CWC SCOP Update

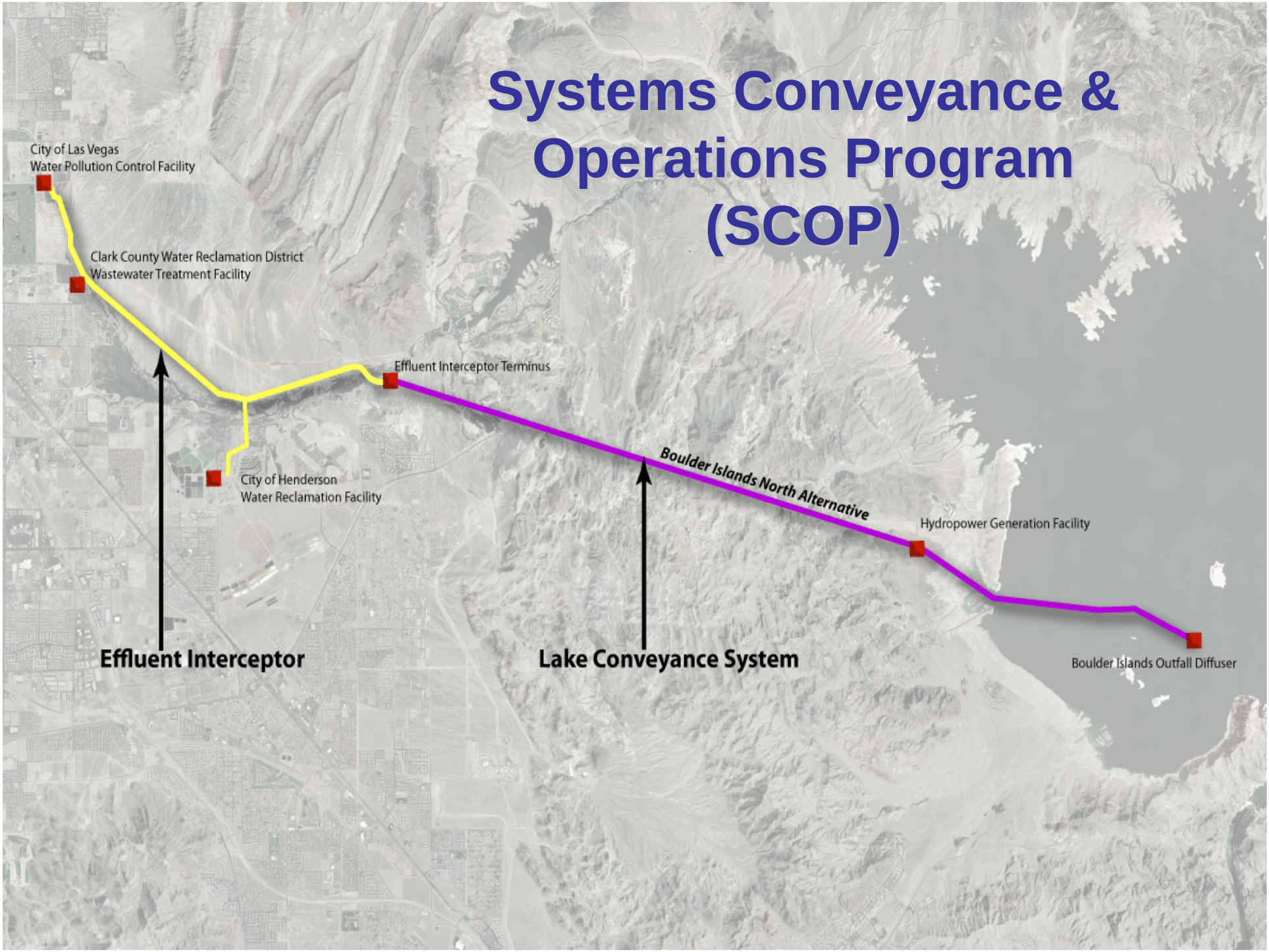
Lake Mead Water Quality Forum

23 January 2007

Douglas Karafa, CWC

CleanWater COALITION

SOLUTIONS FOR CLEAN WATER MANAGEMENT


Systems Conveyance & Operations Program (SCOP)
City of Las Vegas
Water Pollution Control Facility
Clark County Water Reclamation District
Wastewater Treatment Facility
Effluent Interceptor Terminus
City of Henderson
Water Reclamation Facility
Boulder Islands North Alternative
Hydropower Generation Facility
Effluent Interceptor
Lake Conveyance System
Boulder Islands Outfall Diffuser

Implementation of Regional Rates

Approved Sept. – Oct. 2006




- Regional Connection Charge
  - $800 per ERU (single-family residence)
    - $400/ERU started on Oct. 1, 2006
    - Increase of $412/ERU to total of $812/ERU on July 1, 2007
- Usage fee (rates per ERU or equivalent)
  - $0.65 per month begins July 1, 2007
- Anticipate 2-3% increase per year

