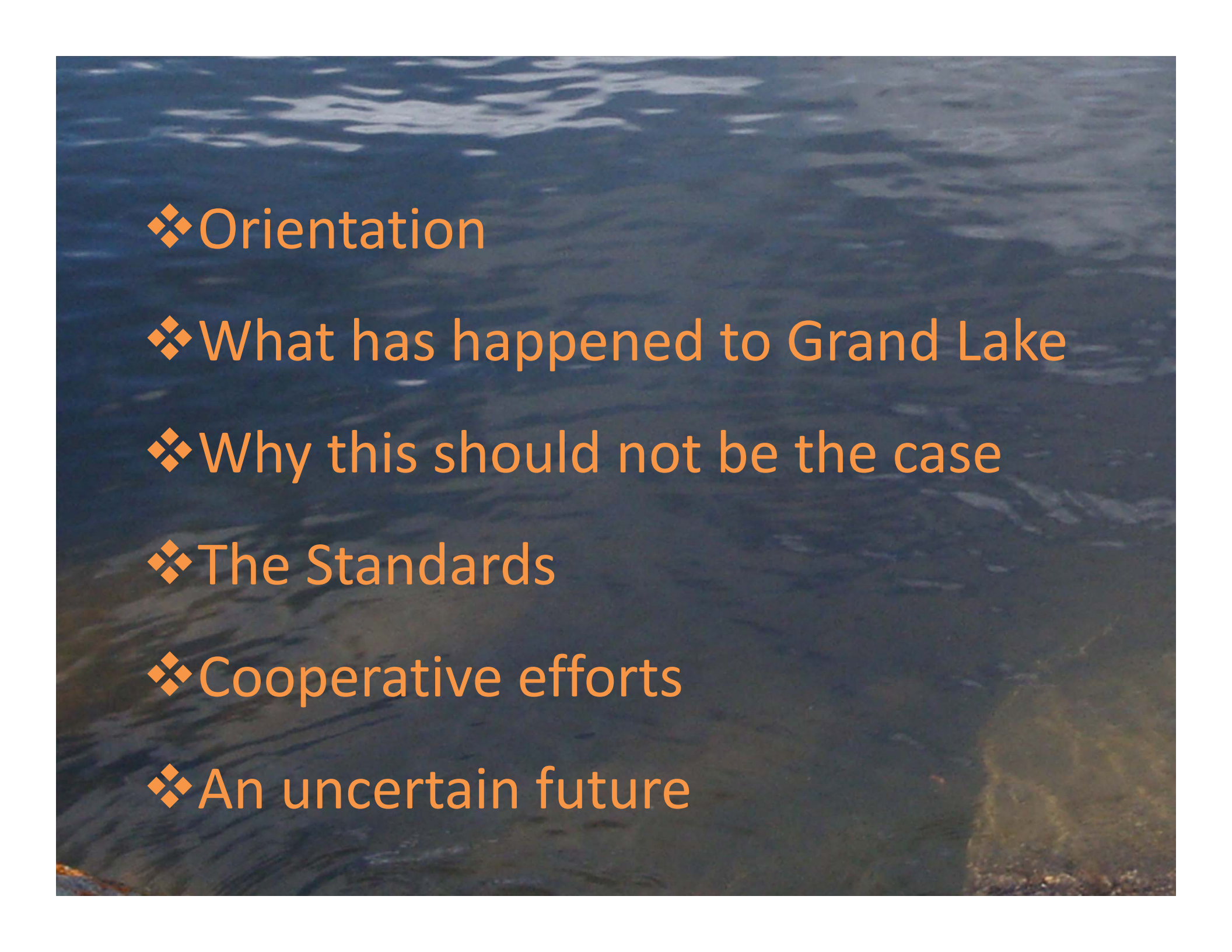


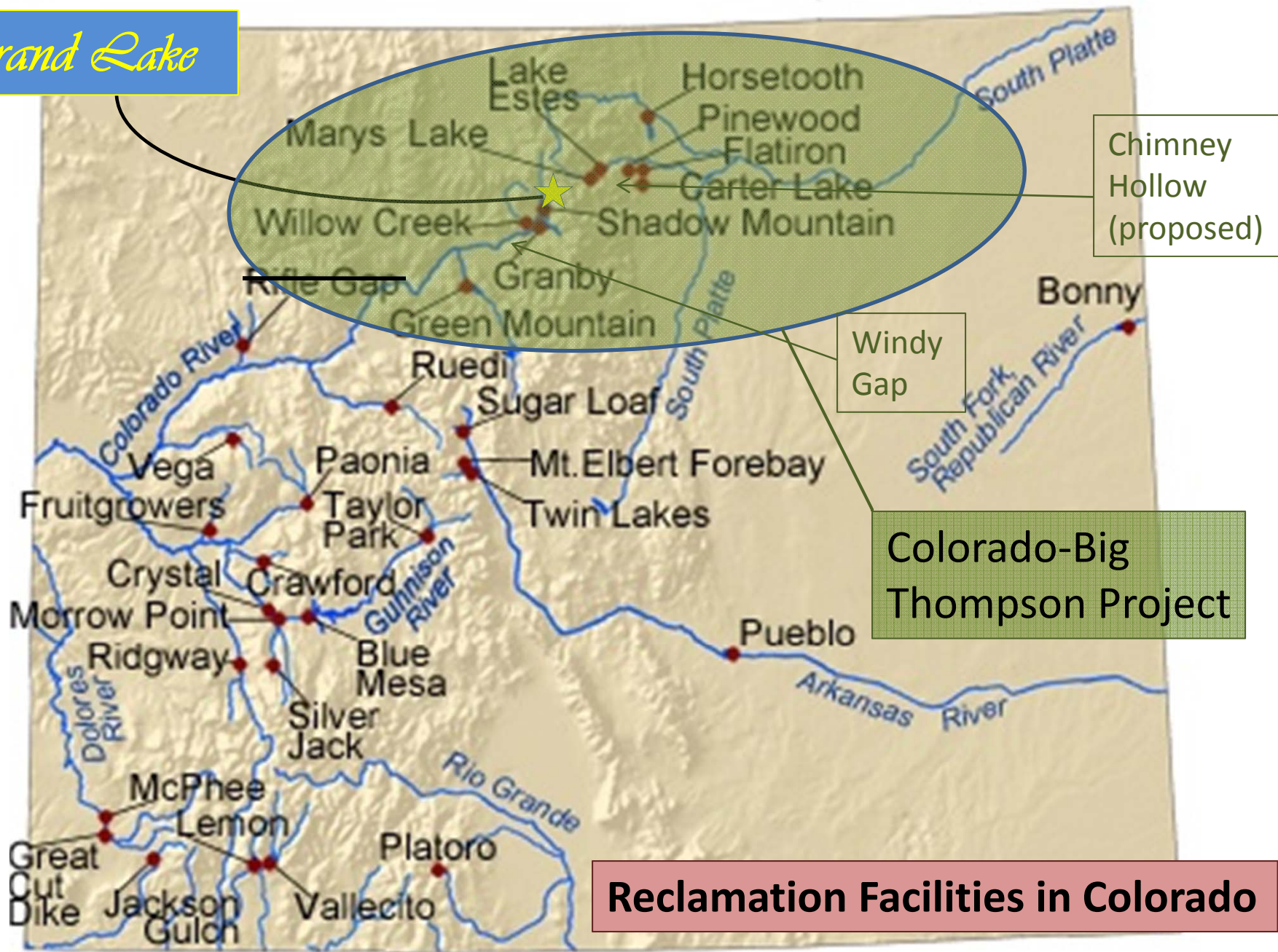


# Water Clarity Standards in Grand Lake

Lurline Underbrink Curran  
Grand County Manager

- 
- ❖ Orientation
  - ❖ What has happened to Grand Lake
  - ❖ Why this should not be the case
  - ❖ The Standards
  - ❖ Cooperative efforts
  - ❖ An uncertain future

*Grand Lake*



Chimney Hollow (proposed)

