

Lake Mead Intake No. 3

CRC Symposium
April 22, 2010

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Presentation Outline

- Project Need & Background
- Project Overview
- Current Status
- Future Schedule



Answering the Need

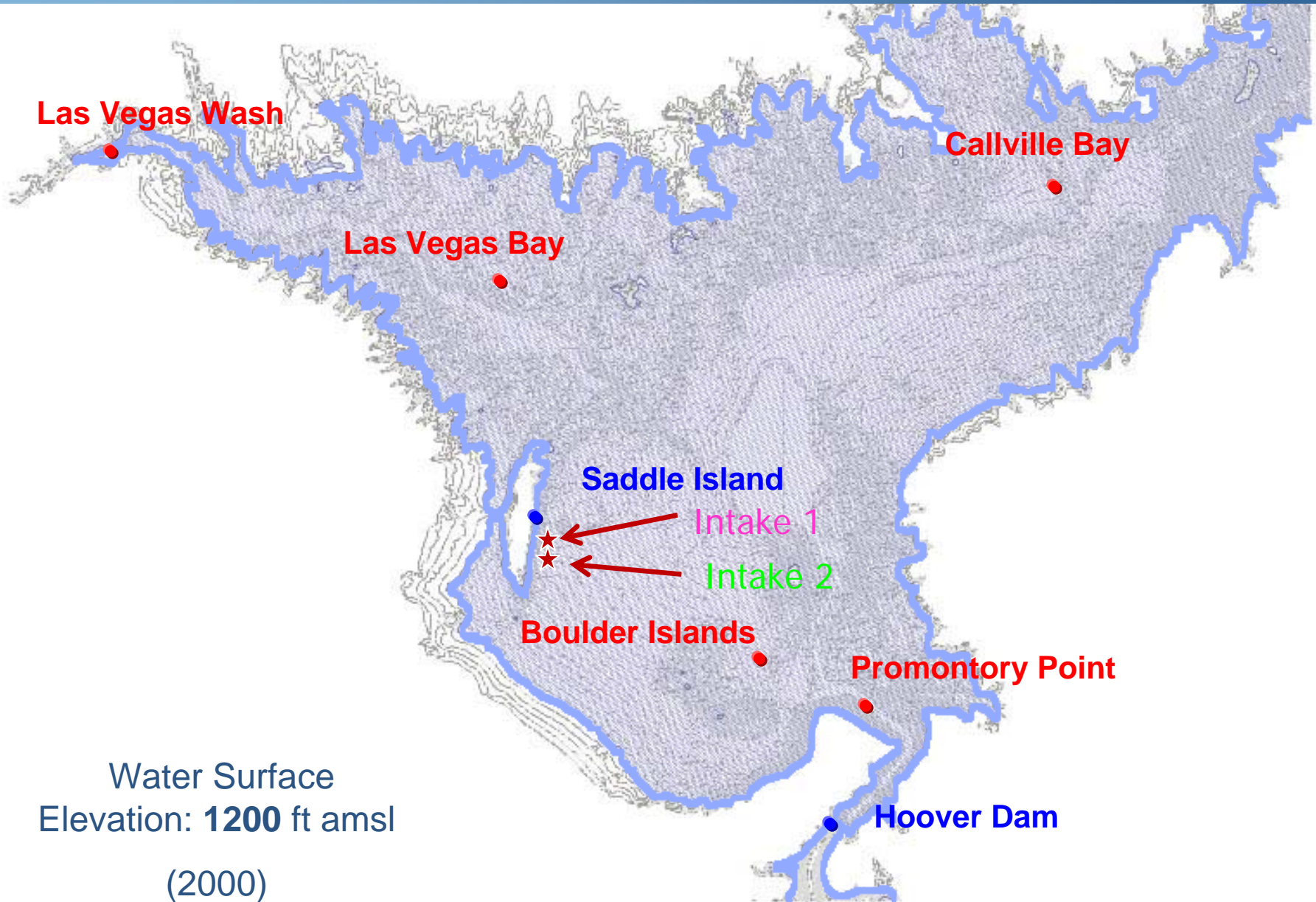
- Ongoing drought in the Colorado River basin
- Declining lake levels
 - 11.55 of 25.88 MAF (44.7% conservation capacity*)
 - 90% of the valley's water supply
- Future operability of one intake is uncertain
- Need protection from potential loss of capacity



