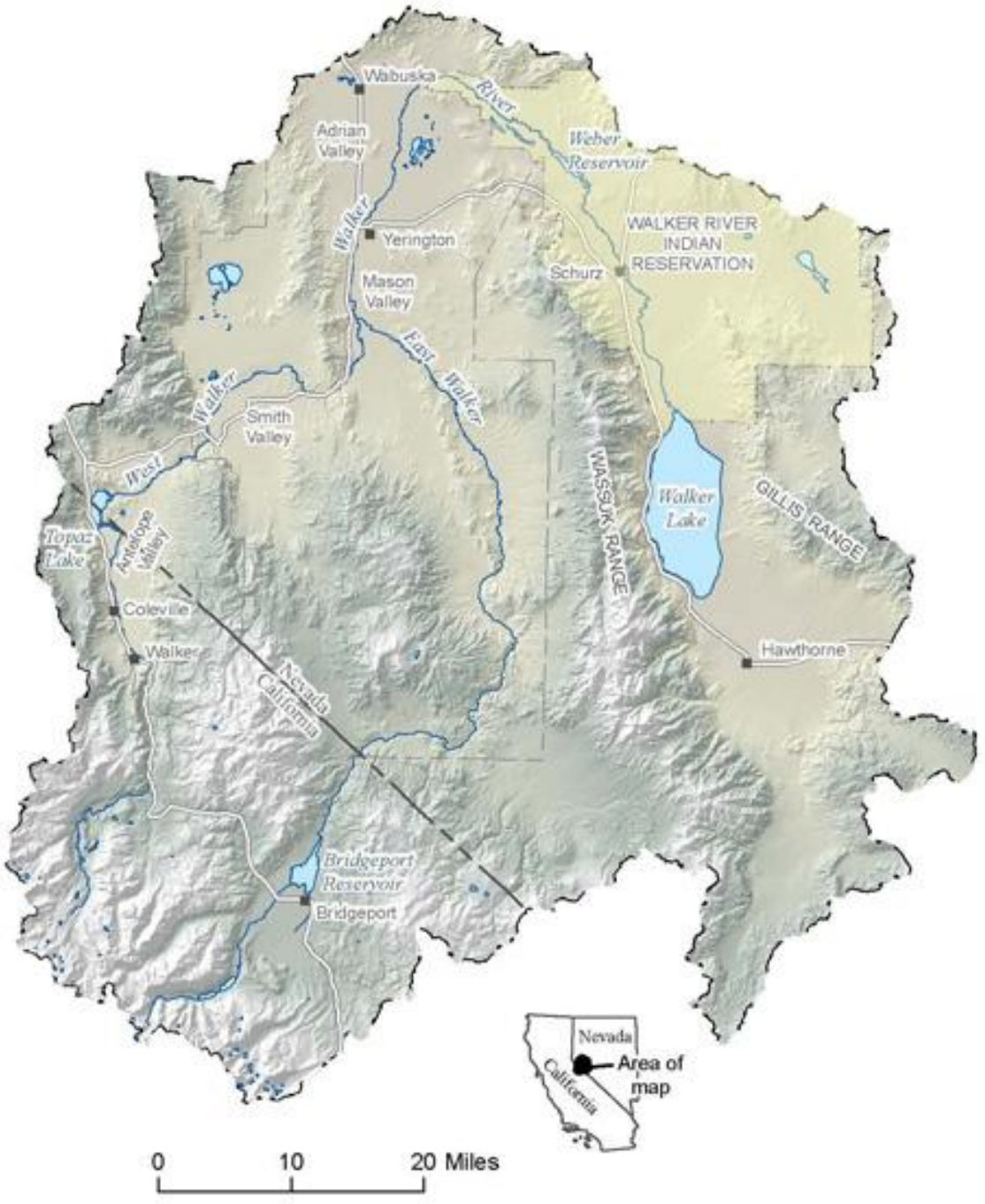
Division of
WATER RESOURCES

Mason Valley Curtailment Hearing

Carson City
October 5, 2015

DEPARTMENT OF
CONSERVATION &
NATURAL RESOURCES



Outline

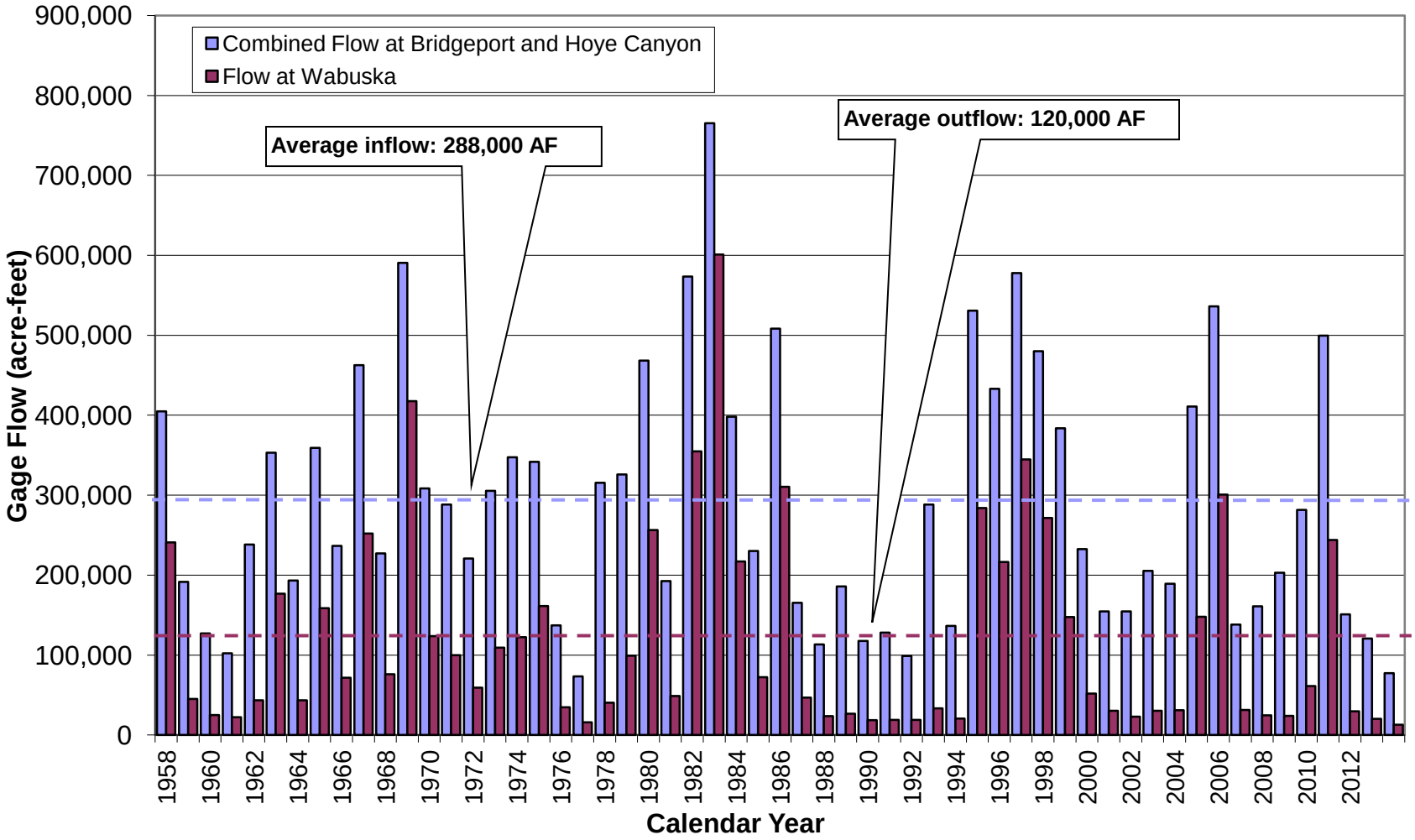
- Review of the issues and actions
- Effects of drought and groundwater pumping
- Climate outlook for winter of 2015-2016
- Recent pumpage tabulations
- Recent DRI modeling results – supplemental rights only
- NRCS streamflow forecast for surface water supply and curtailment
- Curtailment sliding scale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

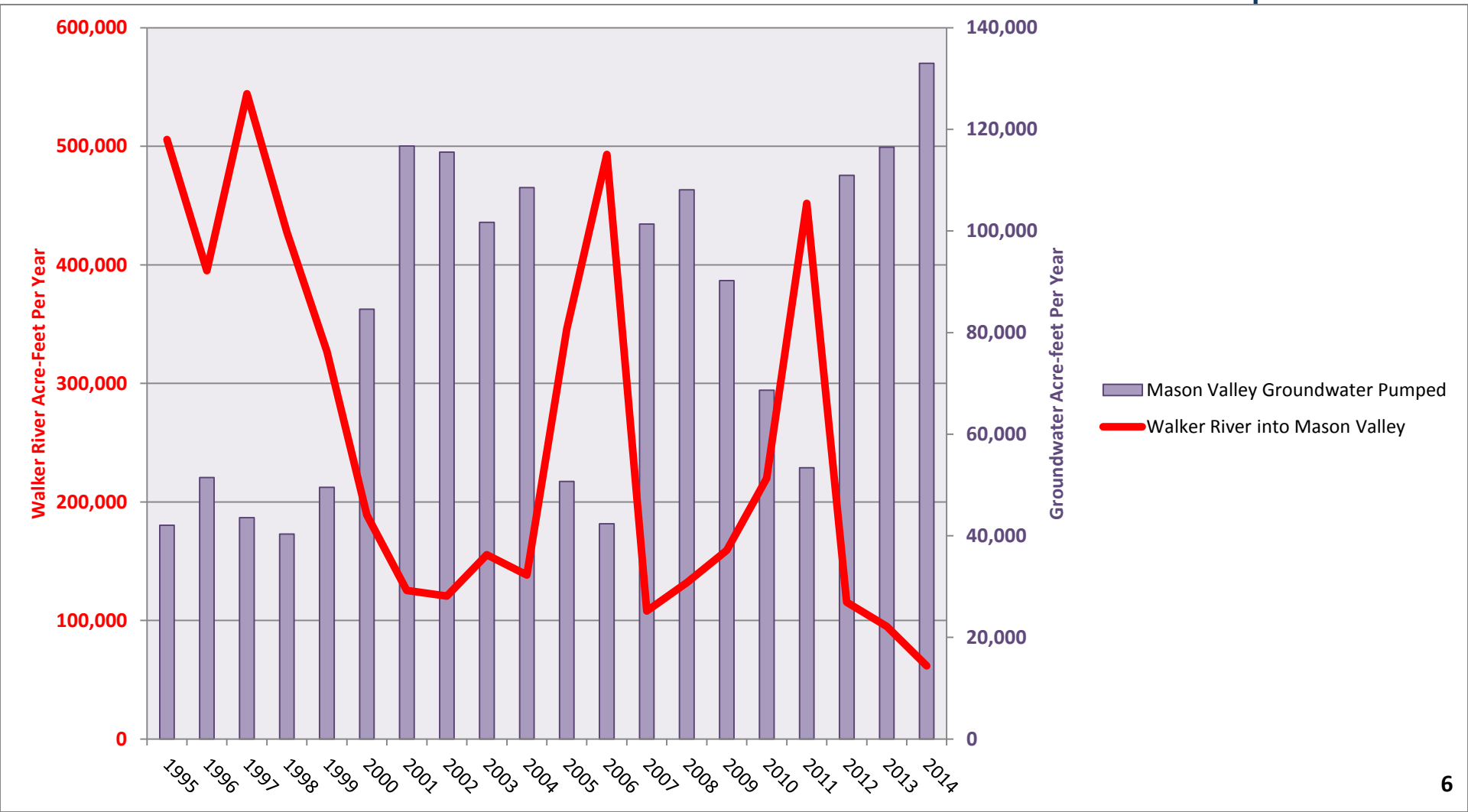
Effects of Drought and Groundwater Pumping

Walker River Flows in Smith, Mason and East Walker Basins



Mason Valley Groundwater & Surface Water History

Less Surface Water Available = More Groundwater Pumped



Mason Valley
Water Level Decline from Nov 2011 to Nov 2014

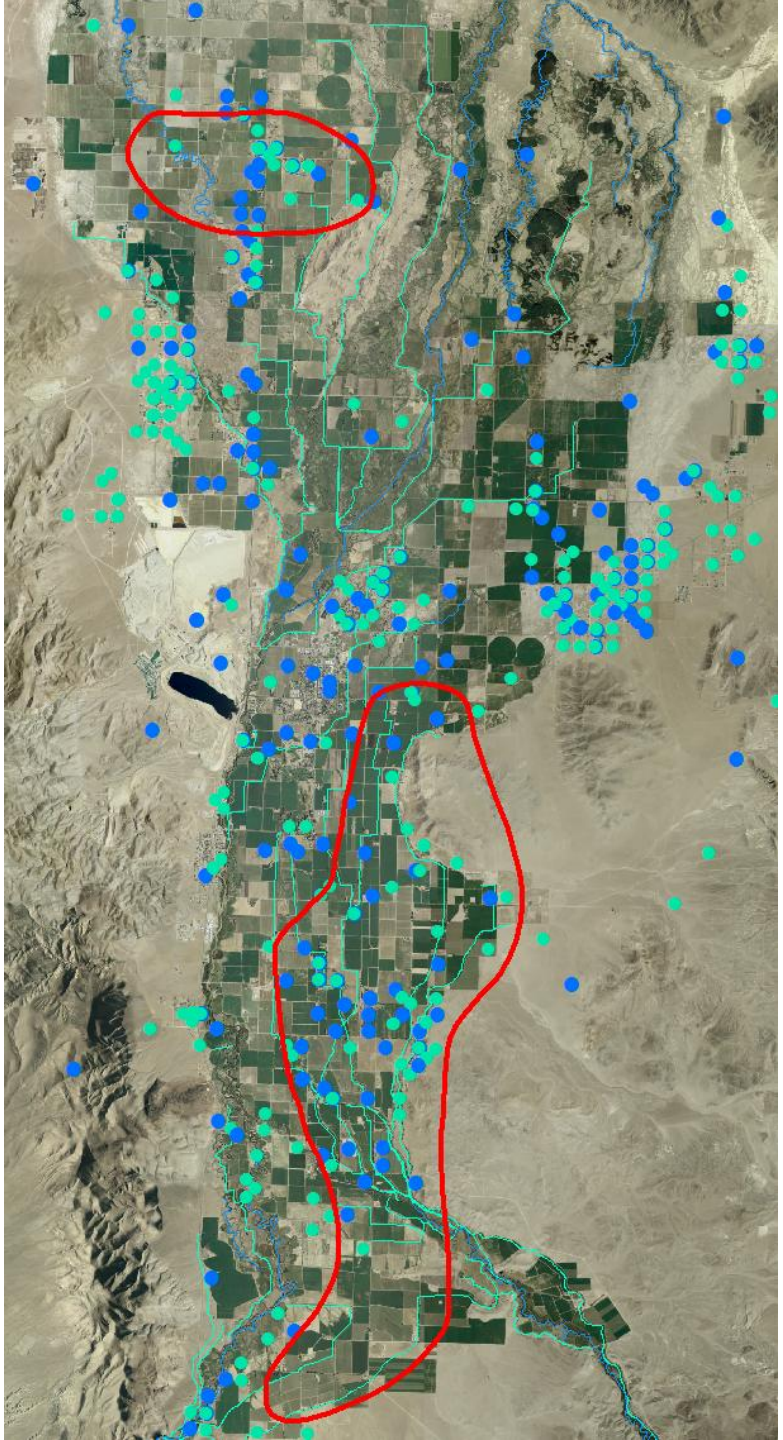
20 - 30 ft

<u>Well Depth</u>

≤ 100 ft

100 – 150 ft

In Mason Valley there are 279 wells that are less than or equal to 100 feet of these 139 are domestic.



