STAFF REPORT

Report To: Board of Supervisors **Meeting Date:** July 21, 2016

Staff Contact: Ed James, edjames@cwsd.org

Agenda Title: Presentation Only: Overview of the water resources for the Carson River Watershed.

Staff Summary: Edwin James, General Manager of the Carson Water Subconservancy District, will give a presentation on the water resources for the Carson River Watershed. Included in his presentation will be a comparison of last year's river runoff to this year's river runoff. Mr. James will also discuss groundwater supplies, water quality, climate changes, and other water-related issues.

Agenda Action: Other/Presentation **Time Requested:** 20 mins

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Proposed Motion
No action - presentation only.

Board's Strategic Goal
N/A

Previous Action

Background/Issues & Analysis

Applicable Statute, Code, Policy, Rule or Regulation

Financial Information
Is there a fiscal impact? ☐ Yes ☐ No

If yes, account name/number:

Is it currently budgeted? ☐ Yes ☐ No

Explanation of Fiscal Impact:

Alternatives

Board Action Taken:

Motion: _____ 1) _____ Aye/Nay

2) _____ _____

_____

_____

_____

_____

(Vote Recorded By)

OVERVIEW OF WATER RESOURCES FOR THE CARSON RIVER WATERSHED

EDWIN JAMES, P.E.
CWSD GENERAL MANAGER

2016

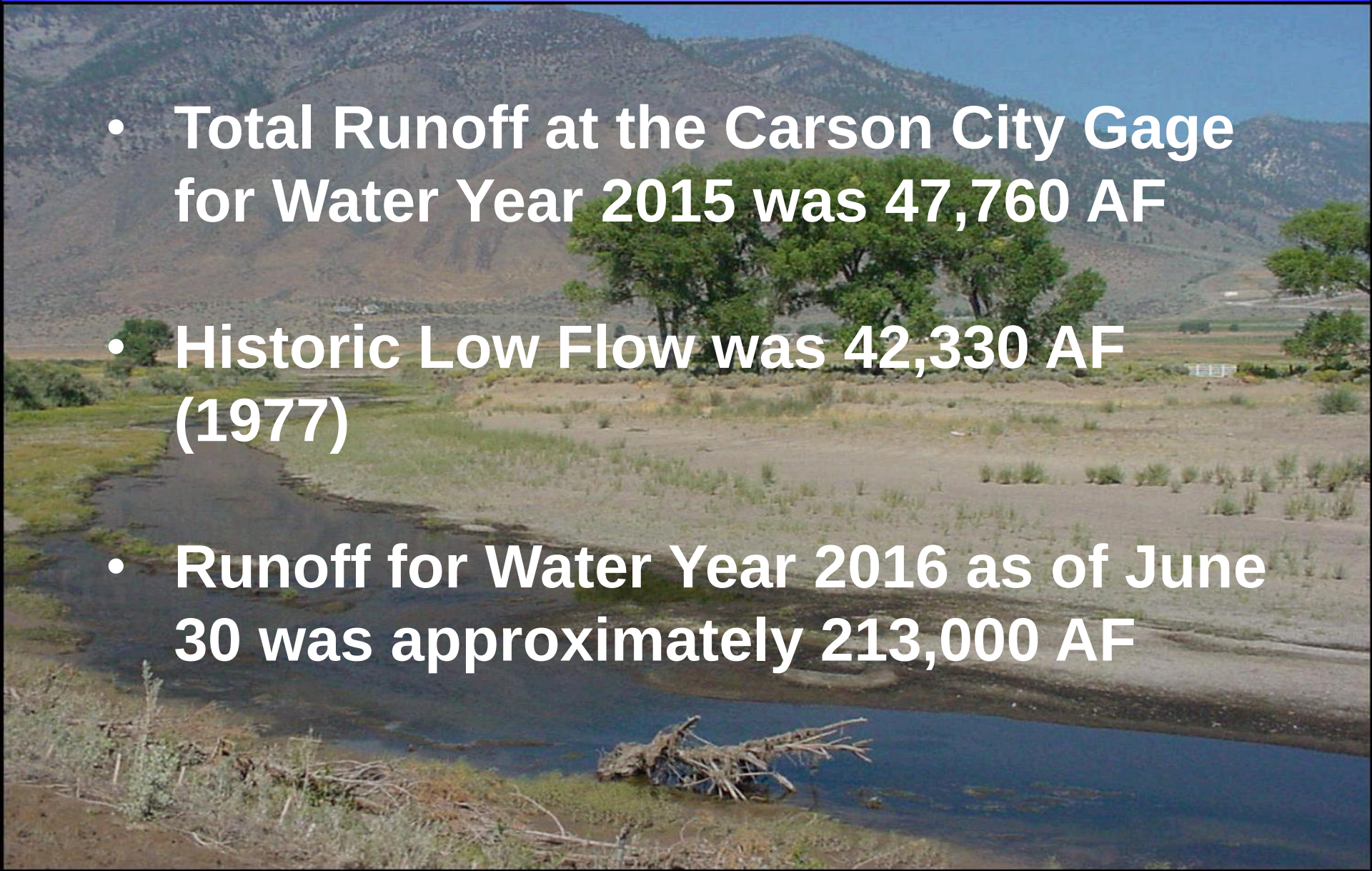
CARSON WATER SUBCONSERVANCY DISTRICT

Watershed's Current Water Supply Situation

- Carson River is fully appropriated
- 95+% Carson River water is used for Agricultural purposes
- Groundwater basins - over appropriated
- Actual GW pumping < Appropriated
- Limited upstream storage
- Water quality problems
- Runoff pattern changes

CARSON WATER SUBCONSERVANCY DISTRICT

2015 Water Year



- Total Runoff at the Carson City Gage for Water Year 2015 was 47,760 AF
- Historic Low Flow was 42,330 AF (1977)
- Runoff for Water Year 2016 as of June 30 was approximately 213,000 AF

Carson River Basin Precipitation

USDA NRCS Natural Resources Conservation Service

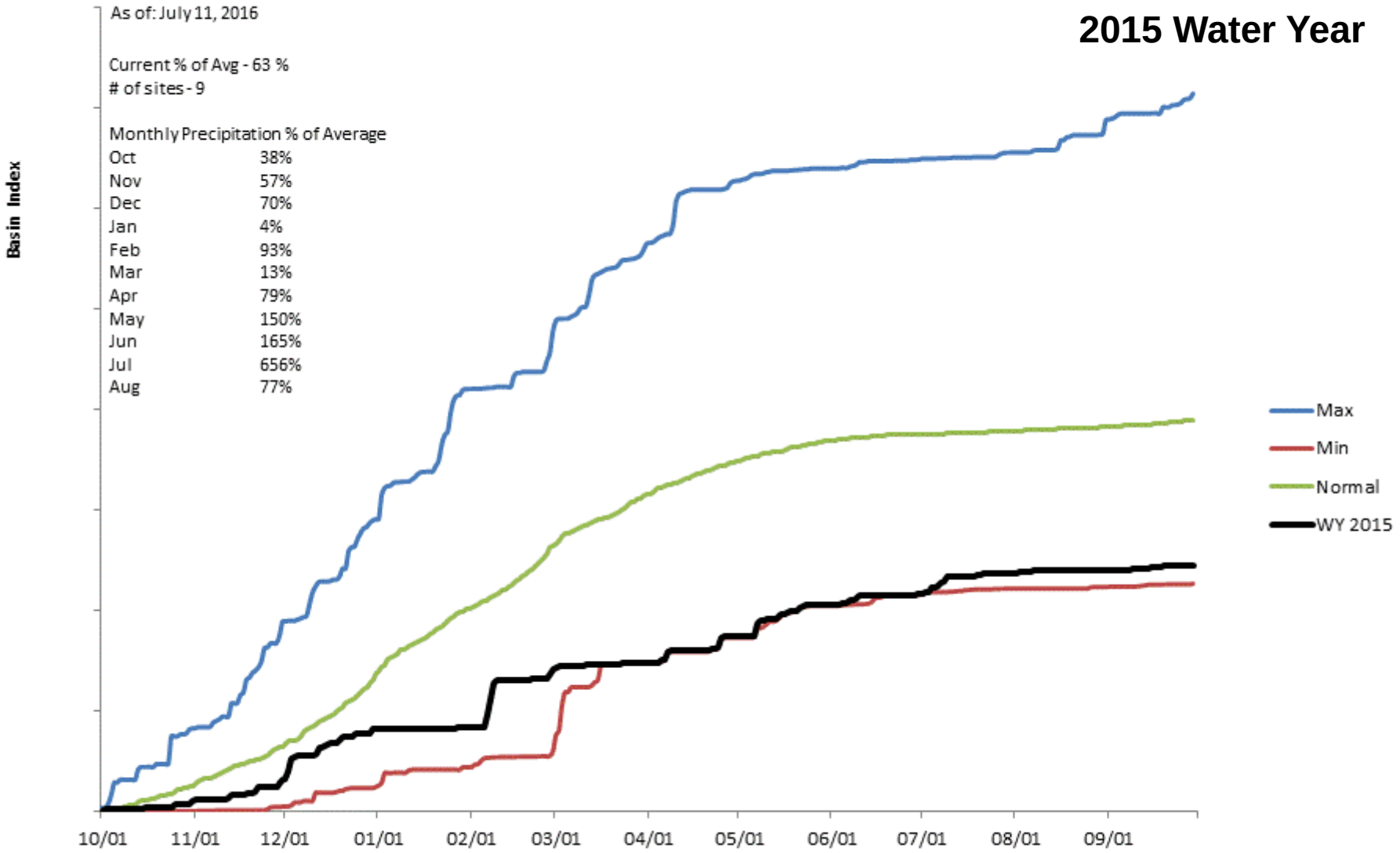
2015 Water Year

As of: July 11, 2016

Current % of Avg - 63 %
# of sites - 9

Monthly Precipitation % of Average

Oct	38%
Nov	57%
Dec	70%
Jan	4%
Feb	93%
Mar	13%
Apr	79%
May	150%
Jun	165%
Jul	656%
Aug	77%