Windy Gap

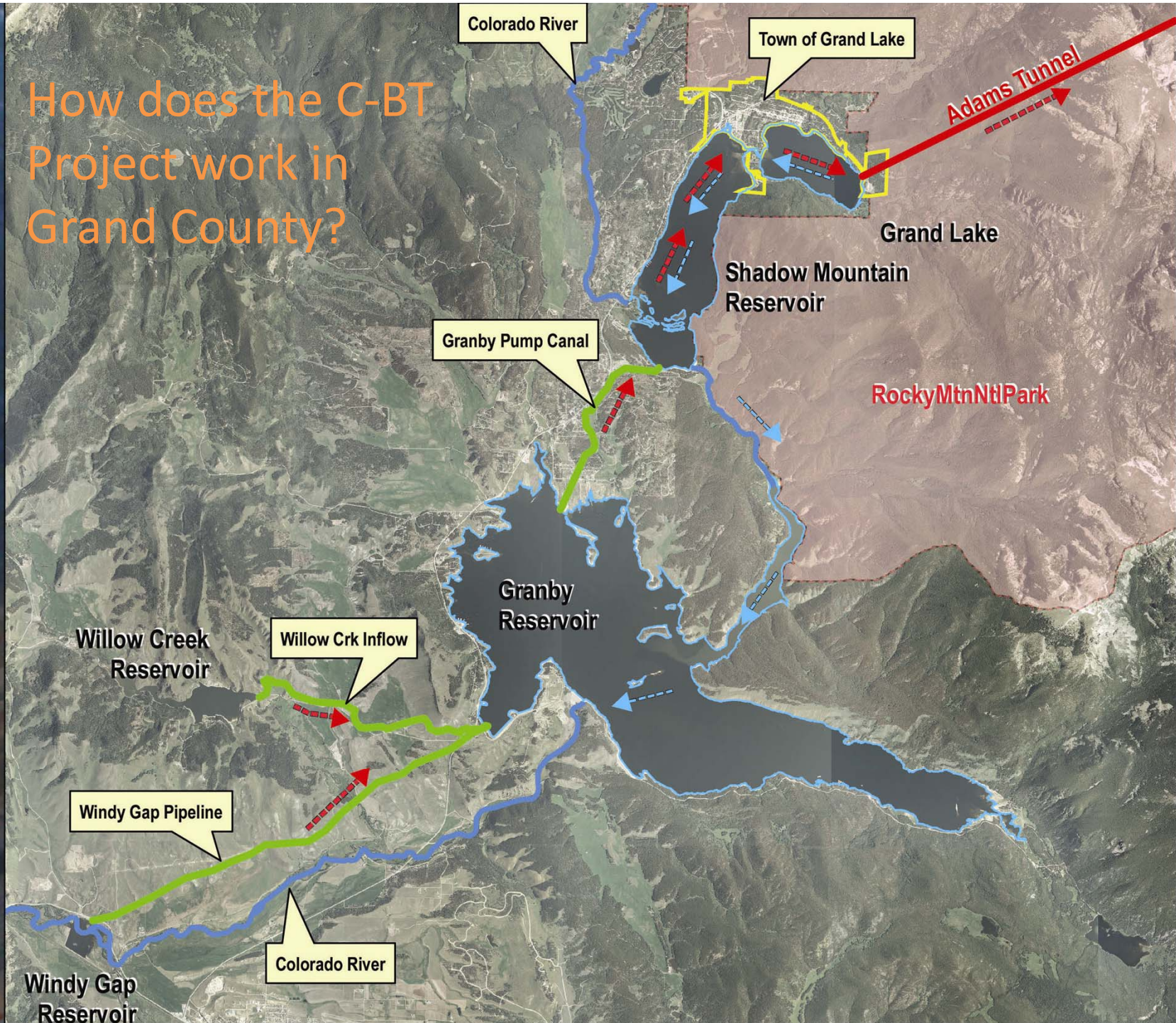
Colorado-Big Thompson Project

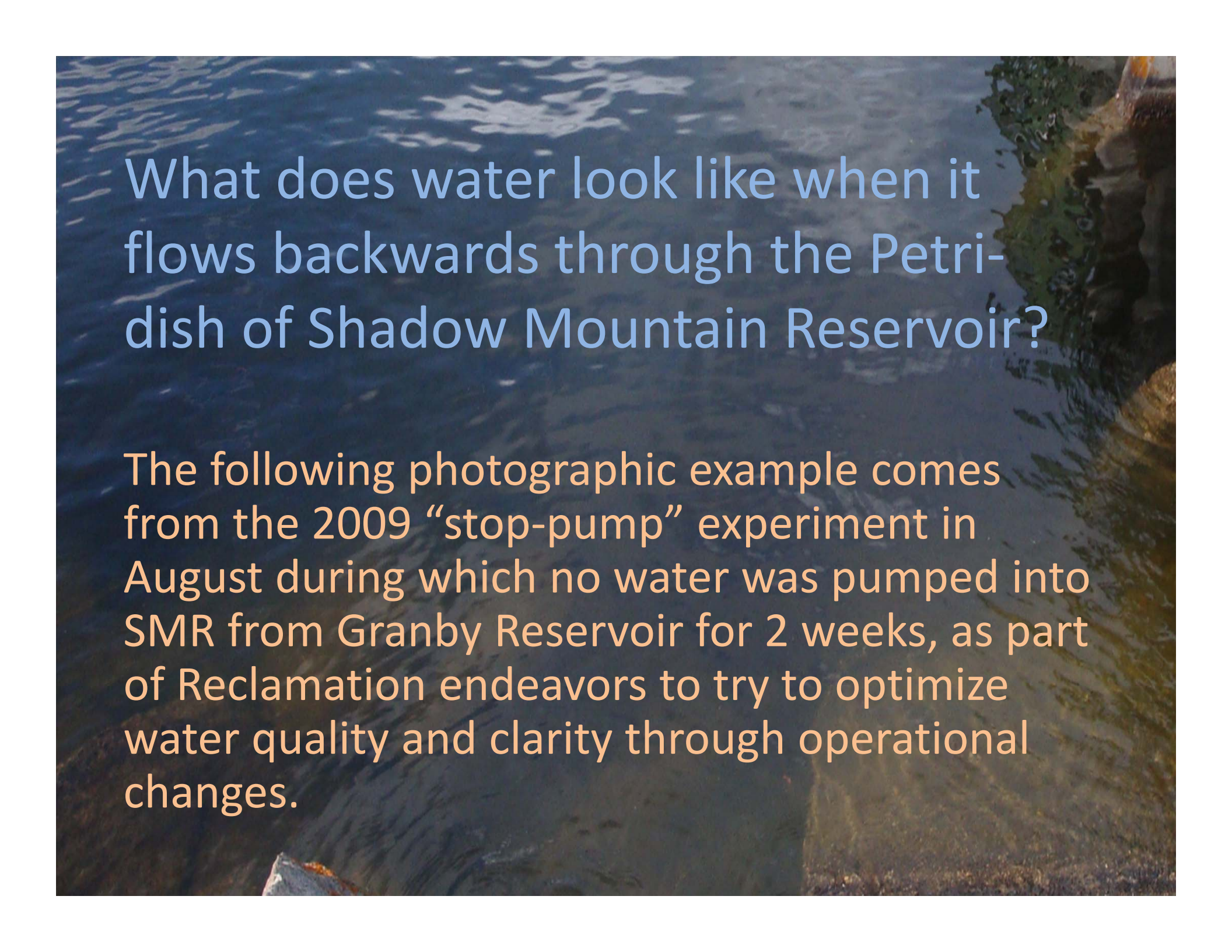
**Reclamation Facilities in Colorado**

## C-BT Successes—East Slope

- Services 30 eastern slope cities and towns north and east of Denver, containing 1.6 million people.
- Irrigates 693,000 acres.