*Capacity data: <http://www.usbr.gov/lc/region/q4000/hourly/rivops.html>

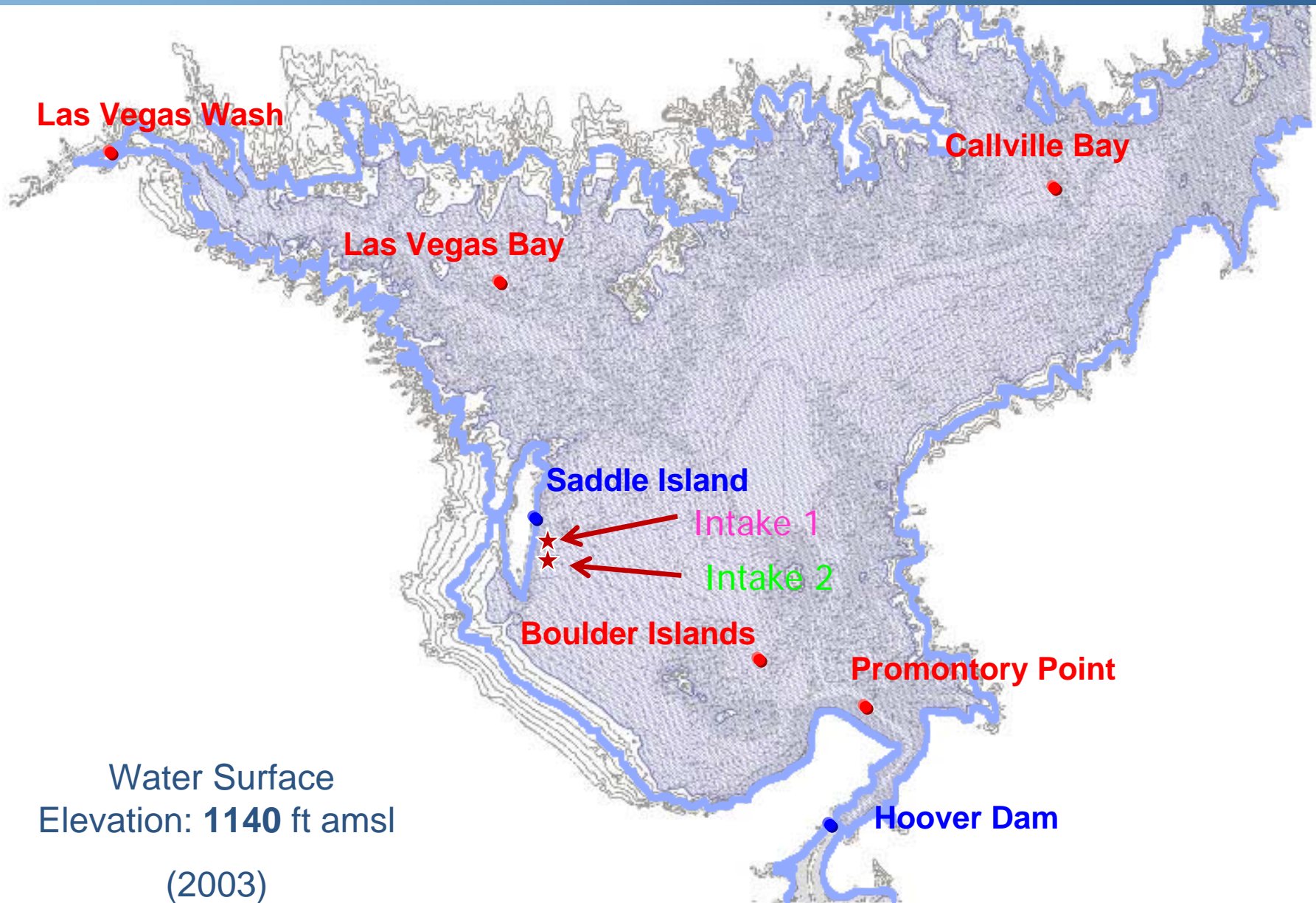


Drought



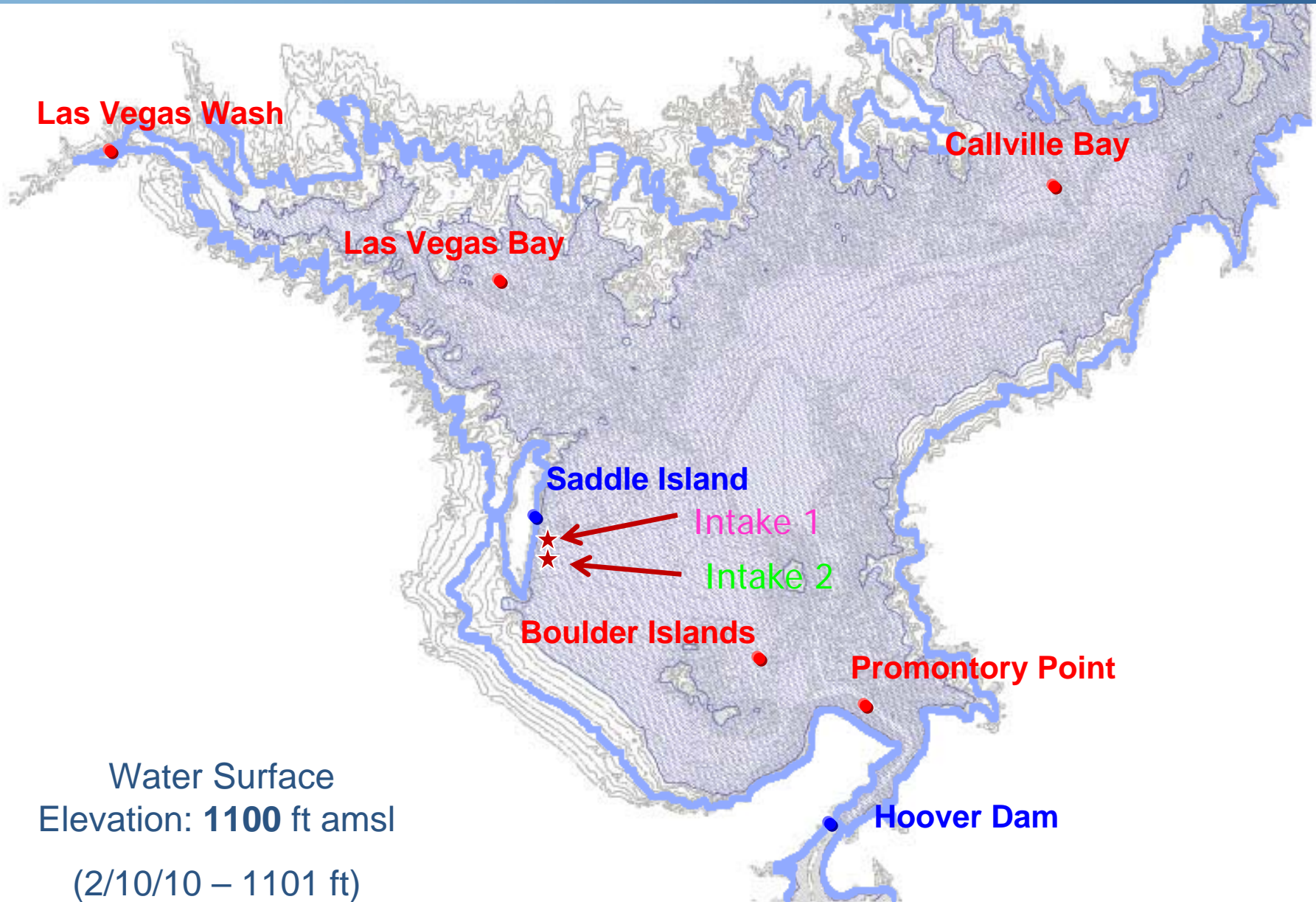


Drought



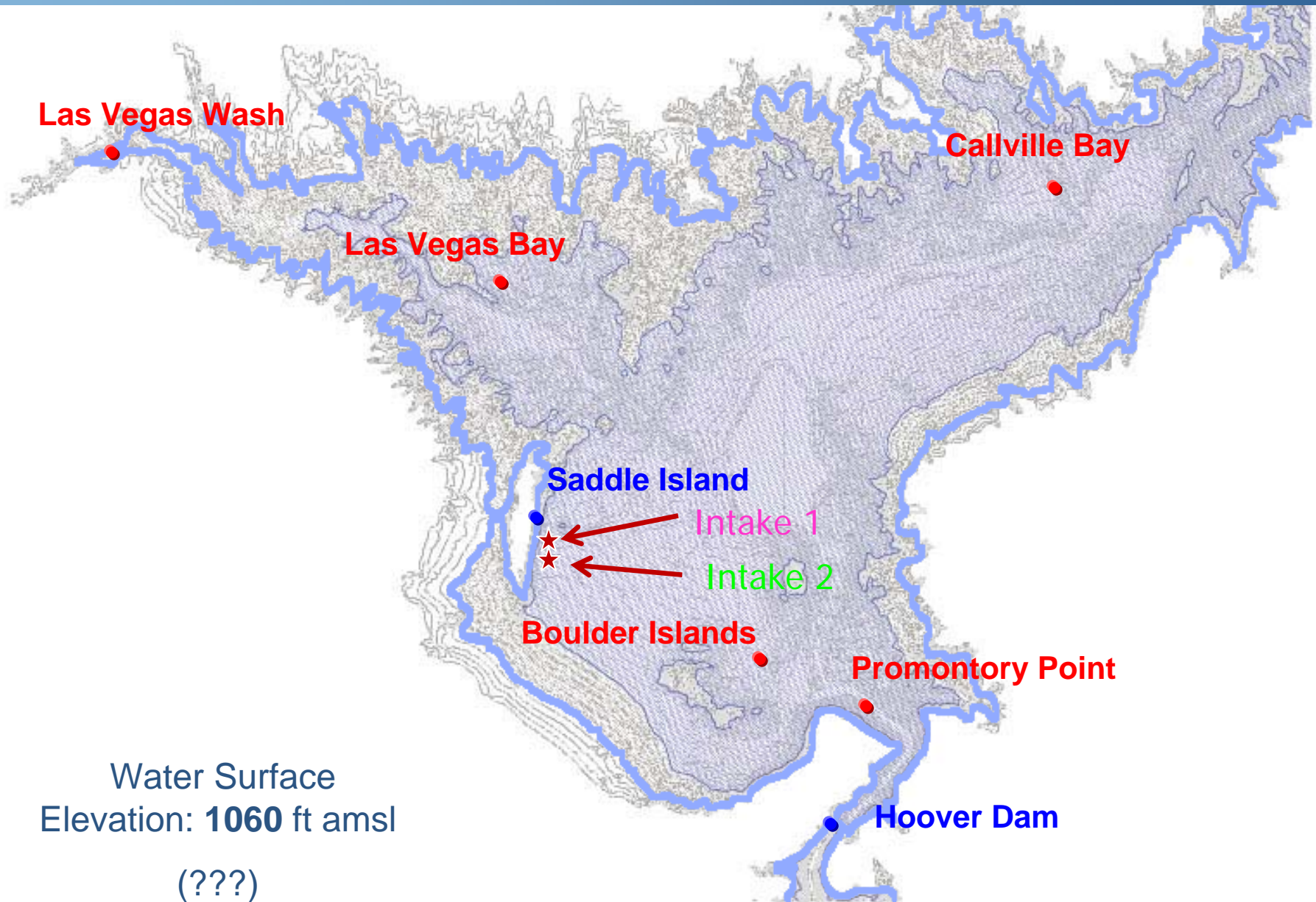


Drought