Carson River Basin Precipitation

USDA NRCS Natural Resources Conservation Service

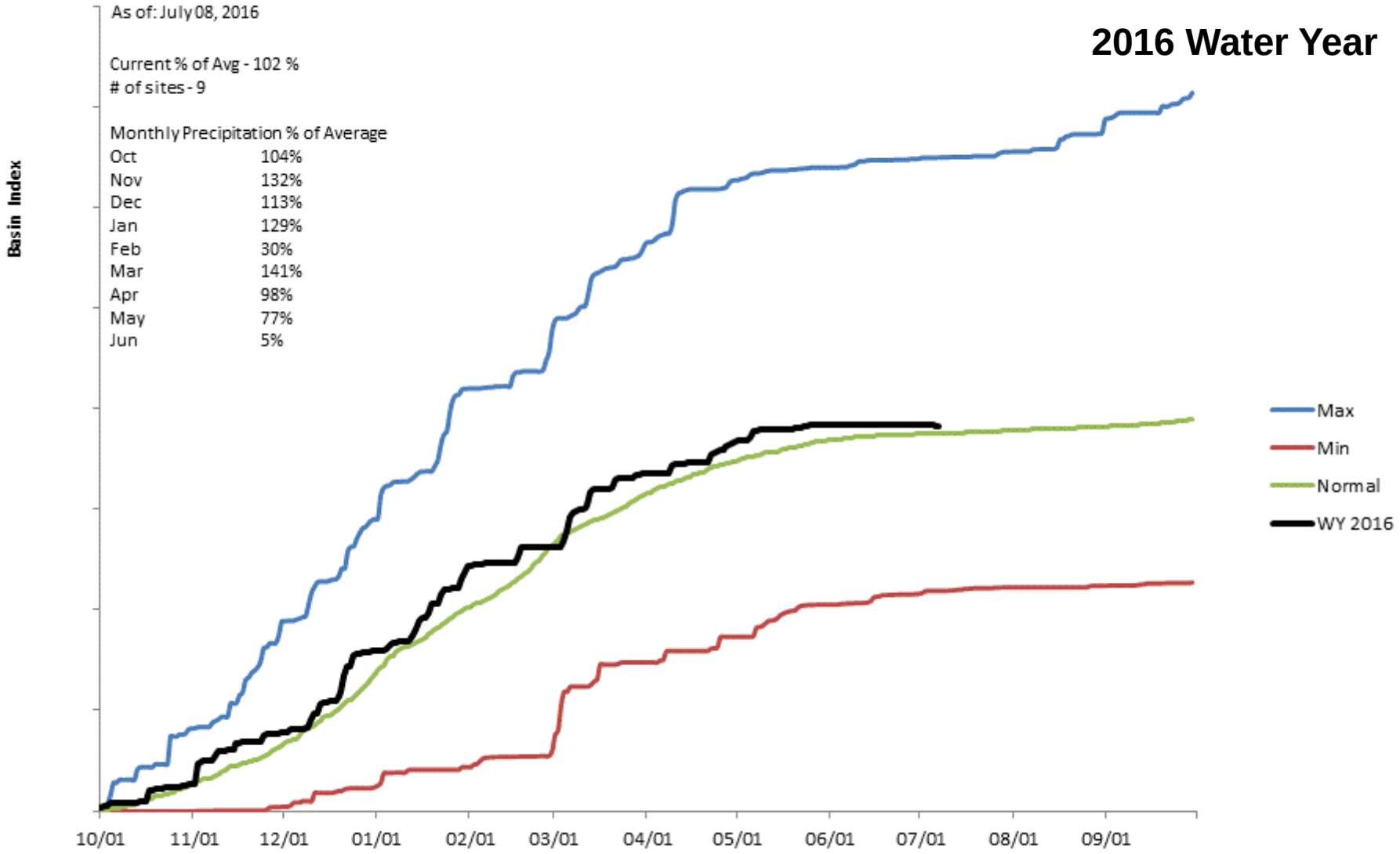
2016 Water Year

As of: July 08, 2016

Current % of Avg - 102 %
# of sites - 9

Monthly Precipitation % of Average

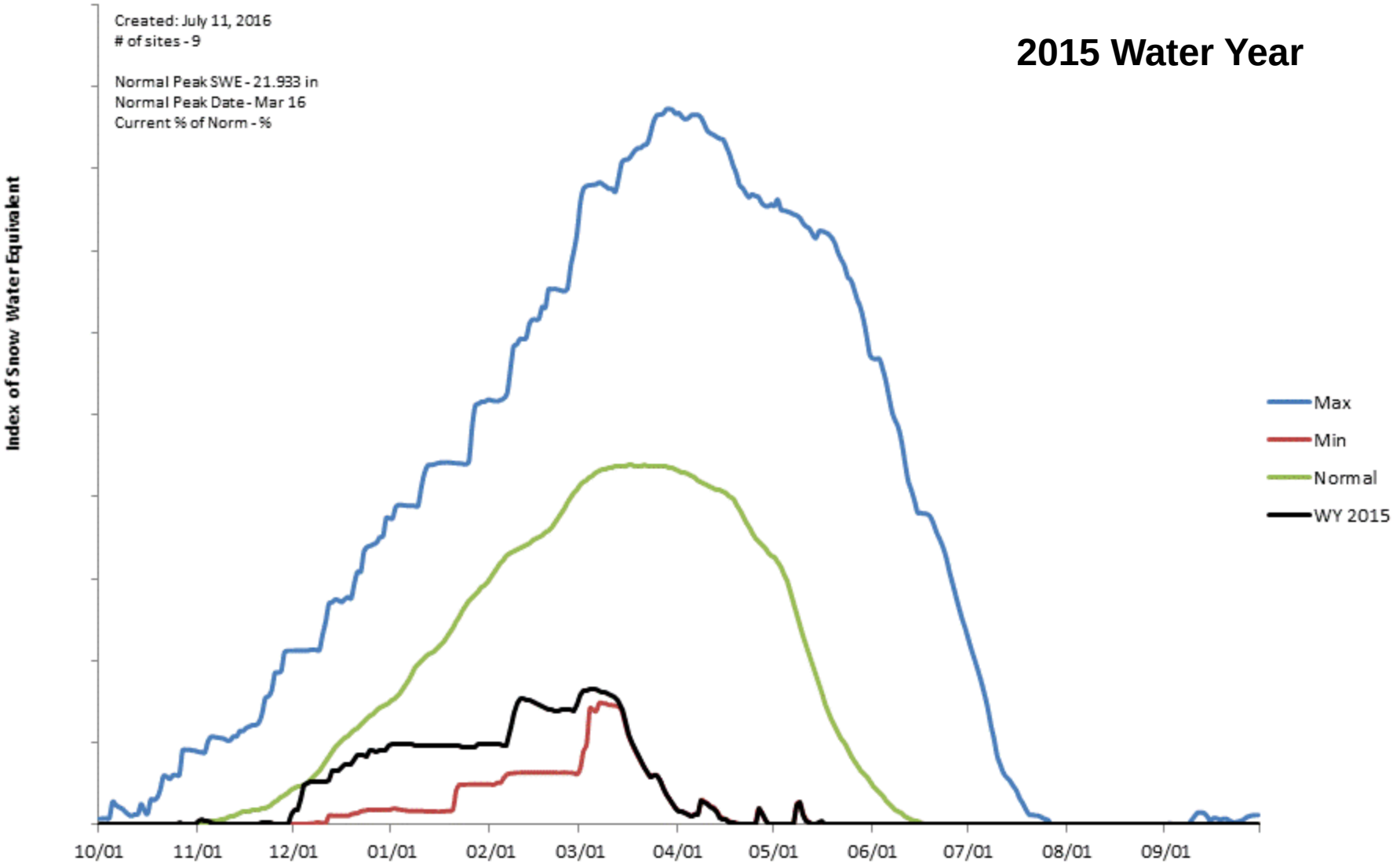
Oct	104%
Nov	132%
Dec	113%
Jan	129%
Feb	30%
Mar	141%
Apr	98%
May	77%
Jun	5%