- Generates power at 5 hydroelectric plants on the east slope, and one on the west slope.
- Delivers approximately 213,000 AF of water annually.

How does the C-BT Project work in Grand County?





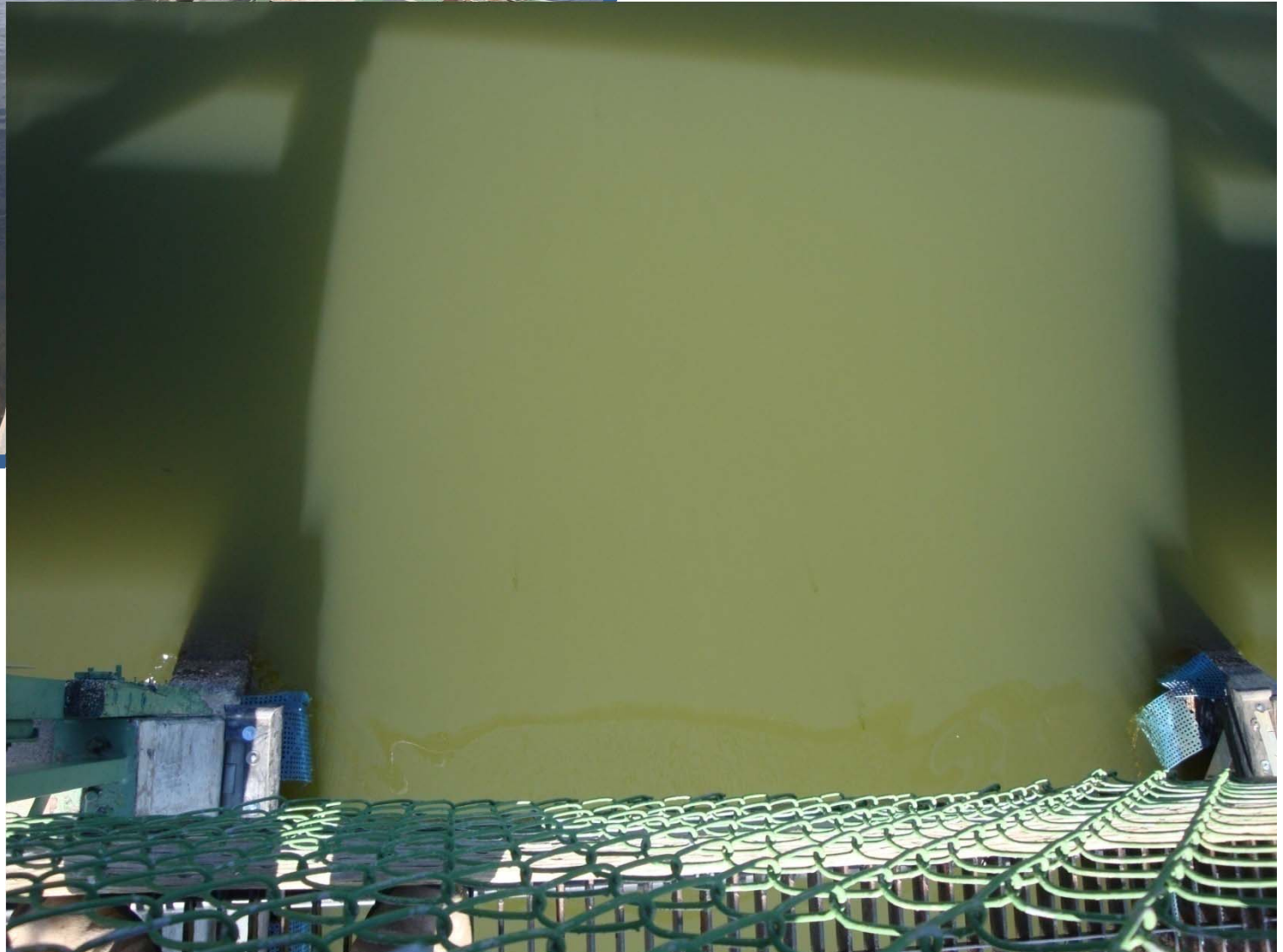
What does water look like when it flows backwards through the Petri-dish of Shadow Mountain Reservoir?