Mason Valley
Water Level Decline from Mar 2014 to Mar 2015
32% of Median Flow

Measured well

Water Level Decline Rates

> 8 feet/year

> 4 feet/year

Pumped 2014 AF/Y

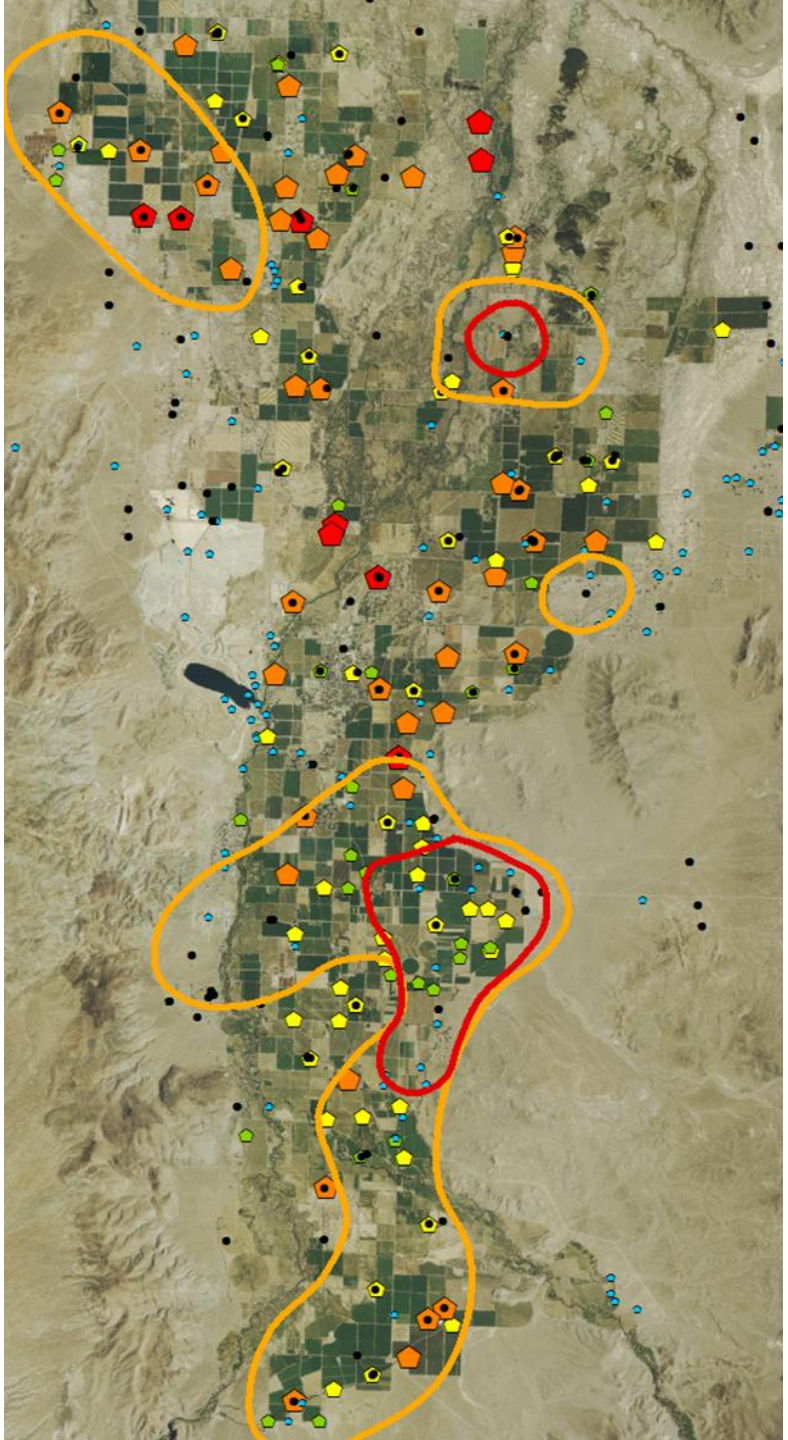
2000 - 3270

1000 - 2000

500 - 1000

200 - 500

0 - 200

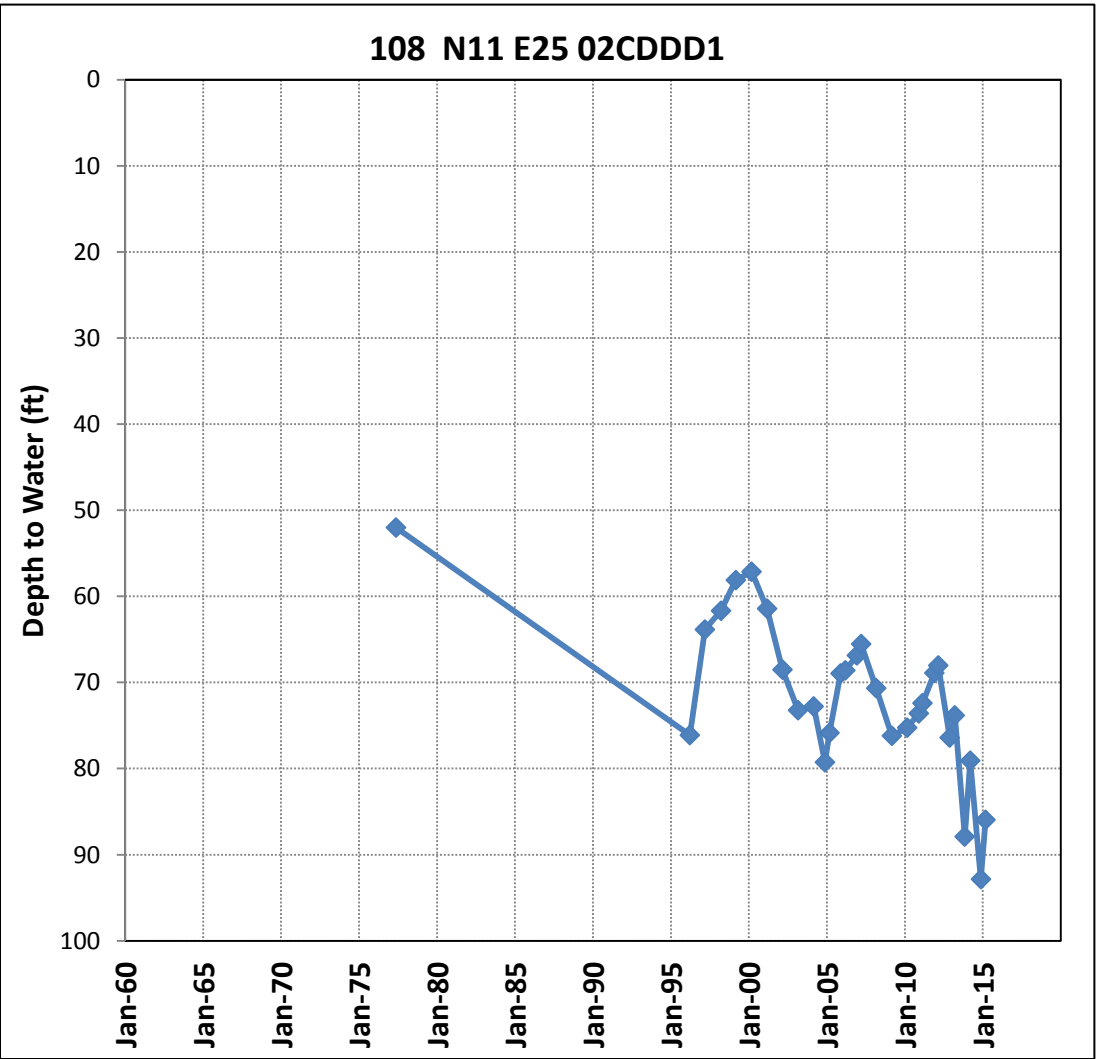


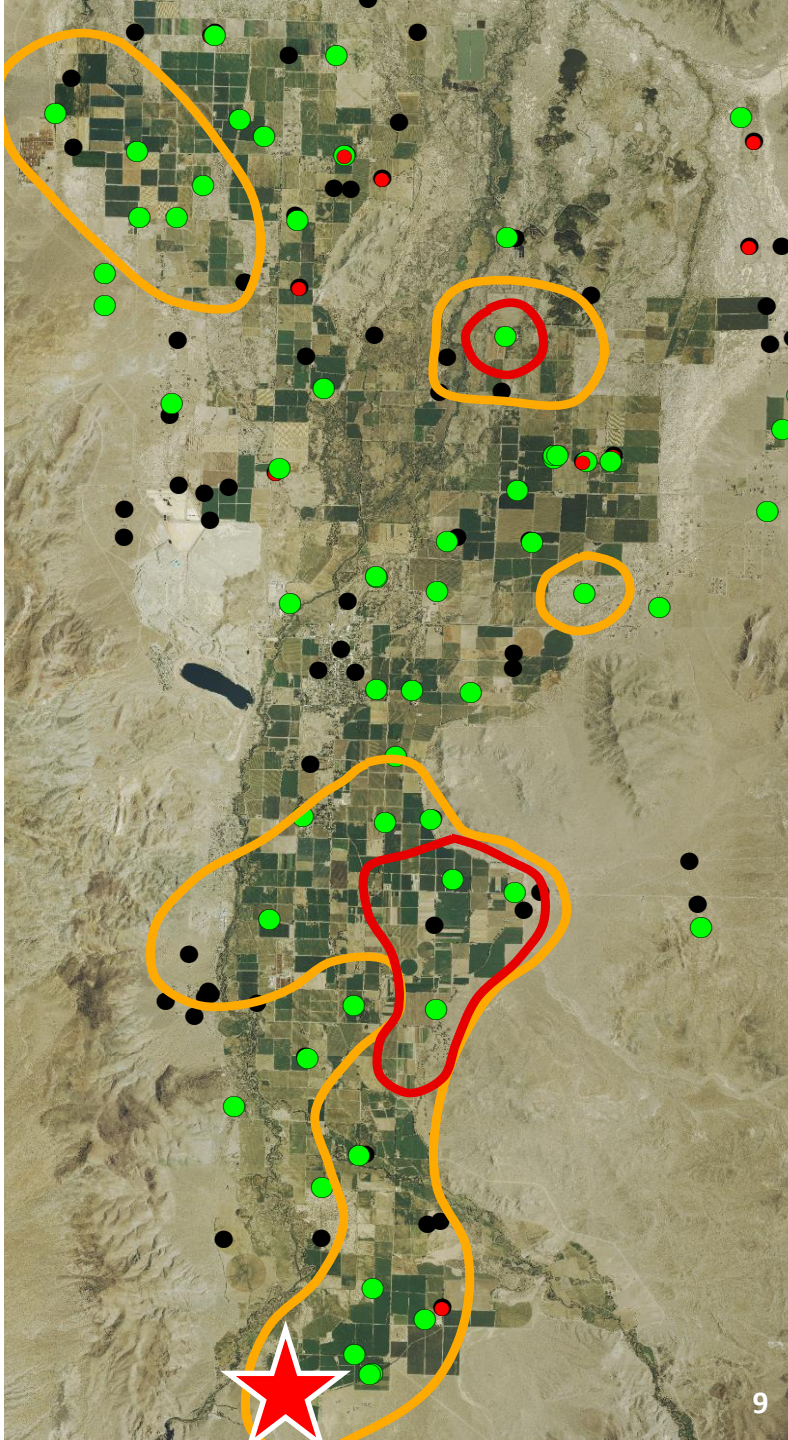
Mason Valley Hydrographs

NDWR Active

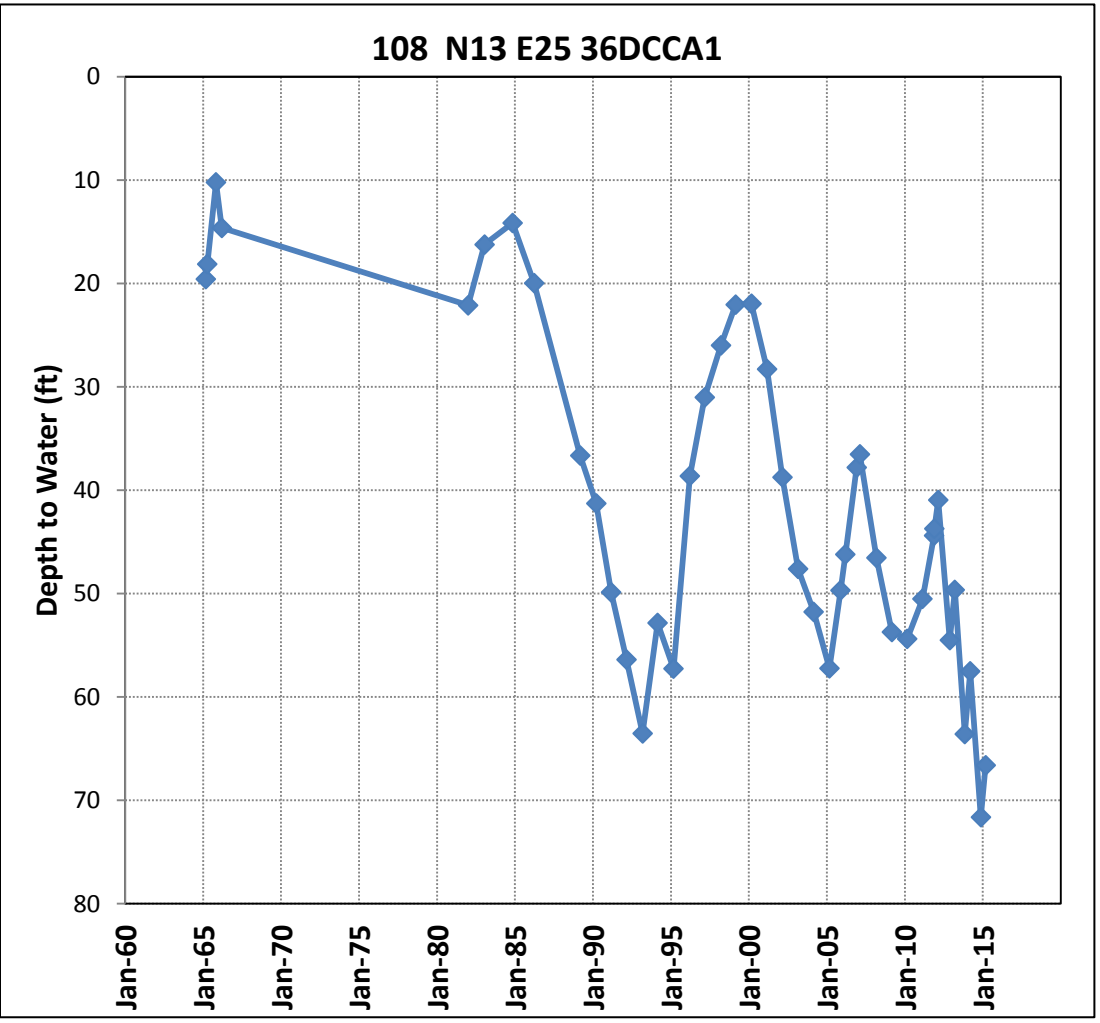
NDWR Inactive

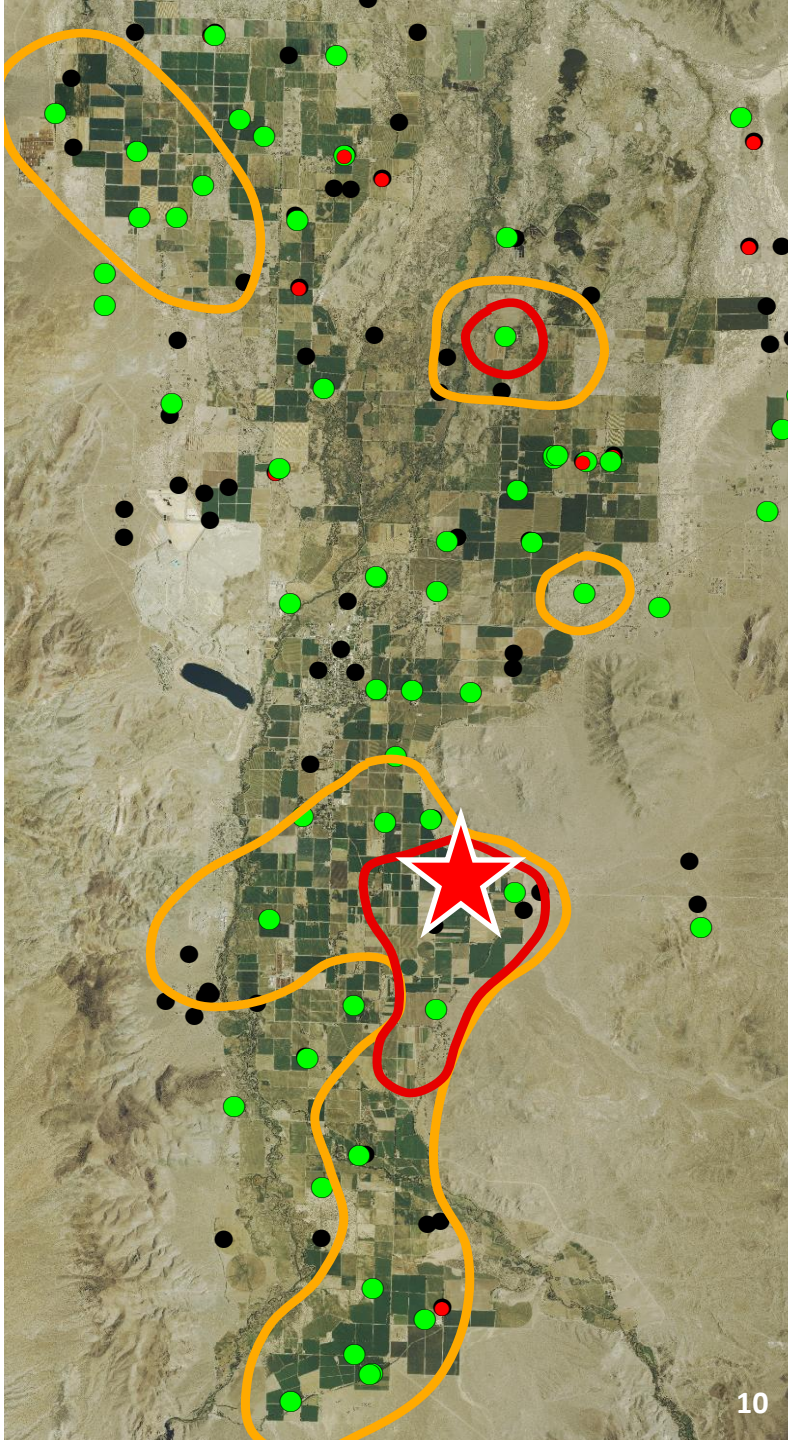
