

Water Quality Update: Las Vegas Valley Watershed Advisory Committee October 2017

Todd Tietjen Ph.D.

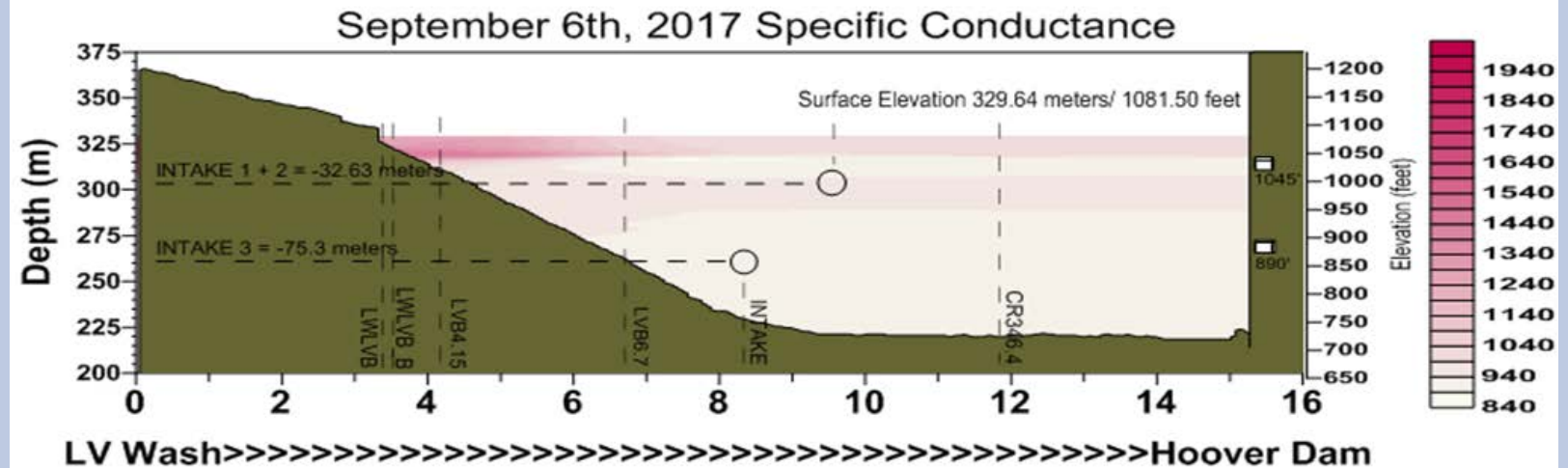
Regional Water Quality Manager