Drought



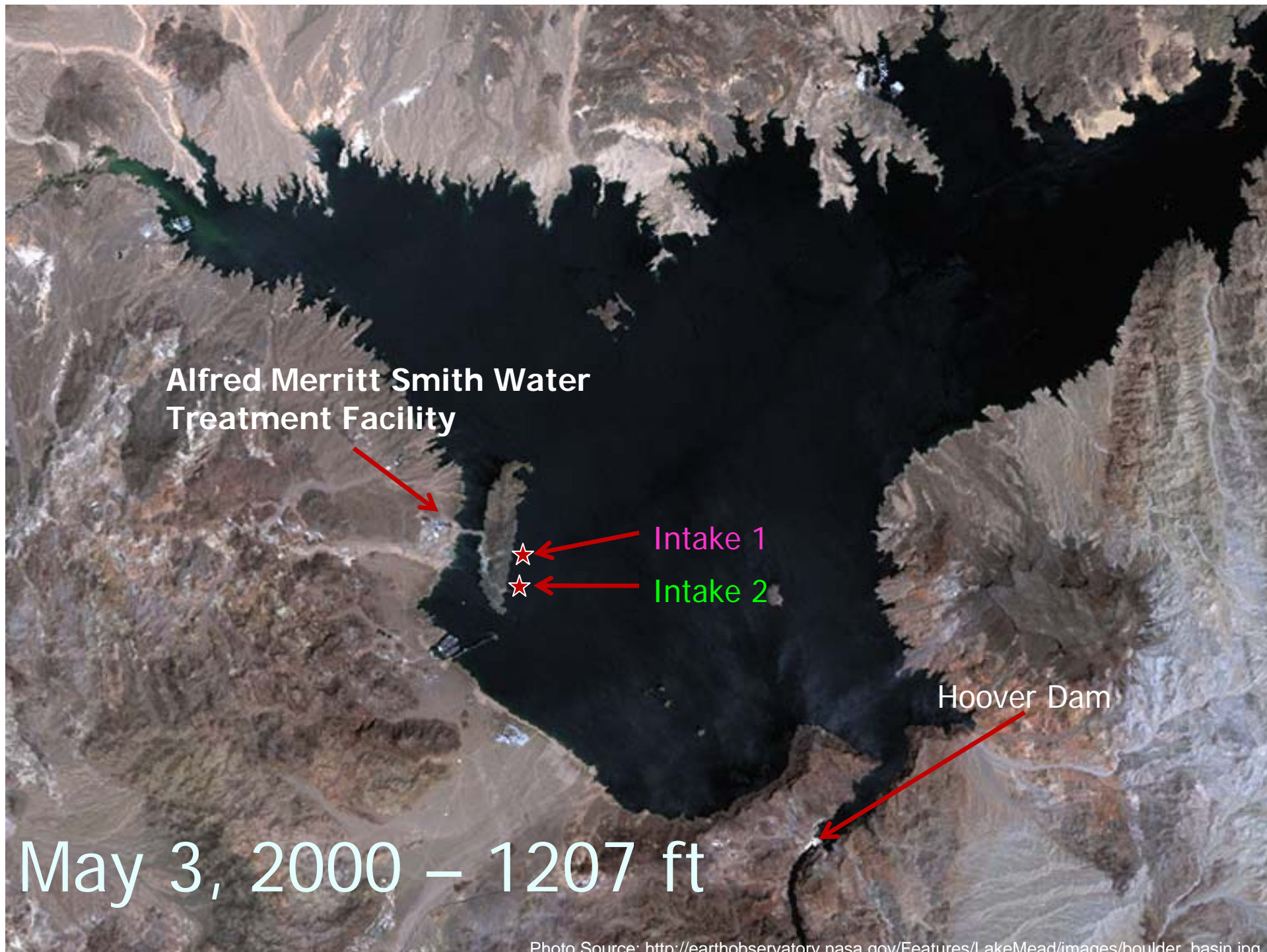


Photo Source: http://earthobservatory.nasa.gov/Features/LakeMead/images/boulder_basin.jpg

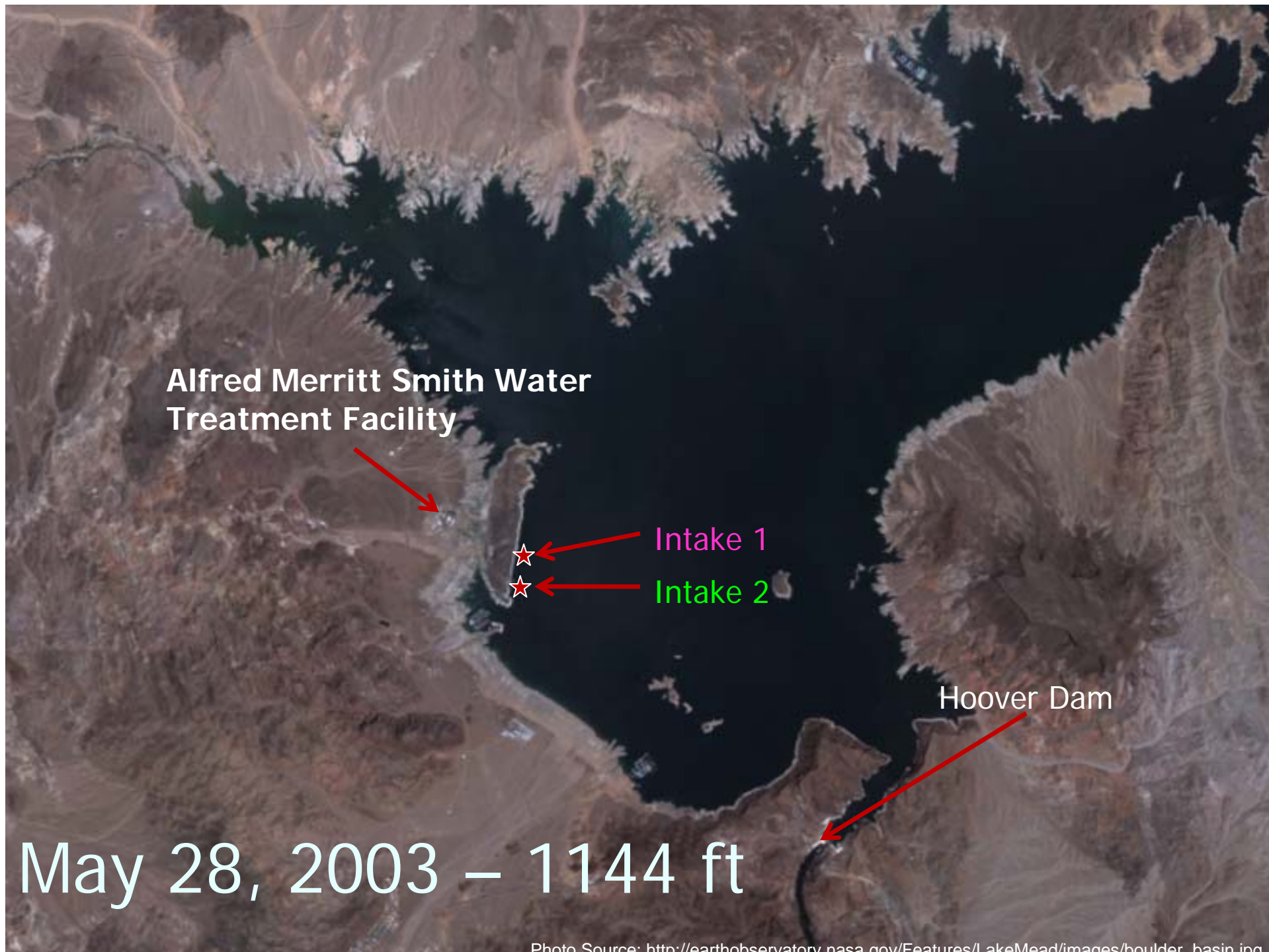
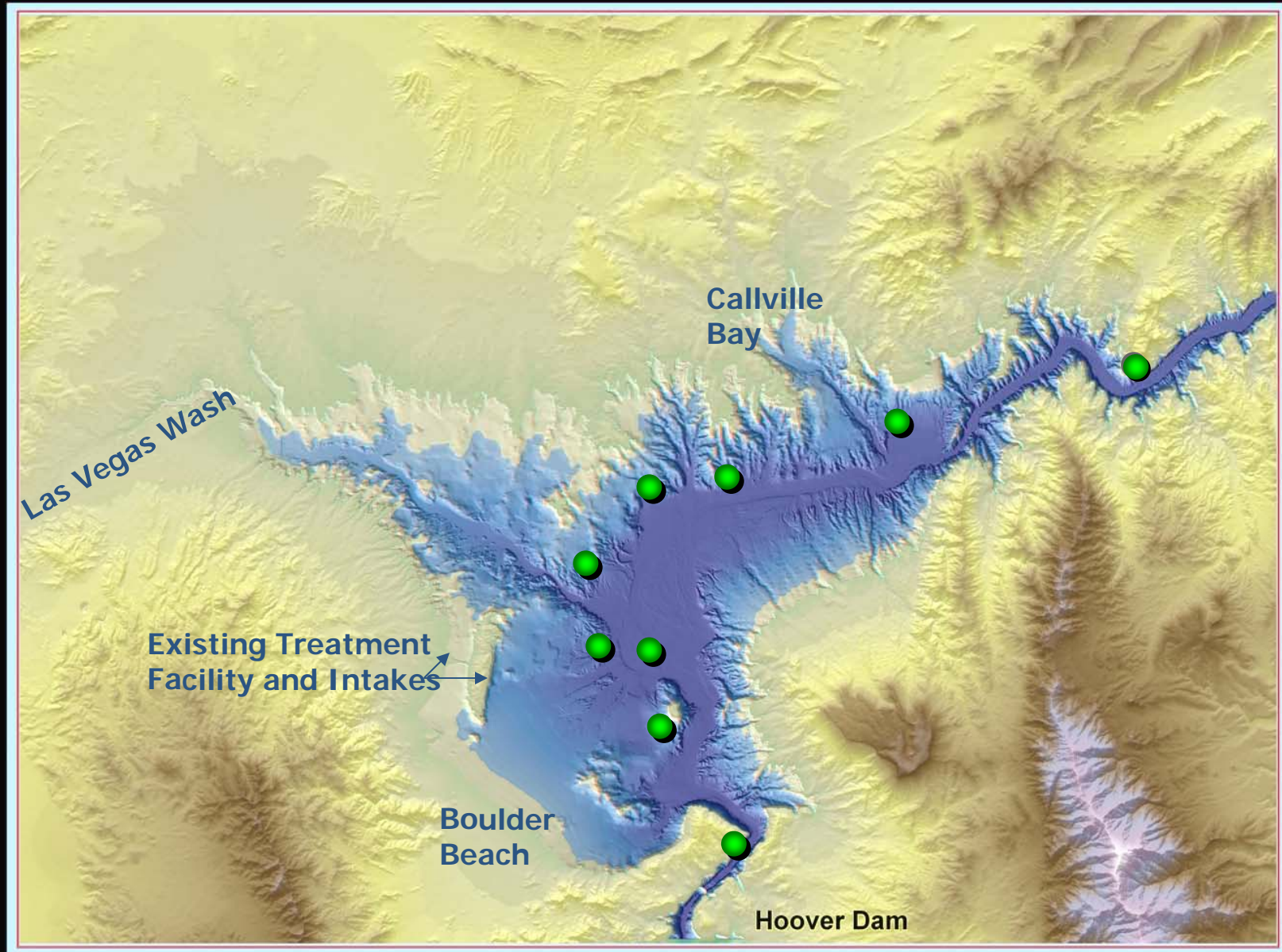