Permitting Schedule




- Publish Final EIS
  - Oct. 20, 2006 Complete
- Post Notice of Availability
  - Around Oct. 20, 2006 End of Jan. 2007?
- Conclude Section 7 Process with USFWS
  - End of December 2006 End of Jan. 2007
- MOU's (BBAMP) (MWD)
  - Before the Record Of Decision CWC and SNWA have approved
- EIS Record of Decision
  - End of December 2006 Feb. – Mar. 2007?
- NPDES Permitting
  - Middle of 2007 On Schedule

Geotechnical Program

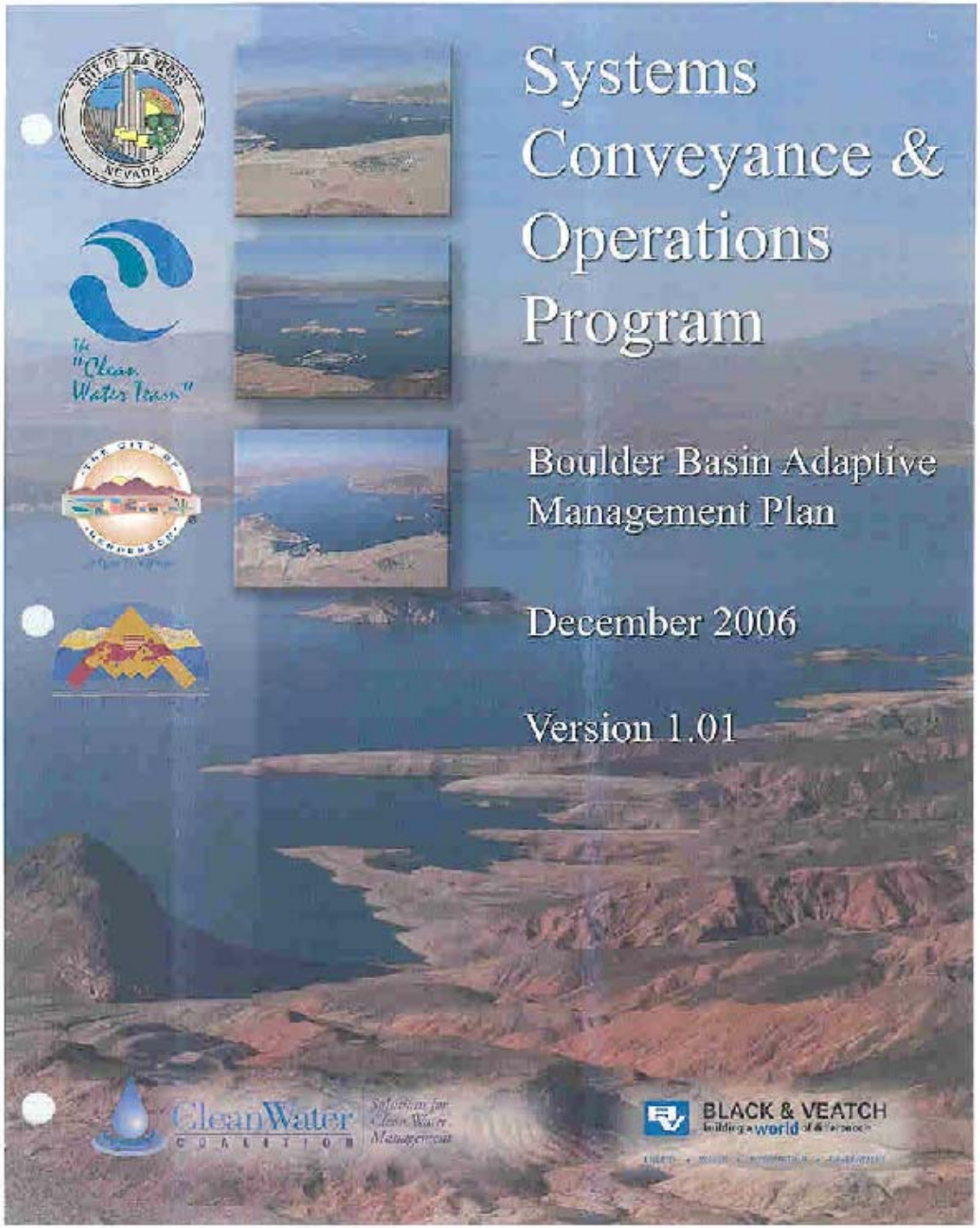



- Lake Mead borings complete
- Tunnel and Pipeline borings 75% complete
- Geotechnical Baseline Report in process

Design and Construction Schedule




- 30% Pre-Design complete
  - December 2007
- Solicit Statements of Qualifications for Nine Final Designs
  - February – March 2007
- Selection of Final Designers
  - March – May 2007
- Final Design Work Begins
  - June 2007
- Construction Begins
  - Mid - 2008

