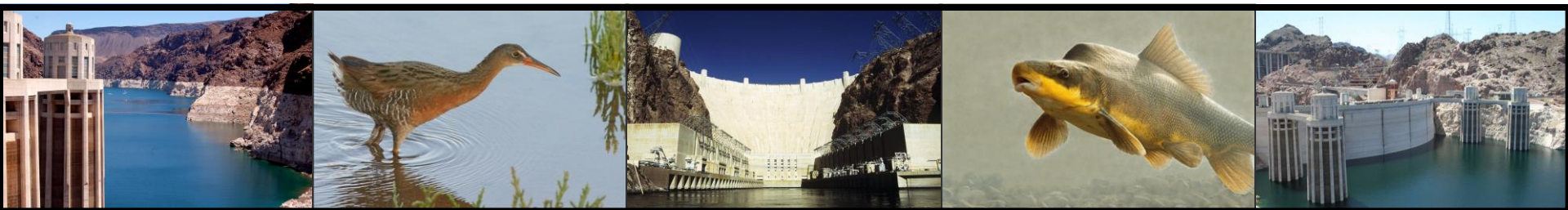
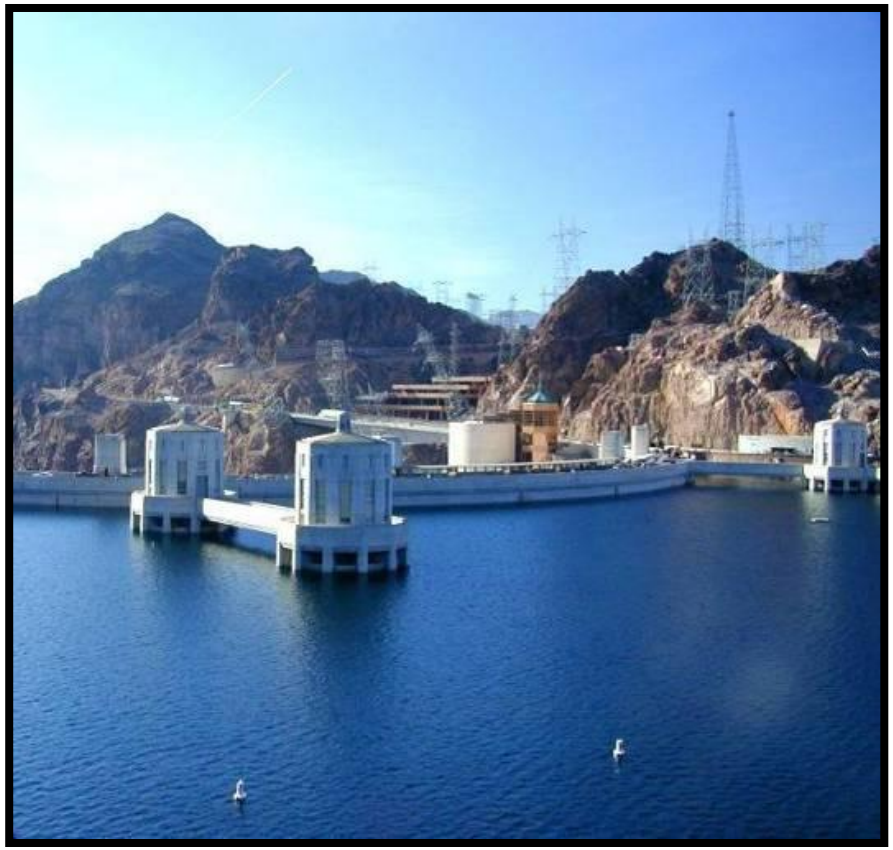
Colorado River Commission of Nevada