Photo Source: http://earthobservatory.nasa.gov/Features/LakeMead/images/boulder_basin.jpg

Intake Sites Evaluated

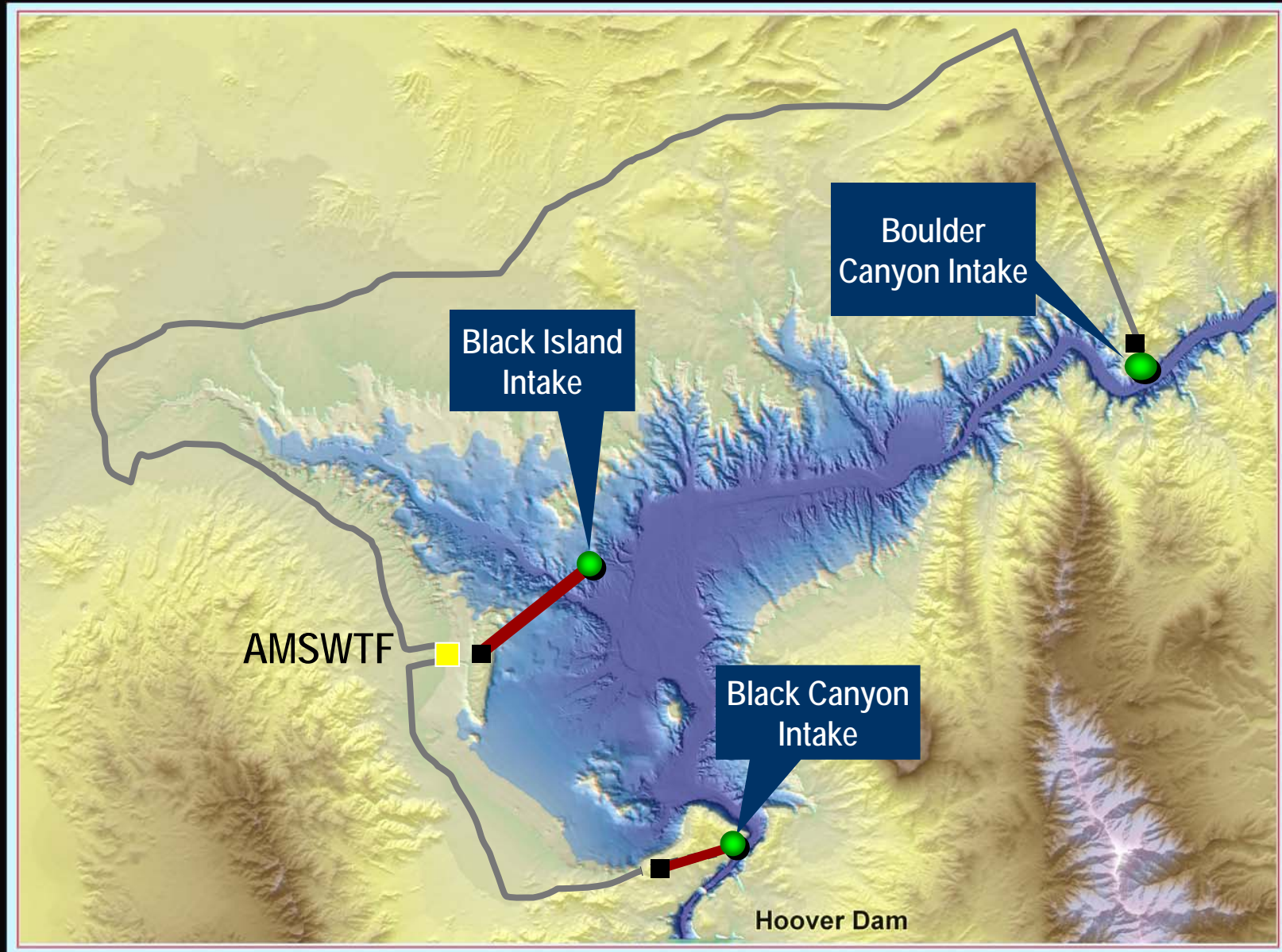


Intake Evaluation

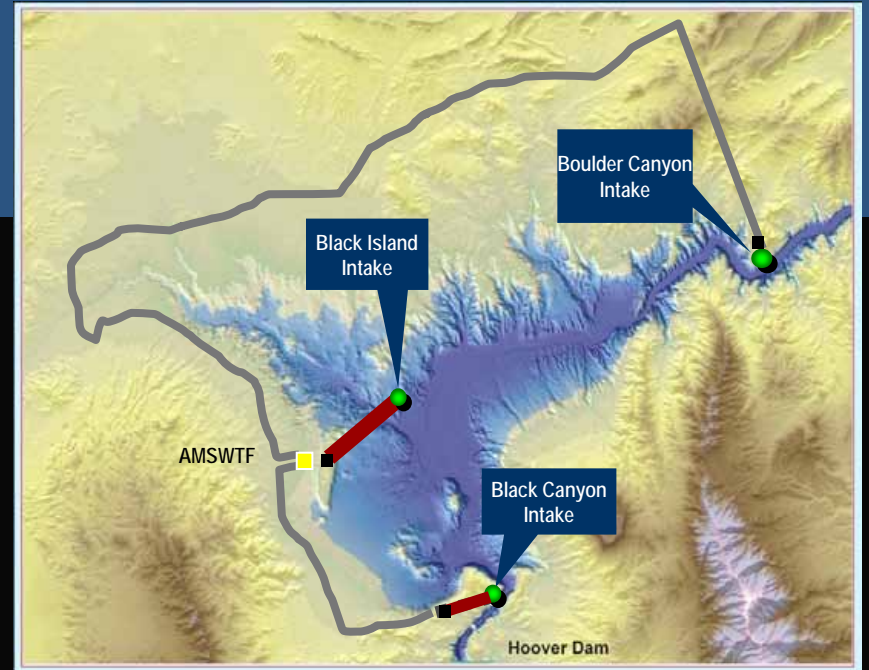
Evaluation Considerations:

- Suitability for water withdrawals below thermocline
- Operations and maintenance requirements
- Environmental impacts
- Permitting requirements
- Construction difficulty
- Cost

Shortlist of Intake Alternatives



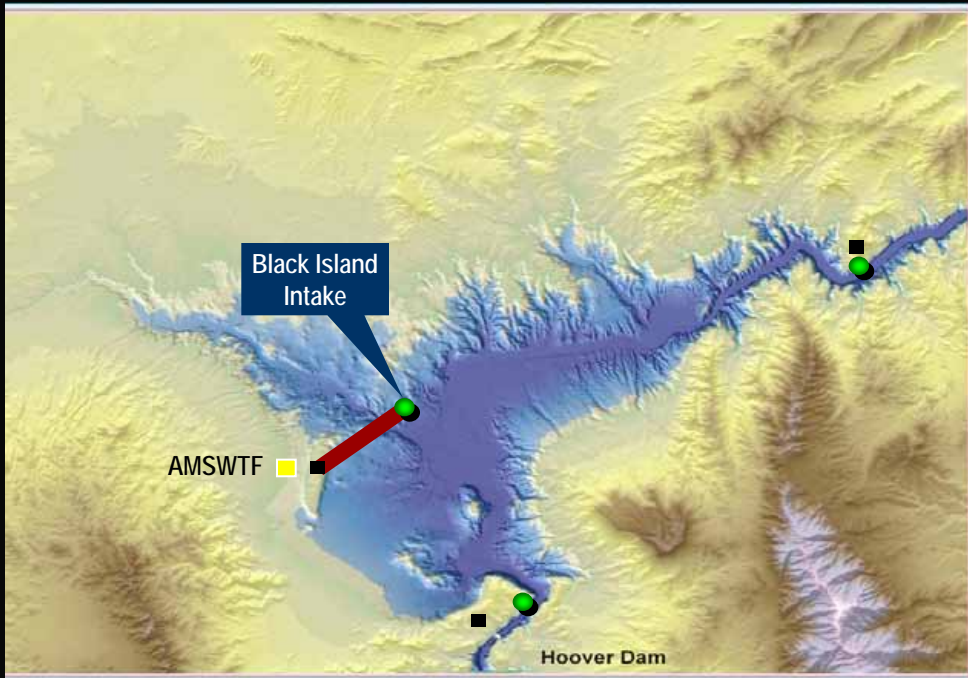
Summary of Alternatives



Intake Alternative	Suitable Intake Location	O&M Issues	Enviro. Issues	Permit Issues	Construction Difficulty	Estimated Cost (\$millions)
Black Canyon Intake						\$860
Black Island Intake						\$650
Boulder Canyon Intake						\$1,820

Recommended Intake Alternative

Black Island Intake



- Good raw water quality benefits
- Least permitting concerns
- Least comparative cost
- Most effectively shares existing infrastructure:
 - AMSWTF
 - IPS1 and IPS2

Existing Lake Mead Water Facilities

Intake No. 1

- Intake Pumping Station No. 1 (IPS-1)
- Pumping Capacity – 600 mgd
- Supplies AMS Water Treatment Facility
- 600 mgd treatment capacity