Measured well





Mason Valley Hydrographs



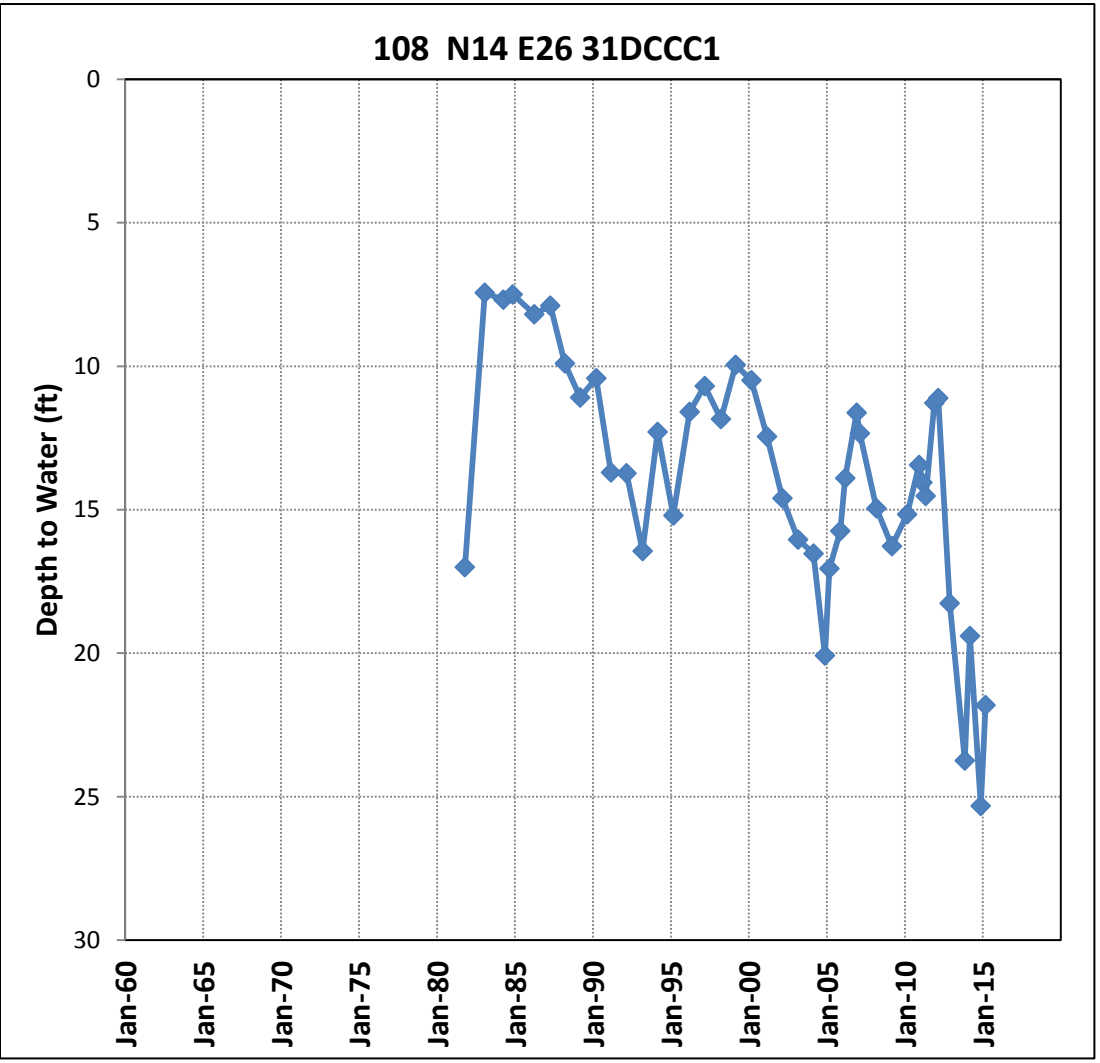


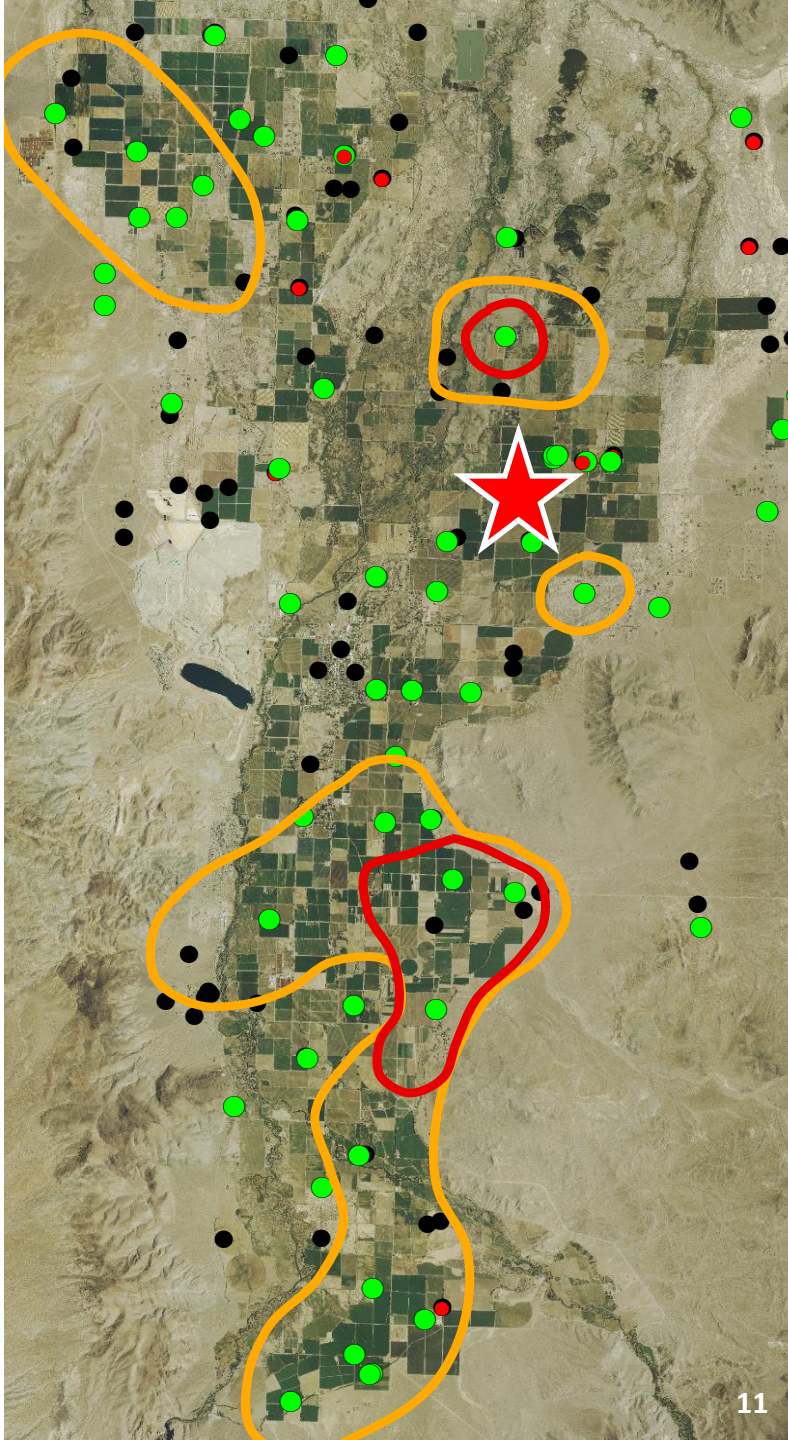
Mason Valley Hydrographs

NDWR Active

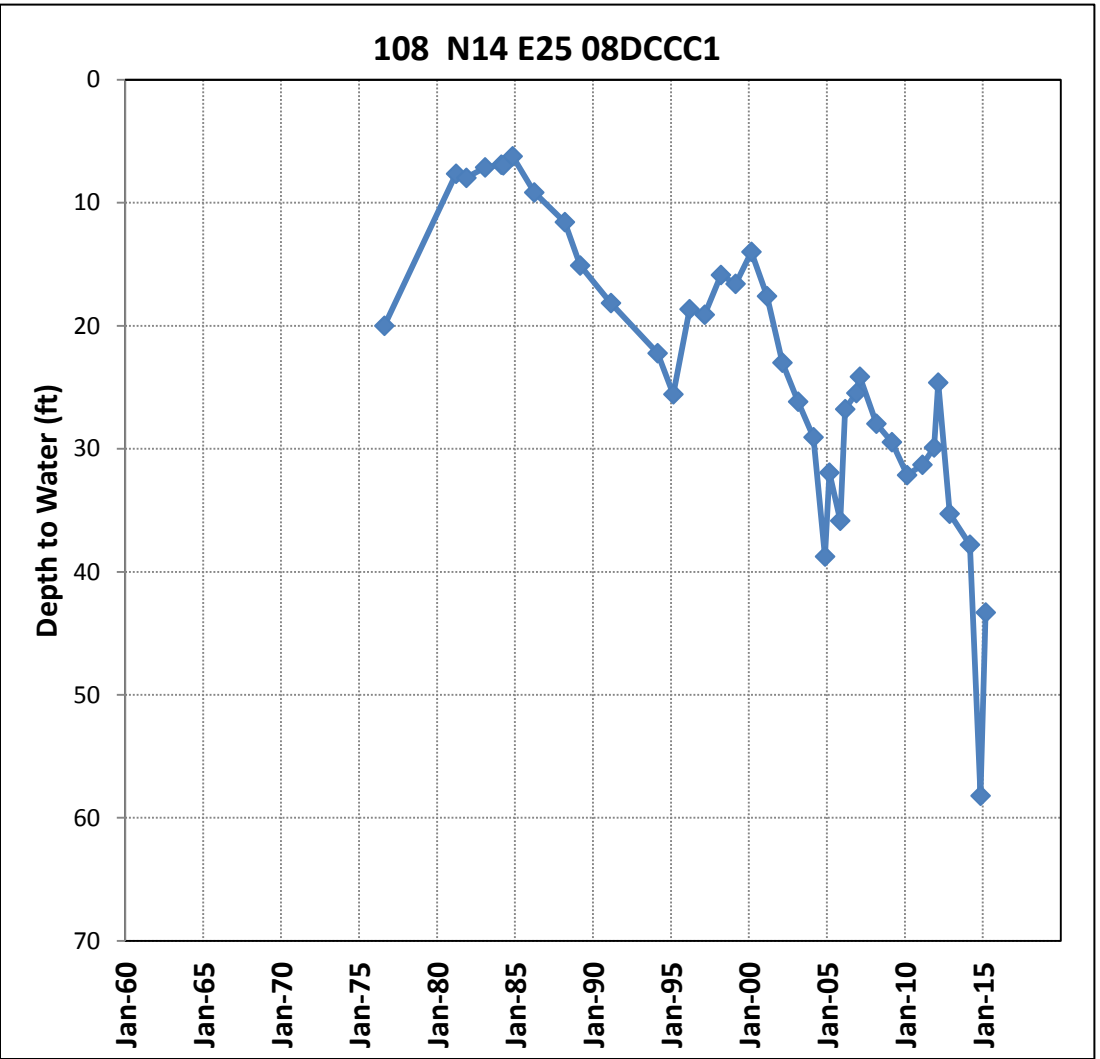
NDWR Inactive

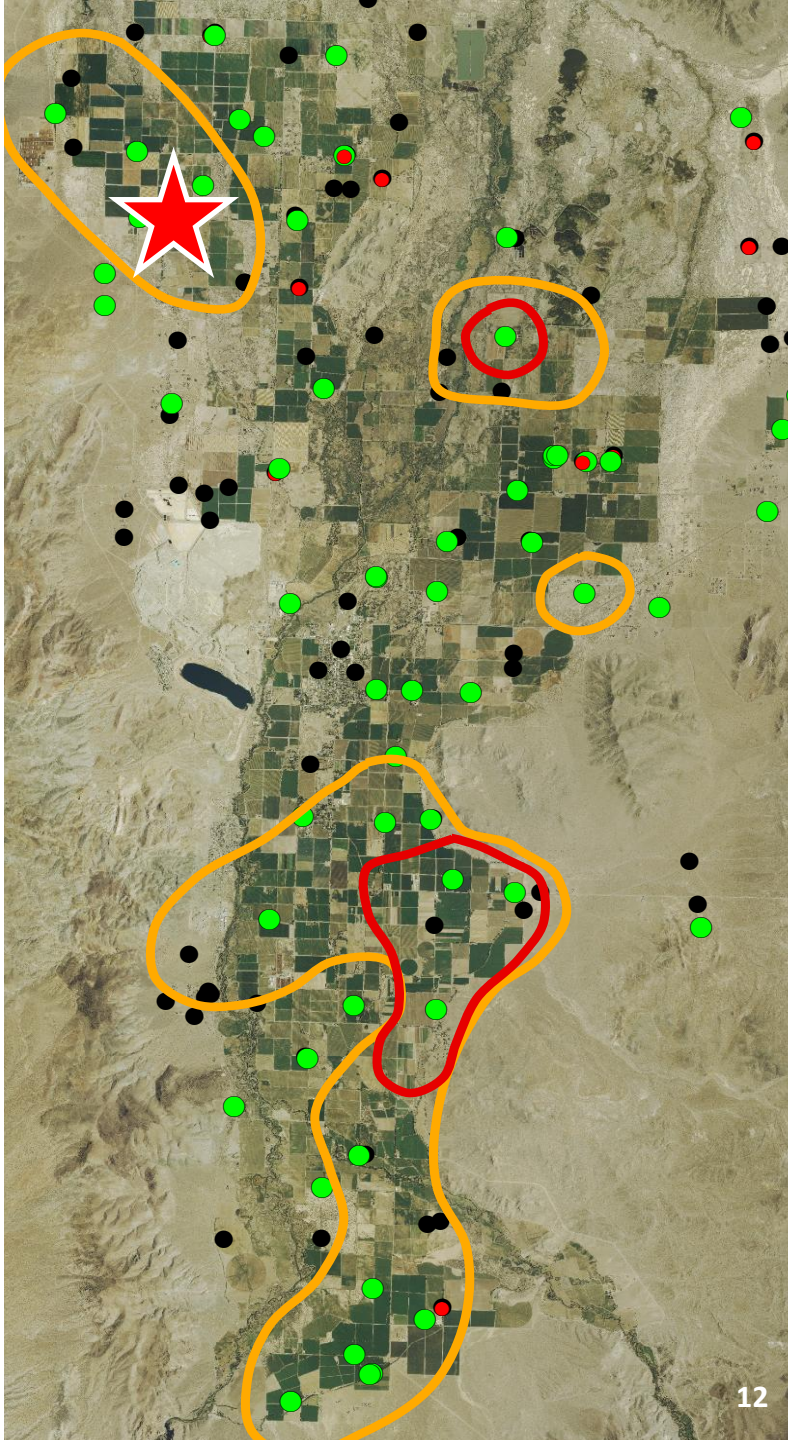
Measured well



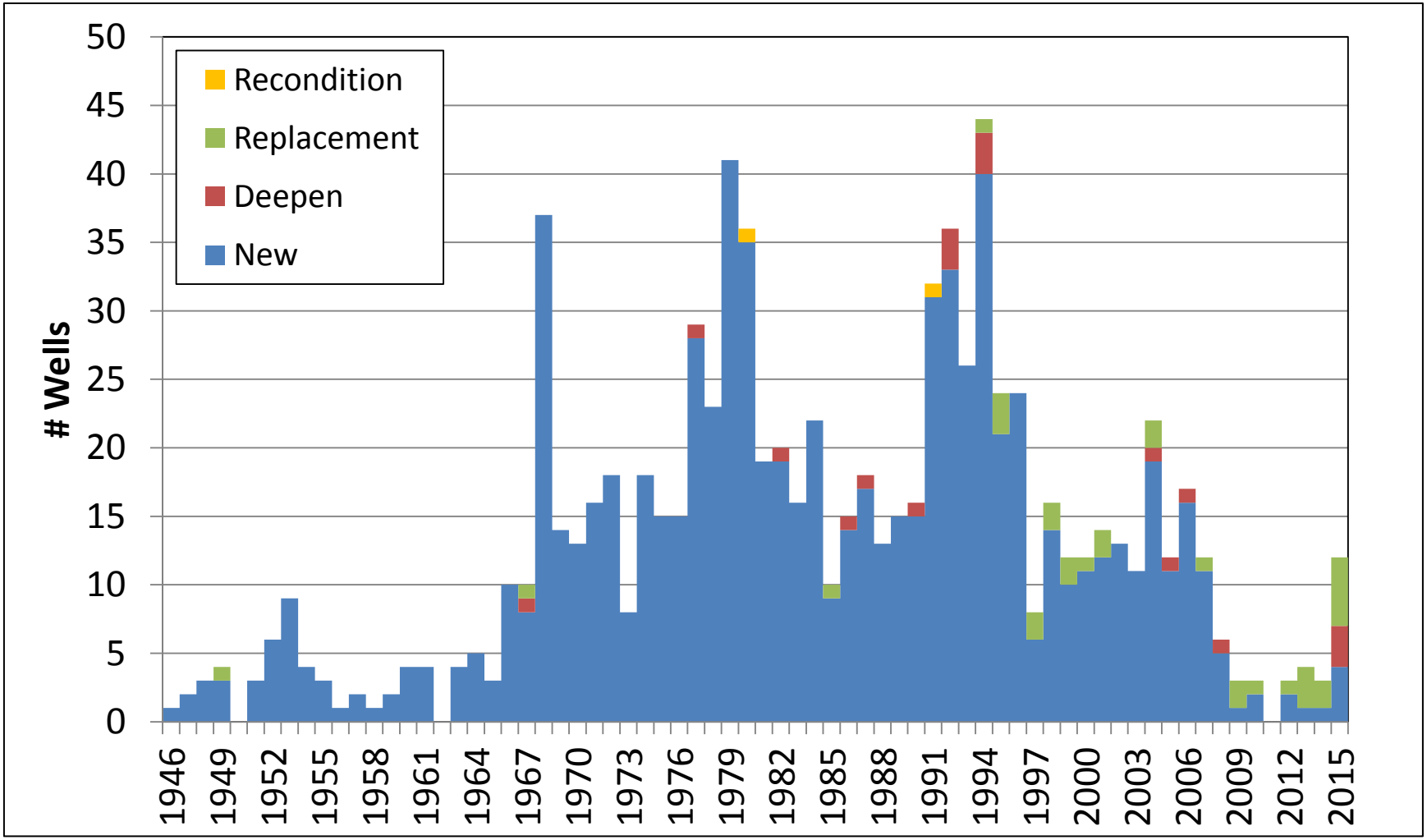


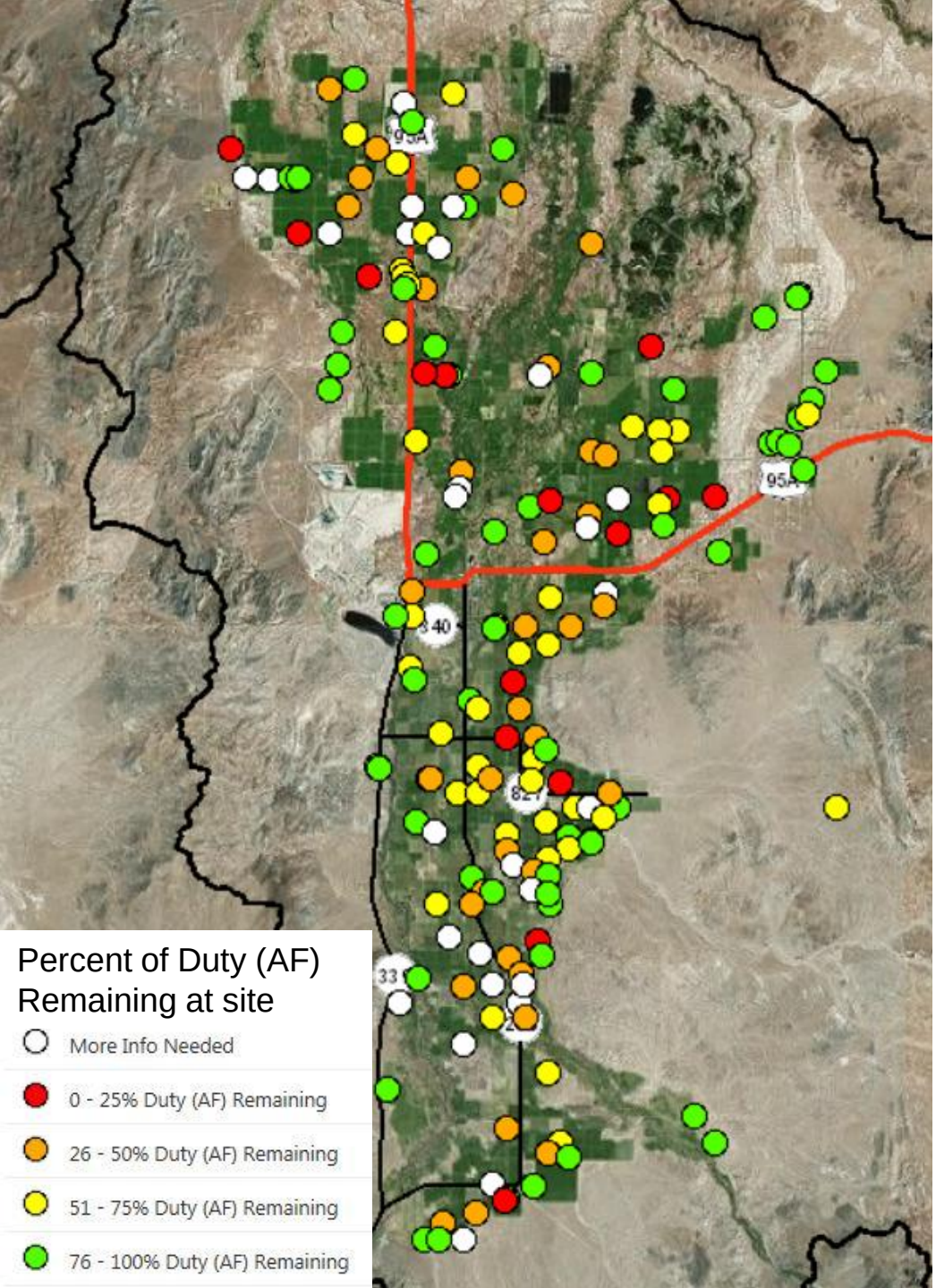
Mason Valley Hydrographs





Mason Valley Domestic Wells