Impacts of Long-term Drought on Colorado River Operations

February 19, 2014



Lake Mead's elevation has dropped more than 100 feet since 2000



2000

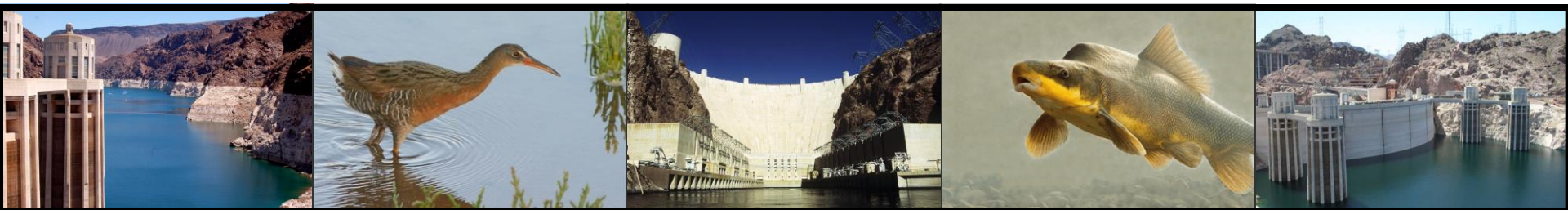
Hoover Dam, Lake Mead

2010

Hoover Dam, Lake Mead

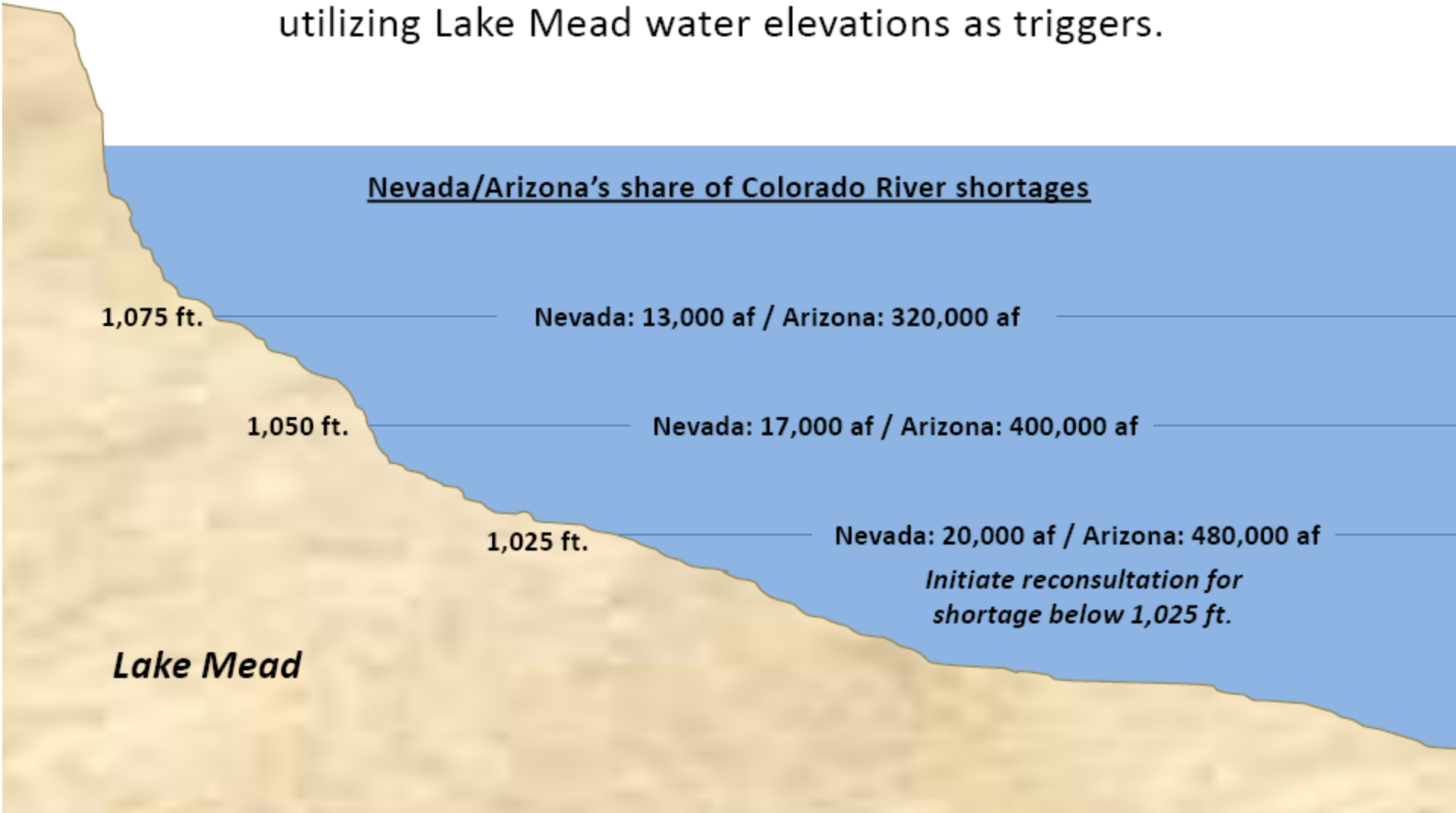
Lower Basin Drought Impacts

- Critical Mead Elevations
  - Water Quantity
    - 2007 Interim Guidelines Shortages