Intake No. 2

- Intake Pumping Station No. 2 (IPS-2)
- 600 mgd Pumping Capacity
- Supplies RM Water Treatment Facility
- 300 mgd treatment capacity



Source: MapQuest

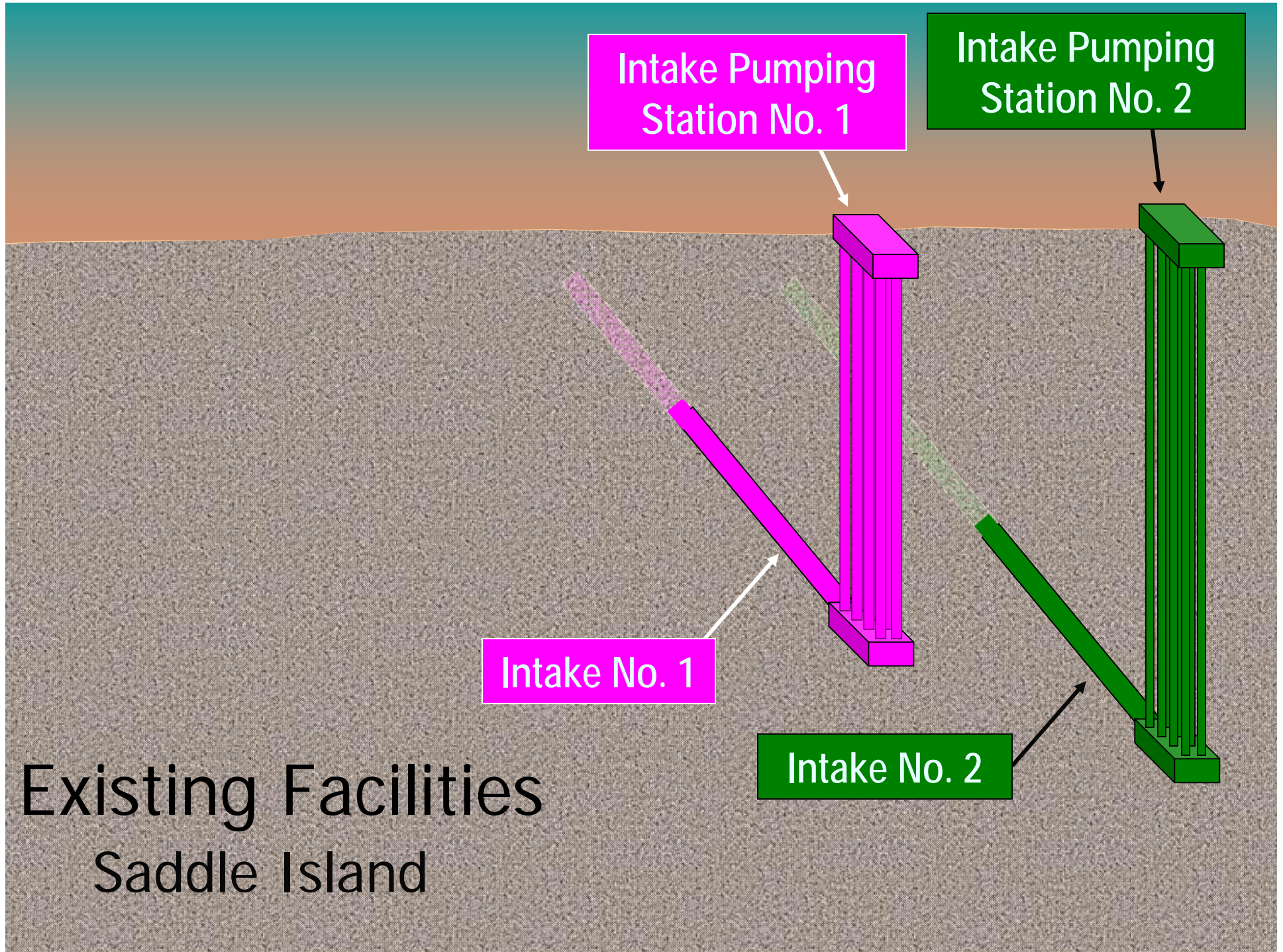
Intake Pumping
Station No. 1

Intake Pumping
Station No. 2

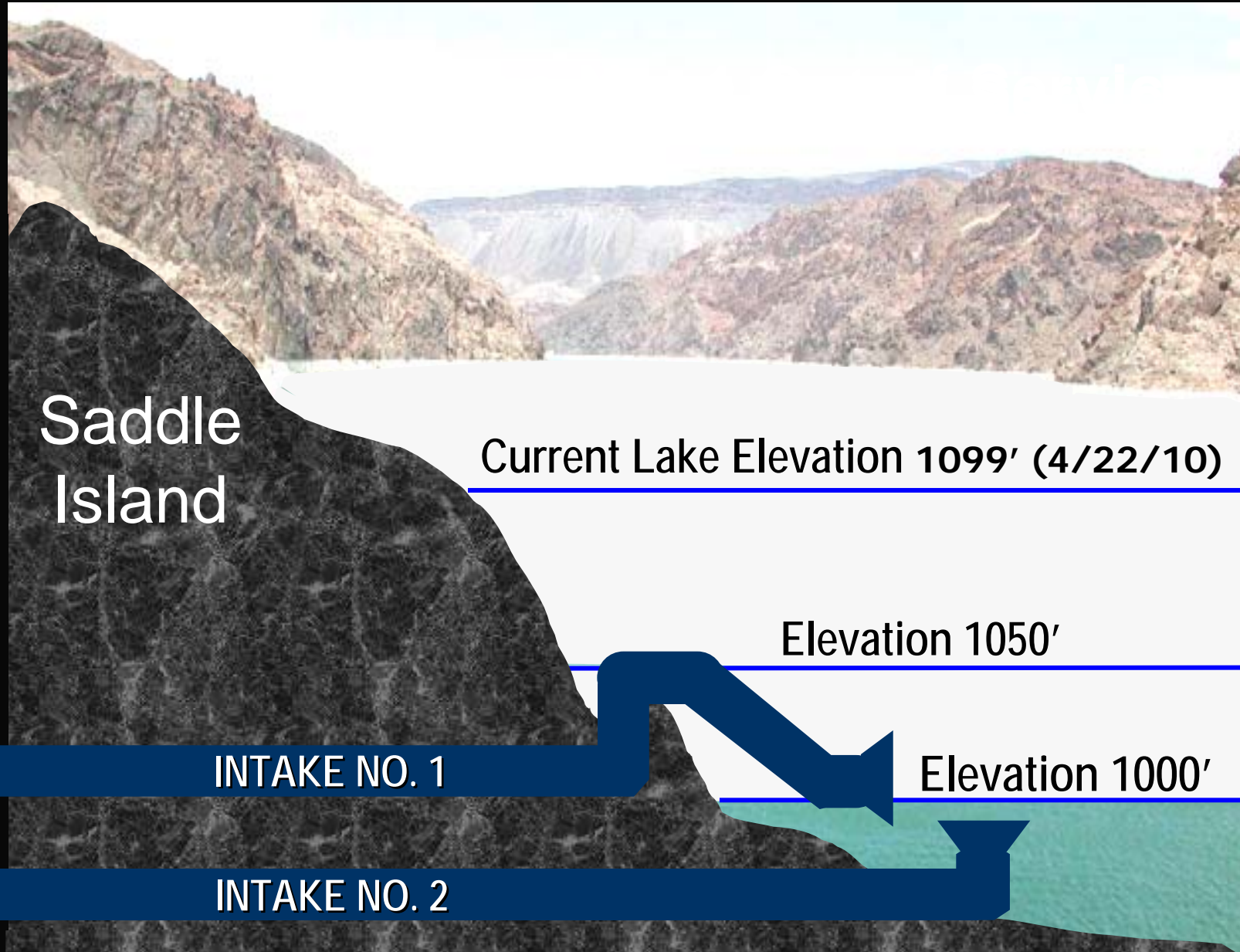
Intake No. 1

Intake No. 2

Existing Facilities
Saddle Island



Lake Mead Water Level Impacts



Impacts of Lower Lake Level

- **If the lake level falls below 1,050 feet:**
 - Intake No. 1 will be out of service
 - Capacity will be reduced from 900 to 600 mgd

A new intake system will be needed
to preserve existing capacity
if lake levels continue to decline.