Mason Valley Irrigation Pumpage estimate as of September 30, 2015: **65,000 Acre-Feet**

(2014 Ag pumping ~ 120,000 af)

Hydrologic Conditions

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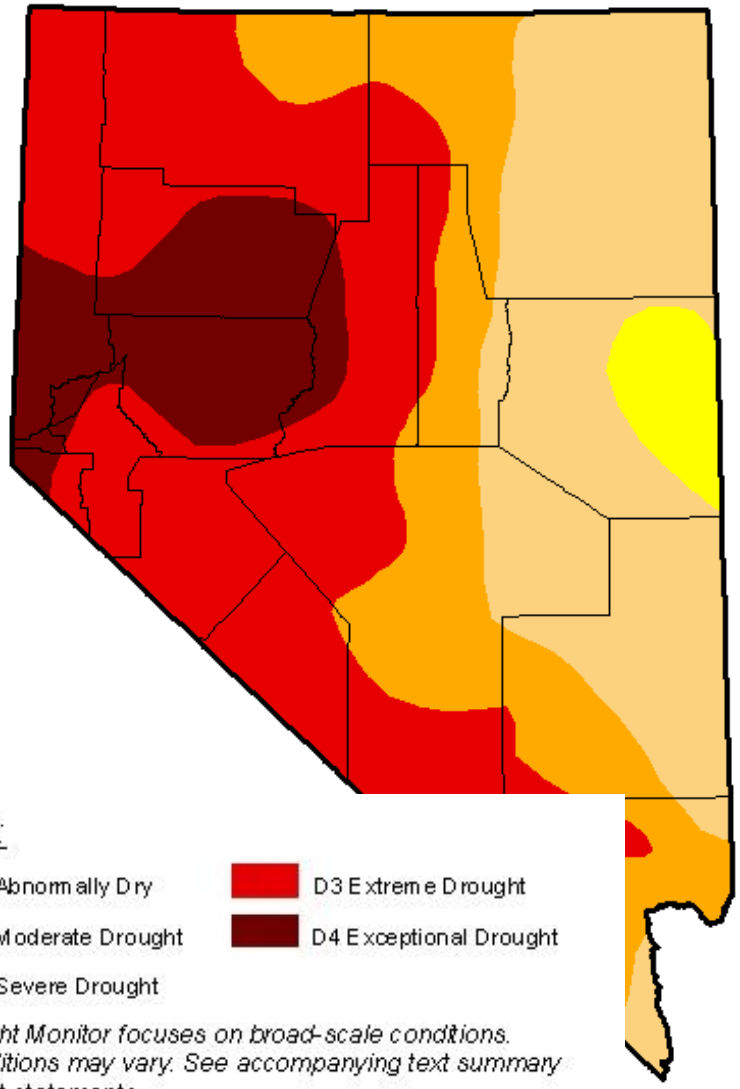
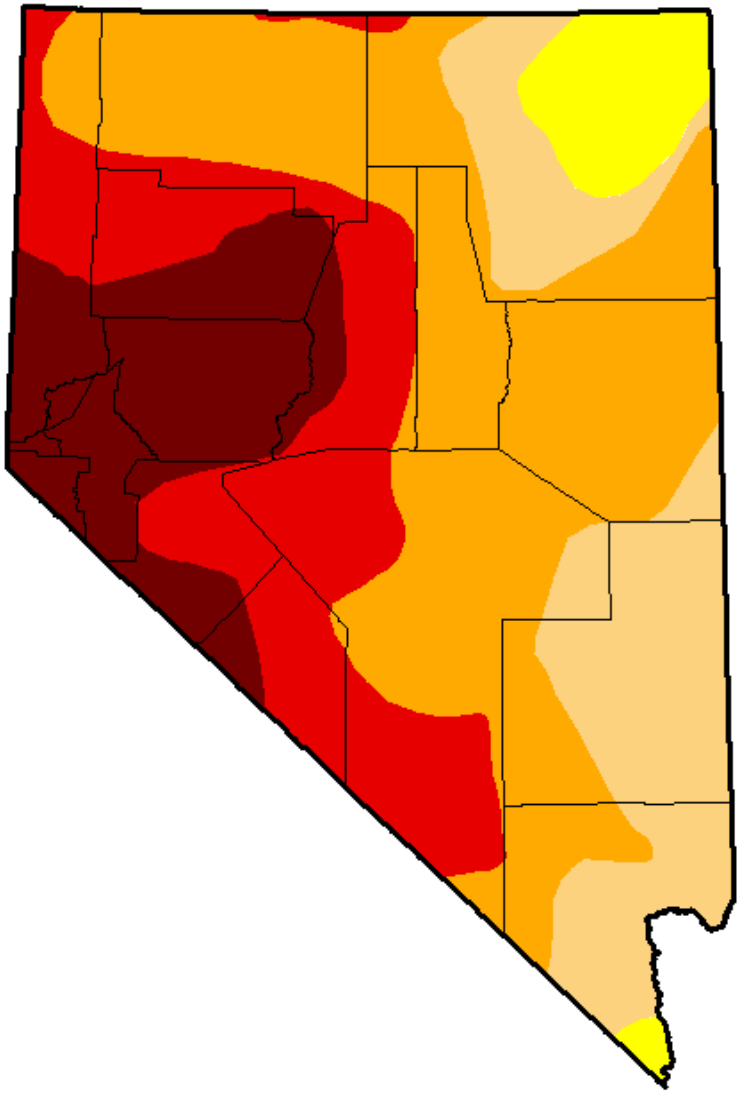
Climate Forecast

Current Drought Conditions

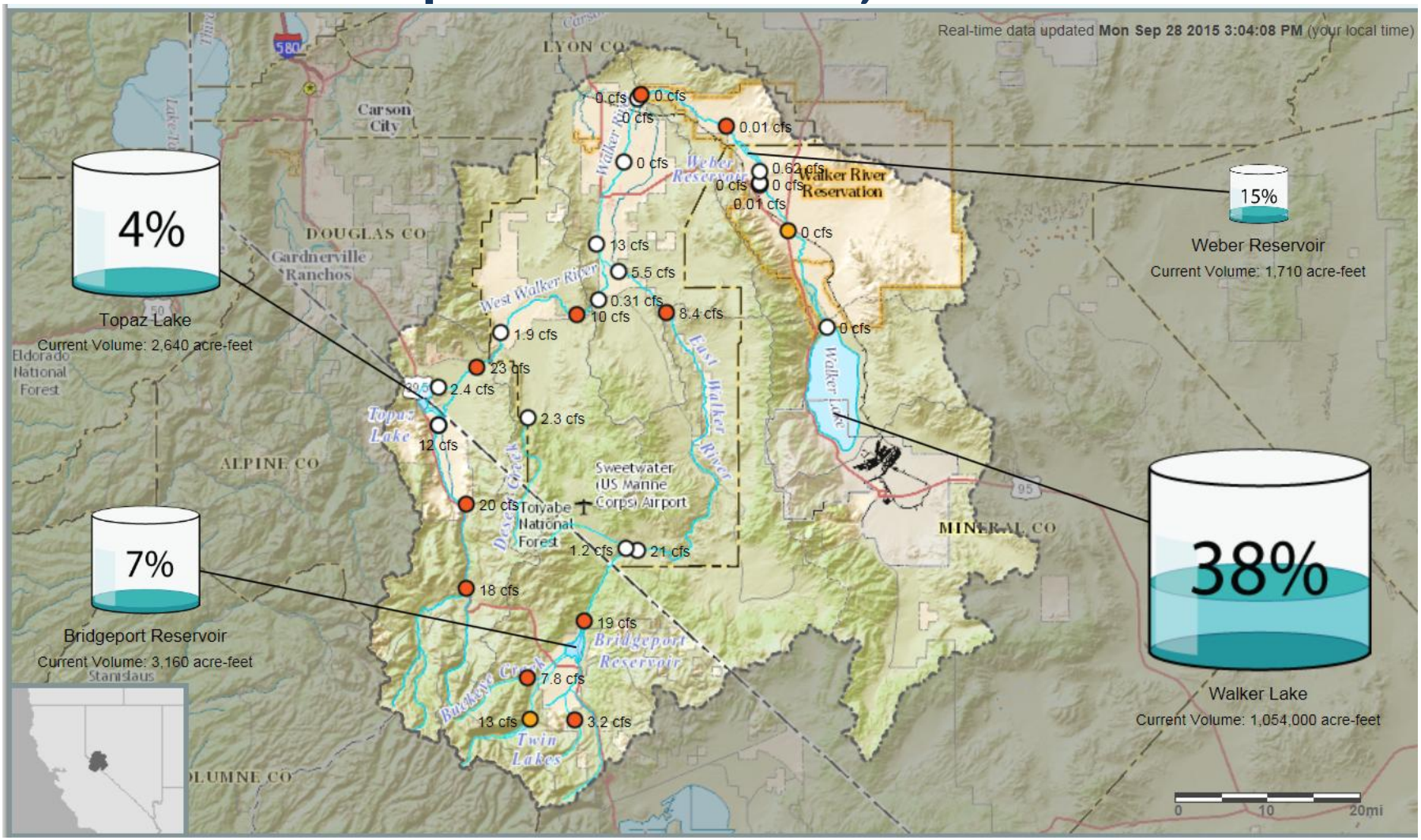
October 7, 2014



September 29, 2015



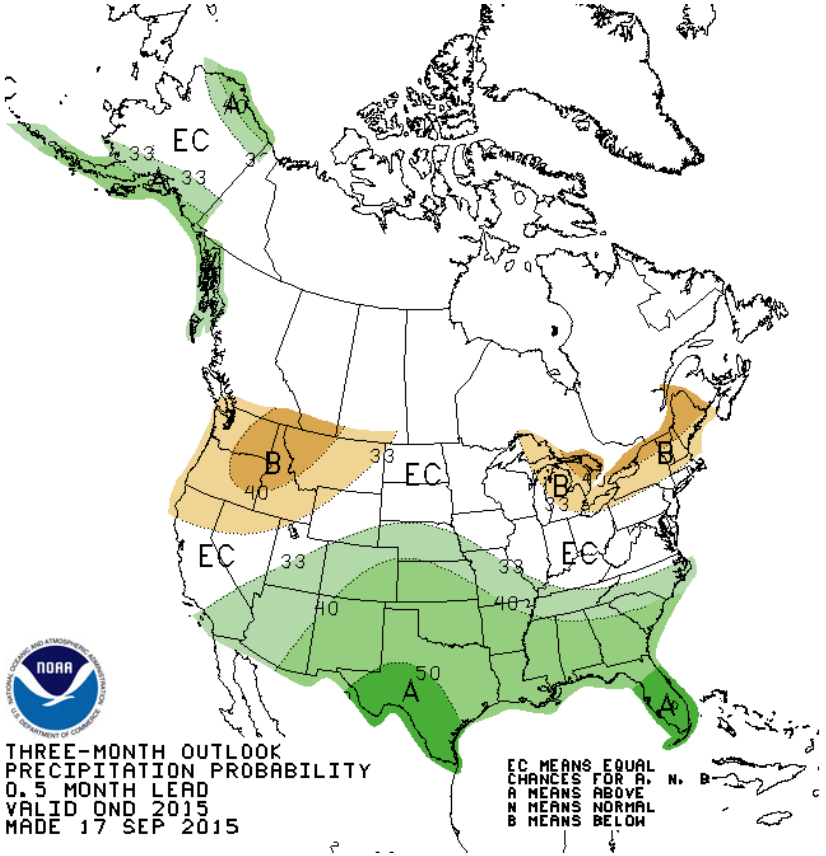
Walker Basin Reservoir Storage September 28, 2015