Carson River Basin - SWE Index

USDA NRCS Natural Resources Conservation Service

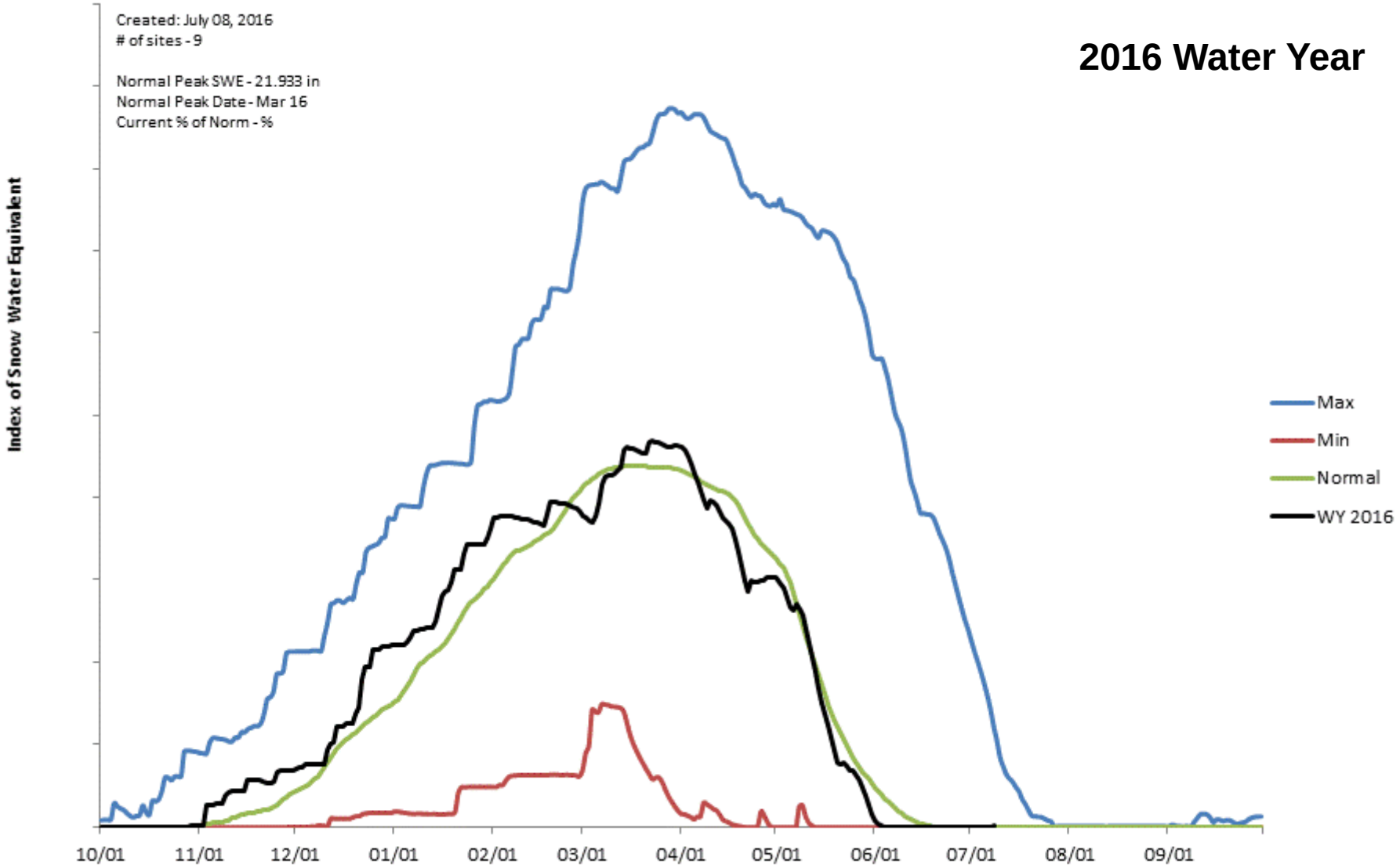
2015 Water Year



Carson River Basin - SWE Index

USDA NRCS Natural Resources Conservation Service

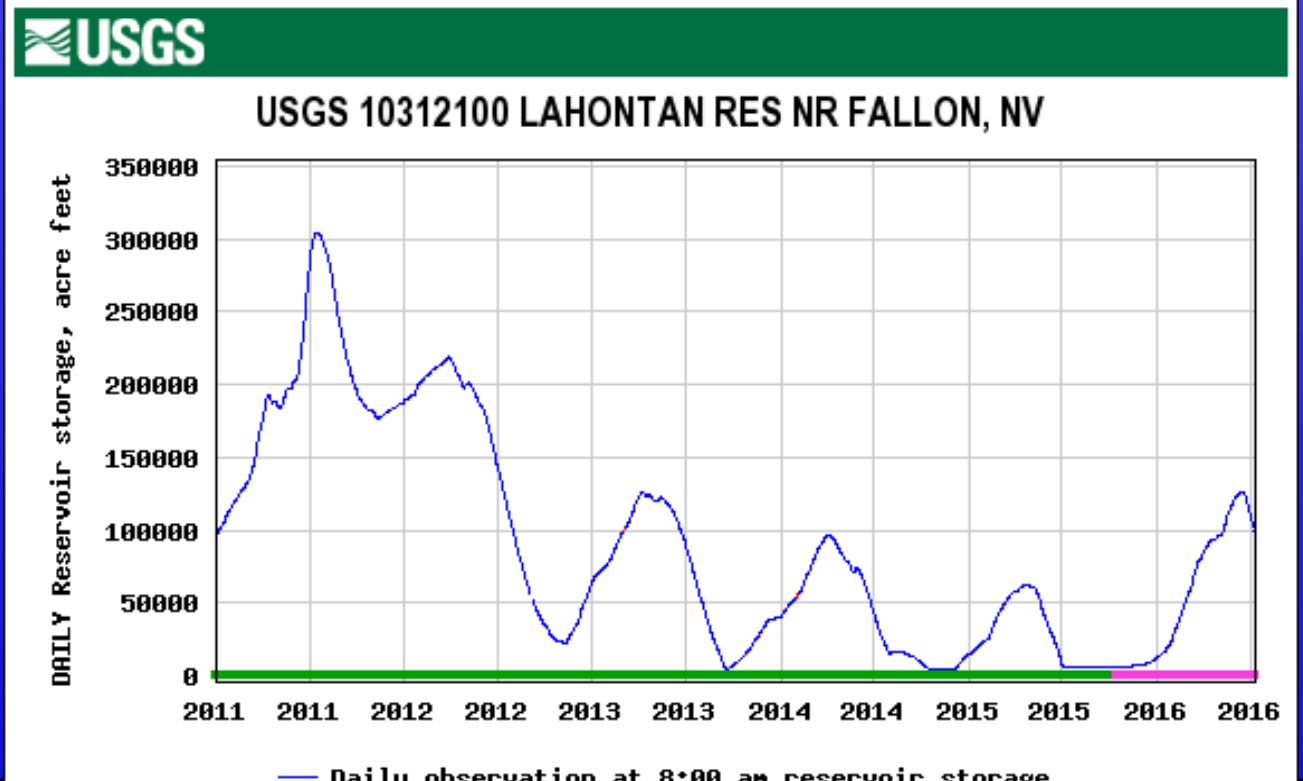
2016 Water Year



How Did the Water Purveyors Do in 2015

- None of the 12 Water Purveyors Experienced any water shortage due to the drought.
- Most Water Purveyors get their water from groundwater.
- Generally the groundwater levels are staying steady

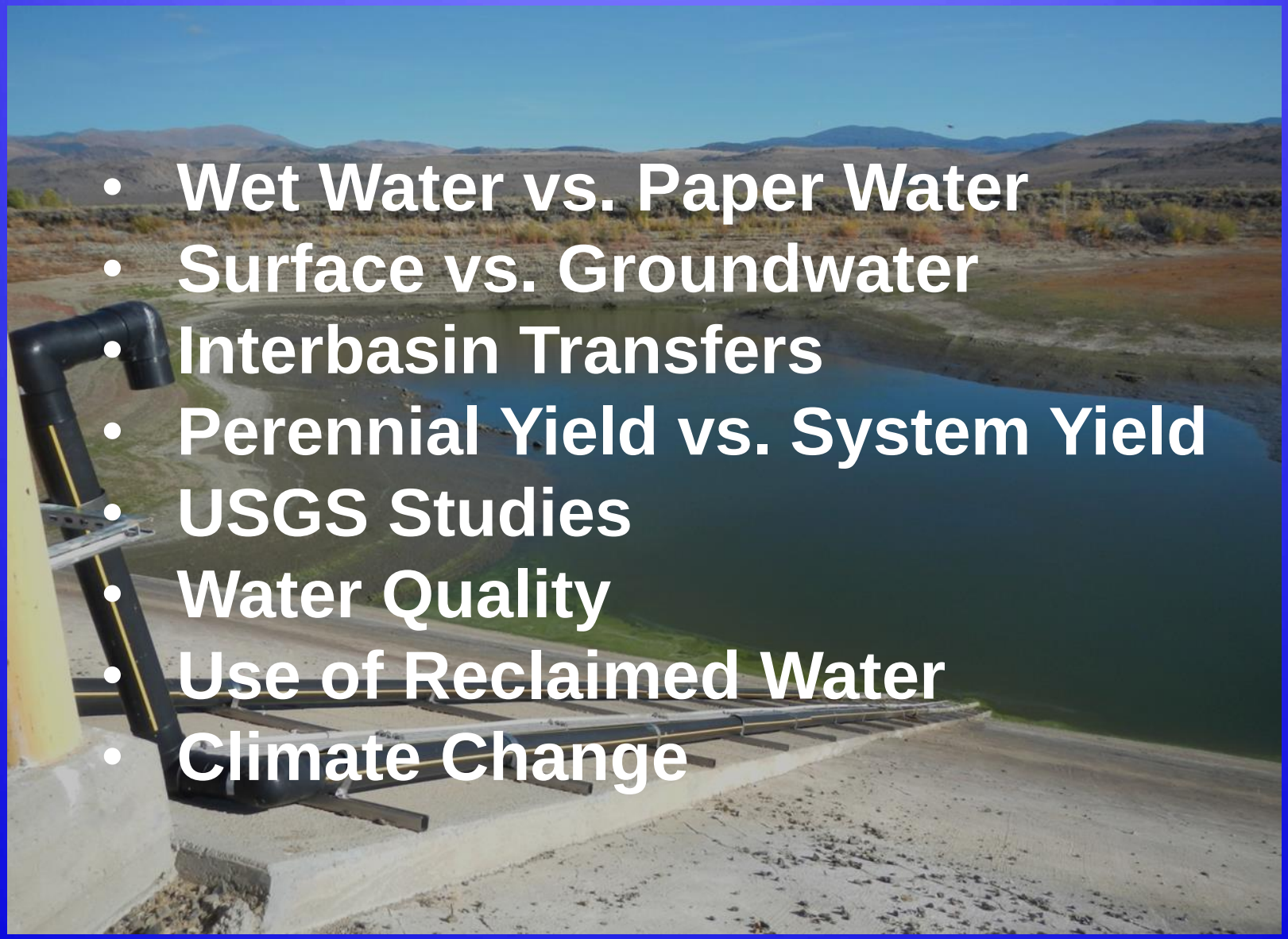
Agriculture was impacted by the drought



GROUNDWATER ASSESSMENT

- Overall the groundwater basins in the Watershed are not being over drafted.
- There are areas of concern:
  - Ruhenstroth area
  - Fish Springs area
  - Johnson Lane area
  - Mark Twain area
  - Stagecoach area
  - South Silver Springs area
  - Churchill County area