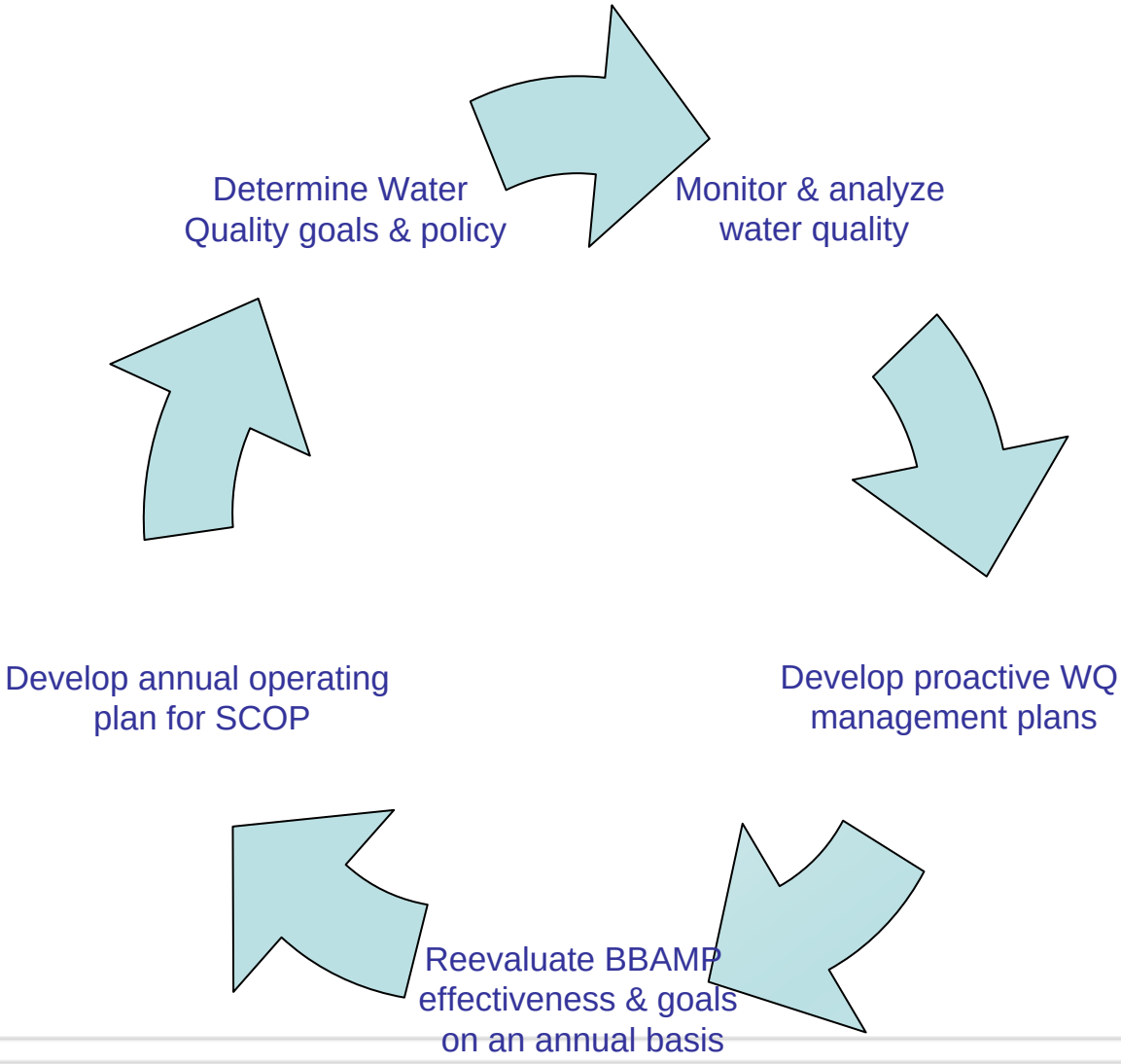

Systems Conveyance & Operations Program
Boulder Basin Adaptive Management Plan
December 2006
Version 1.01
The "Clean Water Team"
CleanWater COALITION
BLACK & VEATCH

Relationship of EIS & BBAMP




- Boulder Basin Adaptive Management Plan (BBAMP) is the operational plan for the preferred alternative in the EIS (SCOP Project)
- Requirements for BBAMP outlined in EIS (Sect 2.2.2.6)
- Provides mechanism to be sure project meets water quality & environmental goals

BBAMP Process






Organizational Structure/ Stakeholder Process

Core Management Team

- National Park Service
- Bureau of Reclamation
- Southern Nevada Water Authority
- Clean Water Coalition

Participants

- Lake Mead Water Quality Forum
- LV Wash Coordination Committee

Technical Committees

- Baseline Monitoring
- Database Management
- Water Quality Modeling
- Water Quality Requirements
- Downstream Water Quality Issues

Advisory Committees

- Water Quality Protection
- Decision Process
- Emerging Contaminants
- Limnology
- Fisheries

Establishment of Water Quality Goals that consider:



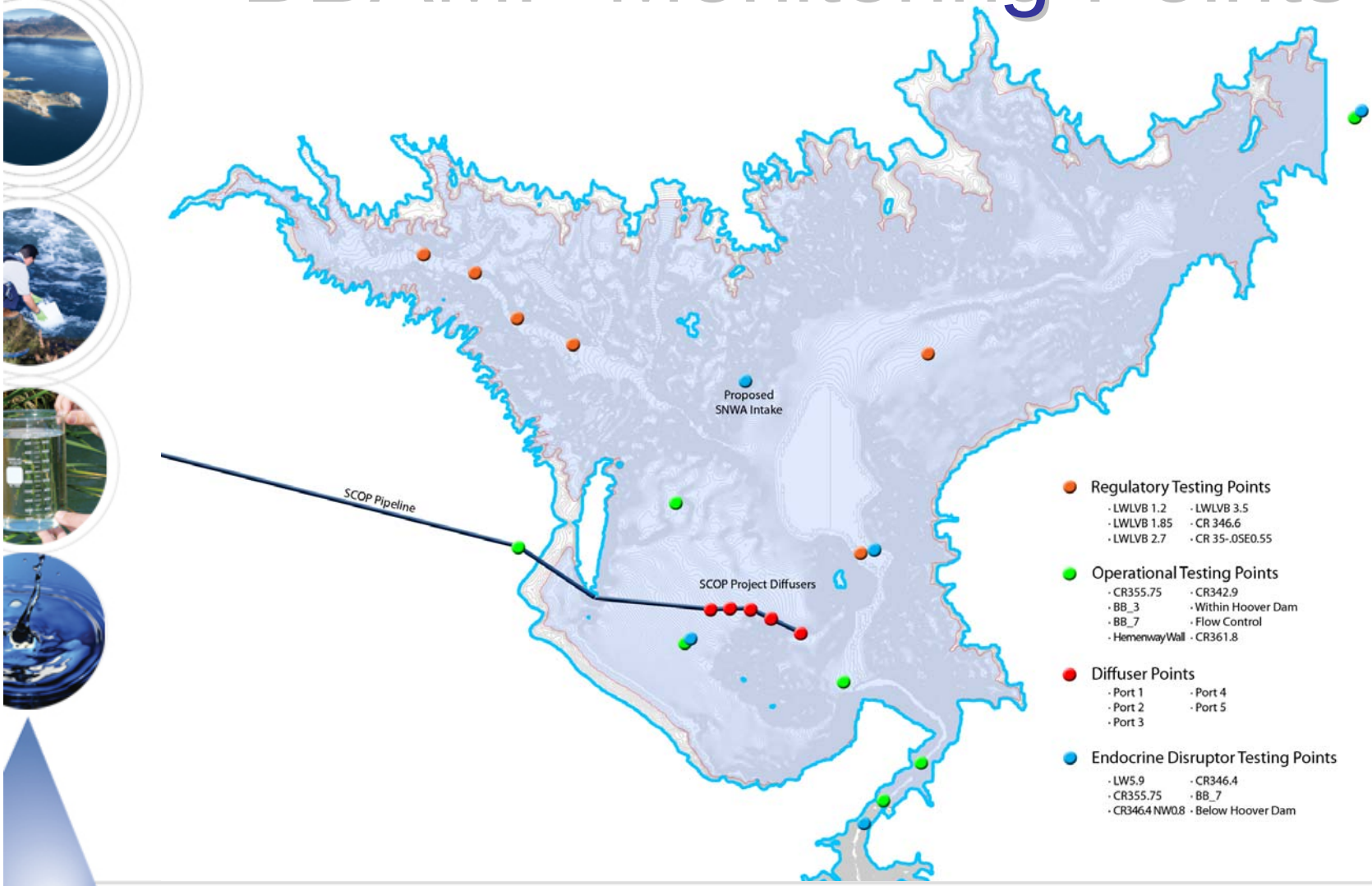

- NPDES regulatory requirements
- Existing water quality
- Clean Water Act anti-degradation standards
- NPS non-impairment guidelines
  - Protection of recreation experience
  - Viable fish and wildlife populations in Lake Mead
- Protection of drinking water source
- Return flow credits
- Downstream uses
- Coordination with other programs