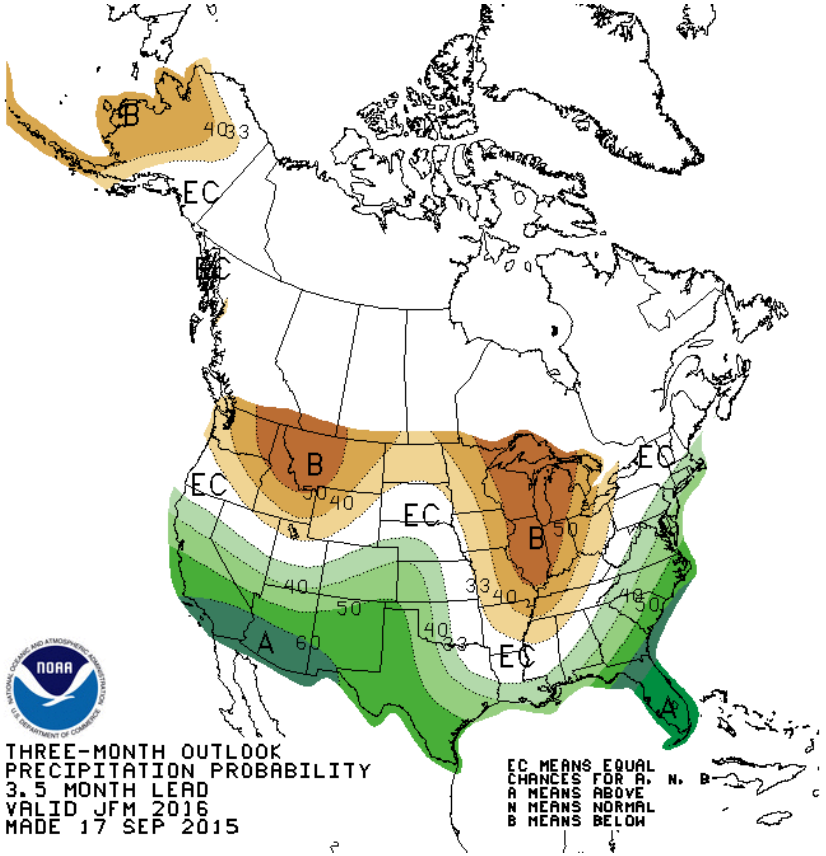


USGS - Walker Basin Hydro Mapper: Home Page. (n.d.). Retrieved September 28, 2015, from http://nevada.usgs.gov/walkerbasinhydromapper/webApp/home.html

Weather/Climate Forecast

Three-Month Outlook - Precipitation

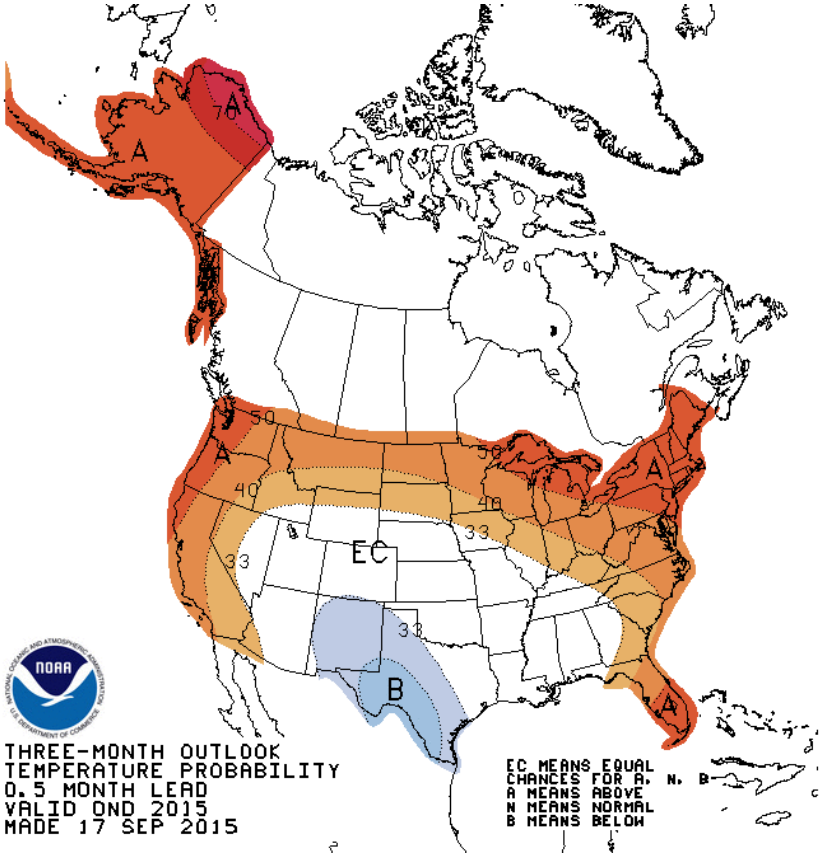


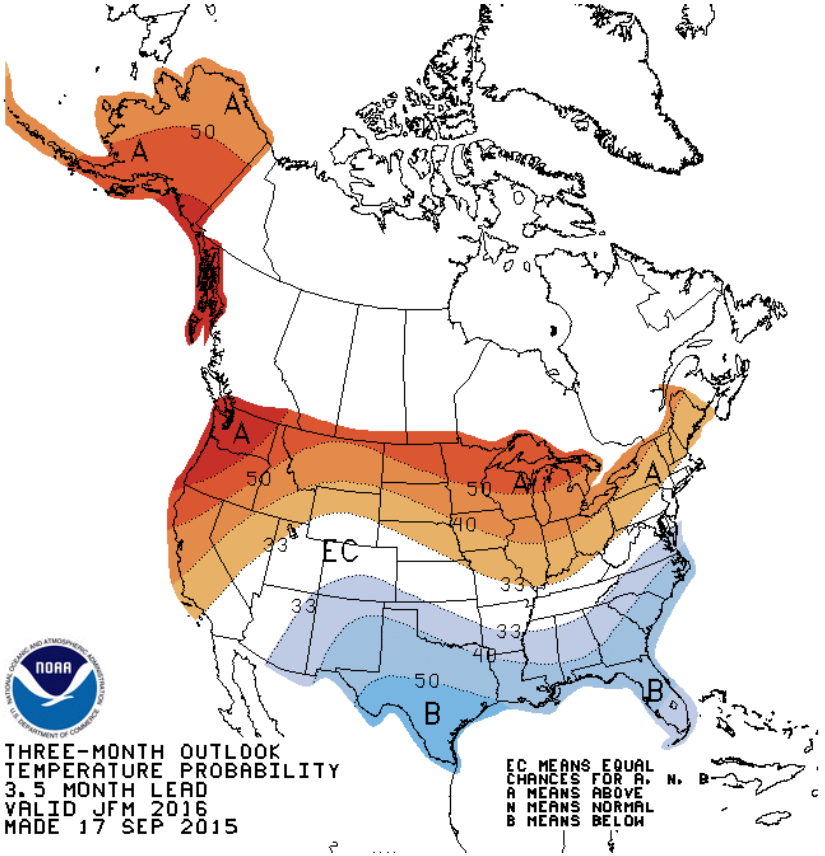


http://www.cpc.ncep.noaa.gov/products/predictions/long_range/

Weather/Climate Forecast

Three-Month Outlook - Temperature





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

Modeling Results

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Curtailment Details

2016 Curtailment

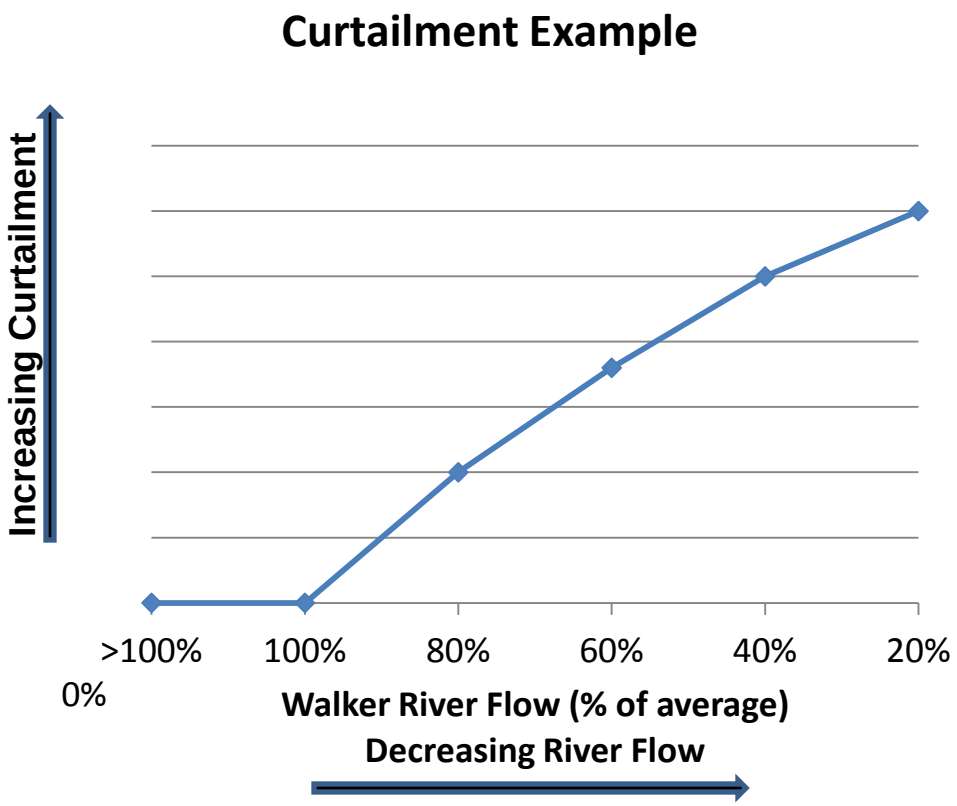
Supplemental Groundwater Only
NOT All Priority Rights
NOT Domestic Wells

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



Mason Valley
Water Level Decline from Mar 2014 to Mar 2015
32% of Median Flow

Measured well

Water Level Decline Rates

> 8 feet/year

> 4 feet/year

Pumped 2014 AF/Y

2000 - 3270

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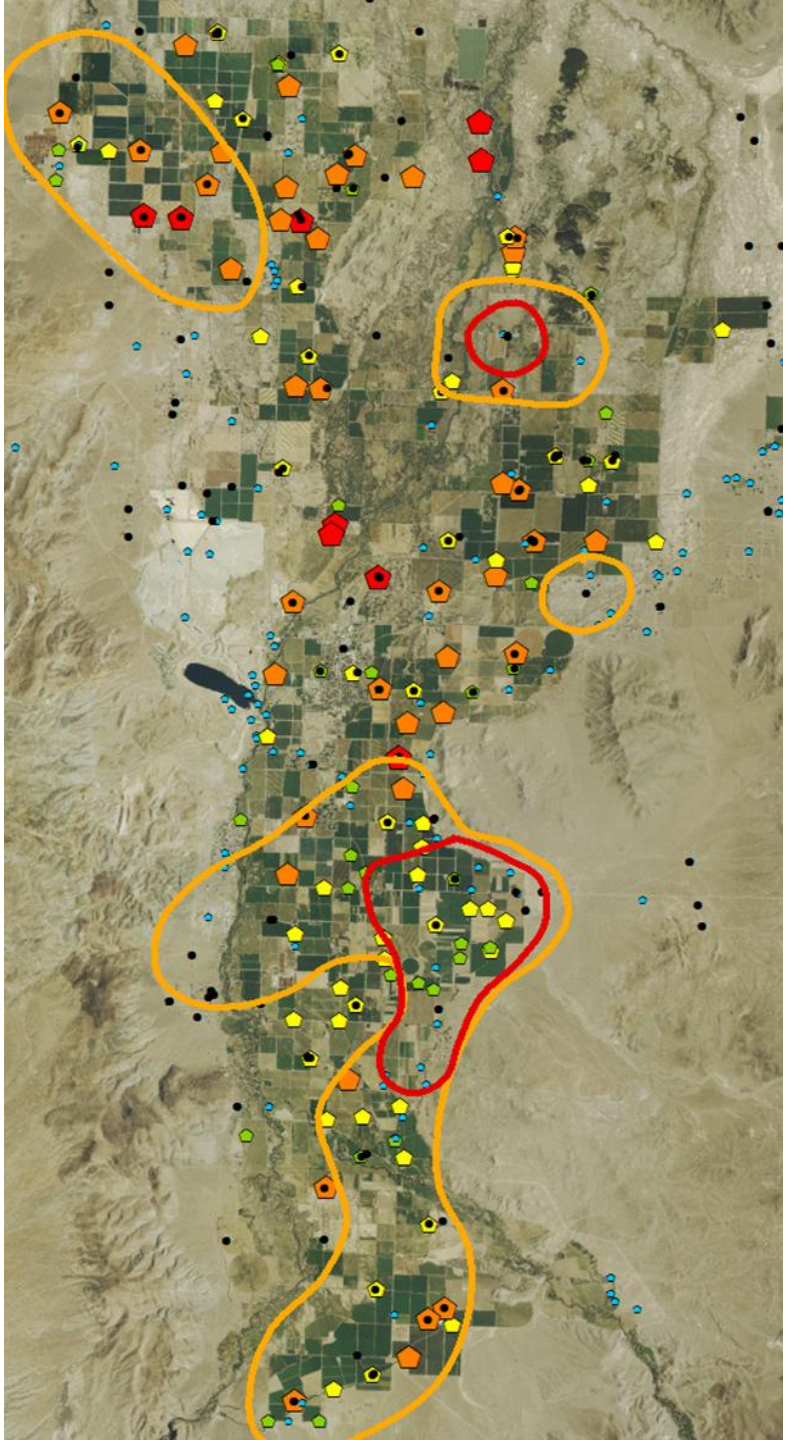
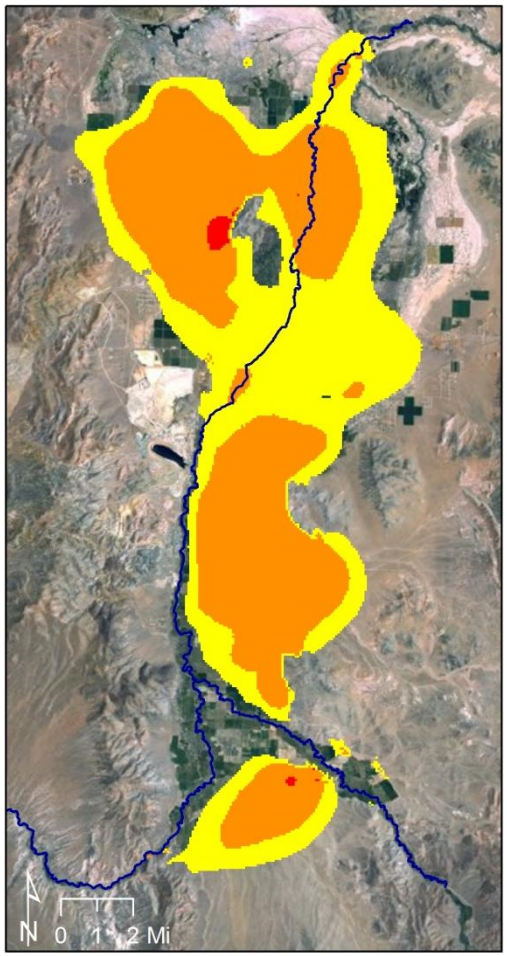