    - Worst Case
    - Nevada's Ability to Deliver Water
    - Delivery Constraints at Glen Canyon Dam
  - Water Quality
  - Power Generation at Hoover Dam
- ICS Benefits to Mead Elevations

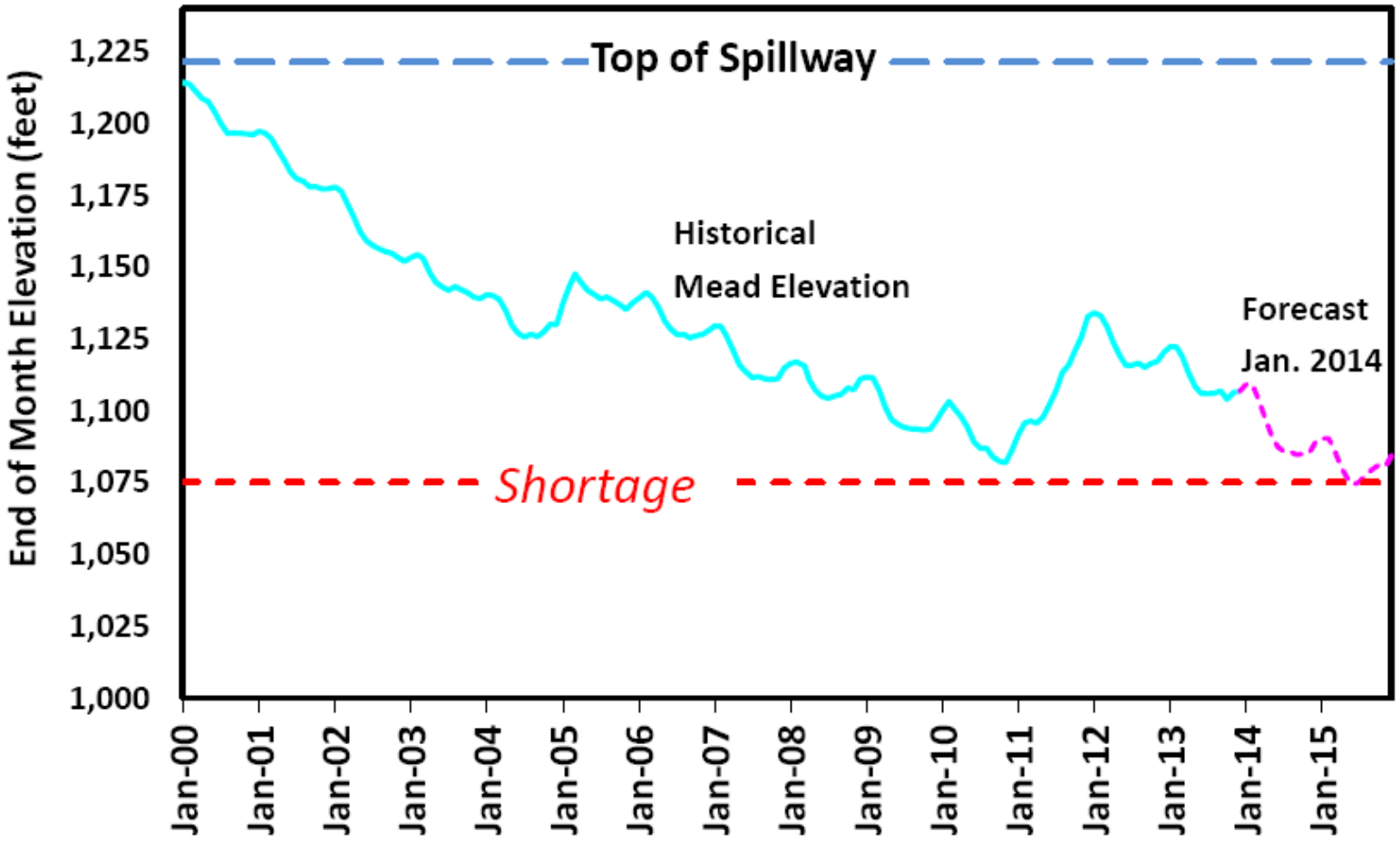


Lower Basin Shortage

The Basin States developed a framework to manage shortages, utilizing Lake Mead water elevations as triggers.