Water Quality and Treatment

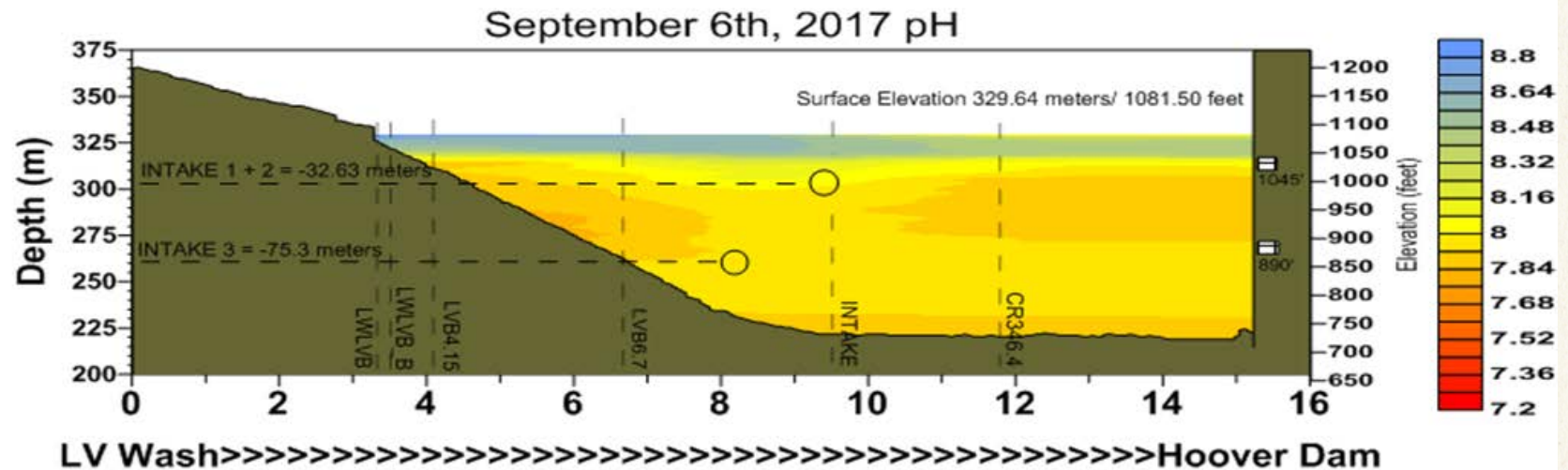
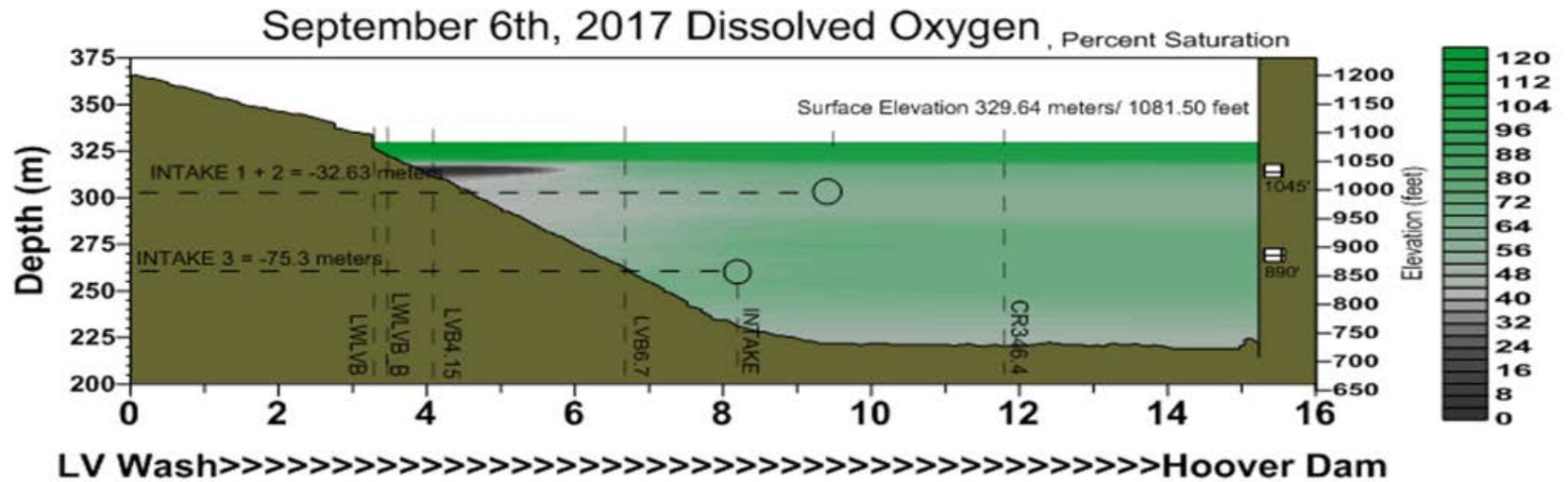
Southern Nevada Water Authority