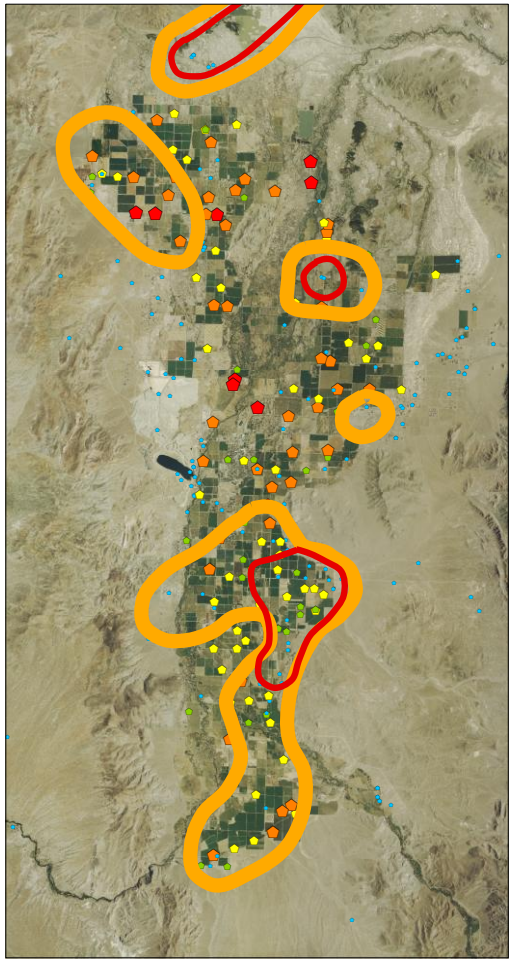
DRI Models - Water Level Changes

Mason Modeled Versus Observed

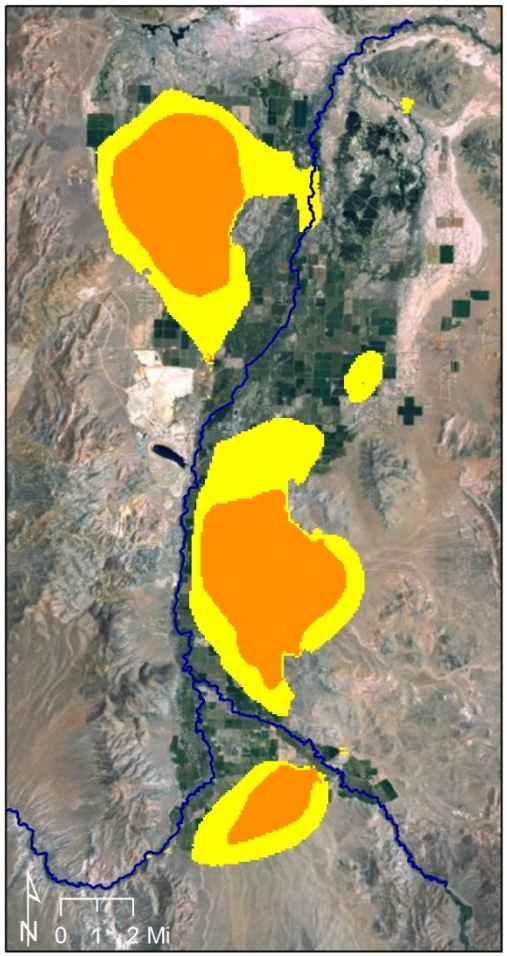
20% Streamflow



Measured Drawdown
32% streamflow



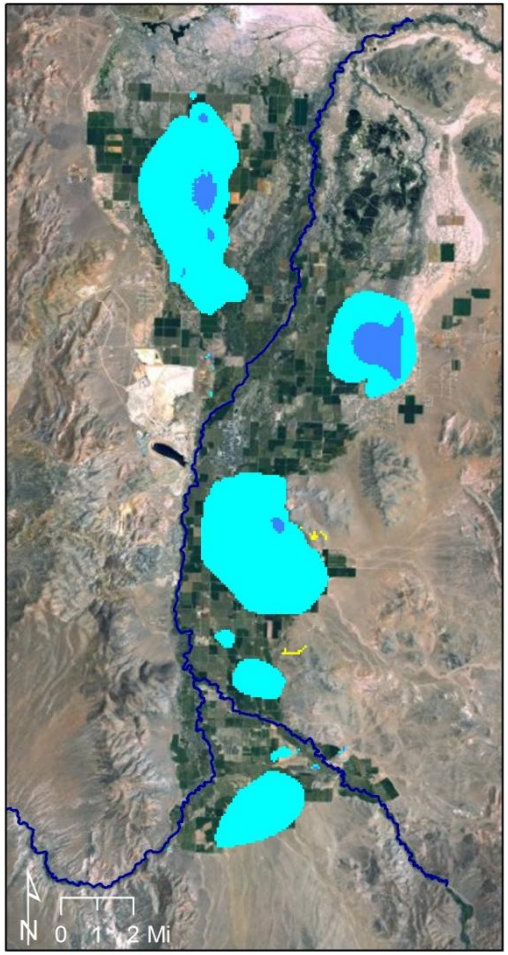
40% Streamflow



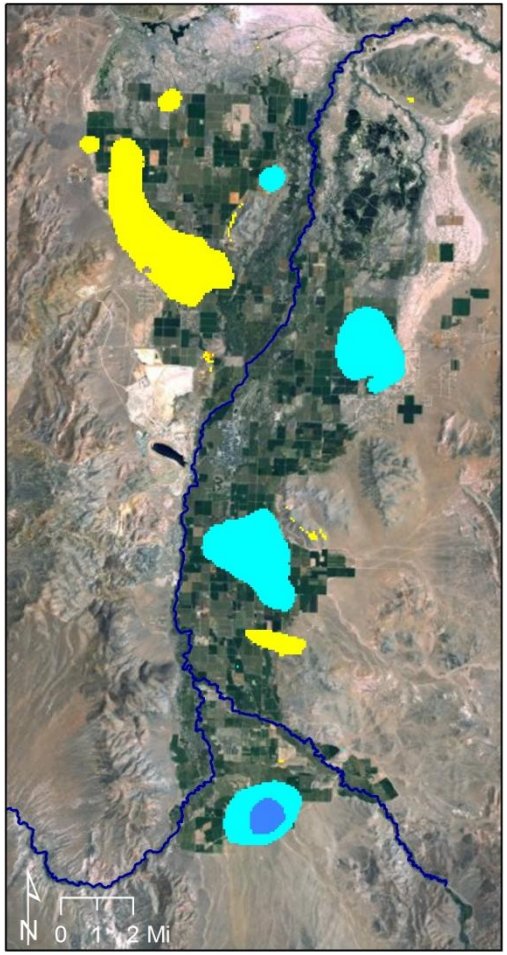
Mason - March to March Drawdown

Streamflow % as shown, No Curtailment

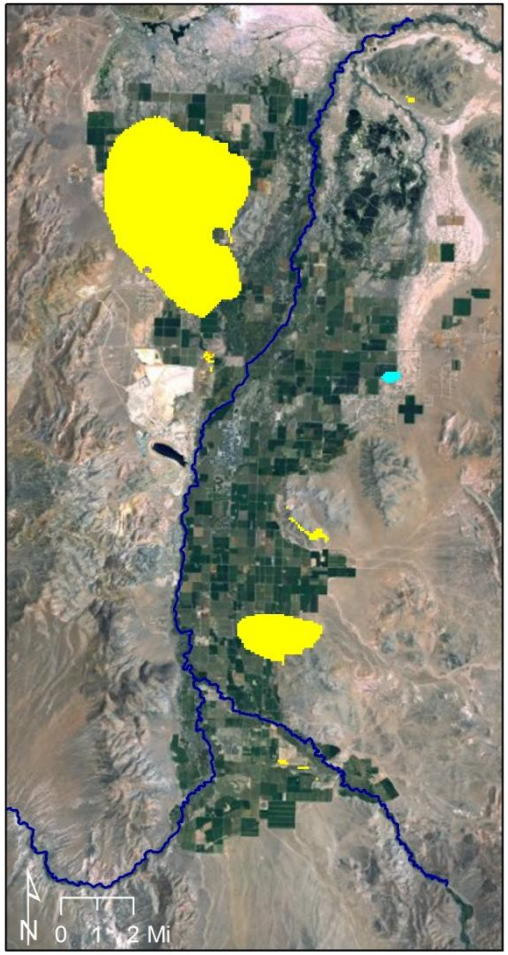
100%



80%



70%



Drawdown

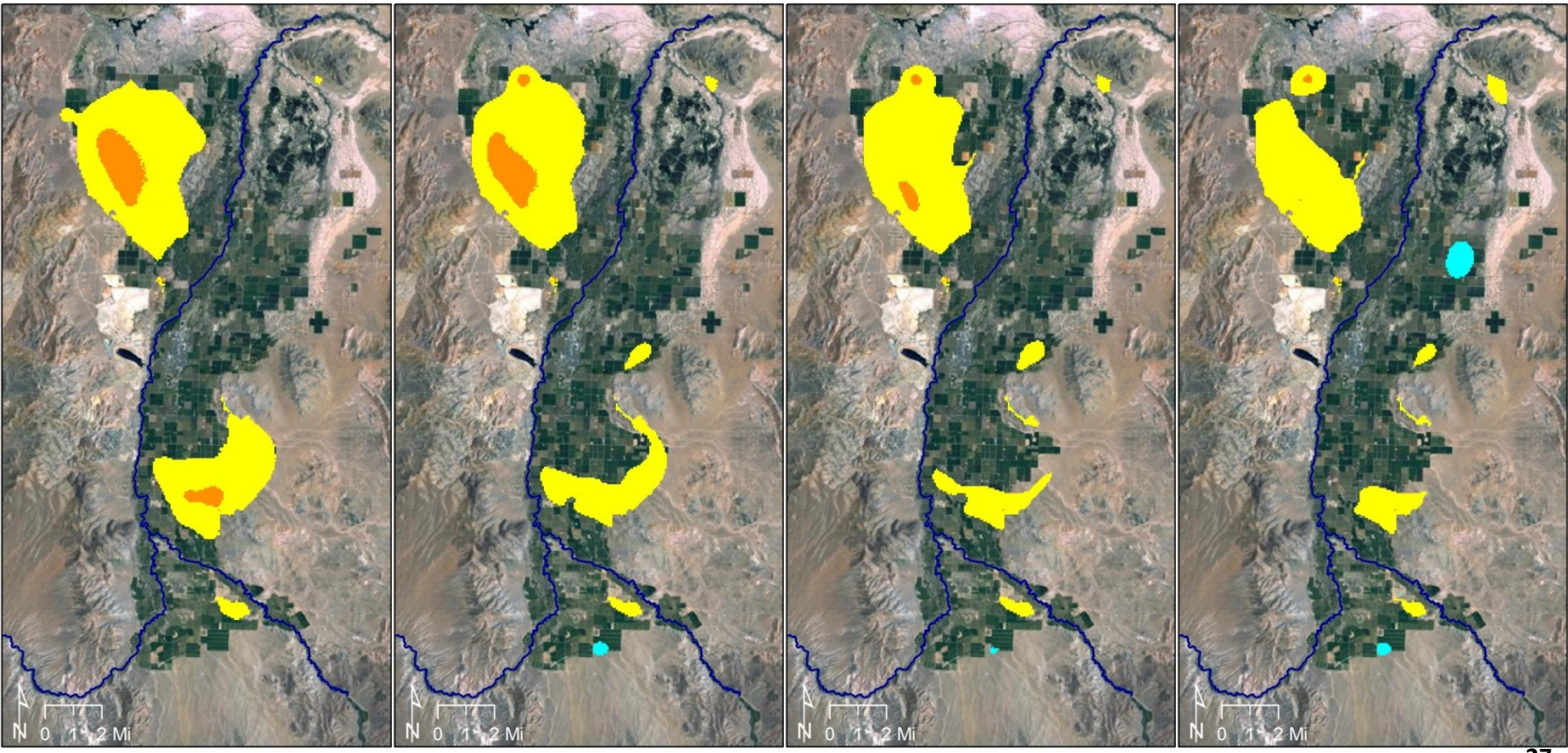
- <-8
- -8 to -4
- -4 to -2
- -2 to 2
- 2 to 4
- 4 to 8
- >8