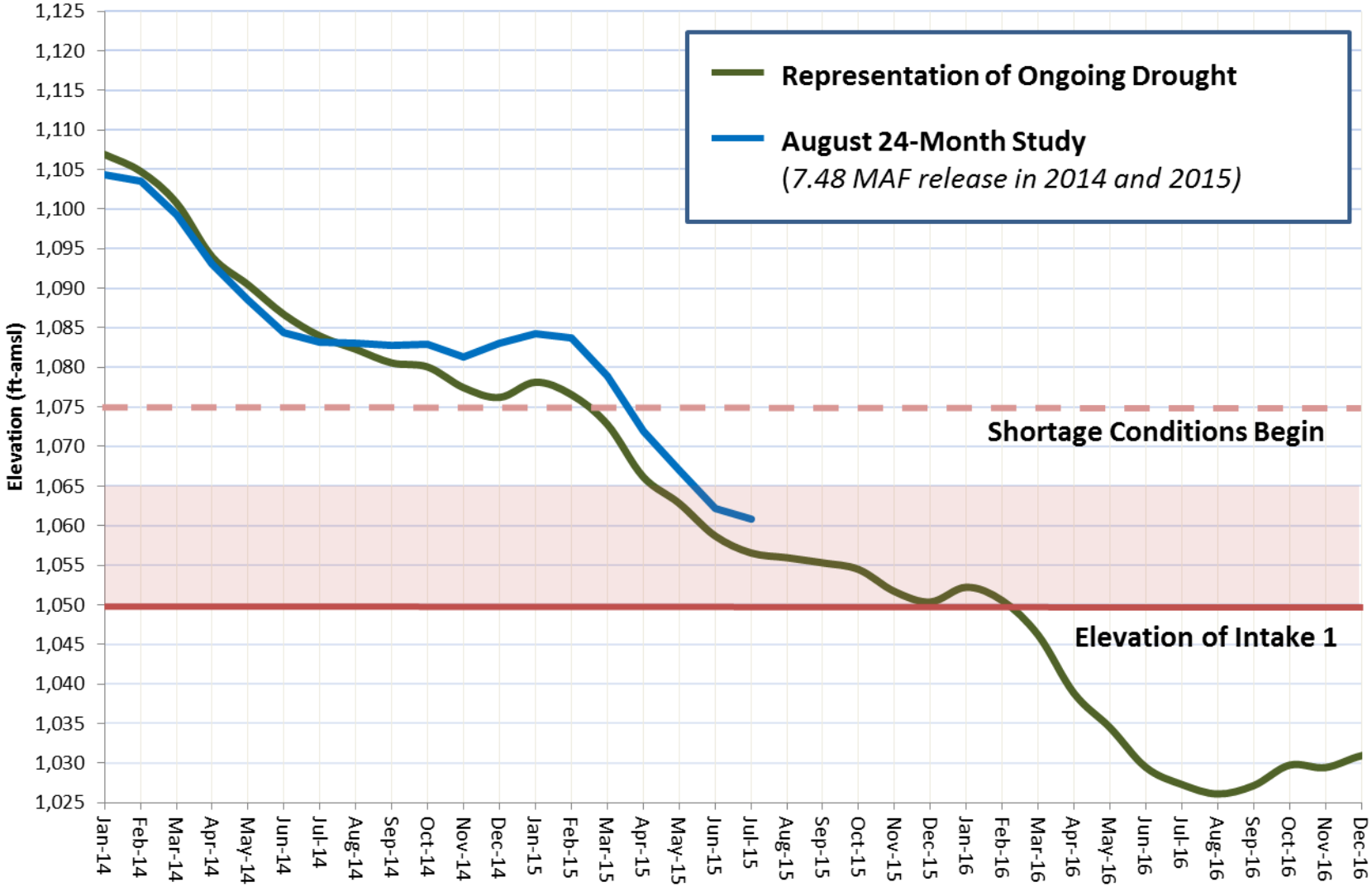
Projected Lake Mead Elevation



Source: Bureau of Reclamation

January 2014 24-Month Study; WY2014 Release - 7.48 maf; WY2015 Projected – 9.0 maf