SOUTHERN NEVADA WATER AUTHORITY®

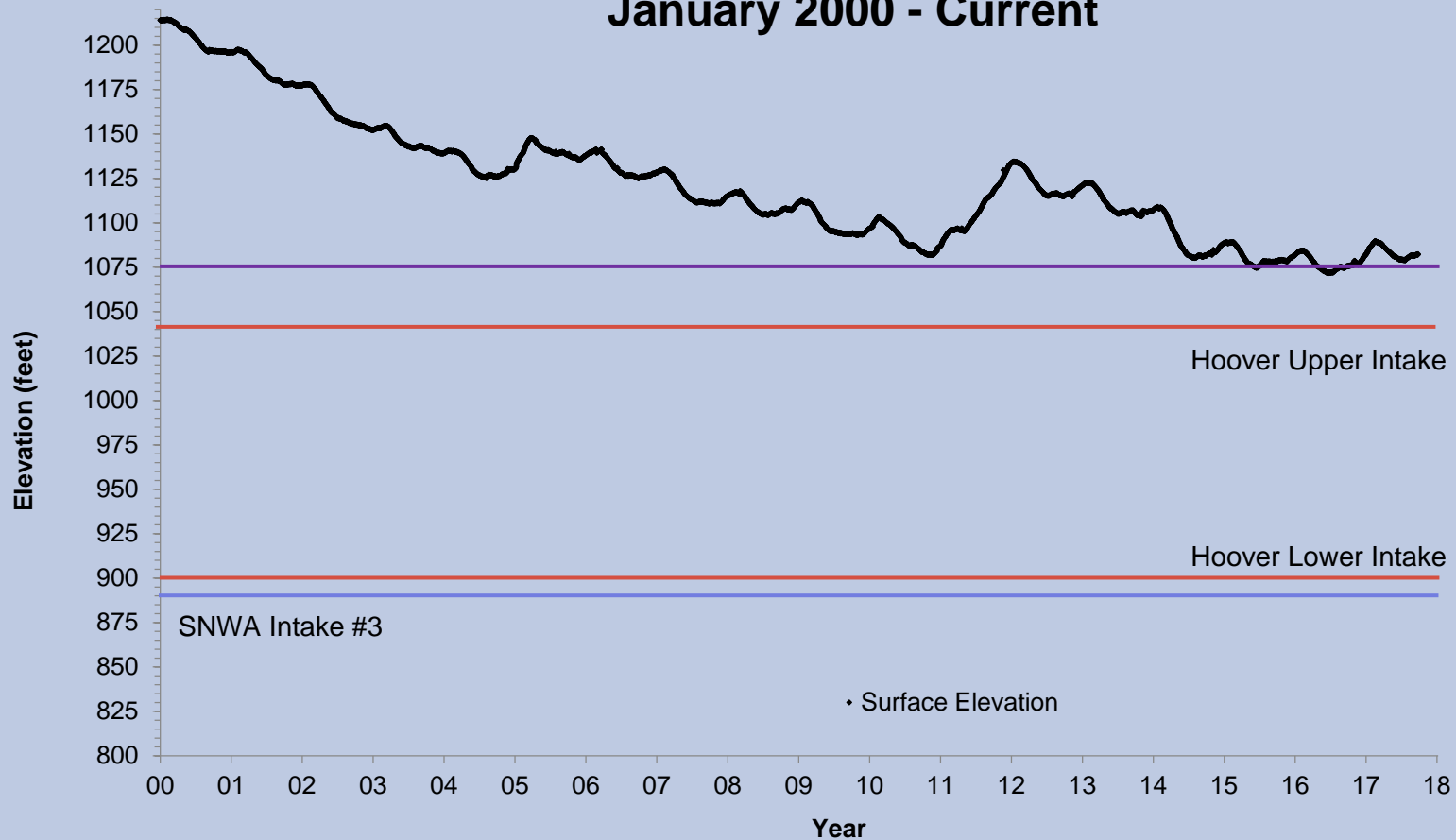


Current conditions in Lake Mead

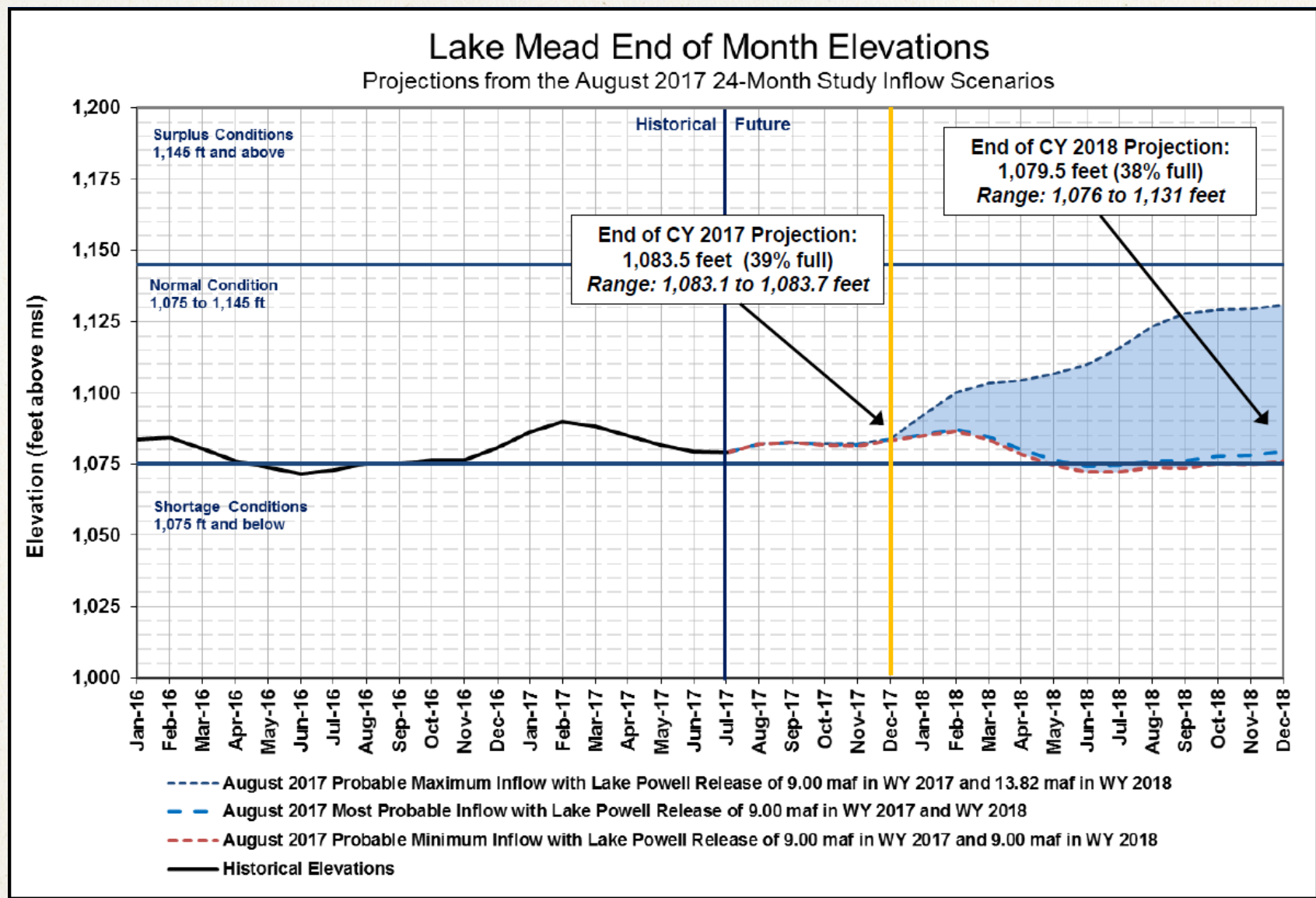


Lake Mead Surface Elevation

**Lake Mead Elevation
January 2000 - Current**

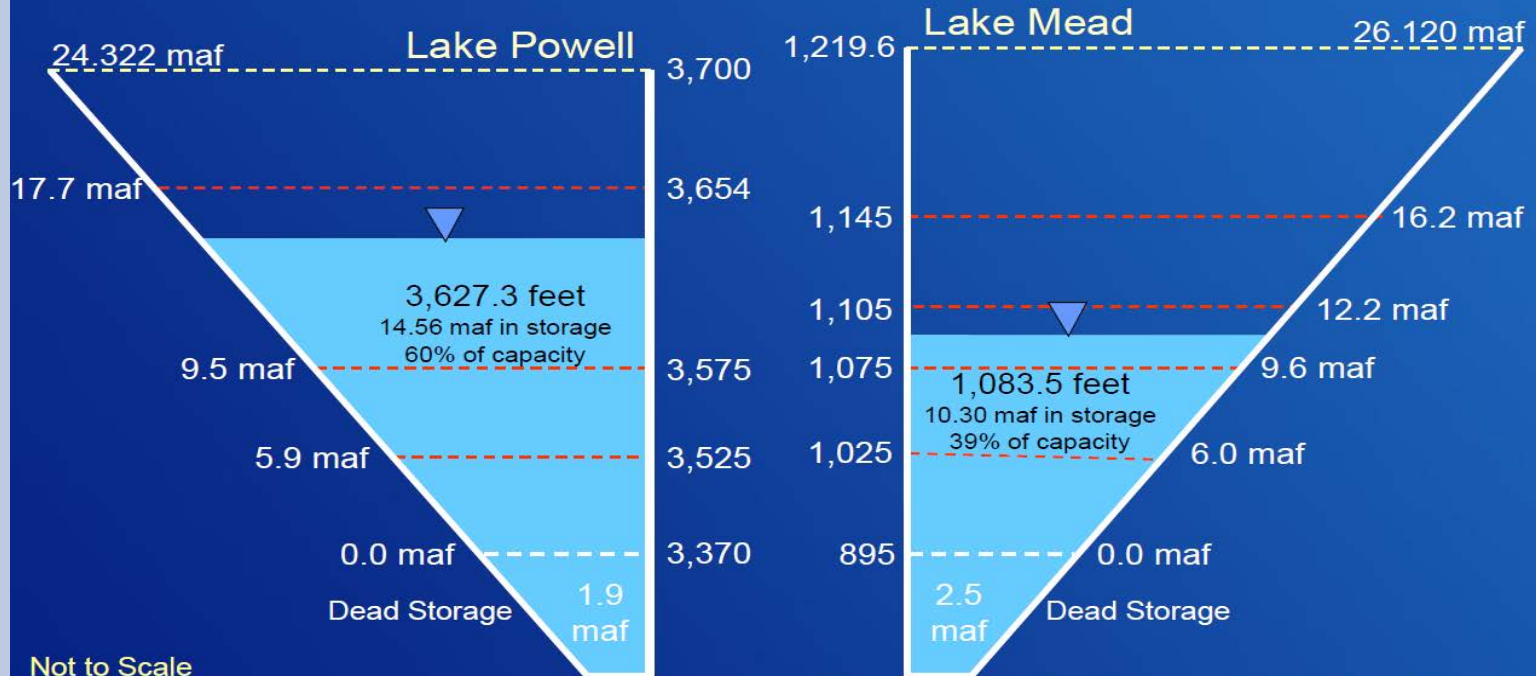


Projected Lake Mead surface elevation