* negative drawdown indicates rising water levels

Mason - March to March Drawdown

Streamflow = 60%

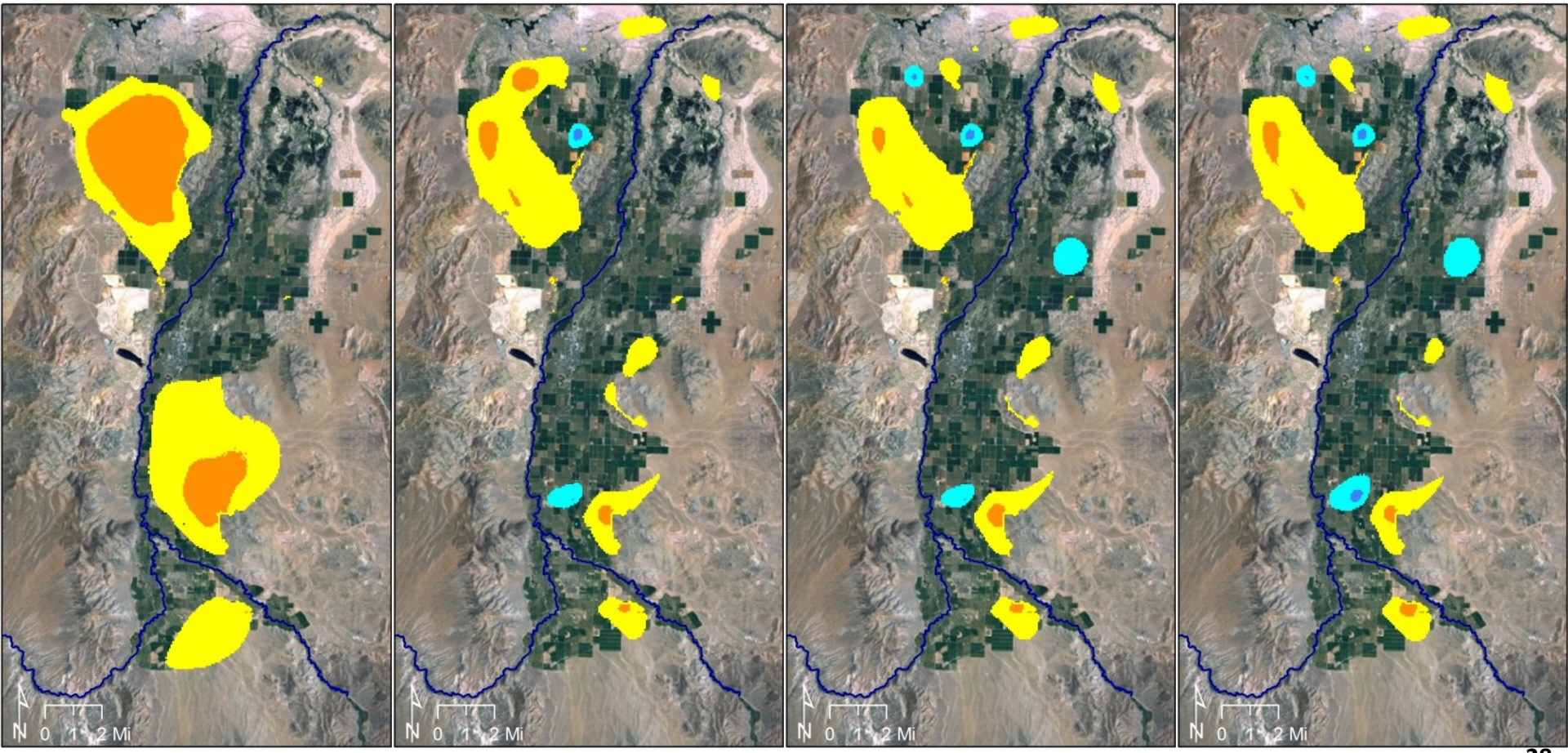
No Curtailment | 20% | 25% | 30%



Mason - March to March Drawdown

Streamflow = 50%

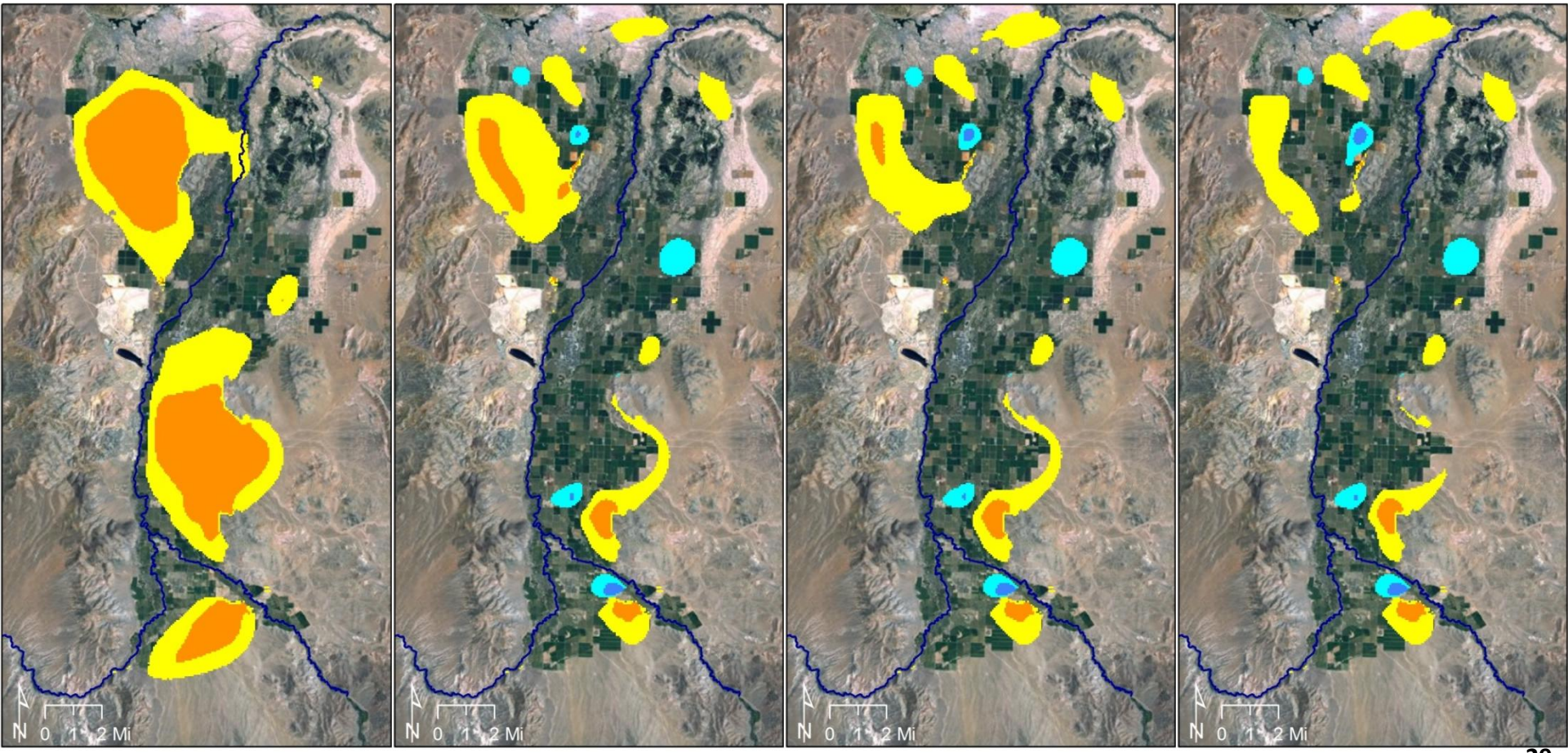
No Curtailment | 45% | 50% | 55%



Mason - March to March Drawdown

Streamflow = 40%

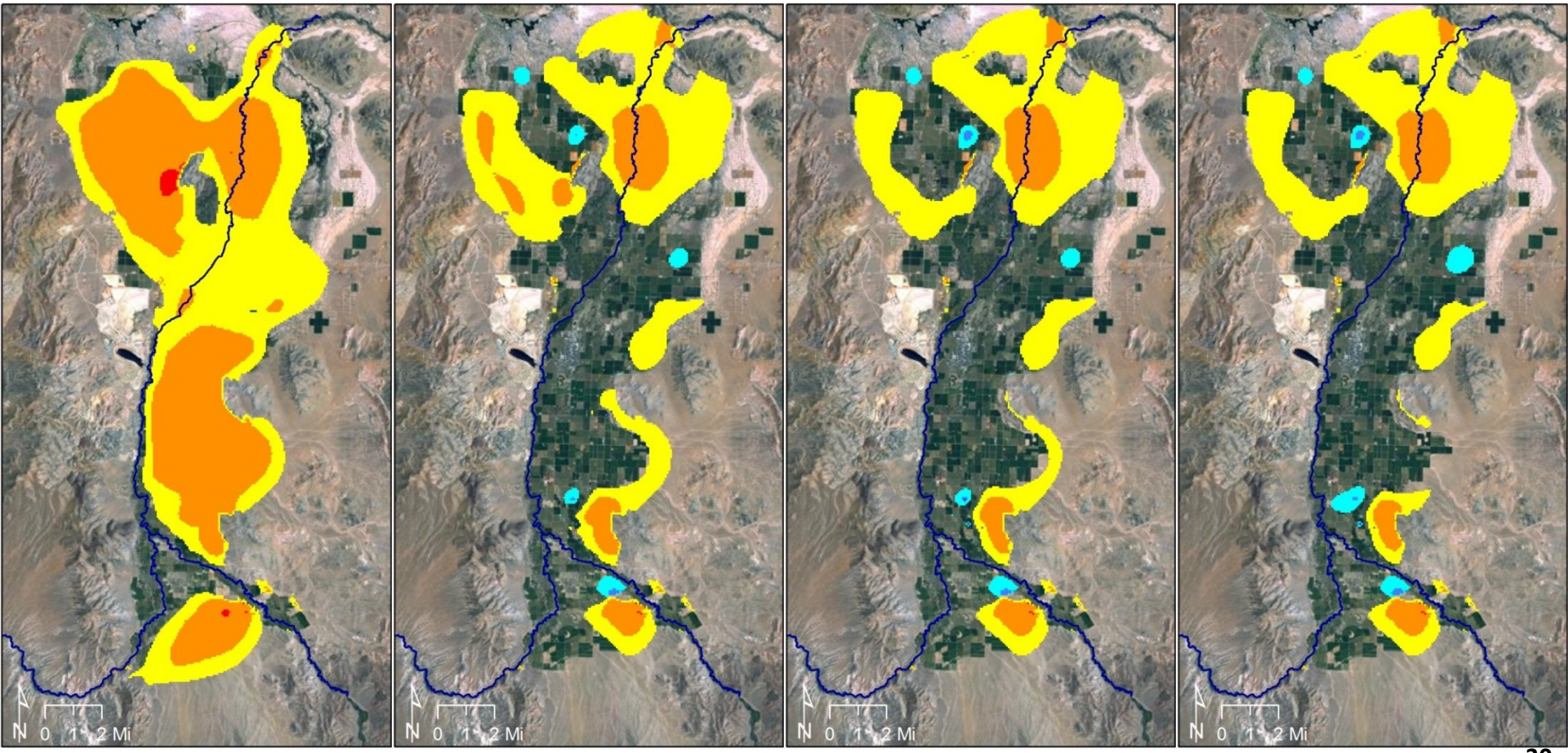
No Curtailment | 60% | 65% | 70%



Mason - March to March Drawdown

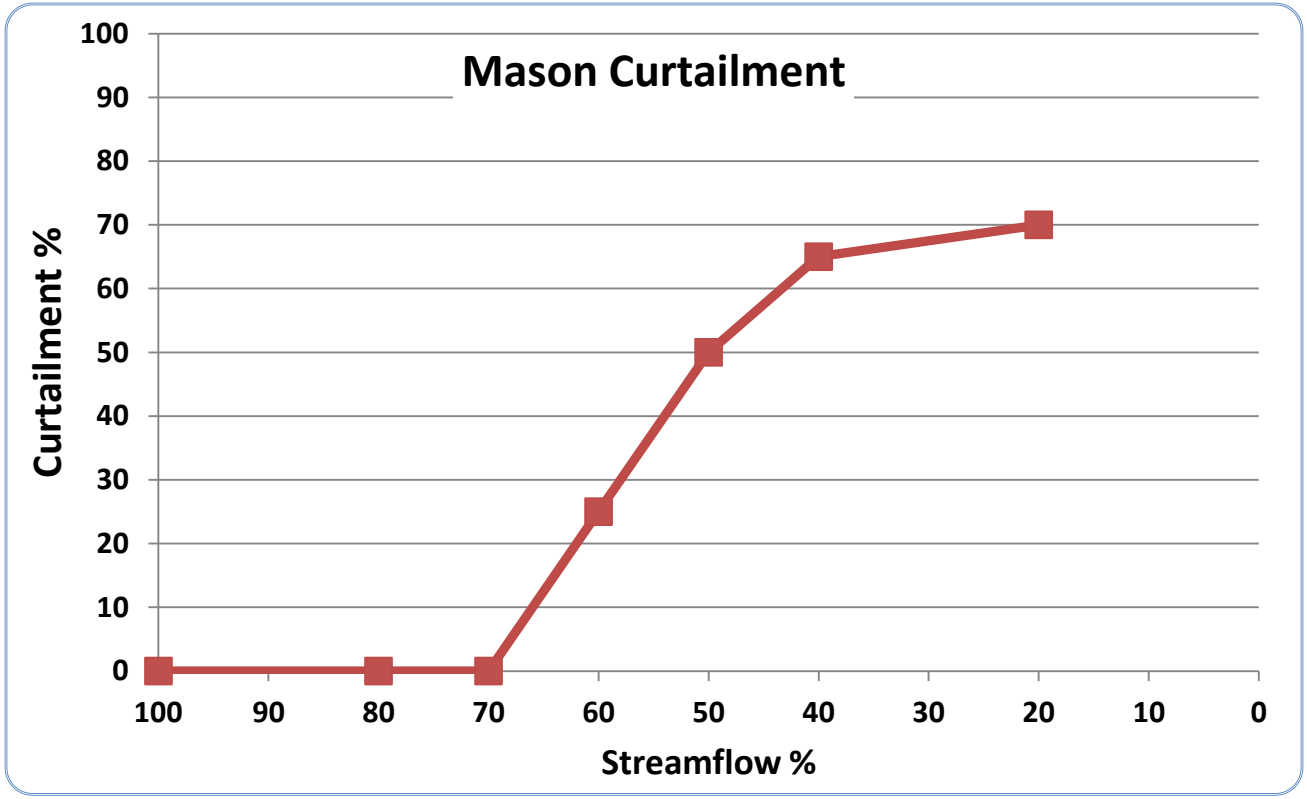
Streamflow = 20%

No Curtailment | 65% | 70% | 75%



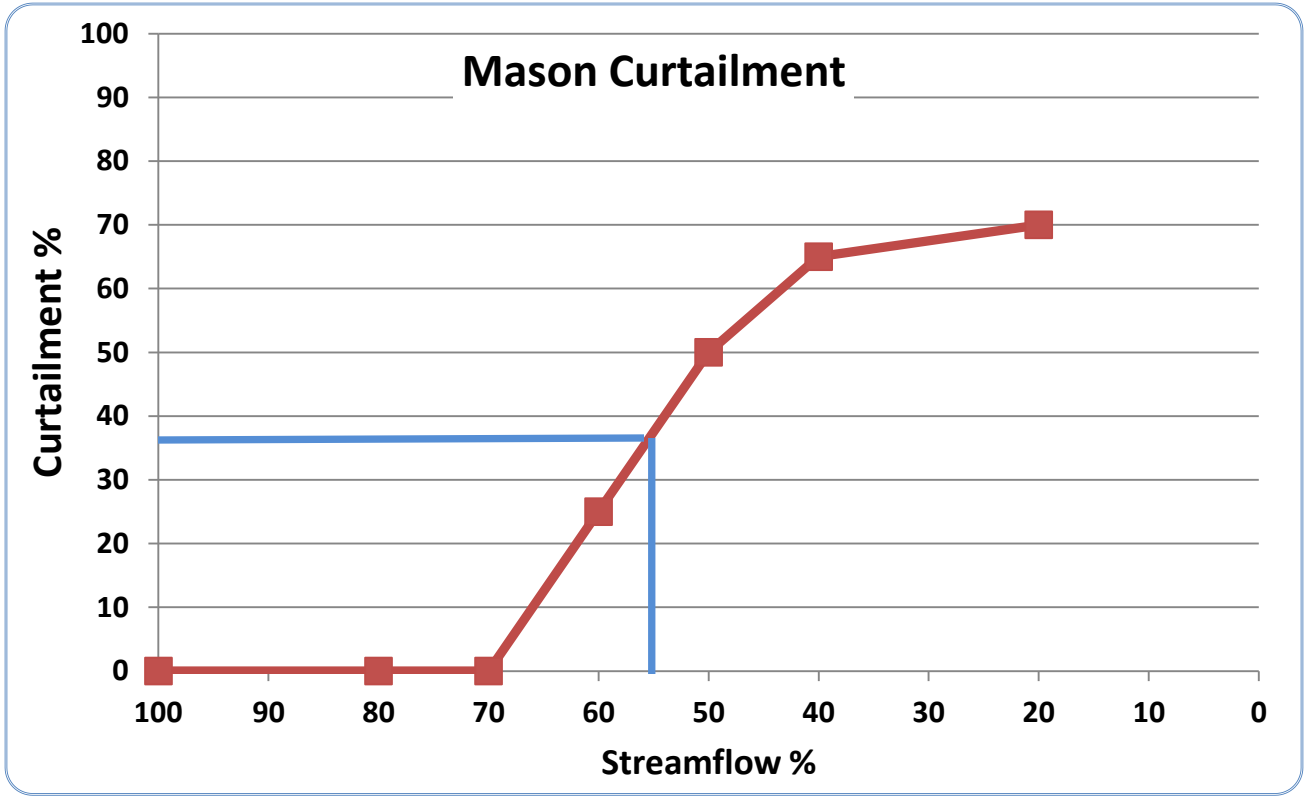
Curtailment Sliding Scale

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

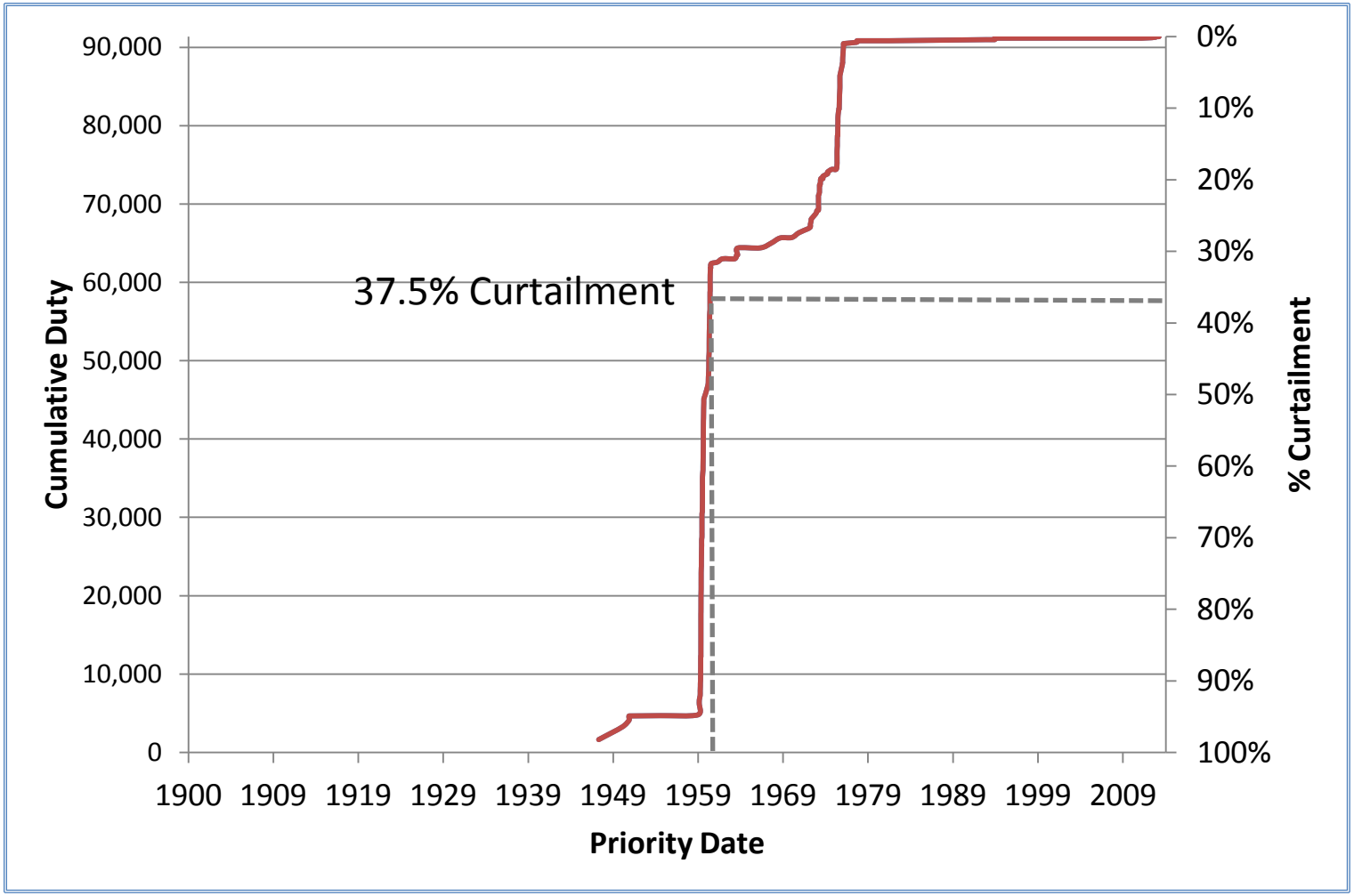


Curtailment Sliding Scale Example

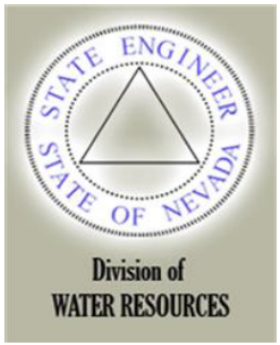
- April 1 forecast 55% of average
- Read curtailment for 55% streamflow
- Curtailment is 37.5%