Water Quality Monitoring

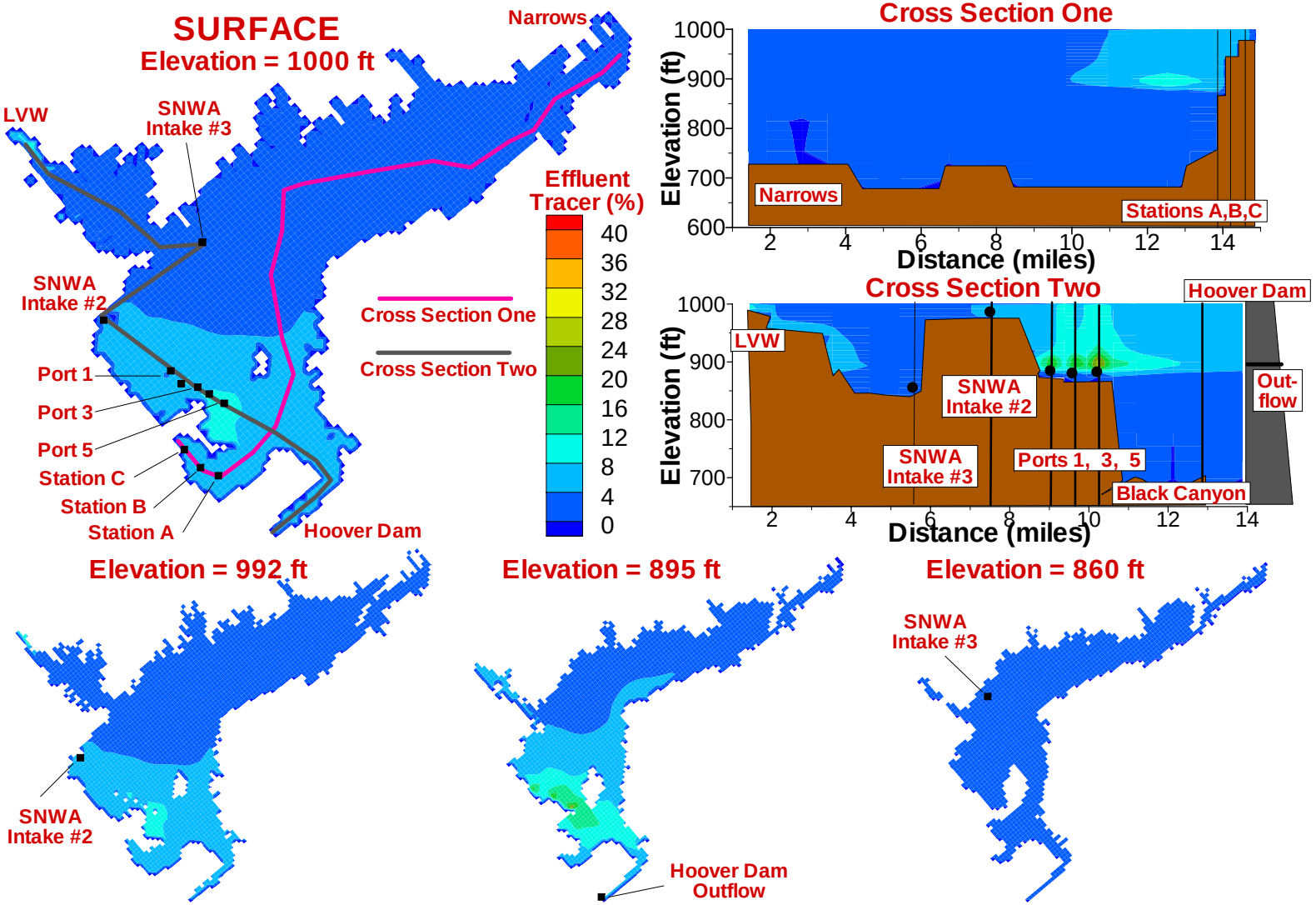



- Baseline- Conventional Pollutants
  - 13 sites weekly 22 compounds
- Emerging Contaminants of Concern
  - 6 sites quarterly 32 compounds
- Water quality data to SNWA Data Repository
- WQ data analysis and forecasting using three-dimensional computer model