Water Issues



- Wet Water vs. Paper Water
- Surface vs. Groundwater
- Interbasin Transfers
- Perennial Yield vs. System Yield
- USGS Studies
- Water Quality
- Use of Reclaimed Water
- Climate Change

Wet Water versus Paper Water

Churchill Valley Groundwater Basin		
Pumpage Inventory		
		2013
Category	Committed Ground Water Resource (AF)	Pumpage (AF)
Irrigation	3,938	581
Commercial/ Stock/ Industial	446	54
Quasi- Municipal	6,461	530
Domestic Wells	N/A	1,405
Total	**10,845**	**2,570**

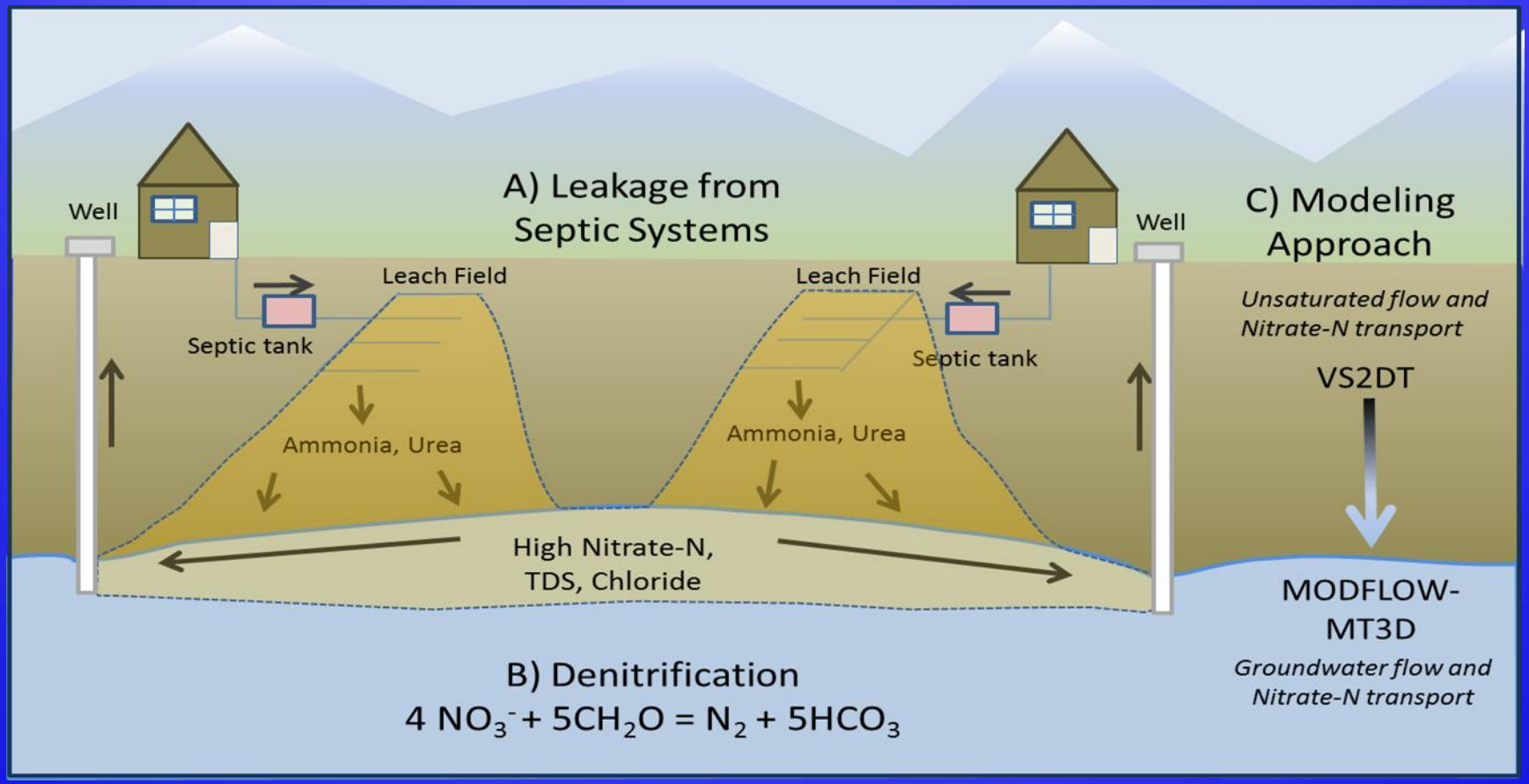
Perennial Yield = 1,600 AF

System Yield = ?

USGS Studies

- Carson Valley Arsenic Study
- Middle Carson River Model
- Carson Valley Nitrate Study

Ground Water Quality



USGS Nitrate Study – The Distribution and Modeling of Nitrate Transport in the Carson Valley Alluvial Aquifer, Douglas County, Nevada

Ruhenstroth Area - Douglas County

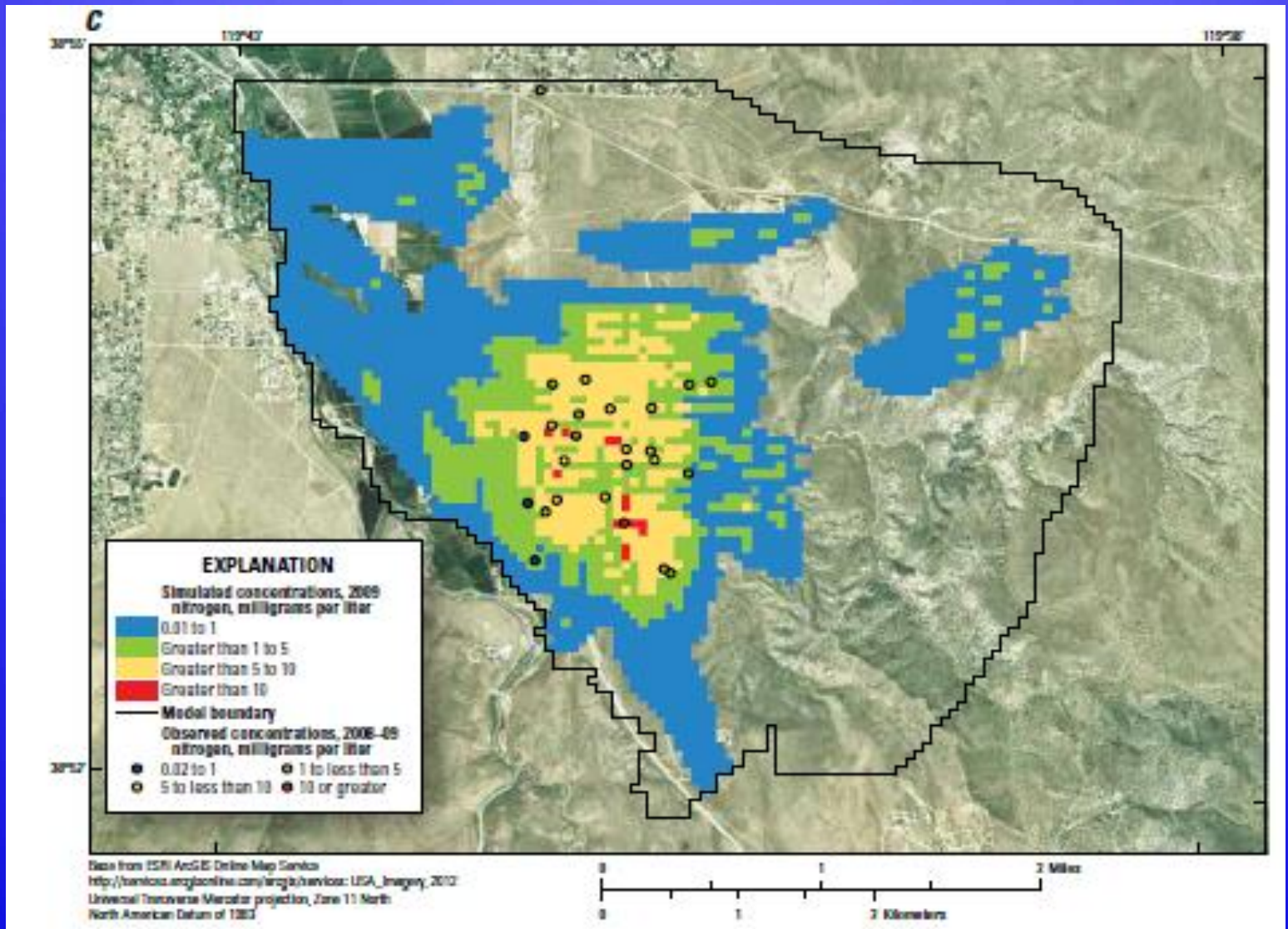


Figure 19. Observed 2008–09 compared to simulated nitrate as nitrogen (N) concentrations for the Ruhenstroth model 2009 time-step: *A*, Observed compared to simulated; *B*, Observed compared to simulated at observation cells and all cells; and *C*, Map depicting spatial distribuiton of nitrate-N 2009 time step with observed Nitrate-N concentrations for 2008–09.