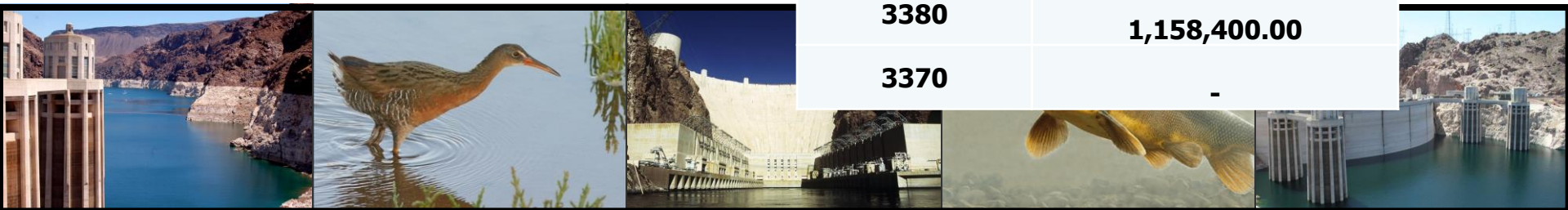
Lake Mead Elevation Projections



Glen Canyon Dam Release Constraints

- Powell's release becomes constrained below elevation 3,490 because only the bypass tubes are available to deliver water

Powell Elevation	Maximum Annual Delivery
3490	10,599,360.00
3480	10,483,520.00
3470	10,193,920.00
3460	9,788,480.00
3450	9,093,440.00
3440	8,282,560.00
3430	7,413,760.00
3420	6,371,200.00
3410	5,096,960.00
3400	3,475,200.00
3390	2,316,800.00
3380	1,158,400.00
3370	-



Impact of Drought on Nevada's Ability to Deliver Allocation

Current Intake's could be lost if elevation continues to drop.

Pumping Station 1 = 1050 ft lake elevation.
Pumping Station 2 = 1000 ft lake elevation.

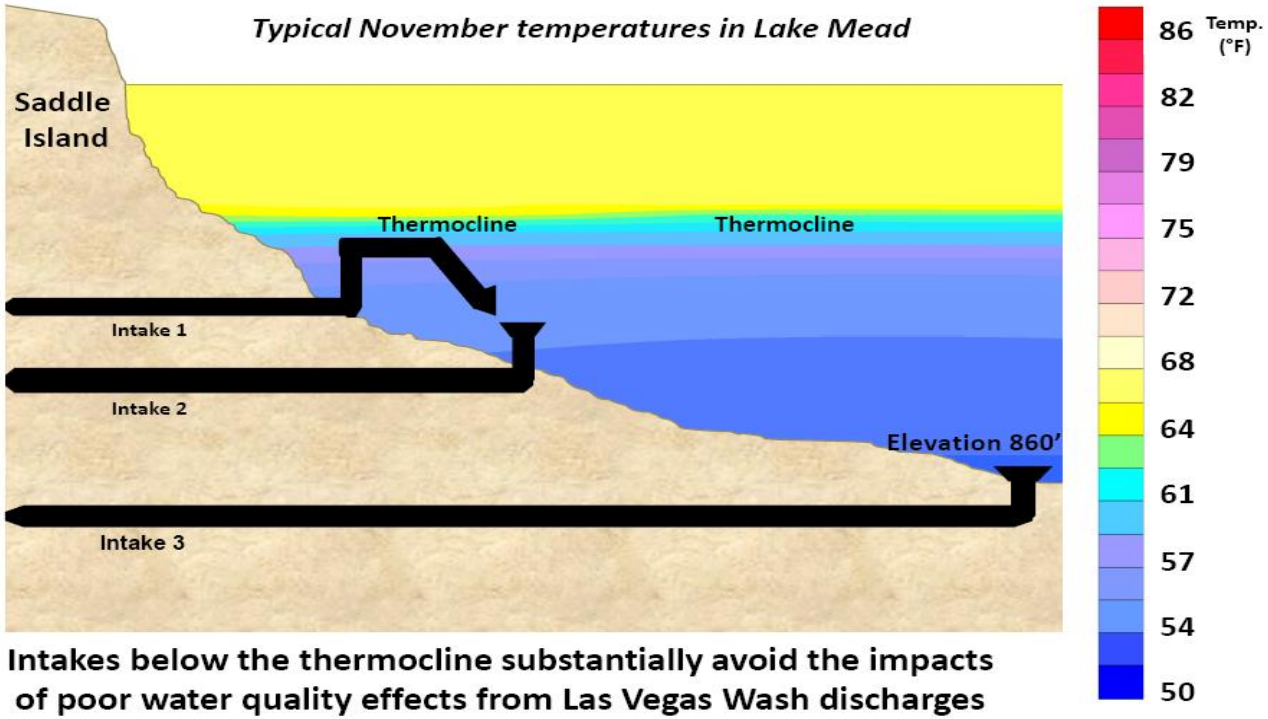
Pumping station 2 can currently handle delivery of current allocation