Supplemental Water Rights in Mason Valley



Curtailment Table



- If Curtailment is 37.5%
- Water Rights dated 5/10/61 and later are curtailed

Mason Valley Supplemental Underground Rights Priority Table

Relative Seniority[1]	Priority Date	Permit	NDWR Point of Diversion Site Name
31.04%	4/1/1964	21921	108 N14 E25 06DDDD2
31.50%	10/30/1962	20821	108 N14 E26 18BACA2
31.72%	3/15/1962	82085	108 N14 E26 30BCDD1
32.36%	6/22/1961	19935	108 N11 E25 11BCDC1
32.36%	6/5/1961	81702	108 N13 E25 03DACA1
33.34%	5/26/1961	19873	108 N13 E25 13ACCC1
35.72%	5/10/1961	19841	108 N13 E25 13CCCD1
	5/10/1961	19840	108 N14 E25 09DDDD1
	5/10/1961	19839	108 N14 E25 09DDDD1
	5/10/1961	19838	108 N14 E25 09DDDD1
38.87%	5/4/1961	80078	108 N13 E25 34DDCD1
	5/4/1961	60495	108 N12 E25 03BCDC2
	5/4/1961	58027	108 N13 E25 03AADD1
	5/4/1961	51939	108 N13 E25 03AADD1
	5/4/1961	19829	108 N13 E25 35CCDD1
	5/4/1961	19828	108 N12 E25 03BCDC2
40.39%	4/18/1961	19758	108 N11 E25 10DBCD1
40.39%	4/13/1961	68309	108 N13 E26 05DBCD1
	4/13/1961	19750	108 N13 E26 06DDBB1

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

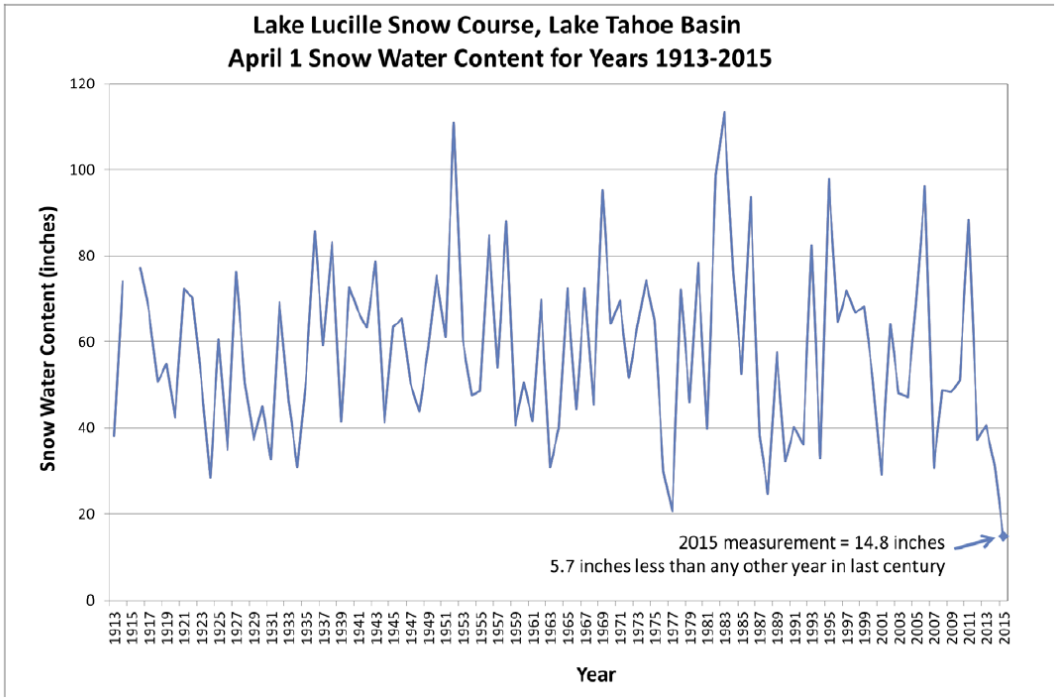
Open Create Customize

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

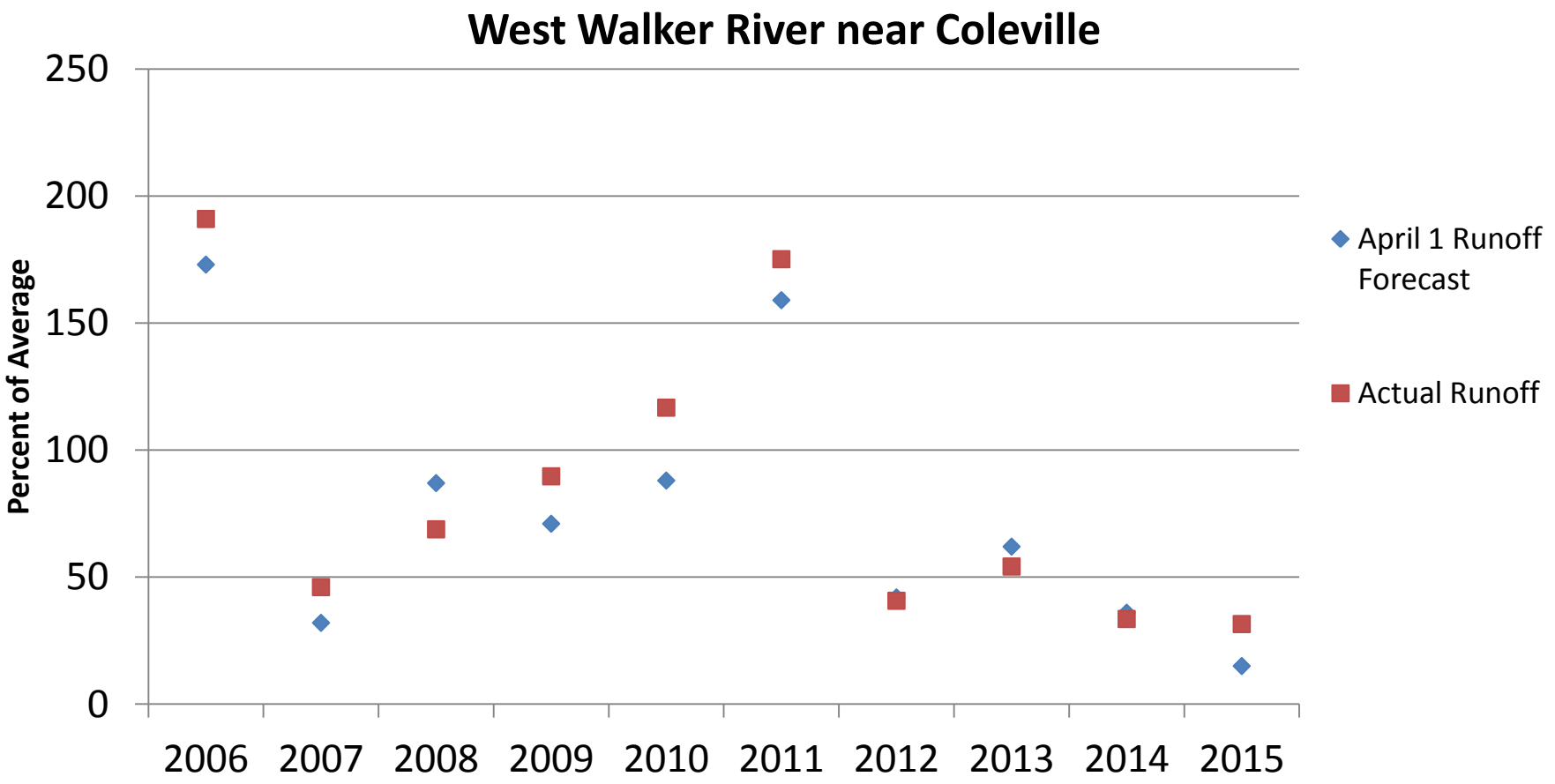
Walker River
Streamflow Forecasts - April 1, 2015

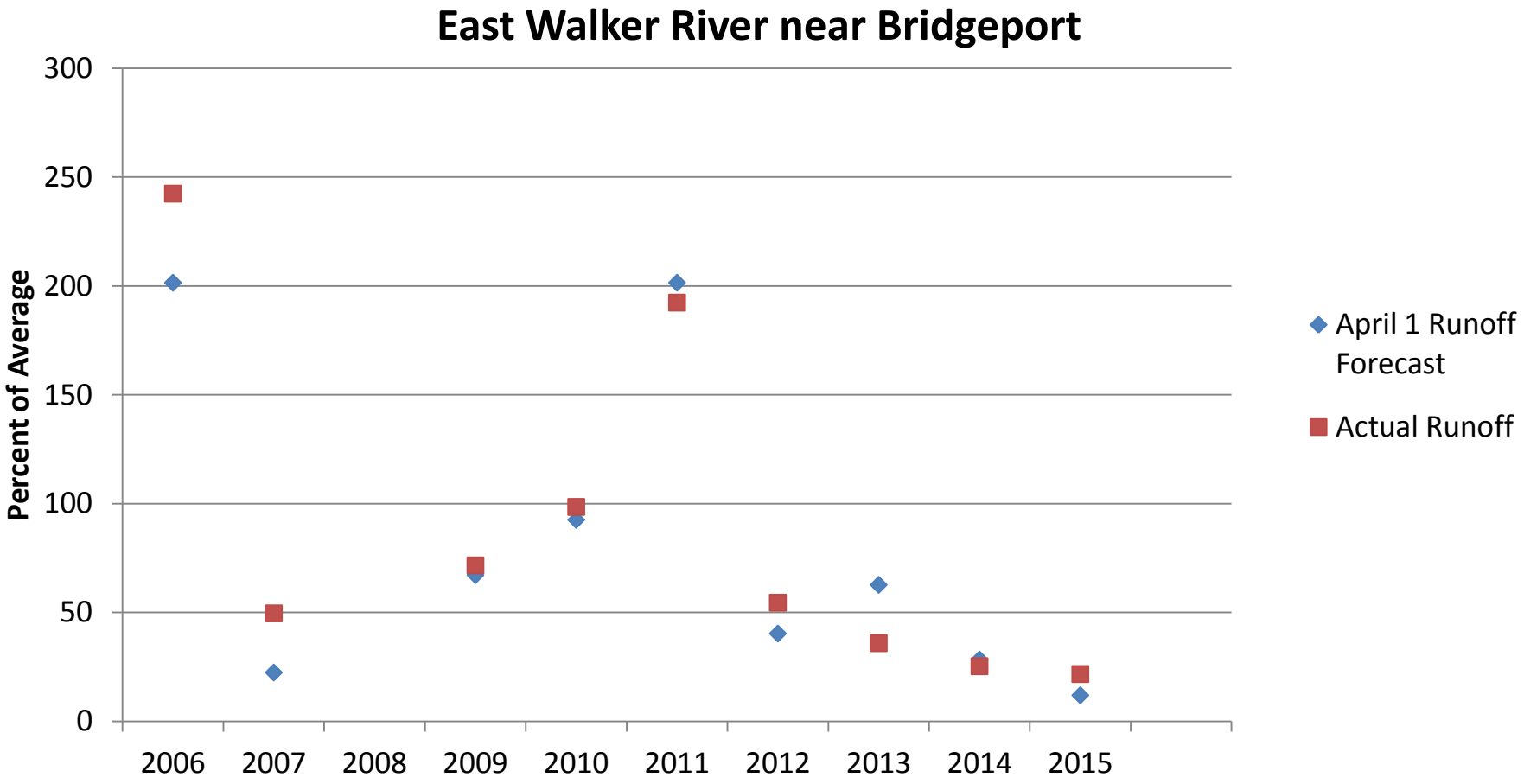
Walker River	Forecast Period	90% (KAF)	70% (KAF)	50% (KAF)	% Avg	30% (KAF)	10% (KAF)	30yr Avg (KAF)
		Forecast Exceedance Probabilities for Risk Assessment Chance that actual volume will exceed forecast						
E Walker R nr Bridgeport								
	APR-AUG	0.67	2	8	12%	24	46	67
	MAY-AUG	0.59	1.77	6	10%	18.4	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


East Walker River near Bridgeport
Percent of Average
300
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

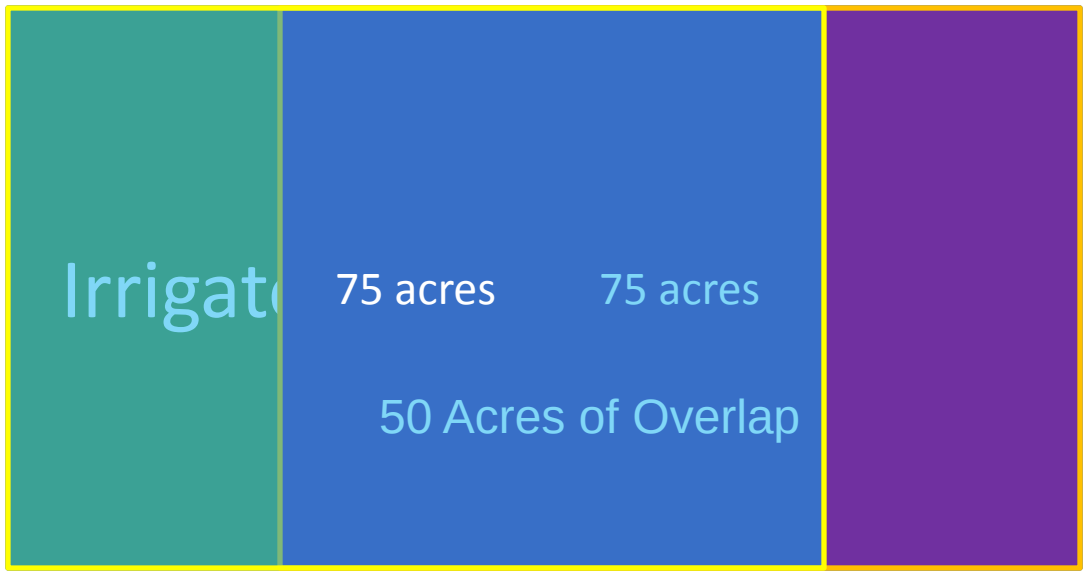
Water Right No.2 :
300 Acre-Feet
Priority Date 7/27/1977

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

- Mason Valley
  - Perennial yield of 25,000 af
    - Recharge from precipitation ~2,000 afa
    - All other recharge derived from Walker River and irrigation
    - Perennial yield assumes additional capture of ET by conversion of new acreage to cropland
  - System yield of 100,000 af (consumptive)
    - Includes surface water and groundwater (1948-1965)
    - Appropriation of supplemental groundwater allows for full system yield use in all years
  - Groundwater appropriations = 148,000 af
    - 91,000 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