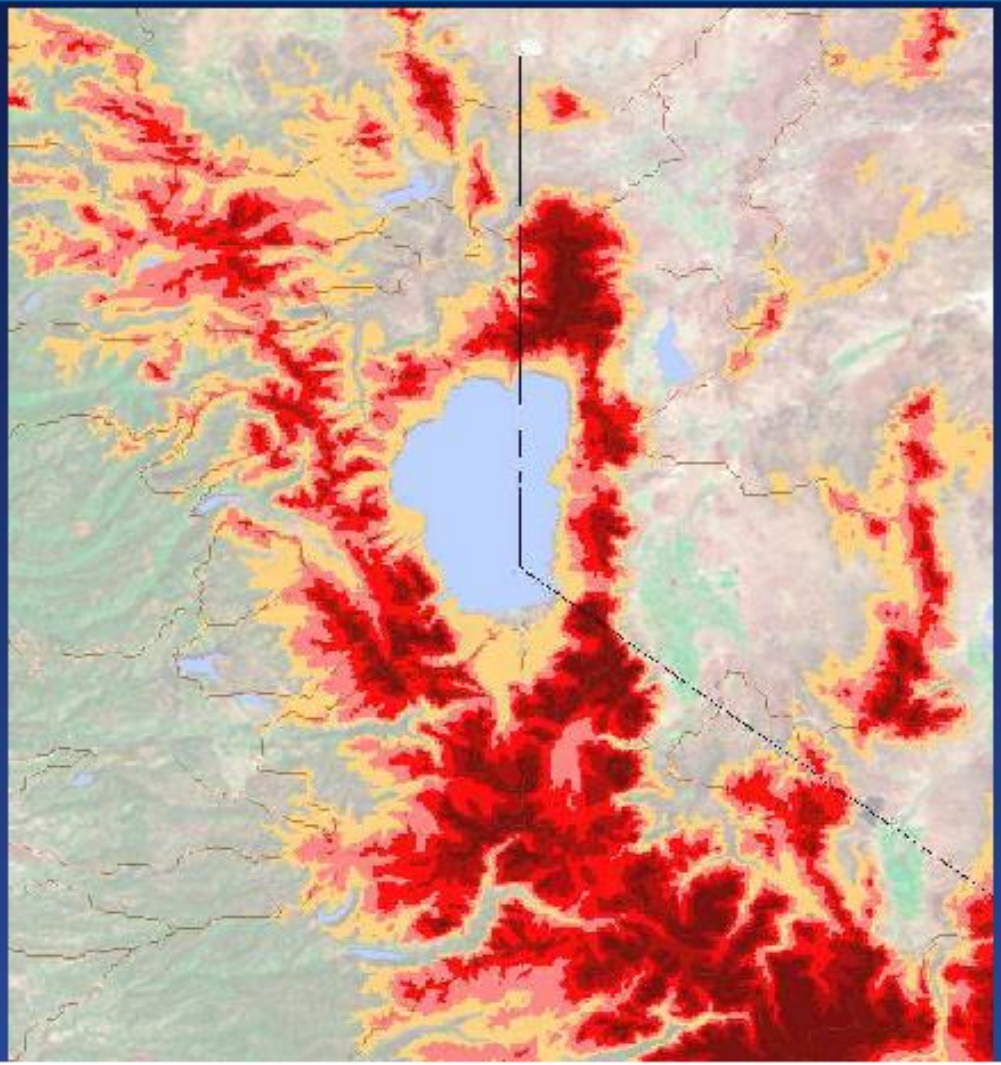
Use of Reclamation Water

- **27% decrease of reclaimed water imported from Lake Tahoe since mid - 1990s.**
- **14% decrease of local reclaimed water from the mid - 2000s to present.**
- **Majority of reclaimed water used for irrigating fields, parks, and golf courses.**

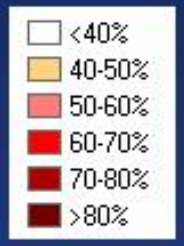
CLIMATE CHANGE

United States Department of Agriculture
Natural Resources Conservation Service

USDA NRCS



Percent of annual precipitation falling as snow



Rainy

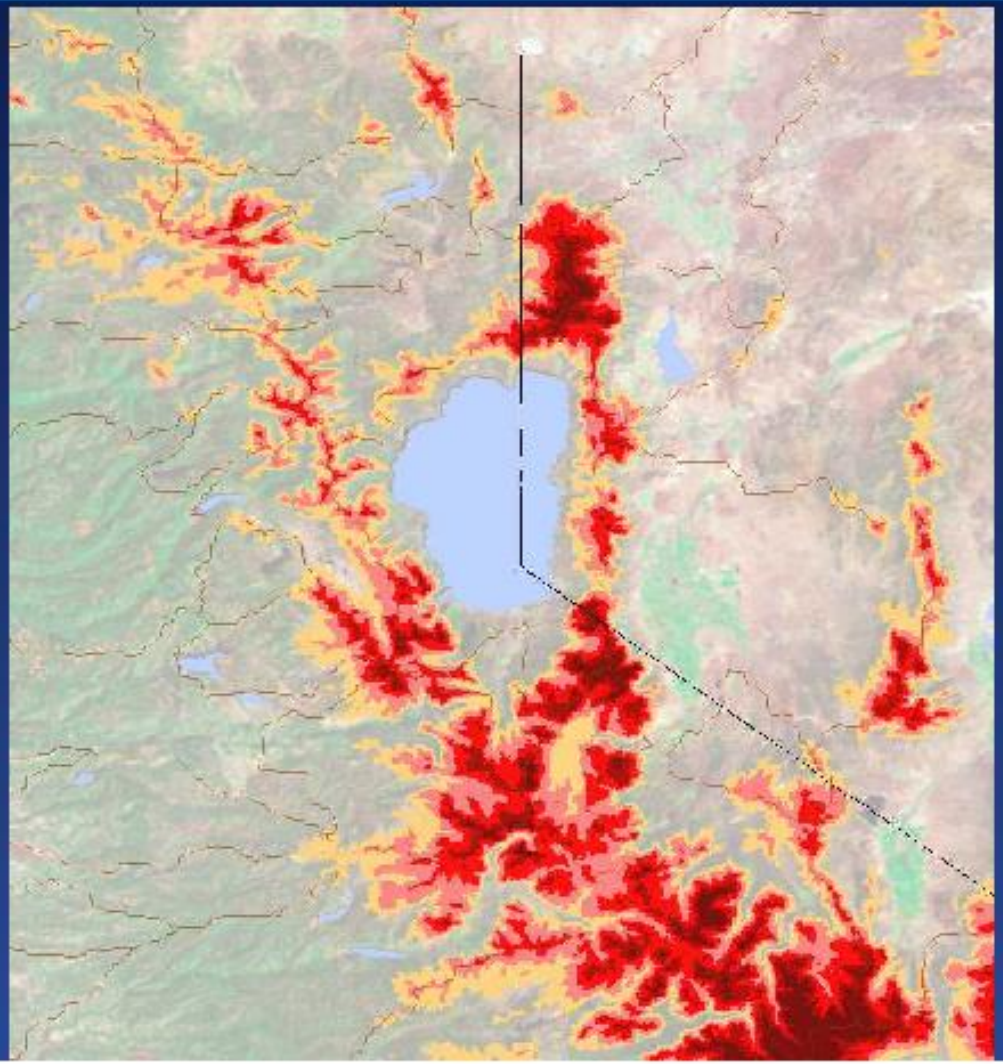
Snowy

Current climate (1990-2007)

How this was made:
For historical SNOTEL station data, sum of precipitation on days that average temperature >0C, >-1C, >-2C etc, divided by total annual precipitation on days that temperature was available. Regress resulting ratio versus elevation. Transform high spatial resolution elevation dataset by regression relationship.