Project Objectives

Intake No. 3 - Primary Objective

- Preserve existing capacity if lake levels fall below elevation 1,050 feet

Intake No. 3 - Secondary Objectives

- Improve water quality
- Improve system reliability and operational flexibility

SNWA Lake Mead Intake No. 3

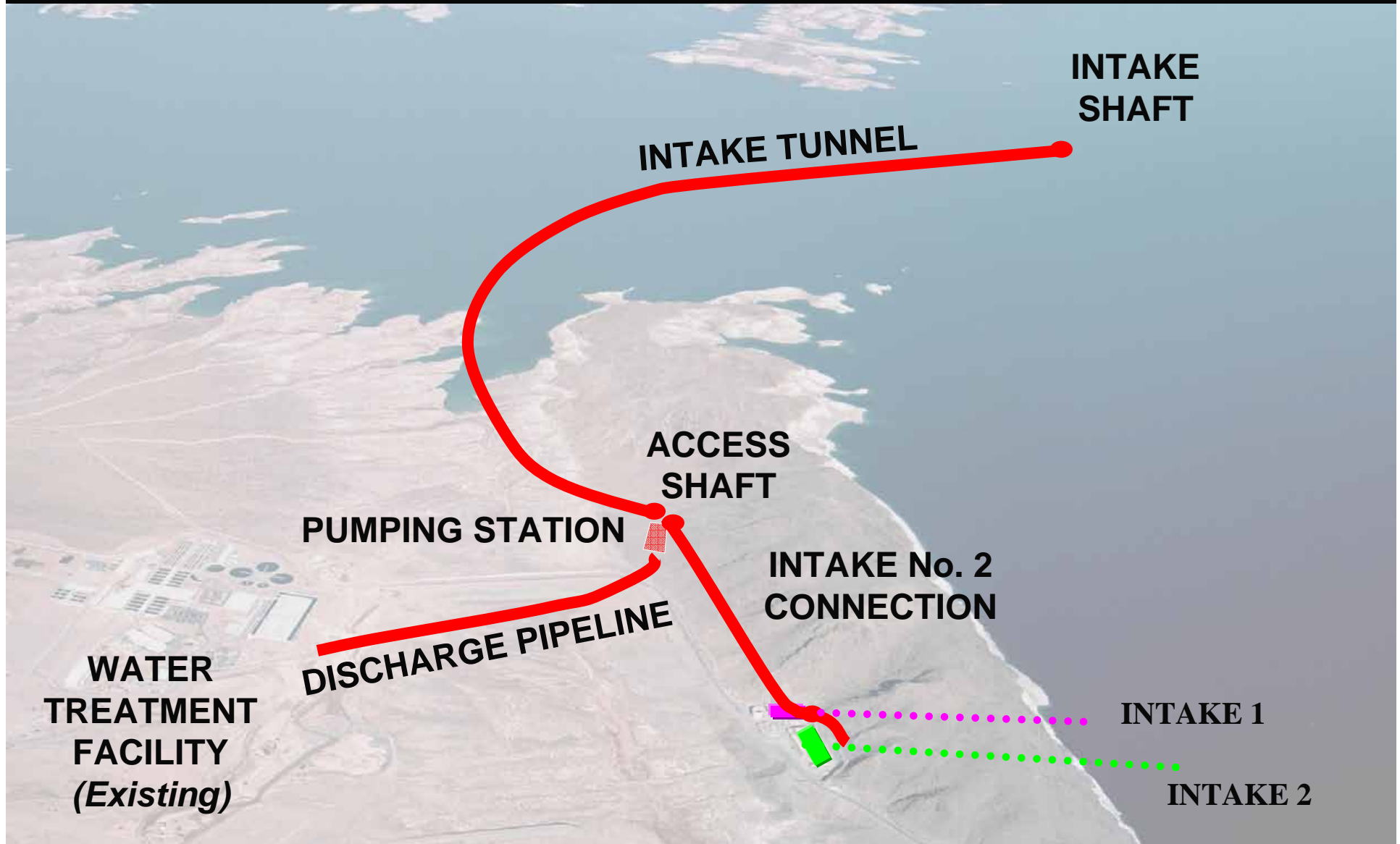
Project Description

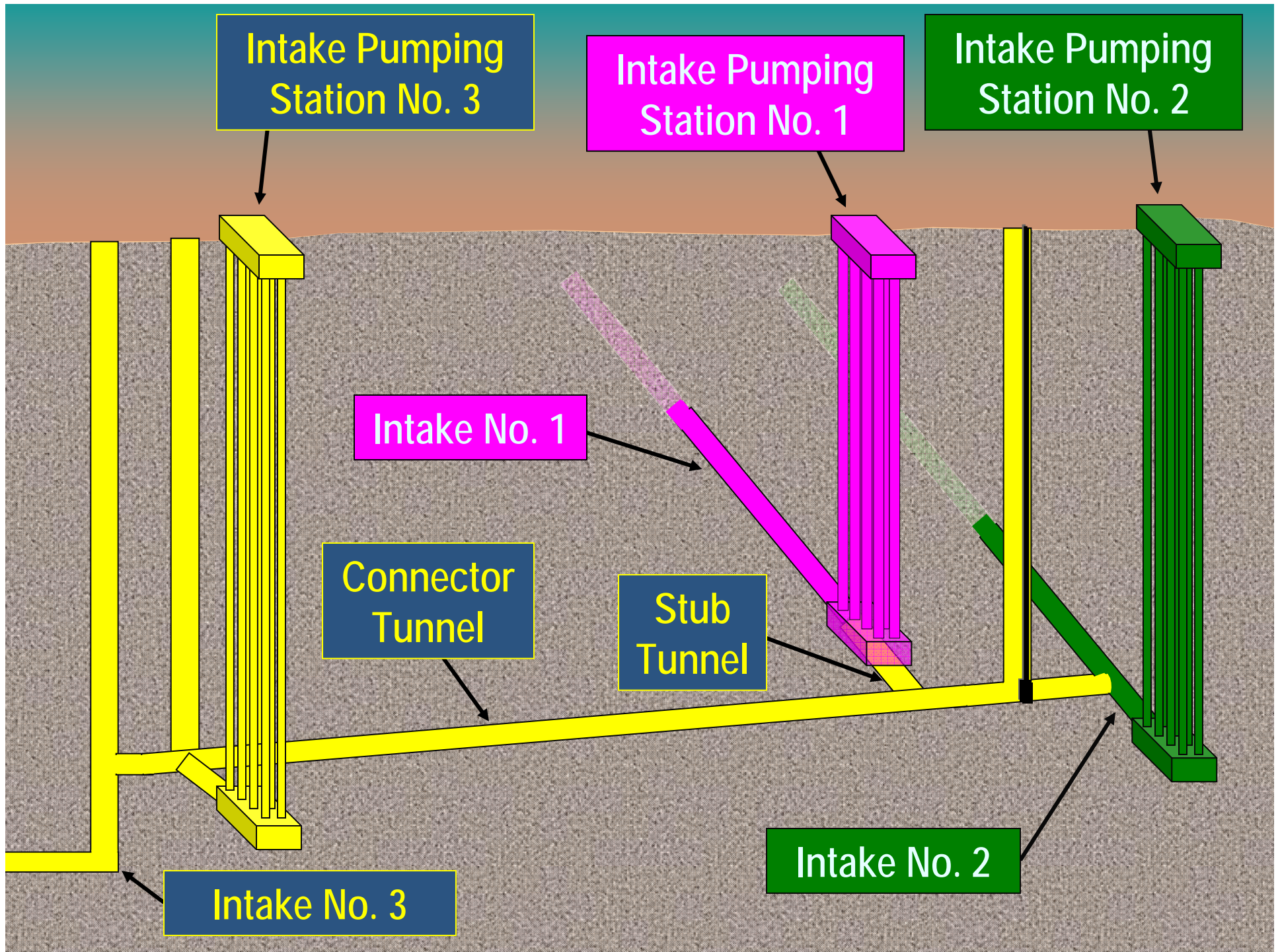
The Project – Lake Mead Intake No. 3

- Approved by SNWA Board of Directors May 2005
- Six contracts (originally), \$817 Million total (est)...
now three major contracts \$530M (est)
- Completion 2013