Basin Storage

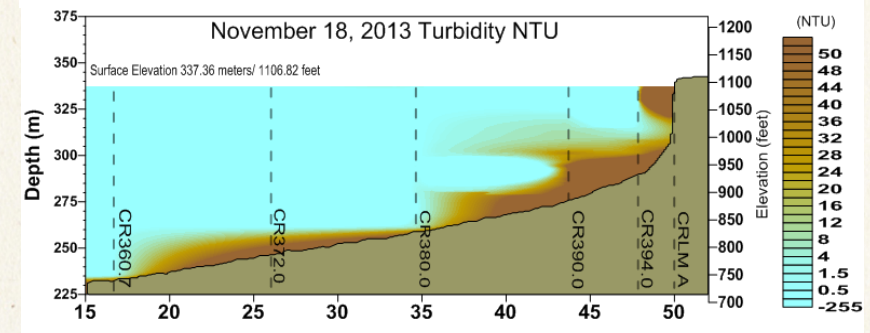
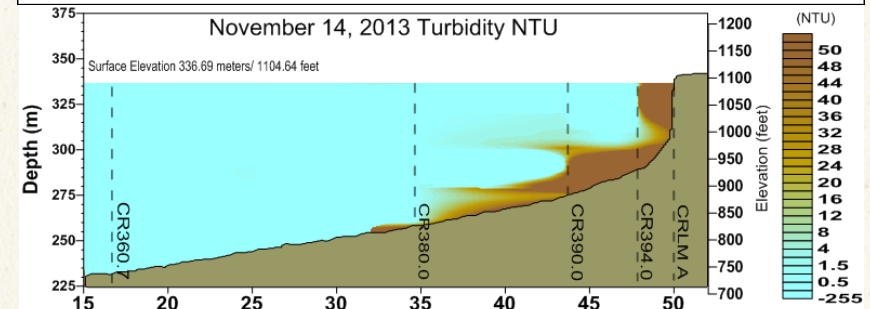
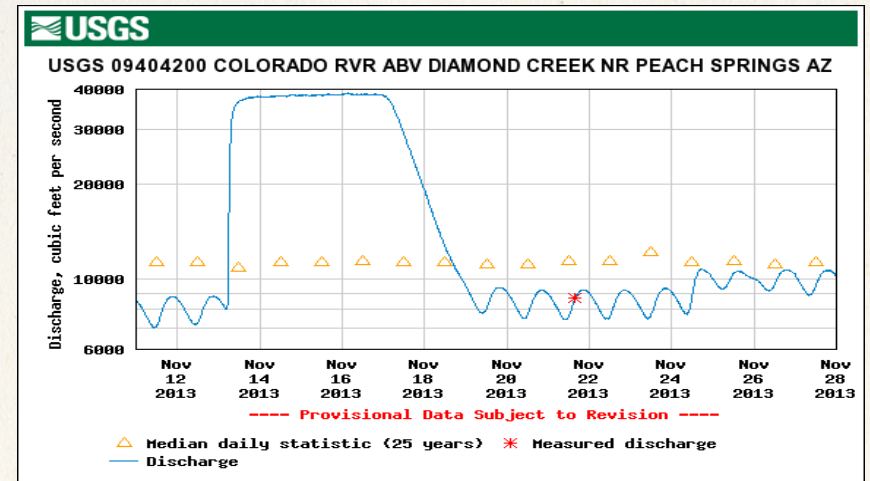
End of Calendar Year 2017 Projections August 2017 24-Month Study Most Probable Inflow Scenario¹ Based on an 9.00 maf release from Lake Powell in Water Year 2018



¹ WY 2017 unregulated inflow into Lake Powell is based on the CBRFC forecast dated 8/1/17.

High Flow Experiments in the Colorado River through Grand Canyon

- High Flow Experiments have been conducted to enhance the development of sand bars in Grand Canyon
 - Move sand from riverbed to shoreline by increasing flow
- It appears unlikely that there will be a High Flow Experiment during the Fall of 2017
 - Insufficient sand has been brought into the Colorado River during the 2017 accounting period
- Past High Flow Experiments have had measurable impacts on Lake Mead, but the impacts have not necessarily been detrimental



