

Water Resources

Smart Management through Machine Learning



Presenting



Brian Reynolds
Data Scientist
&
Natural Resources
Consultant

[LinkedIn](#)
[GitHub](#)

Agenda



Climate & Water in the Southwest



Today in Water

Exclusive: Experts say the term 'drought' may be insufficient to capture what is happening in the West



By [Ella Nilsen](#), CNN

Published 7:00 AM EST, Wed February 16, 2022

Empty canals, dead cotton fields: Arizona farmers are getting slammed by water cuts in the West

PUBLISHED SUN, APR 3 2022 8:00 AM EDT



Emma Newburger
[@EMMA_NEWBURGER](#)

SHARE [f](#) [t](#) [in](#) [✉](#)

Drought threatens Rio Grande levels, again



by [Danielle Prokop](#)

March 1, 2022



BY EMILY HOEVEN
MARCH 16, 2022

Southern Nevada water supply faces Colorado River restrictions

Creative strategies needed to address long-term shortages, say three University of Nevada, Reno professors

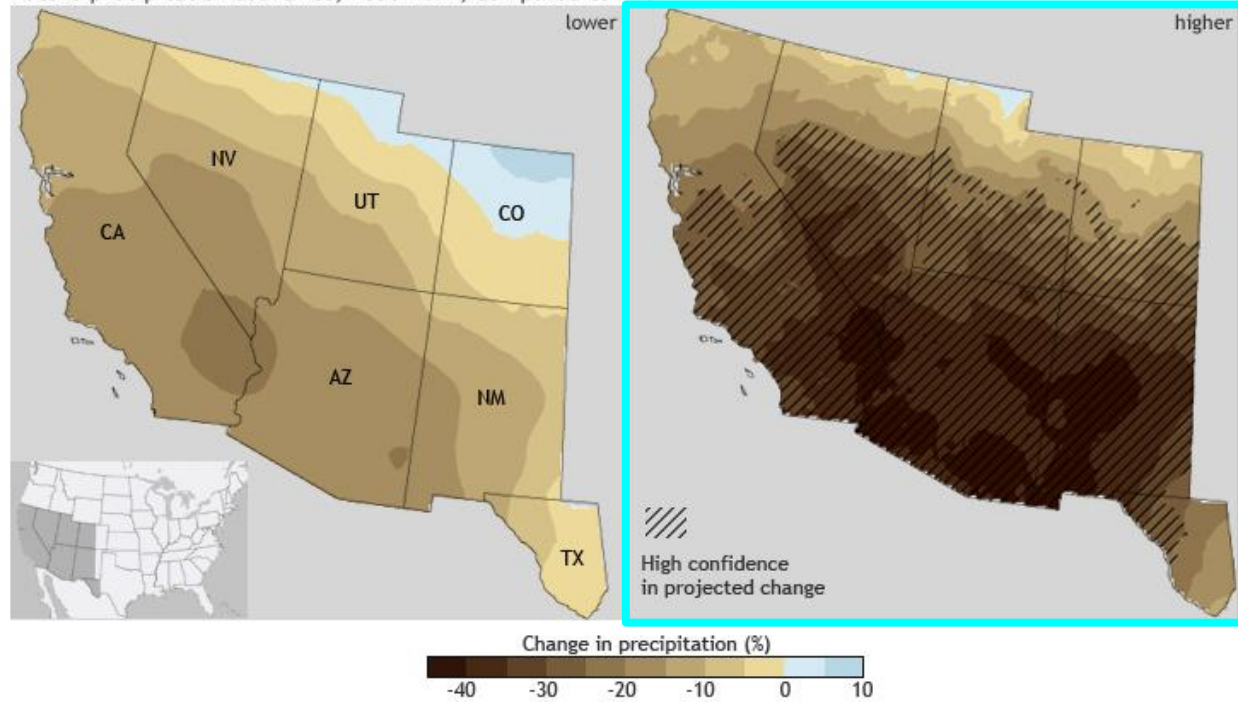
March 16, 2022

[Mike Wolterbeek](#)



