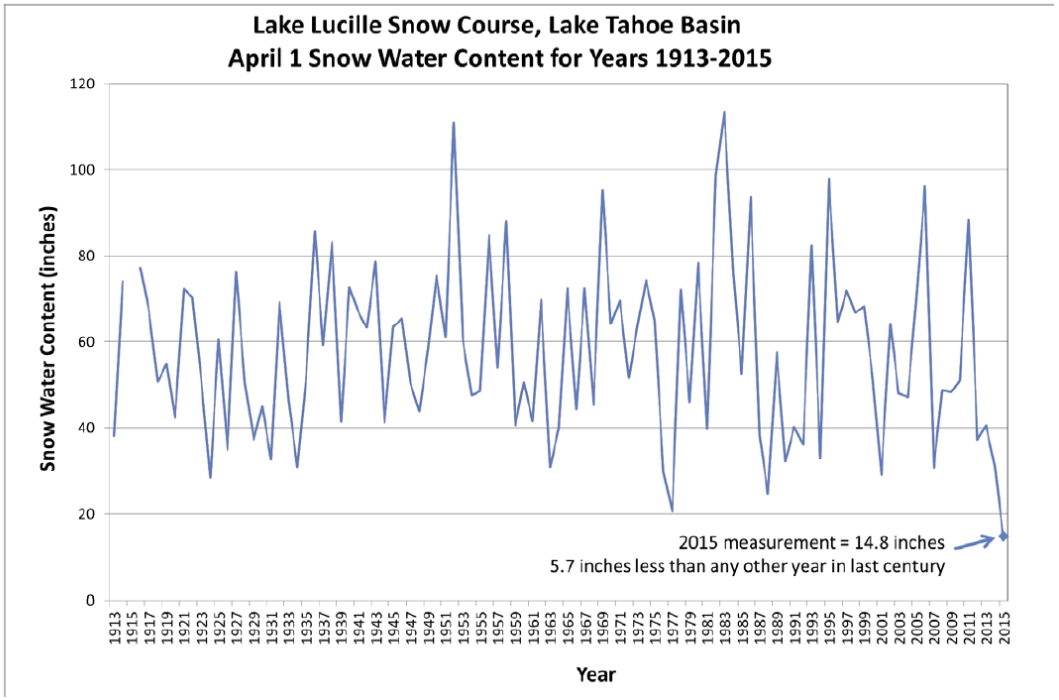
1 / 32 127% Common Tools Fill & Sign Comment

USDA United States Department of Agriculture

Natural Resources Conservation Service

Nevada Water Supply Outlook Report
April 1, 2015



Lowest Snow in a Century

The April 1 snowpack in the mountains around Lake Tahoe is the lowest in over a century of measurements.