The following photographic example comes from the 2009 “stop-pump” experiment in August during which no water was pumped into SMR from Granby Reservoir for 2 weeks, as part of Reclamation endeavors to try to optimize water quality and clarity through operational changes.



Pedestrian Bridge over Shadow Mountain Connecting Channel after two week stop-pump period (8/26/2009).

Water under that same bridge *just one day later*, when pumping resumes.



Three days after pumping resumed, 8/29/2009.

Direction of plume







2010

2009

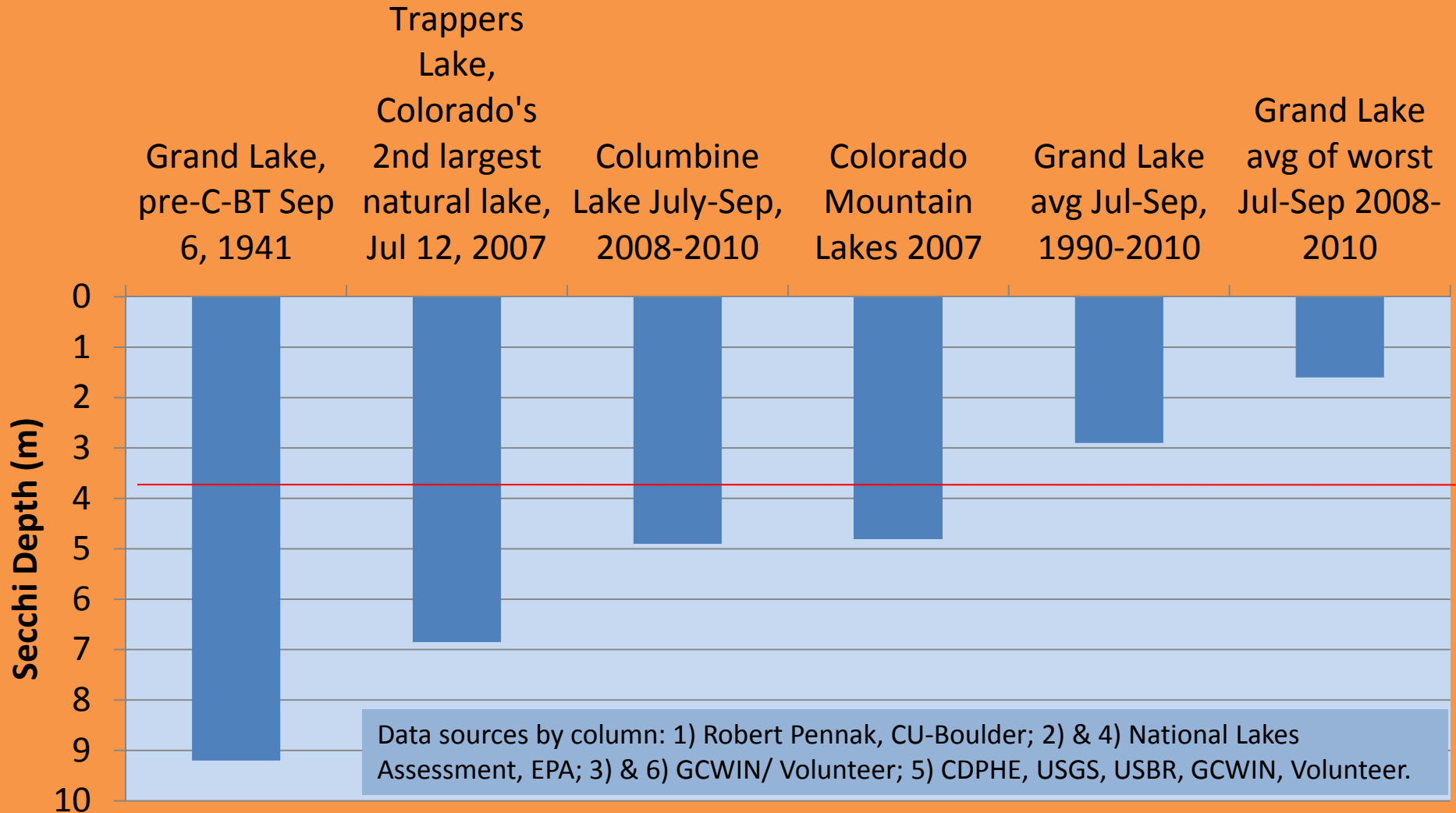
2007

2006

2005

*Whoa!*

# What We Have Lost!

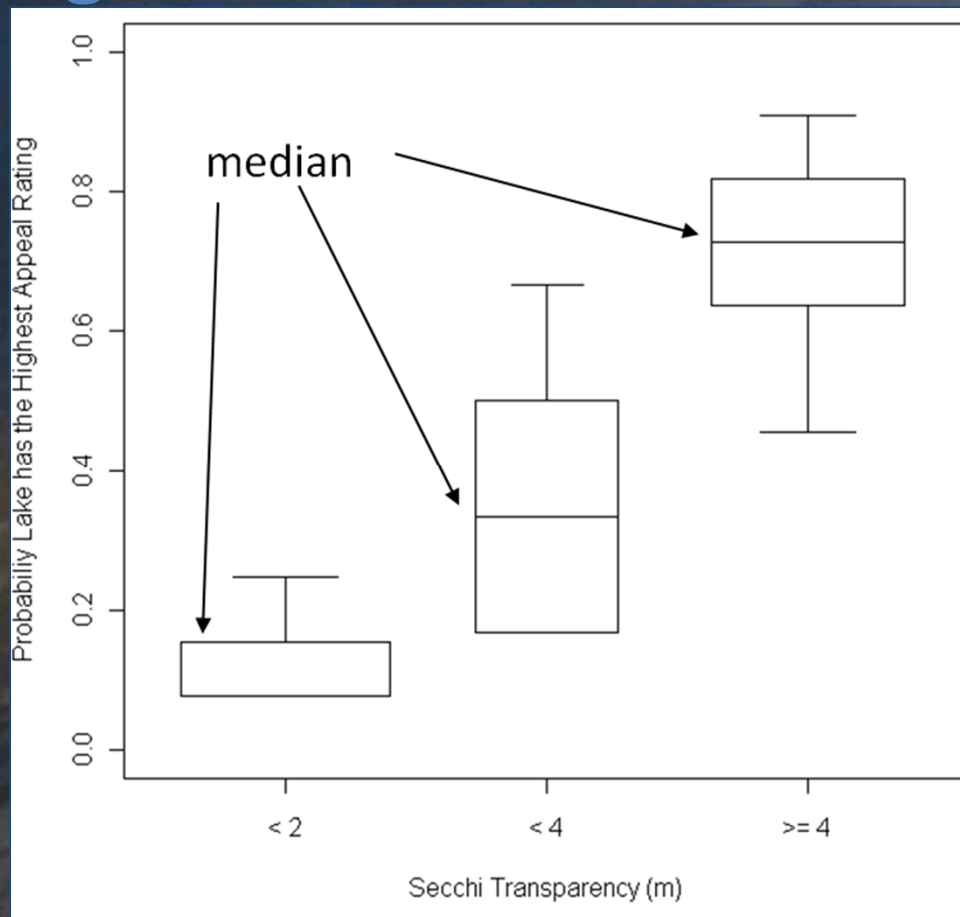


# Senate Document 80

Under Senate Document 80, the 1937 federal authorizing legislation for the C-BT project, the primary purposes by which the project is to be operated are:

1. To preserve the vested and future rights in irrigation.
2. To preserve the fishing and recreational facilities and the scenic attractions of Grand Lake, the Colorado River, and the Rocky Mountain National Park.
3. To preserve the present surface elevations of the water in Grand Lake and to prevent a variation in these elevations greater than their normal fluctuation.
4. To so conserve and make use of these waters for irrigation, power, industrial development, and other purposes, as to create the greatest benefits.
5. To maintain conditions of river flow for the benefit of domestic and sanitary uses of this water.