Climate and Water

Future precipitation scenarios, 2080-2099, compared to 1961-1979

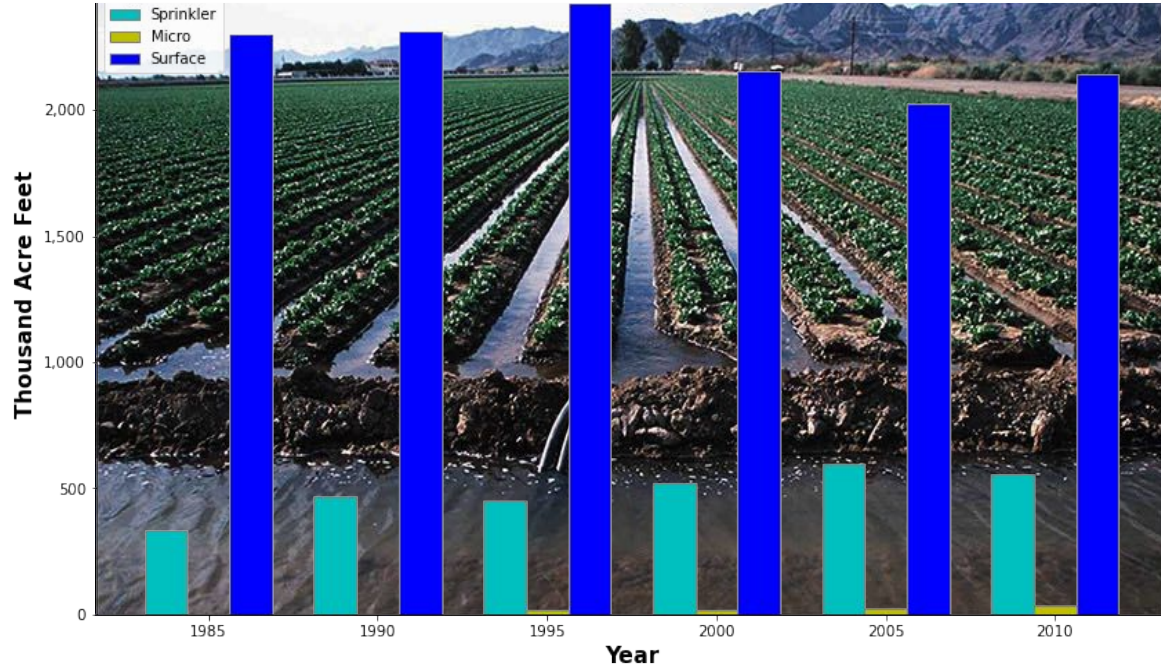
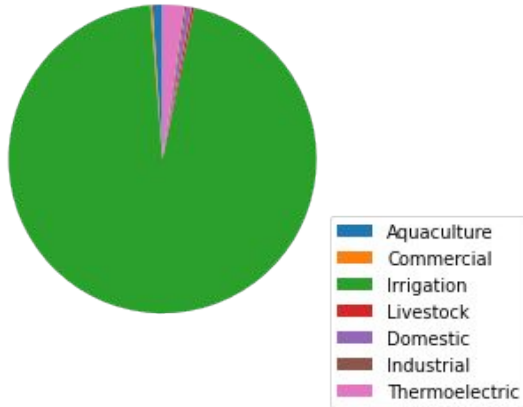