BBAMP Monitoring Points



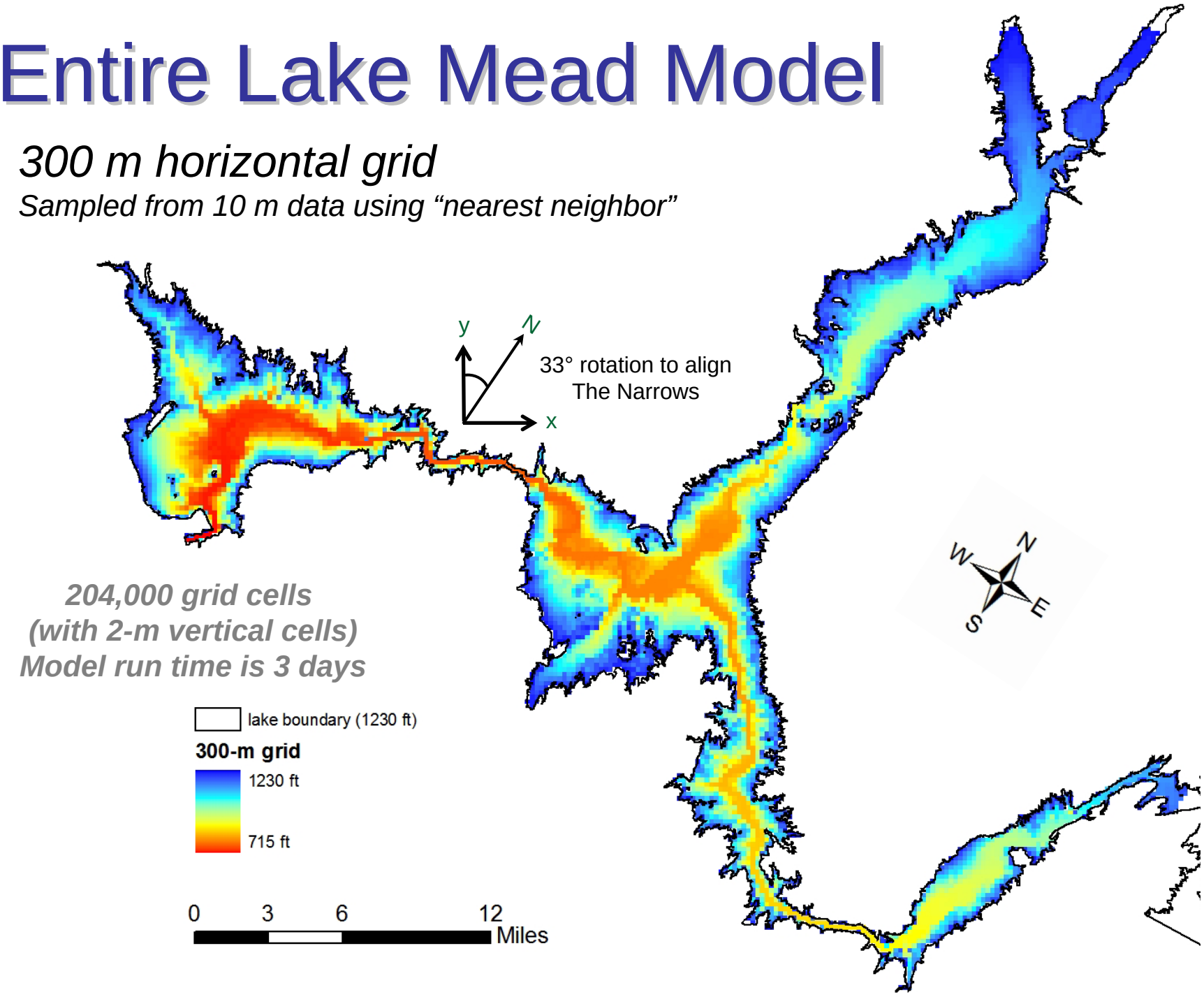
Typical Model Results



Entire Lake Mead Model

300 m horizontal grid

Sampled from 10 m data using "nearest neighbor"



Coordination with Other Programs




- USGS and NPS WQ Sampling
- Las Vegas Wash Team
- Las Vegas Wash Comprehensive Adaptive Management Plan
- Las Vegas Wash Management Advisory Committee
- Las Vegas Wash Coordination Committee
- Lake Mead Water Quality Forum
- MWD participates in Technical Teams and sharing of water quality data

Research and Management Plans




- Triennial Review of Data concerning EDCs, emerging contaminants, current treatment technologies
- Selenium Management Plan for Las Vegas Wash and Las Vegas Bay
  - Some work already under way
- Establishment of environmental indices for Lake Mead

Adaptive Part of Boulder Basin Adaptive Management Plan




- Core Management Team:
  - Conducts biannual review of BBAMP, data, trends, annual operating plans
  - Considers input from other programs
  - Considers input from technical advisory teams
  - Considers outside stressors
- BBAMP is re-evaluated and adjusted as necessary

SCOP Annual Operational Plan




- Management of Effluent flow between Las Vegas Wash and SCOP Diffusers
- Operation of Diffusers and Velocities
- Insertion of effluent in deep water or near surface
- Control of Total Phosphorus Loadings
- Control of Selenium concentrations
- Seasonal operational changes

Implementation of SCOP Annual Operating Plan




- Interlocal Cooperative Agreement forming CWC (as amended) Section XVII "Operation and Maintenance of Facilities"
- Section 17.2 requires that, after SCOP becomes operational, each year the General Manager submit an Annual Operating Plan, for CWC Board approval.
- Section 17.3 states that "the Operating Members shall cooperate with the CWC…. with respect to Discharge from their respective Treatment Facilities ….subject to the operating constraints, if any, of the respective Treatment Facilities."

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Quagga Mussels in Lake Mead

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In the News

Las Vegas Review-Journal, Saturday, January 13, 2007, Page 5B

Lake's invasive mussel ID'd as quagga

Creature similar to zebra mussel, just as vexing

By KEITH ROGERS
REVIEW-JOURNAL

The type of invasive mussel that has infested part of Lake Mead is one that had not been found previously in the United States west of the Great Lakes or the Mississippi River, wildlife officials said Friday.

Word of positive identification of the quagga mussel, which is from the same genus of the species known as the zebra mussel, came as the Nevada Department of Wildlife confirmed that the infestation had spread to the state's fish hatchery on Lake Mead.

"It essentially doesn't change what we're dealing with," said NDOW Supervising Biologist Jon Sjoberg.