United States Department of Agriculture
Natural Resources Conservation Service

USDA NRCS



Percent of annual precipitation falling as snow

- <40%
- 40-50%
- 50-60%
- 60-70%
- 70-80%
- >80%

Rainy

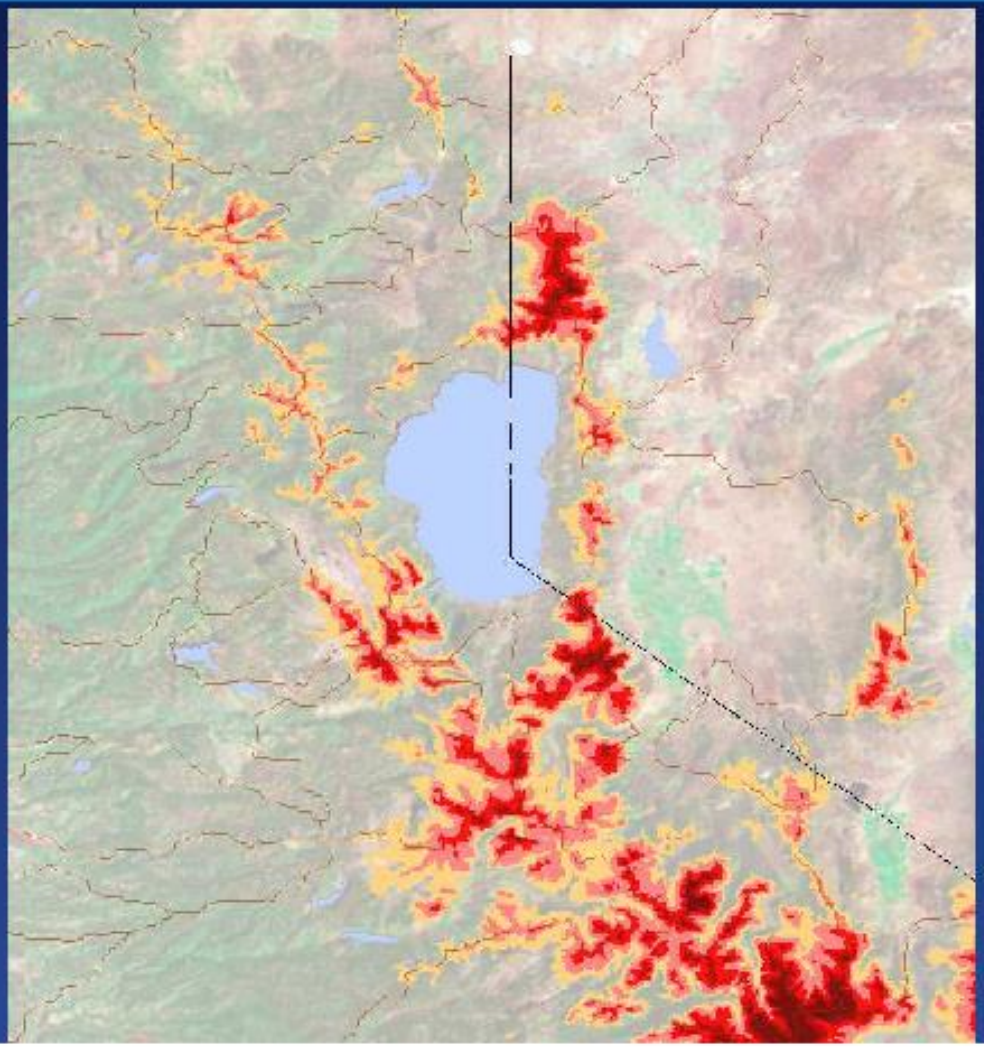
Snowy

Climate +1 deg C warmer

How this was made:
For historical SNOTEL station data, sum of precipitation on days that average temperature >0C, >-1C, >-2C etc, divided by total annual precipitation on days that temperature was available. Regress resulting ratio versus elevation. Transform high spatial resolution elevation dataset by regression relationship.

United States Department of Agriculture
Natural Resources Conservation Service

USDA NRCS



Percent of annual precipitation falling as snow

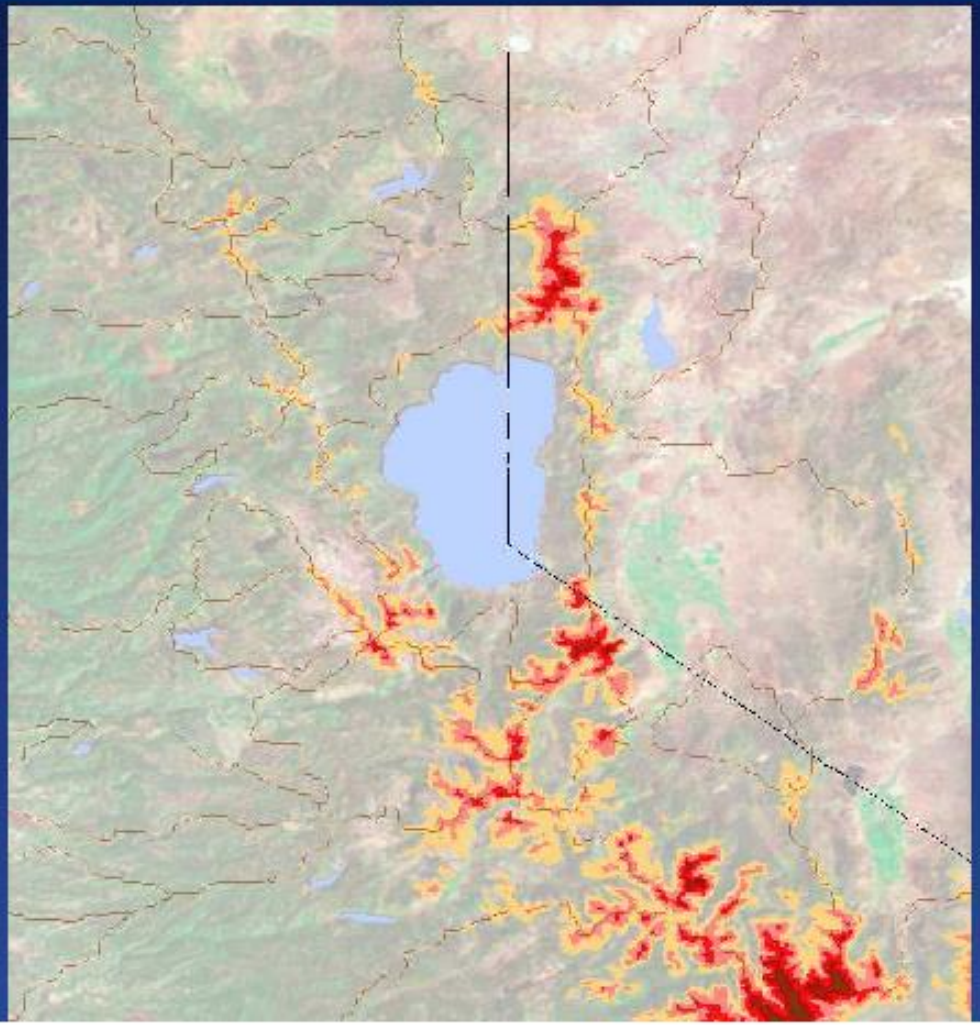
<40%	Rainy
40-50%	
50-60%	
60-70%	
70-80%	
>80%	Snowy

Climate +2 deg C warmer

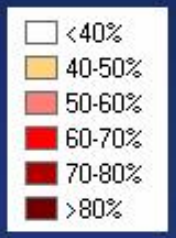
How this was made:
For historical SNOTEL station data, sum of precipitation on days that average temperature >0C, >-1C, >-2C etc, divided by total annual precipitation on days that temperature was available. Regress resulting ratio versus elevation. Transform high spatial resolution elevation dataset by regression relationship.