The Water Resource Problem

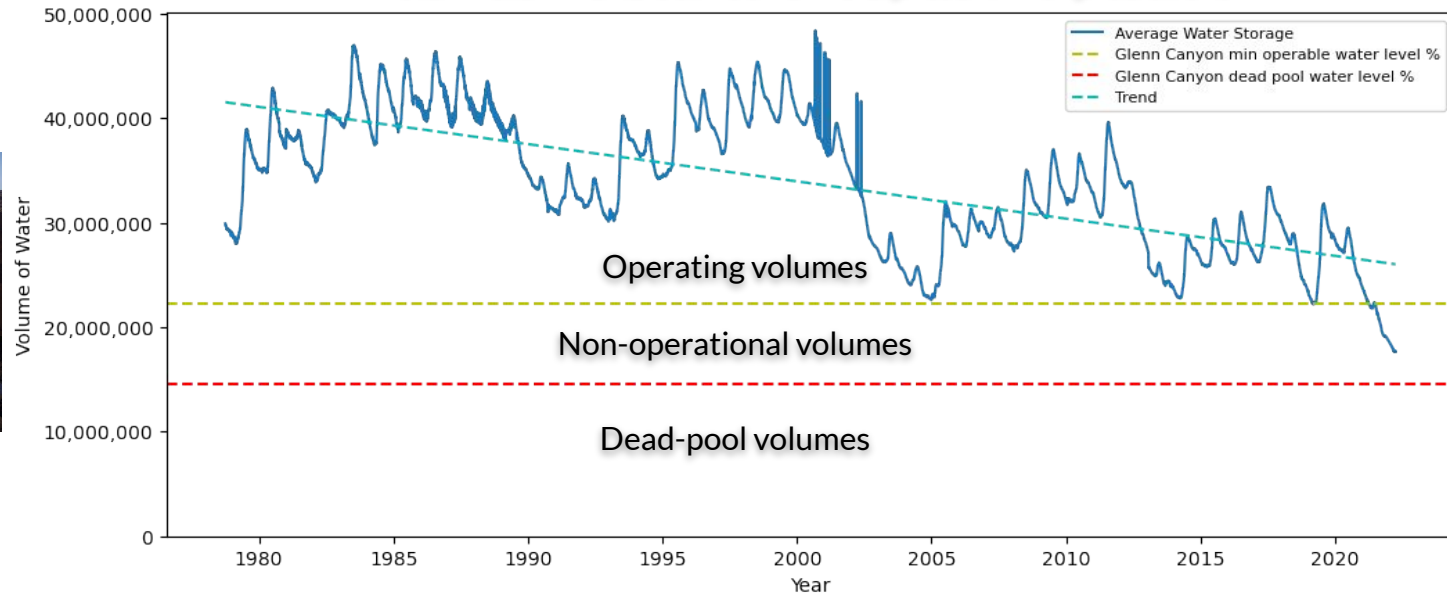


Where does the water go?

Water Usage by Industry



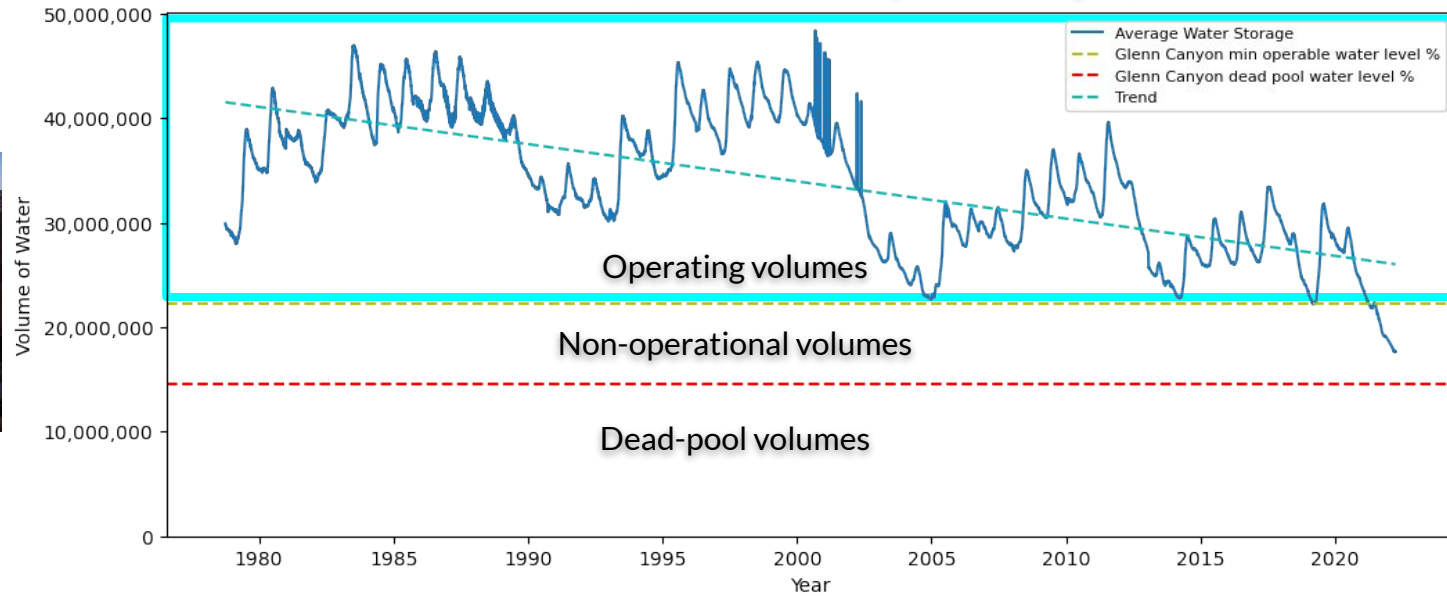
Total Water in CRB between 1978 & present with predictions