Long term plans include a pumping station 3



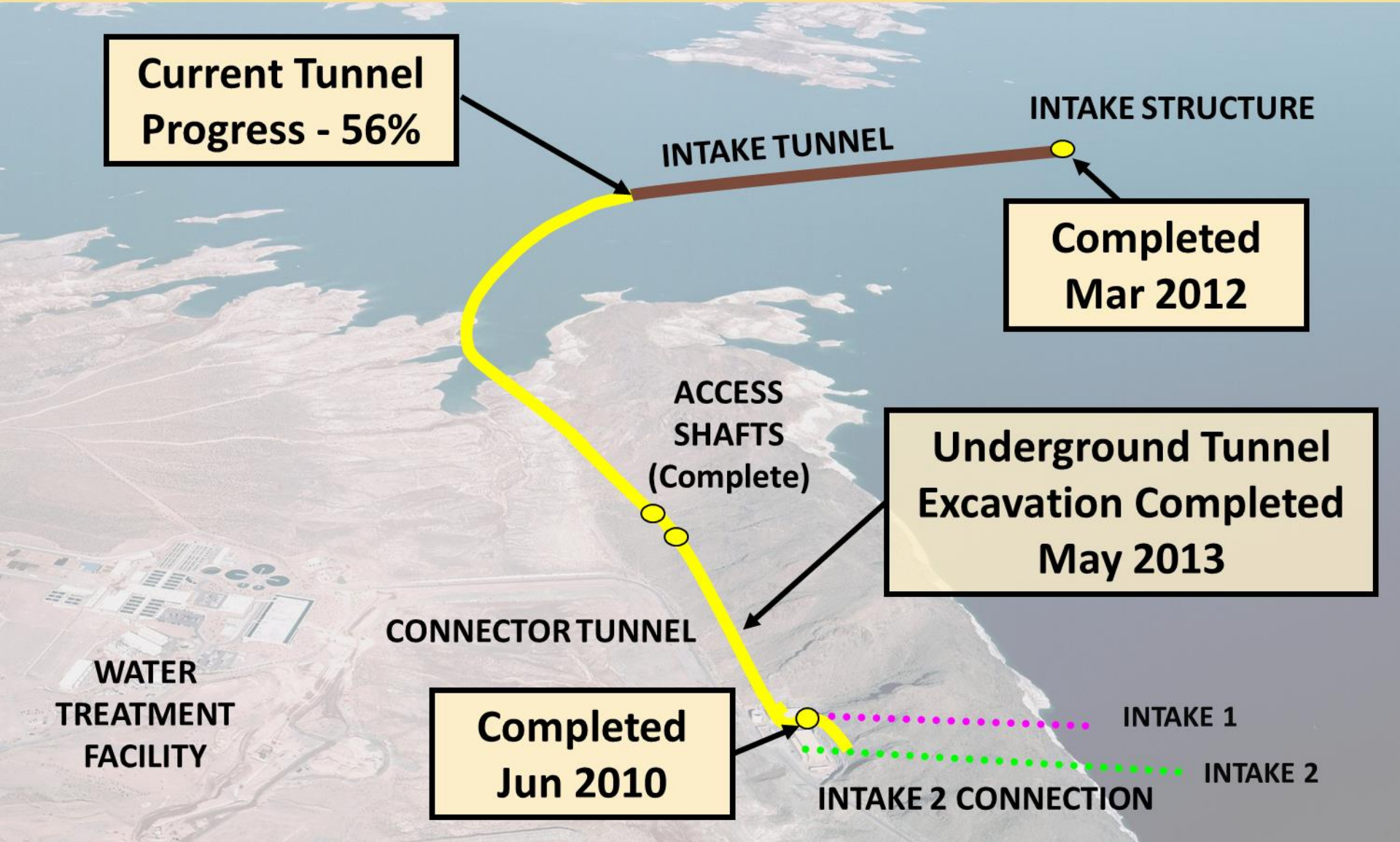
Water Quality Concerns from Lowering Lake Levels