Although it is a different species than officials previously thought was found Saturday in Lake Mead's Boulder Basin, Sjoberg said

Mussels mysteriously spread to Las Vegas area

Biologists are trying to figure out how an invasive zebra-type mussel, called the quagga mussel, was transported from the Great Lakes region to Lake Mead. Like non-native zebra mussels, colonies of quagga mussels can clog water systems and impact native species. Officials confirmed their identity and presence in Lake Mead's Boulder Basin this week. They were first sighted outside the Great Lakes in the Mississippi River in 1995.

MIKE JOHNSON/REVIEW-JOURNAL

e-mail, distributed by David K. Britton of the U.S. Fish and

eventually at Lake Mohave after protocols for stocking fish, like those in affected areas along the Mississippi River, can be adopted.

John Scott, manager of Willow Beach National Fish Hatchery on the Arizona side of Lake Mohave, about 10 miles south of Hoover Dam, said an in-depth investigation into mussel infestation was under way there.

"At the present time we have not found anything," he said.

The facility, operated by the U.S. Fish and Wildlife Service, raises rainbow trout for recreational fishing. It also breeds endangered razorback suckers and bonytail chubs and is assisting in the recovery of the Devil's Hole pupfish and the relict leopard frog.

On Lake Mead, the discovery of mussels at the state fish hatchery raised concerns that the infestation has the potential to spread beyond the lake to the Black Mountain Industrial Center, formerly Basic Management Inc., and even to Lake Las Vegas near Henderson.

Mark Paris, president and chief executive officer of Basic Water Co., said the company's pipeline draws water from an intake structure at Lake Mead's Saddle Island that has been in operation for about 50 years.

"The water is pumped from that intake structure, and the fish hatchery is close to our facility on Lake Mead. So it goes to the fish hatchery before it goes to our terminal reservoir near the city of Henderson's water treatment plant," Paris said late Friday.

Some of that water is treated and delivered in Henderson, "and some goes as raw lake water in our BMI plant," Paris said.

Water from the same system is pumped into Lake Las Vegas at various amounts during the year, he said.

He said company officials don't know if the mussels have reached the intake. The company's intake is at a shallower depth than the two operated by the Southern Nevada Water Authority, about 130 feet below the surface at Saddle Island.

"We are going to send divers to the bottom of our intake structure and see if there are any of them down there to make sure they don't clog up our intake structure," Paris said.

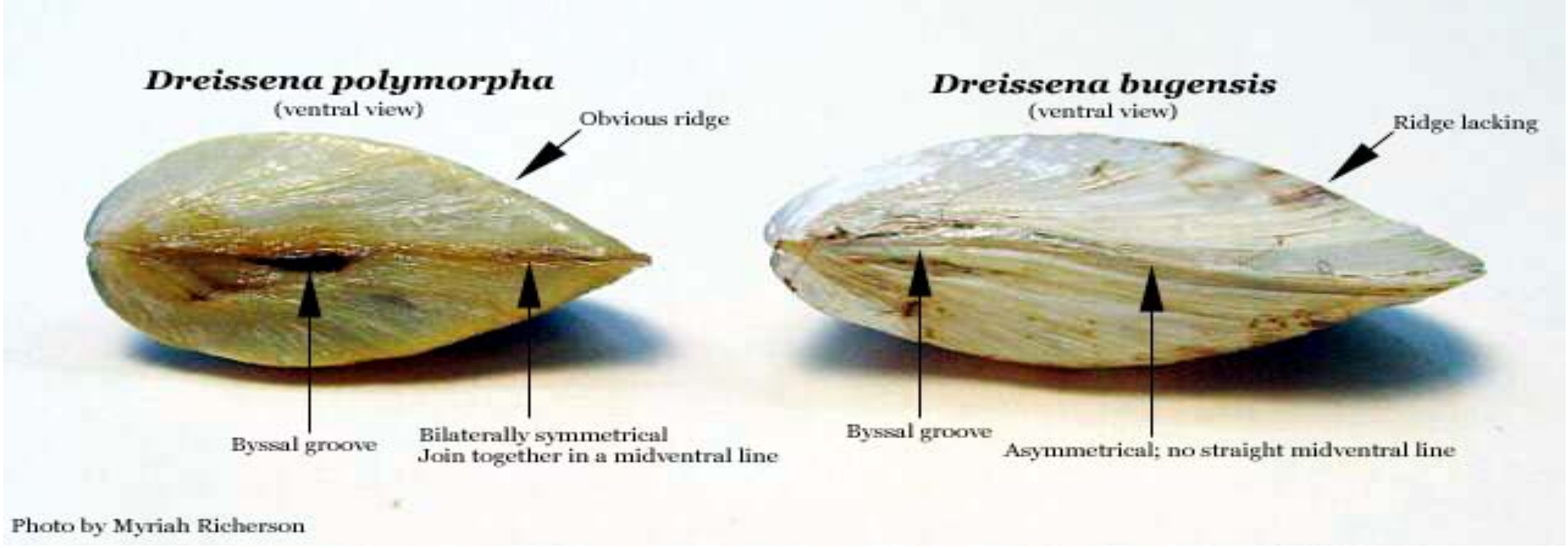
The Southern Nevada Water Authority is taking similar precautionary measures, officials have said.