Glenn Canyon Dam



Total Water in CRB between 1978 & present with predictions



Operating volumes

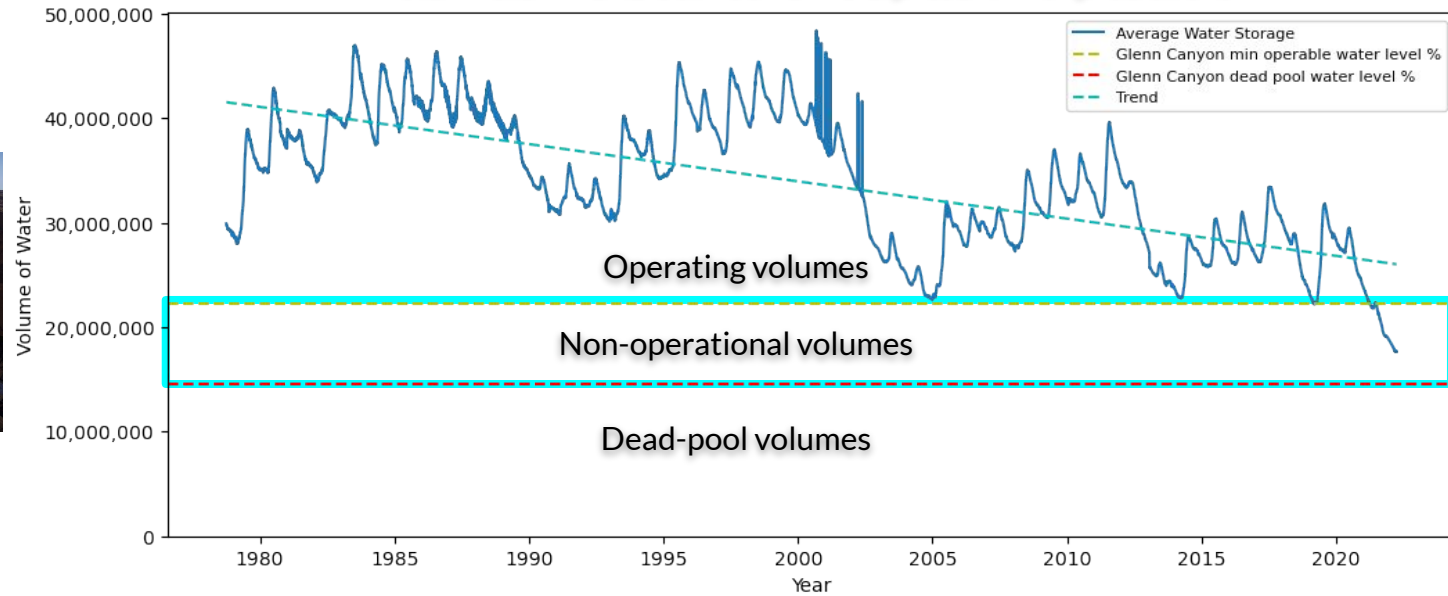
Non-operational volumes

Dead-pool volumes

Glenn Canyon Dam



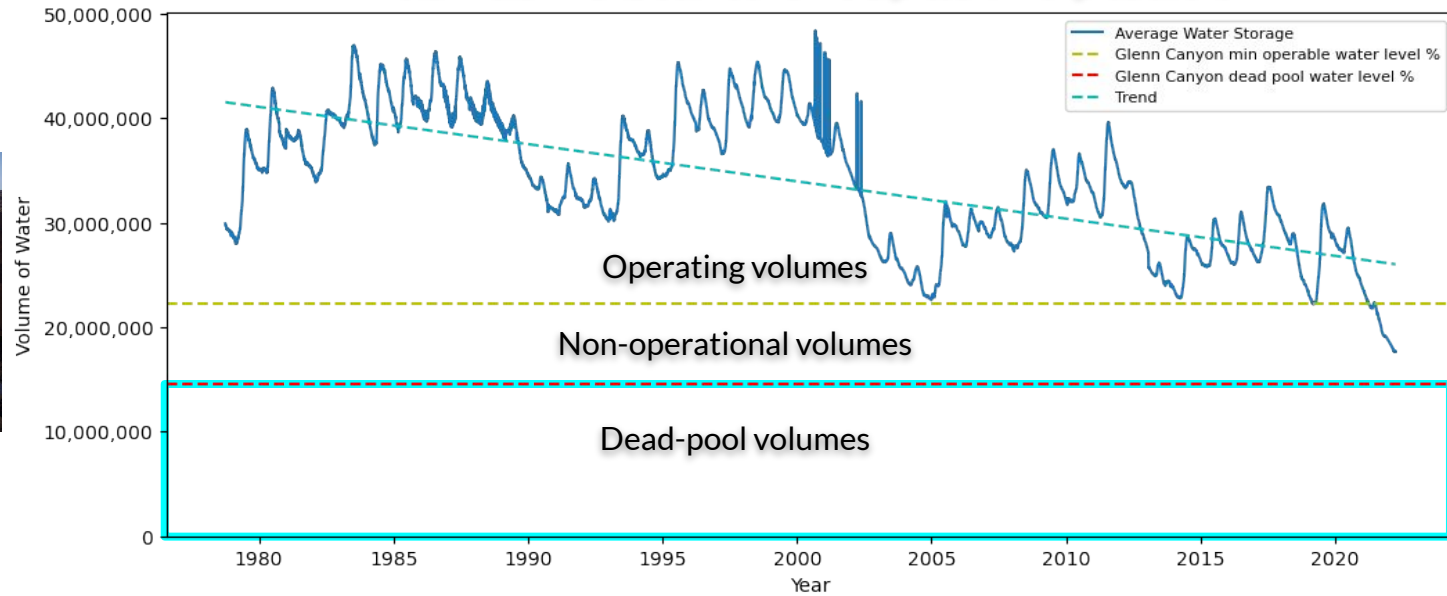
Total Water in CRB between 1978 & present with predictions