What is the probability that a lake will be ranked in the highest appeal category, given the Secchi class it belongs to?



For lakes with Secchi depths less than 2m there is about a 15% chance they will be ranked in the highest appeal category. Whereas lakes with secchi  $\geq 4$ m have an 80% probability of the highest ranking.

Secchi observations for Colorado Lakes were divided into 3 groups: less than 2m, less than 4m but greater than or equal to 2, and greater than or equal to 4m.

Thanks to Bryan Milstead, Rhode Island EPA, for this analysis. Bryan has modeled the “appeal” of lakes.

# Our Concerns Began 60 Years Ago

- 1947 Flood depositions & geological report
- 1953 Fish management investigations, and Analysis of data
- 1954 Letter from Game and Fish Commission to Reclamation on algaecide issue
- 1954 Memo to the algae commission, and Algae Control Cooperation
- 1956 Certificate of Resolution of Committee on Grand Lake Water Problems
- 1956 Memo to the Superintendent of Irrigation
- 1971 Save Our Lakes Committee, State legislature passes SB 317 “TLWSD Act”
- 1978 Three Lakes Design Review Overlay Zone
  - Water quality setback, 30’-150’ from all water bodies
- 1978 ANRA Legislation provided an appropriation of \$5M for water quality
- 1982 TLWSD system goes live
- 2003 Three Lakes Clean Lakes Watershed Assessment Report
- 2005-2010 Weed surveys
- 2006 Scoping Study 3 Lakes Water Quality
- 2008 Nutrient Study Final Report by Reclamation, and Grand Lake begins regular street sweeping for water quality
- 2009 Factors controlling transparency in Grand Lake, Colorado, and Town of Grand Lake installs a storm sewer treatment



# The Standards

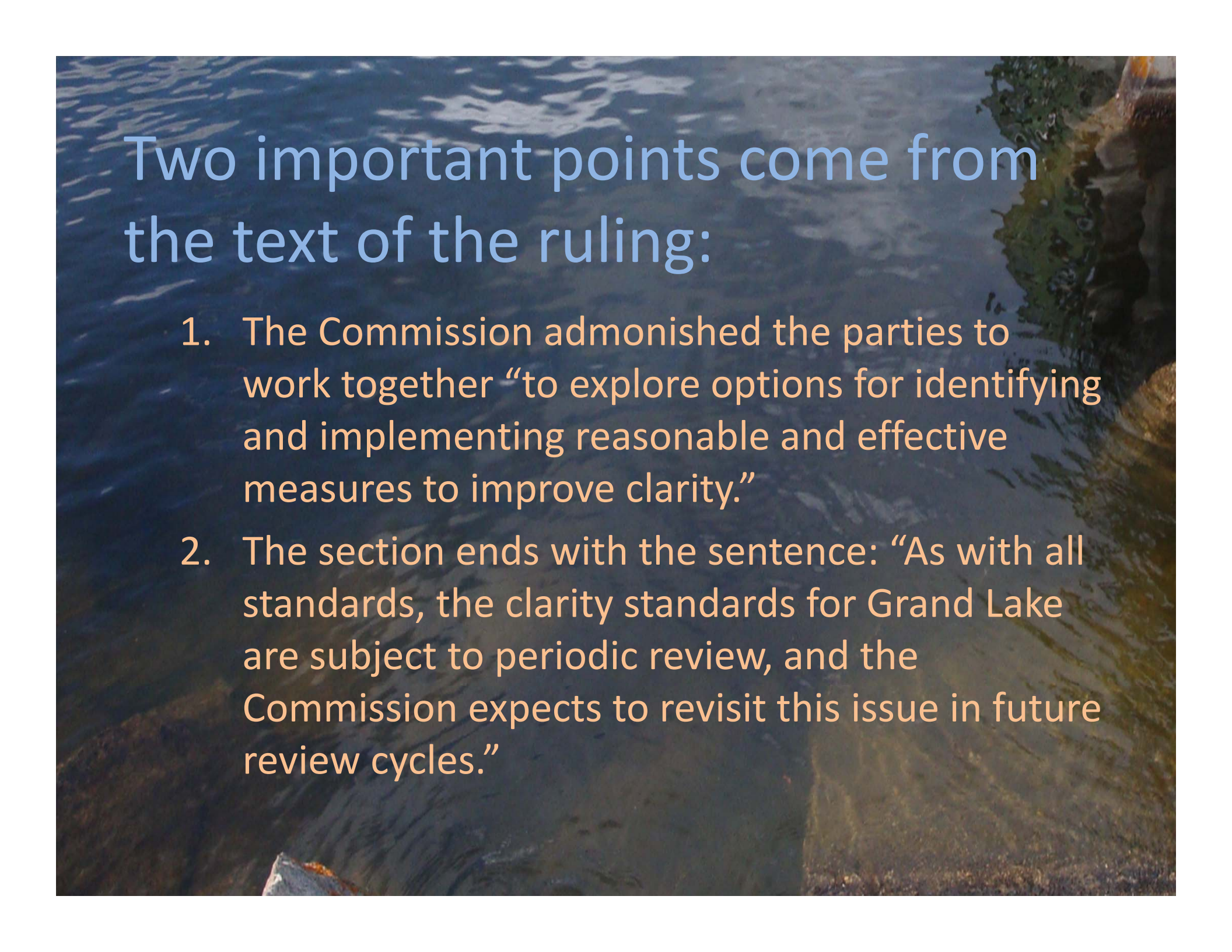
At its 2008 Upper Colorado Basin Hearing the Water Quality Control Commission