- As Lake Mead lowers the warmer surface waters get closer to the Intakes.
- Using water below the thermocline avoids the presence of pollutants from the Las Vegas Wash.
- Third Intake will provide better water quality and less expensive treatment processes to meet Safe Drinking Water standards (to remove pollutants).



Intakes below the thermocline substantially avoid the impacts of poor water quality effects from Las Vegas Wash discharges

Lake Mead Intake No. 3
Current Progress – Jan 2013

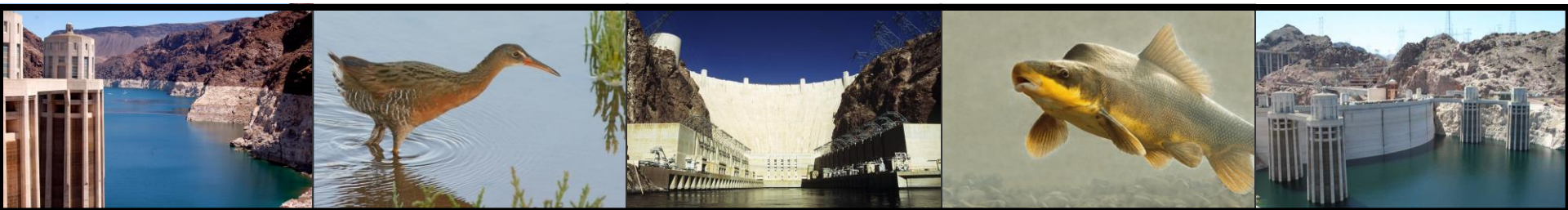


Intentionally Created Surplus (ICS)

Storage in Lake Mead as of December 31, 2012

State	**Storage** (AF)	**Feet***
Nevada	512,804	5.7
California	579,786	6.4
Arizona	103,050	1.1
Total	1,195,640	13.3

*90,000 acre feet storage per 1 foot of storage at elevation 1,100

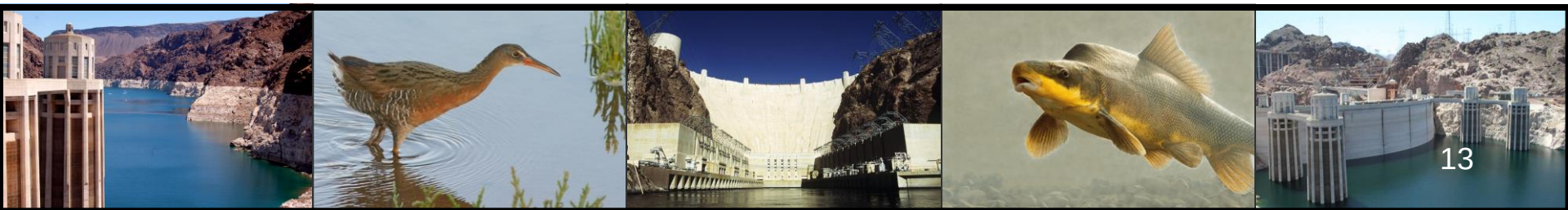


Lake Mead Elevations Impact on Power Generation

- Hoover will be able to pass water and generate power down to low Lake Mead elevations
  - The efficiency and power output will be decreased
  - Cavitation damage and rough zones will increase
- Lower lake levels will force multiple units online thereby decreasing efficiency
  - 5 wide head turbines with better regulation capability will be operational by 2017

Hoover Dam Power Production

- Generator Description
  - 17 turbine generators
  - 2 at 62 MW; 15 at 130 MW unit capability
  - 2,074 MW combined installed capacity (full lake level)
- Lake Mead Elevation of 1050 feet
  - 1371 MW estimated capacity
- Lake Mead Elevation of 1000 feet
  - 1046 MW estimated capacity
- Lake Mead Elevation of 950 feet
  - 696 MW estimated capacity



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