Glenn Canyon Dam



Total Water in CRB between 1978 & present with predictions



Glenn Canyon Dam



Data Collection

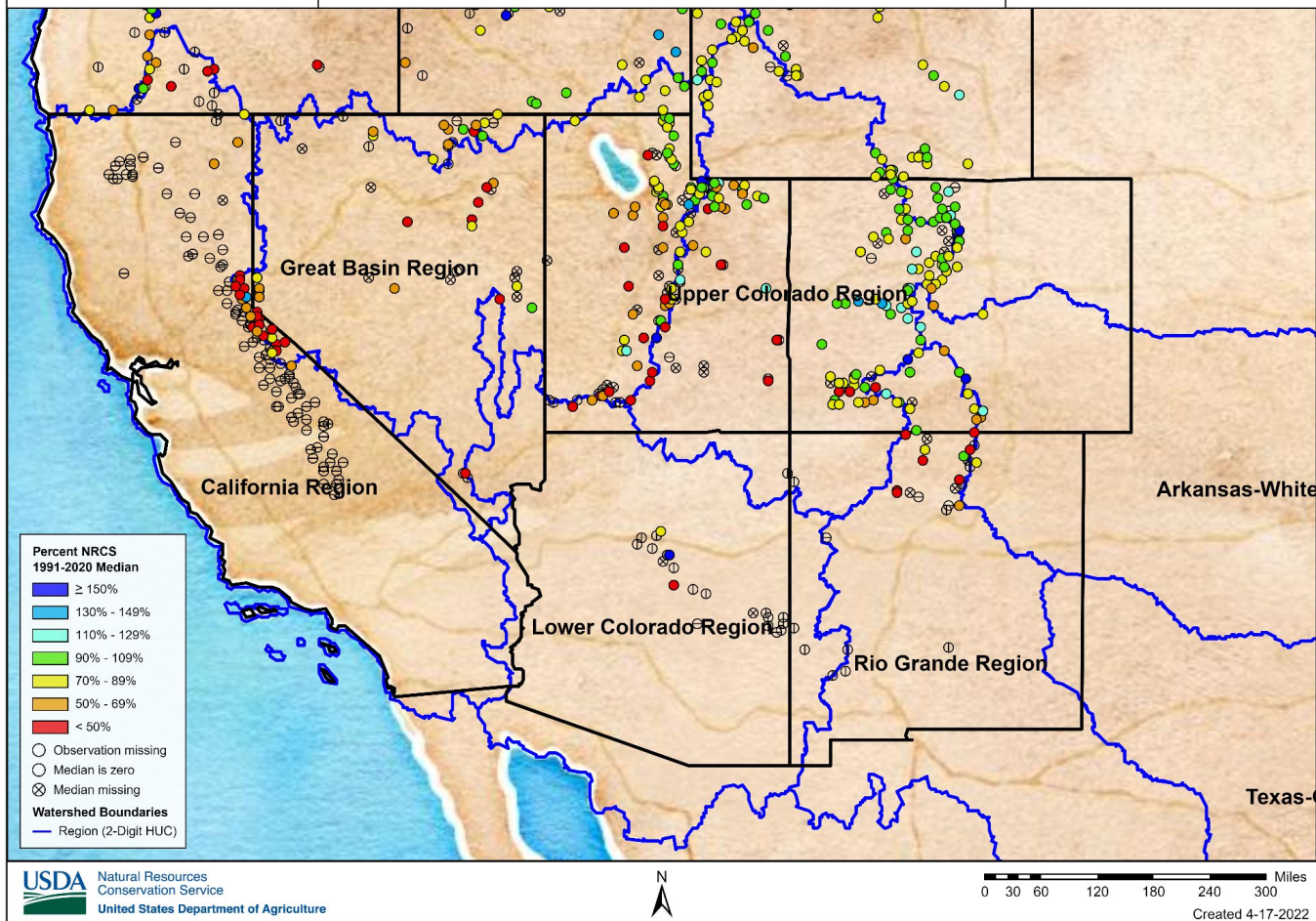


Snow Water Equivalent

Snotel Stations

Percent NRCS 1991-2020 Median

April 16, 2022, end of day



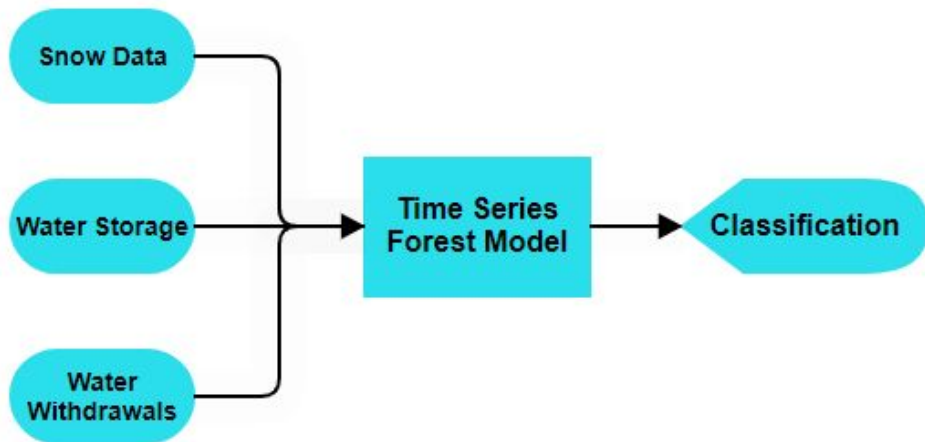
Data Collection

Machine Learning

Using predictive models to drive regulatory policy



Machine Learning



Accuracy: 97.2%

Identifies between:

- Operational water depth
- Non-operational water depth
- Dead-pool water depth



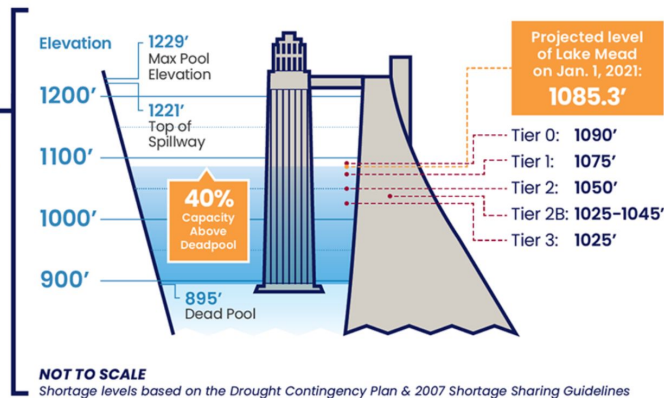
Future Considerations



Future Considerations



24-Month Study – Lake Mead August 2020



Specificity and Customization

- Grouping by downstream reservoir
- Applying model to new basins
- Prepare model classification based recommendations for management



Thank you.