"070F" - Lake Mead Intake No. 3





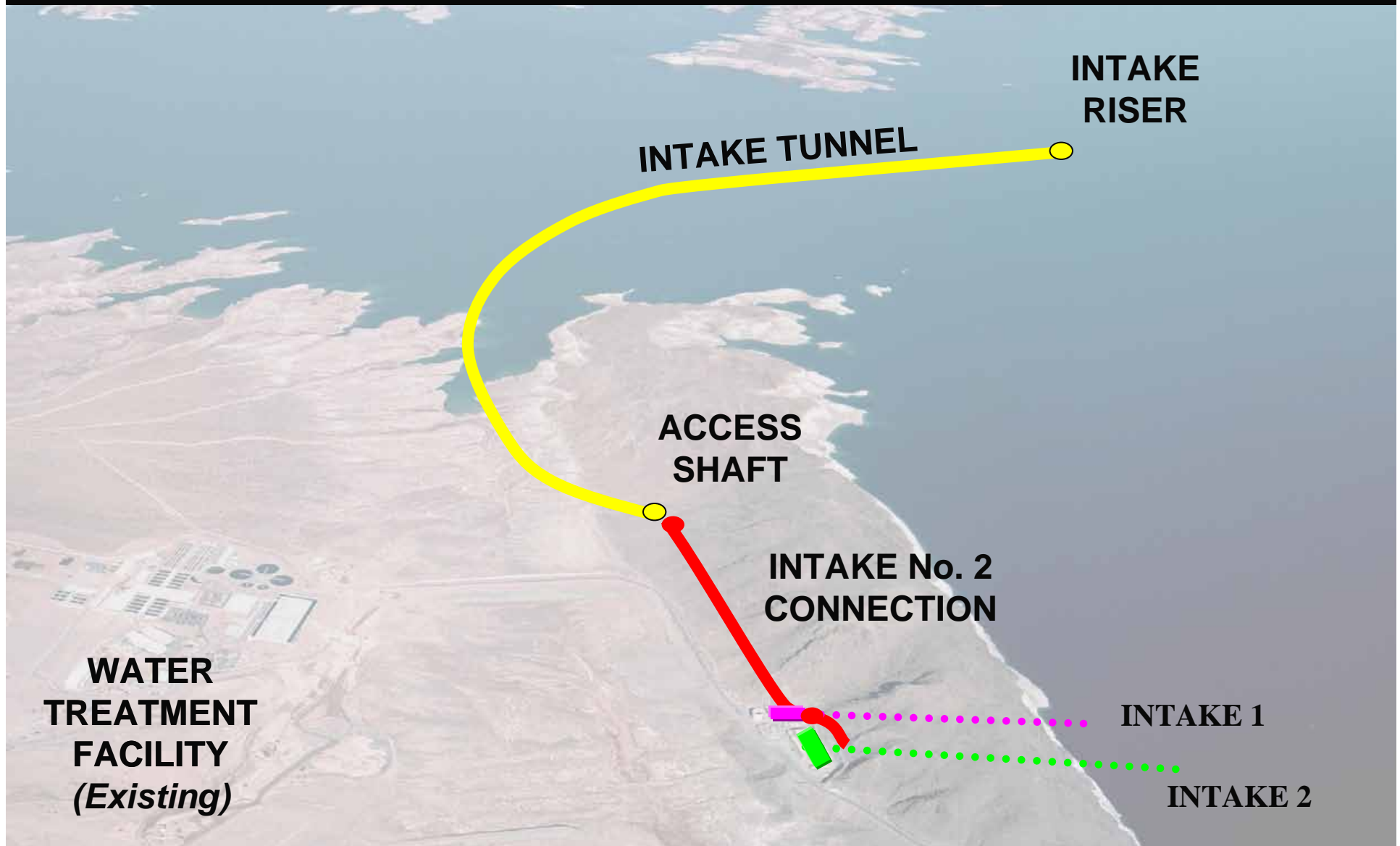
Technical Challenges

Intake No. 3

- Underground work - environment & nature
- Schedule – drought driven
- Varying ground conditions – Solid to weak & fractured
- Potential high water pressure – 17 bar
- Interfaces -
 - between contracts
 - existing facilities
- NPS area – public coordination/minimize impacts

How these are addressed....

"01"- Intake No. 3 Shafts & Tunnel



"01"- Intake No. 3 Shafts & Tunnel

Vegas Tunnel Constructors (Design-Build) ~ \$447 million

Shaft

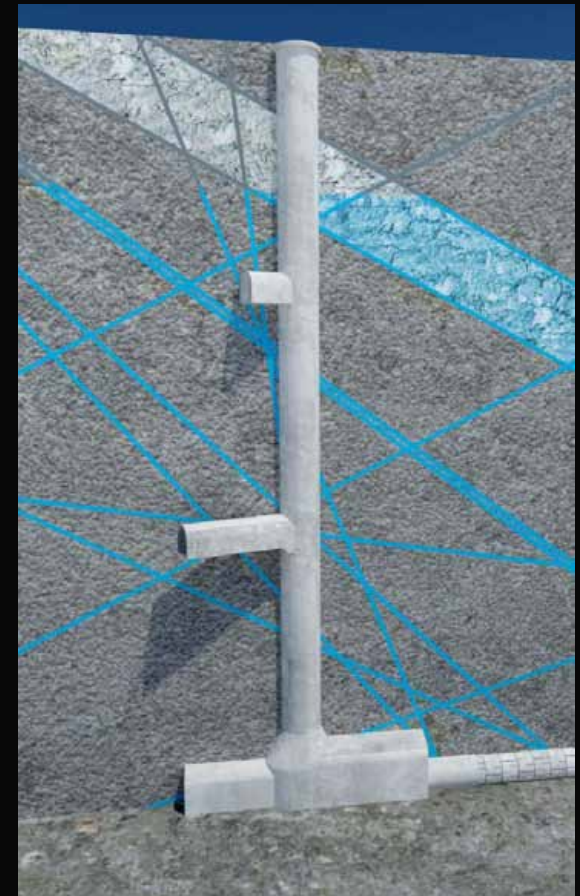
- ~ 600' deep
- 30' interior diameter

Tunnel

- Launch Chamber ~ 202' long, 47' W x 35' H
- Starter Tunnel ~ 348' long, 27' W x 25' H
- TBM tunnel
 - 20' internal diameter
 - ~ 14,904' long
 - 14" concrete segmental lining

Intake Riser

- 16' diameter x 92' high
- Radial inlet



Lake Mead Intake No. 3 At-a-Glance

Profile of Intake No. 3 Tunnel and Pumping Station



Intake No. 3 –Project Site





*Intake No. 3 Shafts & Tunnel
Drill & Blast -began June 2008*



Intake No. 3 Shafts & Tunnel
Shaft Collar Forms – Elevation 1230



Intake No. 3 Shafts & Tunnel



Concrete Lining

Shaft Collar

25 July 2008



Intake No. 3 Shafts & Tunnel

Shaft Progress – 130 feet deep - 16 September 2008

Intake No. 3 Shafts & Tunnel



Drill Jumbo



Intake No. 3 Shafts & Tunnel

Shaft Progress 16 October 2008

Water control grouting



Intake No. 3 Shafts & Tunnel



Grouting Platform – Contact Grouting

Intake No. 3 Shafts & Tunnel

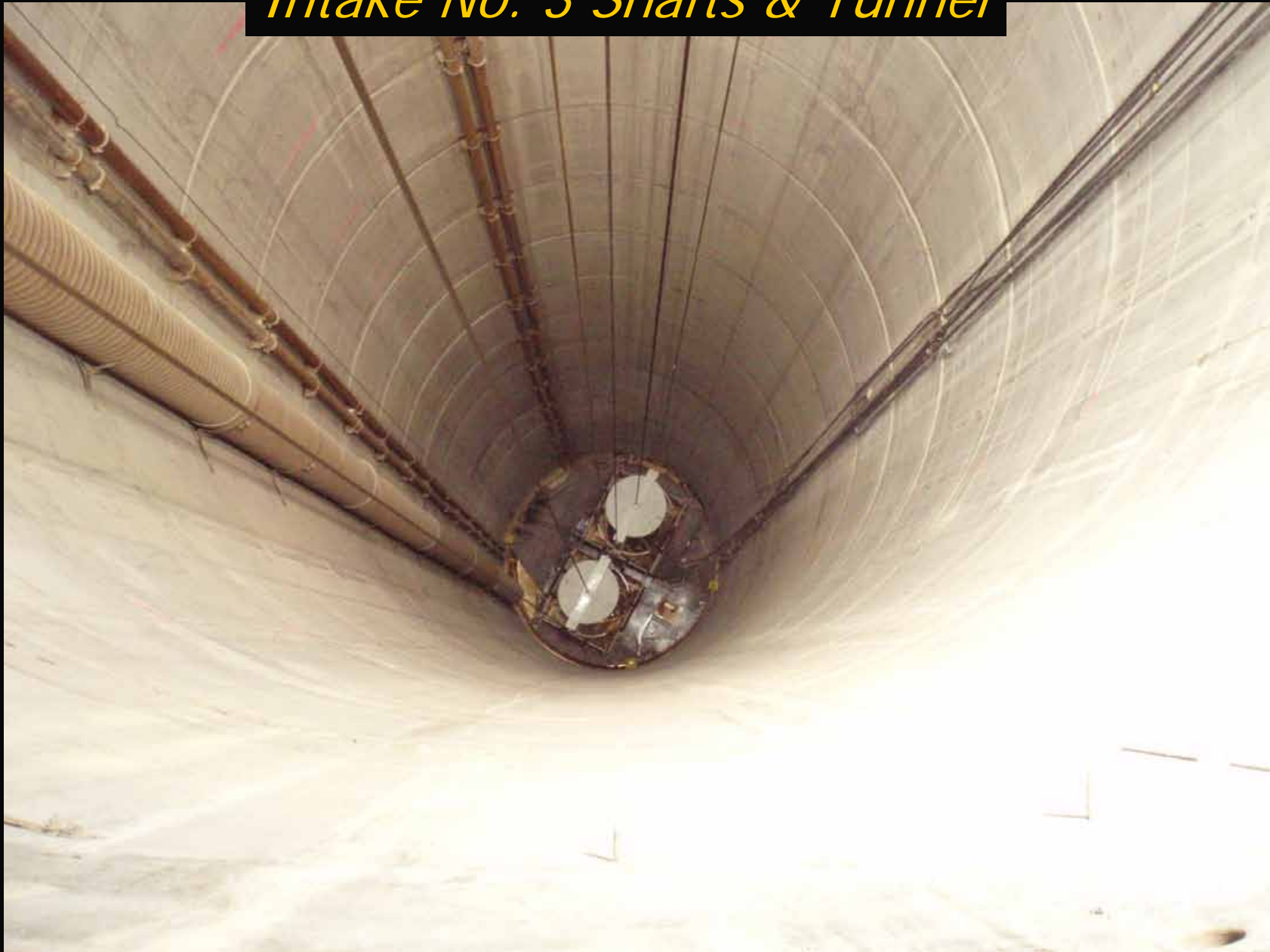


Headframe and Hoist

13 March 09



Intake No. 3 Shafts & Tunnel



Shaft Progress – Elevation 970 (19 March 09)