United States Department of Agriculture
Natural Resources Conservation Service

USDA NRCS



Percent of annual precipitation falling as snow



Rainy

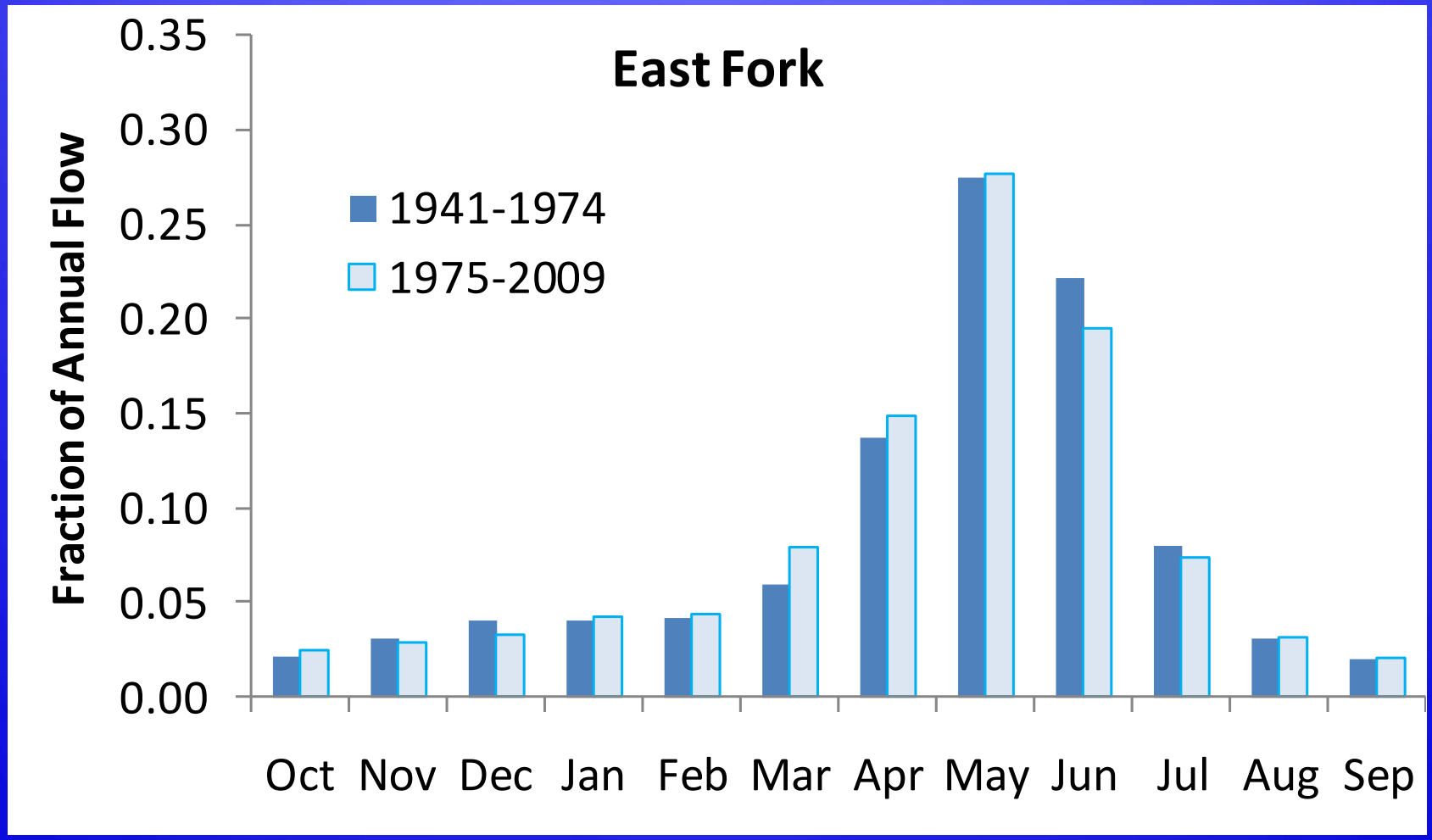
Snowy

Climate +3 deg C warmer

How this was made:
For historical SNOTEL station data, sum of precipitation on days that average temperature >0C, >-1C, >-2C etc, divided by total annual precipitation on days that temperature was available. Regress resulting ratio versus elevation. Transform high spatial resolution elevation dataset by regression relationship.

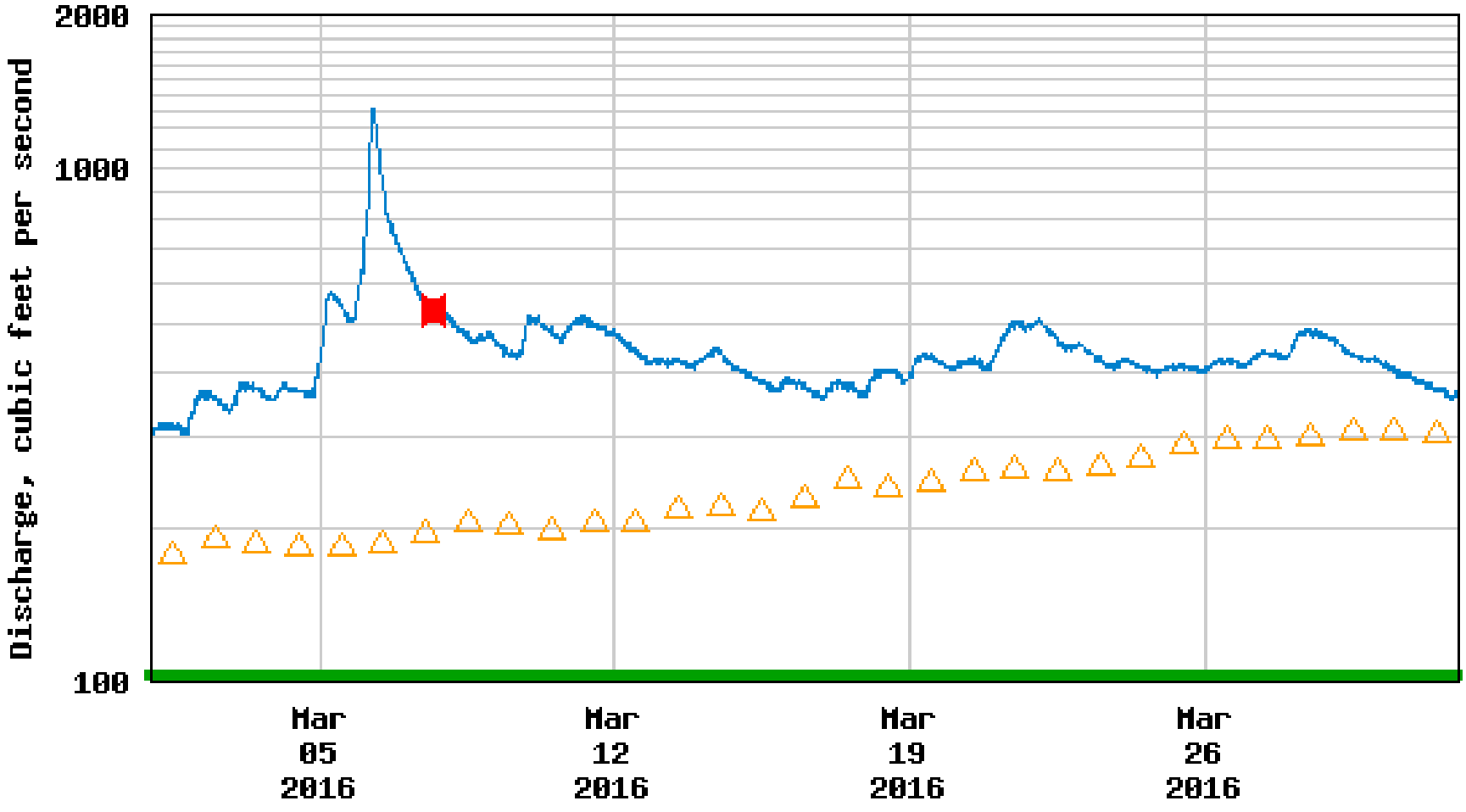
Runoff Changes

Monthly Streamflow – East Fork



USGS

USGS 10309000 E FK CARSON RV NR GARDNERVILLE, NV



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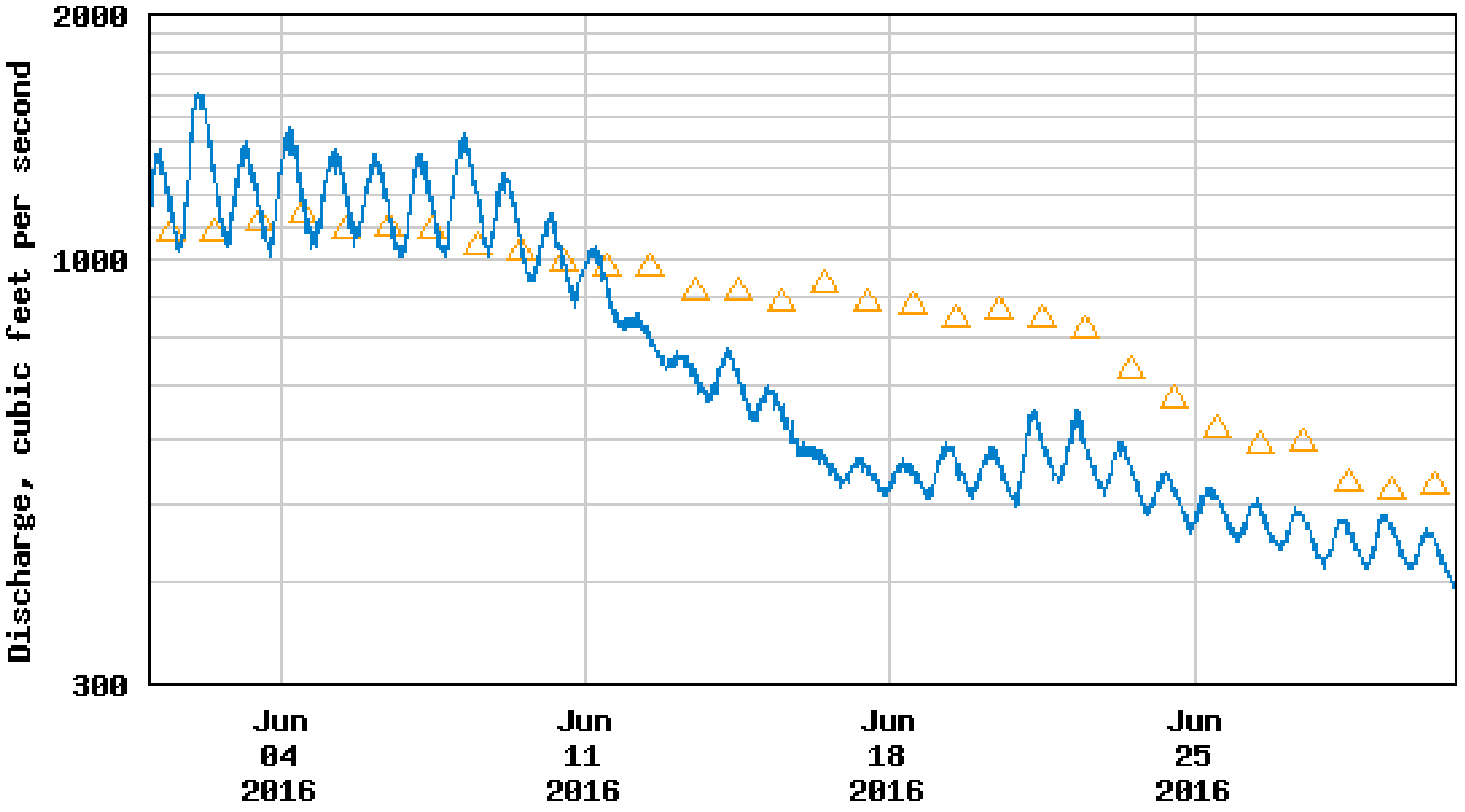
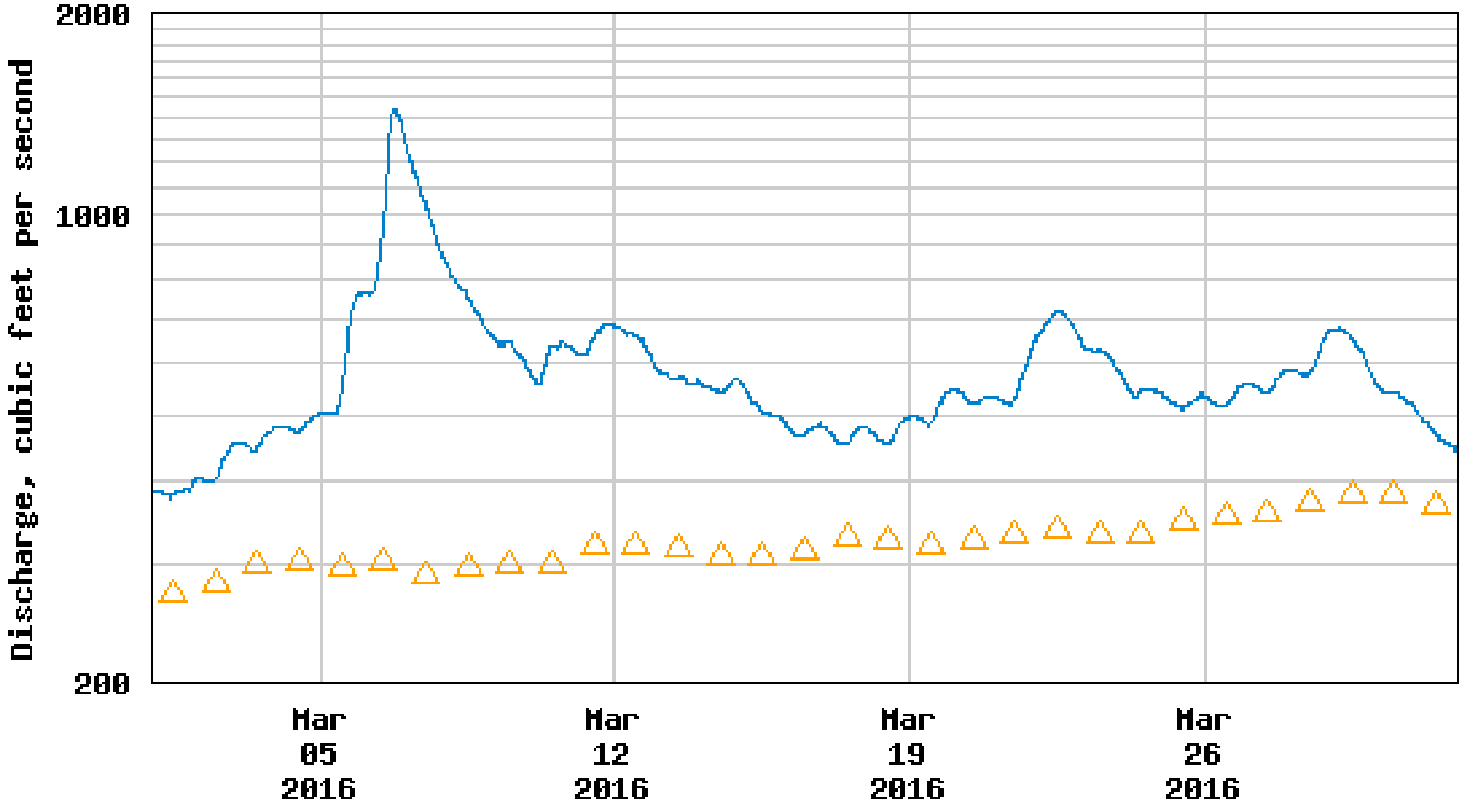