The newest of the water agency's two intakes is equipped with a chemical feed system that was installed to inject potassium permanganate to kill invasive mussels should they be found there.

According to a U.S. Geological Survey Web site, there have been a few occurrences of quagga mussels outside the Great Lakes in New York, Ohio, Michigan and Pennsylvania. Some were sighted in the Mississippi River between St. Louis and Alton, Ill., in 1995.


Dreissena bugensis
(Actual size is 13 mm)


Zebra mussel
Quagga mussel
J.E. Marsden


Dreissena polymorpha
(ventral view)
Obvious ridge
Byssal groove
Bilaterally symmetrical
Join together in a midventral line
Dreissena bugensis
(ventral view)
Ridge lacking
Byssal groove
Asymmetrical; no straight midventral line
Photo by Myriah Richerson

Quagga vs. Zebra Mussels




- Type of Mussel
  - Zebra - Freshwater, bivalve mollusk that typically have a dark and white (zebra-like) pattern on their shells, typically an inch or less in size, have been found at depths to 100 ft, adults attach to hard substrates
  - Quagga – Freshwater, bivalve mollusk that typically have a dark and white pattern on their shells but paler toward the hinge, typically an 1 ½ inch or less in size, have been found at depths to 390 ft, adults prefer silty or sandy lake bottoms but will attach to hard substrates
- Common Characteristics
  - Young are small and free swimming and can be spread by water currents
  - Proliferate in areas with water currents

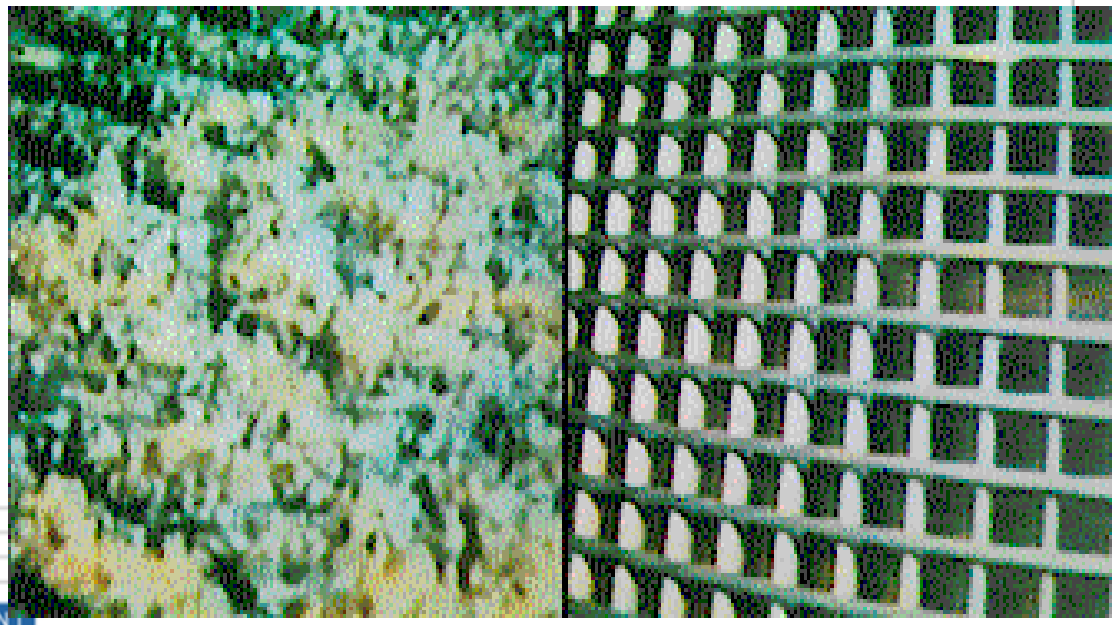
Courtesy SNWA

Ecosystem Effects




- Mussels remove substantial amounts of Chlorophyll A and phytoplankton, the basic food-chain for zooplankton, and then fish.
- Mussels increase water clarity, which can have an affect on basic limnologic structure of Lake Mead
- Mussels accumulate organic pollutants and then dispose to lake bottom

Mussels clogging intake screens



Quagga Mussel Controls




- Use of toxic chemicals – Chlorine, Chlorine Dioxide, Potassium Permanganate
- Physical Removal – Screens, grates, mechanical cleaning
- Pipe and screen materials – Copper, Galvanized Metal, Silicone treatment
- Water temperature, velocity, pH

Effects on SCOP




- What we know
  - Intakes draw mussels and larvae into their system, but also can use chemical controls.
  - Outfalls blow mussels and larvae outward but cannot send out toxic chemicals
  - Great Lakes has many reports of intake fouling, but none regarding outfall fouling

CWC Actions




- Already looking at engineering changes
  - Pipe materials and coatings
  - Velocities exceeding mussel's ability to attach
  - Chemical feed systems
- Retaining Dr. John E. Van Benschoten from State University of New York at Buffalo (SUNYAB)