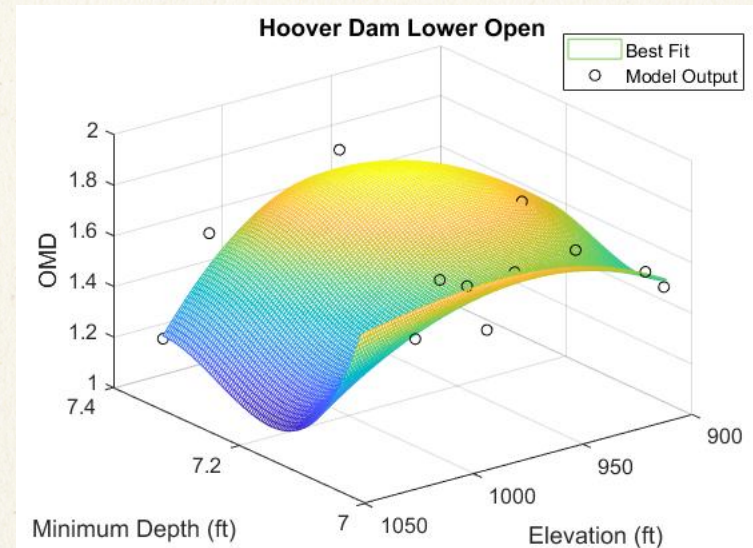
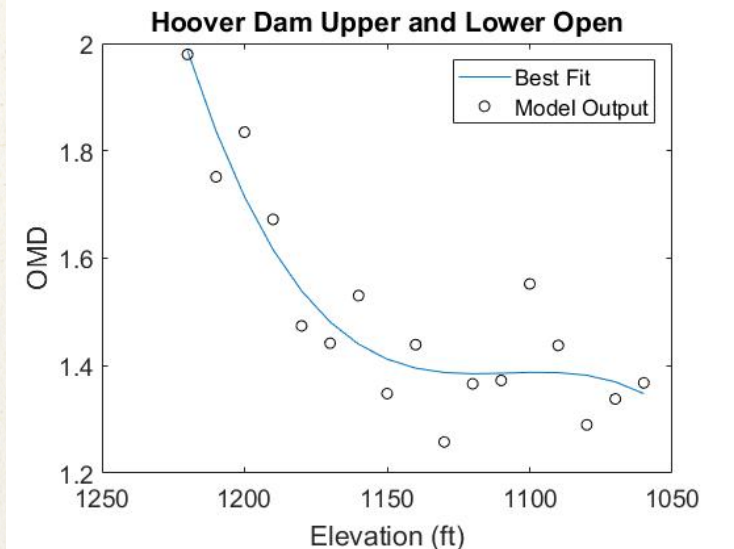


Modeling related to High Flow Experiments

- In response to past High Flow Experiments SNWA Regional Water Quality has begun planning to model the impacts of these turbid inflows on Raw water brought into the drinking water intakes
- Deena Giffen has completed the transition from the “old” ELCOM CAEDYM Lake Mead Model to the “new” AEM3D Lake Mead model.
 - Revalidated for recent years, first significant update since 2006-2007
- Regional Water Quality is working with UNLV Civil and Environmental Engineering to build a coupled model system:
 - Use AEM3D to model Lake Mead dynamics at a variety of surface elevations and inflow conditions, including High Flow Experiments
 - With UNLV, develop a model of the SNWA Treatment Plants
 - Use the coupled system to plan for possible future conditions
- Regional Water Quality has obtained grant funding from the USBR WaterSMART program to pay for UNLV's participation

Additional Modeling Activity

- In response to conversations with Dischargers and NDEP, Regional Water Quality set about to assess the representativeness of NPDES sampling locations in Las Vegas Bay with falling lake surface elevation
- Chose LVB1.2 as sampling location
 - First location “downstream” from the confluence of the Las Vegas Wash and Las Vegas Bay
- At higher surface elevations (both Dam intakes) the dilution with distance is straightforward
- At lower surface elevations (lower intake only) the dilution relationship is much more complex





Nevada Aquatic Invasive Species Management Plan

- The Nevada Department of Wildlife has completed the Aquatic Invasive Species Management Plan
- Plan has been approved by the state Wildlife Commission, NDOW Director, and Governor Sandoval.
- Awaiting Federal Review

- The goals of the AIS Management Plan are to:
 - Prevent new introductions of AIS to Nevada
 - Limit the spread of existing AIS populations in Nevada, and eradicate or control AIS populations when possible
 - Minimize harmful ecological, economic, social, and public health impacts that result from AIS

- Will be available for download from NDOW.org in the near future

Algal toxins in Lake Mead and Mohave

- Microcystin, the toxin produced by the cyanobacterium *Microcystis*, has been measured in Lakes Mead and Mohave in recent years
 - First measured in 2015
 - Low concentrations in the open waters of Lake Mead
 - NEVER detected at the SNWA Raw water intakes
 - NEVER measured at depth
 - Highest concentrations measured in Boulder Basin Marinas
 - Algae likely blown into the marina by wind
 - Algae became stressed and produced/released toxin
- During 2017 microcystin has been measured in Lakes Mead and Mohave
 - Low concentrations, Infrequently detected
 - Less than 1 ug/L
- Unclear what, if anything, changed over the past 2 years