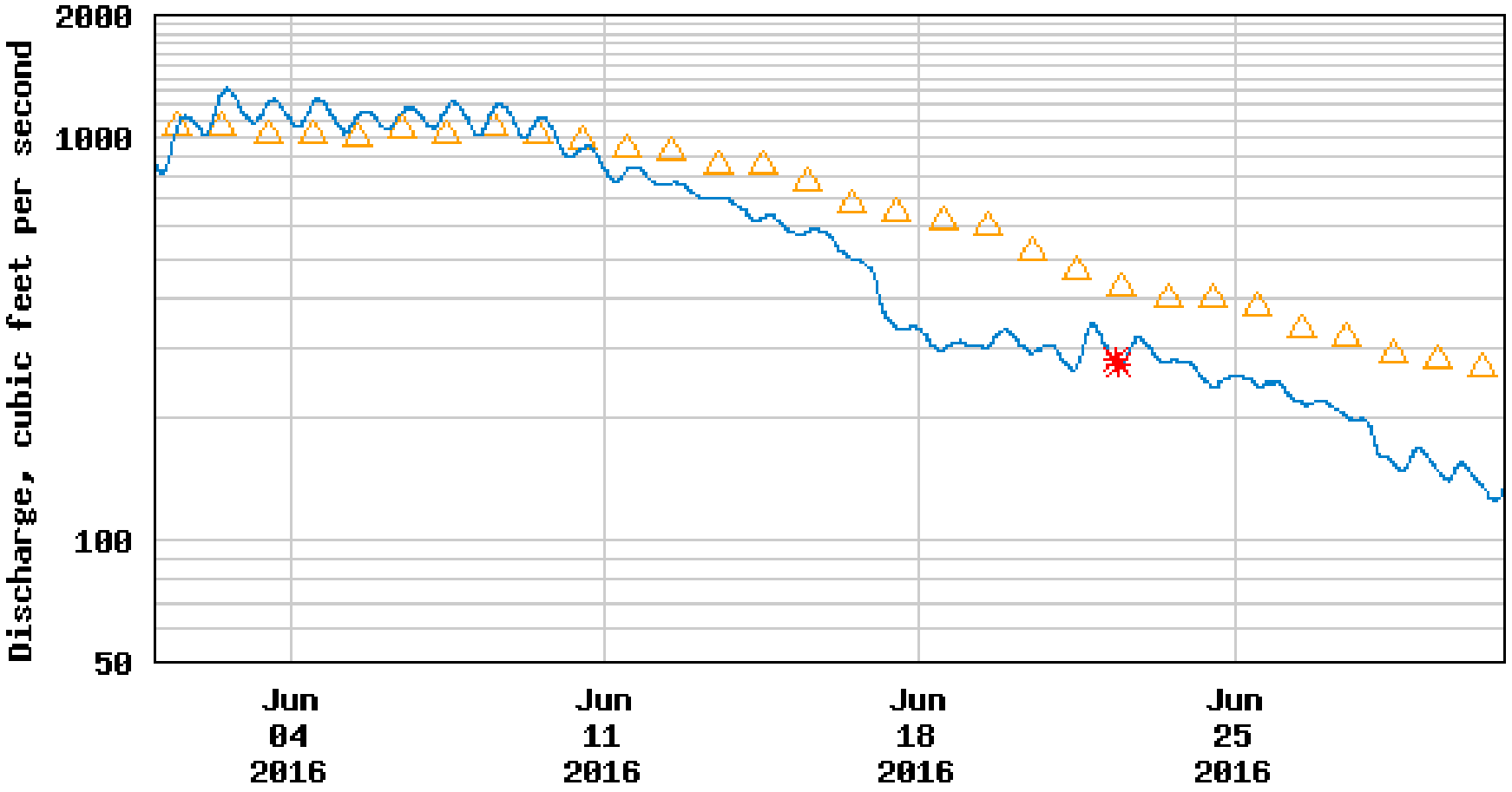
USGS

USGS 10311000 CARSON RV NR CARSON CITY, NV



USGS

USGS 10311000 CARSON RV NR CARSON CITY, NV



WATER for the SEASONS

"A Program for Sustaining Water Resources in a Changing Climate"

Nevada Department of Water Resources
Tahoe Regional Planning Agency
The Nature Conservancy
Truckee Meadows Water Authority
Stillwater Wildlife Refuge
Pyramid Lake Paiute Tribe
Washoe Tribe
Carson Valley Conservation District
Carson River Subconservancy
Truckee-Carson Irrigation District
City of Fernley
Fallon Shoshone Paiute Tribe

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USGS science for a changing world
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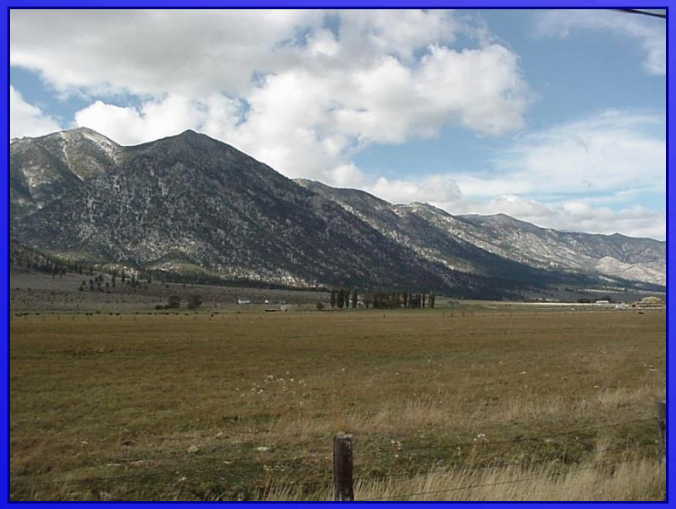
Balancing Water Supplies

Environmental



Agricultural

Domestic

Questions?

www.cwsd.org

Photo by: Juan Guzman