Intake No. 3 Shafts & Tunnel



Intake No. 3 Shafts & Tunnel



Intake No. 3 Shafts & Tunnel

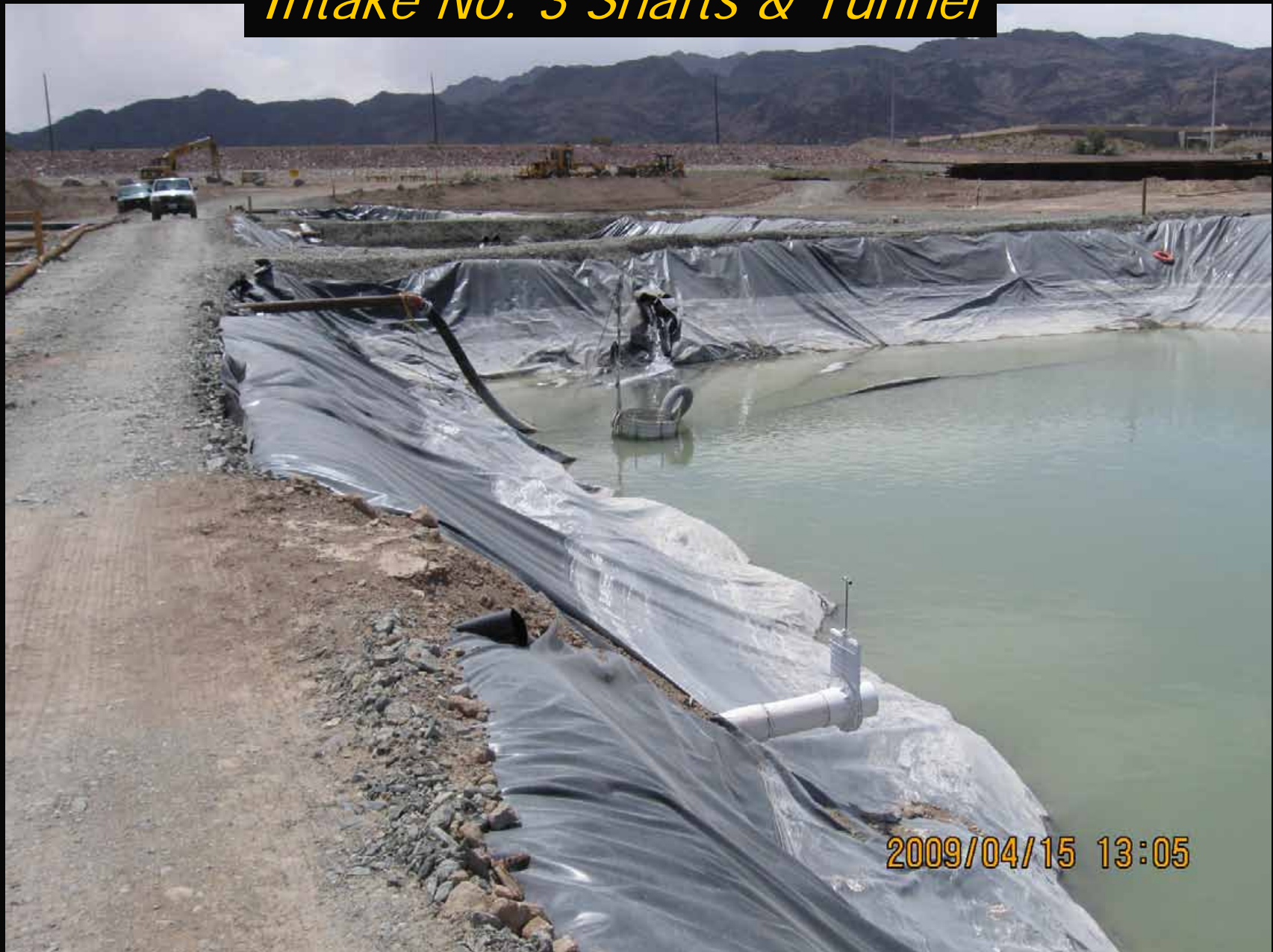


Intake No. 3 Shafts & Tunnel



Loader in Utility Stub Tunnel – Completed 24 February 2009

Intake No. 3 Shafts & Tunnel



Water Treatment Holding Ponds – 15 April 2009

Intake No. 3 Shafts & Tunnel



Water Treatment Facility – 15 April 2009

"01" - Intake No. 3 Shafts & Tunnel



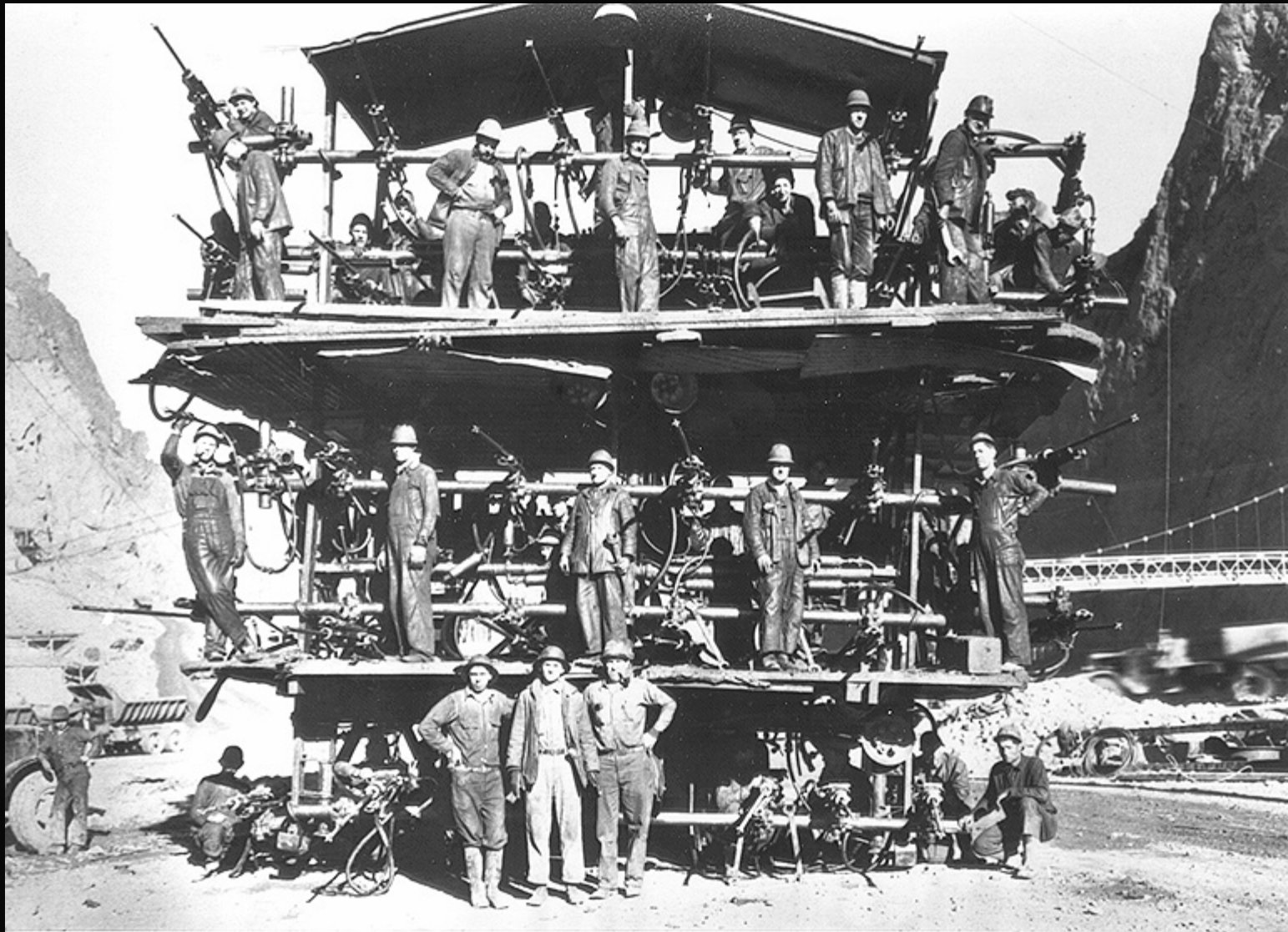
TBM Launch Chamber - Drill Jumbo Top Heading

"01" - Intake No. 3 Shafts & Tunnel



Current Progress - TBM Launch Chamber

Back then...



Drilling Jumbo Truck - Hoover Dam Diversion Tunnels

<http://www.usbr.gov/history/photos/dams007.jpg>

Now...

- Tunnel Boring Machine (TBM)
- Handle more challenging ground conditions (water pressure, etc)
- Herrenknecht
- 23.5' outside diameter



Backup (Gantry Equipment)

- 585' long
- 1500 tons