Nevada Division of Environmental Protection Standards Review

- NDEP has begun informal discussions regarding the revision of water quality standards in the Las Vegas Wash and Lake Mead
- Las Vegas Wash
 - Review standards to protect/maintain freshwater marsh conditions created by erosion control structures
 - Protection of Aquatic Life: Maintain sufficient oxygen concentrations
 - Fish
 - Non-contact recreation: bacterial standards
- Lake Mead
 - Assess performance of LVB1.2 sampling location for NPDES monitoring
 - Rainbow Trout
 - TIN and Chlorophyll a: No compliance issues
 - Turbidity and TSS at inflow areas: Footnote already provides exception
- Colorado River/Lake Mohave
 - Temperature conditions for maintenance of Trout
 - Lake Mohave not currently in NAC – Included with river
- Lake Las Vegas
 - Discussion of whether to set Water Quality Standards specific for uses

Nevada Division of Environmental Protection Standards Review

Comparison of 2016 Selenium Criterion to 1999 Criteria.

Criterion Version	Chronic					Short-term
	Egg-Ovary ¹ [mg/kg dw]	Whole Body ¹ [mg/kg dw]	Muscle ¹ [mg/kg dw]	Water Lentic ¹ [µg/L]	Water Lotic ¹ [µg/L]	Water ¹ [µg/L]
2016 Selenium Criterion	15.1	8.5	11.3	1.5 (30 day)	3.1 (30 day)	Intermittent exposure equation
1999 Selenium Criteria	N/A	N/A	N/A	5 (4 day)	5 (4 day)	Acute Equation based on water column concentration

- NDEP has to promulgate a rule
 - Expect to advance EPA values
 - Permanent vs. Temporary Petition



Selenium Standards

- As previously presented the existing water column data for Lake Mead and the Las Vegas Wash will not meet the water column standards
- Existing, but old, fish tissue data suggests that fish tissue is unlikely to meet the standards
- Las Vegas Wash Team is currently attempting to sample fish from the Las Vegas Wash
 - Difficulty in collecting fish similar to species representation from past collections.
 - Changes in habitat have limited the effectiveness of capture gear.
- Evaluating fish capture options for Lake and Wash
- Evaluating analysis options
 - ~ \$65 per sample for sample digestion and analysis
 - Does not include dissection.
- Currently advertising an intern position for Regional Water Quality to work on development of site specific standards
- This importance of this issue is increasing as NDEP moves towards propagating standards.

Cooperation between agencies on Lakes Mead and Mohave

- Cooperation between agencies sampling Lakes Mead and Mohave continues to be extremely high and successful
 - City of Las Vegas
 - Lake Mead National Recreation Area
 - Southern Nevada Water Authority
 - US Bureau of Reclamation

- Successful, comprehensive sampling would not be possible without cooperation between agencies



Future Lake Mead Sampling

- SNWA has acquired a sampling platform and a sampling buoy to automate some data collection on Lake Mead
 - Funding through USBR grant
 - Currently in Las Vegas Boat Harbor for testing pre-deployment
- Buoy will be placed near the confluence with Las Vegas Wash
 - Surface data collection of routine physical and chemical parameters plus algal pigments, turbidity and wastewater tracers.
- Platform will be deployed near the SNWA Intake location
 - Will sample through the water column
 - Physical and chemical measures, plus algal pigments and turbidity
- All data will be transferred to cloud servers and imported into the Lower Colorado River Water Quality Database
- Intend to share data widely, in near real-time.
- Currently pursuing ordering another 3 platforms for placement near Hoover Dam, Sentinel Island, and CR355 (inflow to Boulder Basin from uplake)

Las Vegas Valley Watershed Advisory Committee Achievement Document for 2016

- Please forward information for inclusion in the 2016 accomplishments document to:
 - Todd.Tietjen@lvvwd.com
 - Cynthia.Bodnar@lvvwd.com

- We will compile for the next meeting

- Questions?