Data Current as of: 4/6/2015 9:21:03 AM

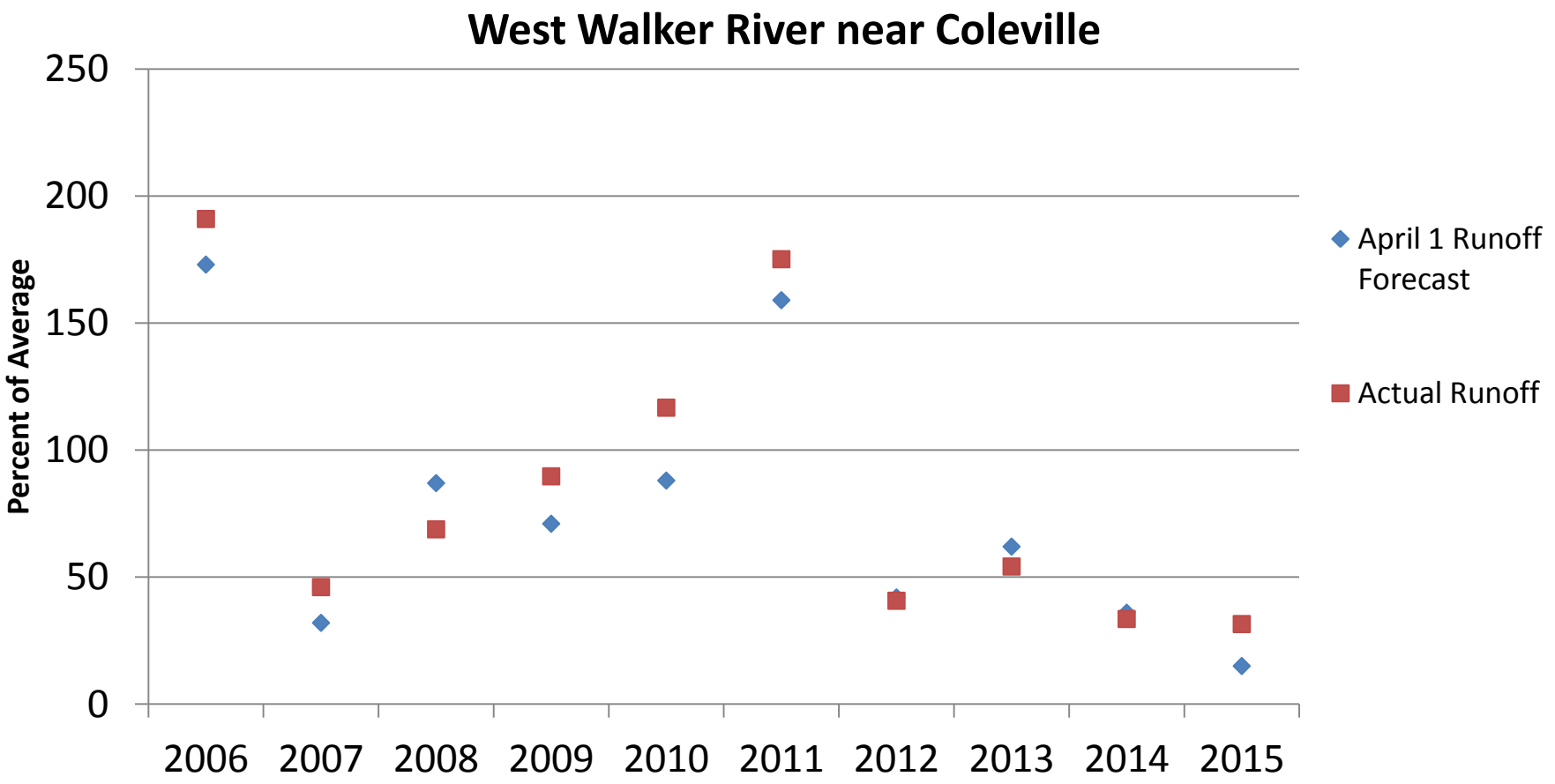
Walker River
Streamflow Forecasts - April 1, 2015

Walker River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
E Walker R nr Bridgeport								
	APR-AUG	0.67	2	8	12%	24	46	67
	MAY-AUG	0.59	1.77	6	10%	18.4	37	59
W Walker R bl L Walker nr Coalville								
	APR-JUL	0	7.5	24	15%	40	65	162
	MAY-JUL	0	5.1	21	15%	38	62	142
W Walker R nr Coalville								
	APR-JUL	15.7	21	24	15%	27	32	163
	MAY-JUL	0	2.9	21	15%	59	114	143
Walker Lake Elevation Change[1]								
	LOW-HIGH	-5.9	-3.5	-2.4	-170%	-1.26	1.17	1.41

1) 90% and 10% exceedance probabilities are actually 95% and 5%
2) Forecasts are for unimpaired flows. Actual flow will be dependent on management of upstream reservoirs and diversions
3) Median value used in place of average

Reservoir Storage End of March, 2015	Current (KAF)	Last Year (KAF)	Average (KAF)	Capacity (KAF)
Bridgeport Reservoir	6.5	10.2	27.2	42.5
Topaz Lake	9.6	7.9	32.1	59.4
Basin-wide Total	16.1	18.0	59.3	101.9
# of reservoirs	2	2	2	2

Watershed Snowpack Analysis April 1, 2015	# of Sites	% Median	Last Year % Median
Walker River Basin	8	18%	44%
E. Walker Rv. Nr Bridgeport	4	4%	37%
W. Walker Rv. Nr Coleville	5	22%	48%


West Walker River near Coleville
Percent of Average
250
200
150
100
50
0
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
April 1 Runoff Forecast
Actual Runoff

Curtailment Examples

Curtailment Example

One water right and one Place of Use :

If the curtailment priority cut-off date is 4/1/1974.

Total Limit: 400 Acre-Feet for the irrigation of 100 Acres

Curtailment Example

One water right and one Place of Use:

If the curtailment priority cut-off date is 3/1/1970

Total Limit: 0 Acre-Feet for the irrigation of 0 acres

Curtailment Example

Multiple water rights, one Place of Use , AND THE WATER RIGHTS ARE ADDITIVE:

If the curtailment priority cut-off date is 4/1/1974

Water Right No.1 :
100 Acre-Feet
Priority Date 10/9/1972

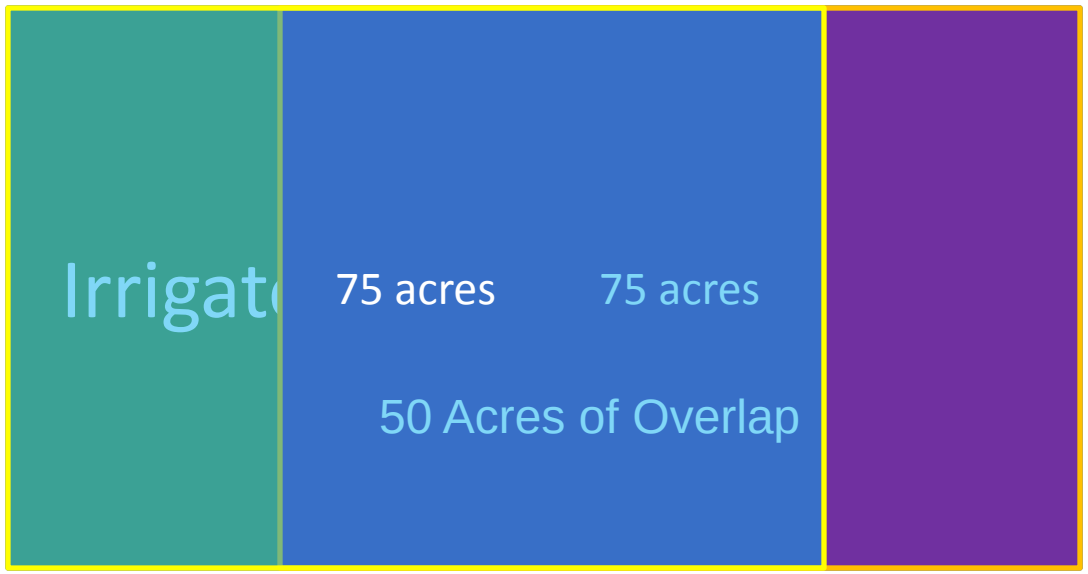
Water Right No.2 :
300 Acre-Feet
Priority Date 7/27/1977

Total Limit : 100 Acre-Feet

Curtailment Example

Multiple water rights, one Place of Use , AND THE WATER RIGHTS ARE NOT ADDITIVE:

Without a curtailment in place



Water Right No.1 :
75 Acres
Maximum: 300 Acre-Feet
Pro-Rata: 200 Acre-Feet

Water Right No.2 :
75 Acres
Maximum: 300 Acre-Feet
Pro-Rata: 200 Acre-Feet

Total Limit: 400 Acre-Feet for the irrigation of 100 Acres

Curtailment Example

Multiple water rights, one Place of Use , AND THE WATER RIGHTS ARE NOT ADDITIVE:

If the curtailment priority cut-off date is 4/1/1974

Water Right No.1 :
Maximum: 300 Acre-Feet
Priority Date 10/9/1972

Water Right No.2 :
Maximum: 300 Acre-Feet
Priority Date 7/27/1977

Total Limit: 300 Acre-Feet for the irrigation of 75 Acres

Why Only Supplemental Rights are Curtailed

Basis for Curtailment of Supplemental Groundwater Rights

- Perennial Yield is the amount of groundwater that can be pumped every year without depleting the resource.
- System Yield has been defined as the amount of surface and groundwater that can be used each year for an indefinite period of time. Supplemental water rights are granted under this management method.
- EXCEPT in the case of severe and prolonged drought, the continued reliance on groundwater as the primary water supply has resulted in unreasonable lowering of the water levels and depletion of the aquifer.

Water Budgets – Water Supply

- Smith Valley
  - Perennial yield of 17,000 af
    - Recharge from precipitation = 17,000 afa
  - System yield of 62,000 af (consumptive)
    - Includes surface water and groundwater (1958-1972)
    - 17,000 afa recharge
    - 75,000 afa diversions
    - (-)30,000 afa return flow
  - Groundwater appropriations = 55,000 af
    - 34,000 af supplemental to surface water rights

Curtailment Order Review

- Targeted water level change of 4 feet or less
- Use existing groundwater flow models to simulate river flows and curtailment
- Curtailing supplemental irrigation only
- Sliding scale approach
  - Increasing curtailment when flows are lower
  - Priority tables available on our website (Water.nv.gov)
- Use April 1 NRCS forecast for determination of water supply
- Actual curtailment amount for 2016 to be determined in first week of April
- Curtailment may be adjusted (downward only) based on April and May precipitation, using NRCS June 1 forecast

State Engineer Actions for 2016

- Draft Curtailment Orders in early September 2015 ✓
- Hearings in October 2015 ✓
- Curtailment Orders issued in late October 2015
- Use April 1, 2016 NRCS runoff estimates as basis
- Use June 1, 2016 NRCS runoff to reduce curtailment if appropriate
- Farmers have access to the same information as State Engineer in determining need for curtailment
- Continued high level of presence in both basins