“determined that it is appropriate to adopt water quality standards for the protection of Grand Lake’s clarity because of Grand Lake’s uniqueness as Colorado’s largest natural lake [and because] Grand Lake adjoins and complements Rocky Mountain National Park in the headwaters of the Colorado River and its social and economic importance is worthy of protection.”

# What was adopted?

- “A numerical clarity standard of 4 meter Secchi depth for the months of July through September, with an effective date of January 1, 2014”
  - This has since been deferred to 2015
- A narrative standard for the intervening years of “the highest level of clarity attainable, consistent with the exercise of established water rights and the protection of aquatic life.”

*(...What does that mean?)*



## Two important points come from the text of the ruling:

1. The Commission admonished the parties to work together “to explore options for identifying and implementing reasonable and effective measures to improve clarity.”
2. The section ends with the sentence: “As with all standards, the clarity standards for Grand Lake are subject to periodic review, and the Commission expects to revisit this issue in future review cycles.”



# Working Together

The cooperative efforts listed on the following slide have been implemented and funded either in part or whole by

- Colorado River Water Conservation District
- Grand County
- Grand County Water Information Network
- Greater Grand Lake Shoreline Association
- Northern Colorado Water Conservation District
- Three Lakes Watershed Association
- Town of Grand Lake
- US Bureau of Reclamation
- US Forest Service
- US Geological Survey
- Western Area Power Administration

With input from the:

- Colorado Department of Public Health and the Environment
- Colorado Division of Wildlife
- US Environmental Protection Agency

# Working together

- Draw downs to control aquatic weeds (1990, 1991, 2006)
- NCWCD's Nutrient Project
  - Flow monitoring
  - Water quality monitoring
  - Modeling
- Transparency monitoring
- Cyanotoxin Monitoring
- Special studies such as the Center for Limnology's 2009 transparency study
- Reclamation has tried different water management efforts to improve water clarity and quality
  - Stop-pumps 2009, 2008
  - Steady, moderate pumping 2010

# PROJECT IDEA

Idea for project presented that Reclamation has the authority to consider. The idea appears to contribute to the national economy while meeting environmental and planning strictures



## APPRAISAL STUDY

Reclamation, along with the sponsor, partners, and public, answer these questions:

- Is there a Reclamation interest?
- Does one possibility meet the need or opportunity or solve the problem?
- Is the solution viable (benefits likely to exceed costs; no "show stoppers")?
- Can Reclamation recommend further study to Congress?



## CONCLUDING REPORT

Findings of Appraisal Study

## PLAN OF STUDY (FEASIBILITY)

- Activities
- Time/Costs
- Sponsor's commitment to share costs



## IMPLEMENTATION OF PLAN

If Congress authorizes the project and provides funds, the feasibility report / NEPA document (EA or EIS) is translated into repayment contracts, loan guarantees, advanced designs, construction plans, and operations and maintenance plans.

# Planning Process Blueprint

## FEASIBILITY/NEPA STUDY

If Congress authorizes the study and provides funds, Reclamation, sponsor and partners follow planning and NEPA processes to produce a report that:

- Describes needs, resources, and alternative plans (applying P&G's and NEPA and other strictures.)
- Analyzes effects of the alternatives (including the No Action Alternative / Future Without Condition.)
- Evaluates alternatives by the P&G's four accounts and covers risks and uncertainties.
- Recommends the best alternative for implementation.

# Umbrella Clarity MOU

- Fears
  - Reclamation will determine no interest
  - Periodic state standard review will result in less than 4 meters
  - Strong public opinion that the only solution is structural
- This MOU would ensure nobody gets out of the deal until a solution is found to the problem of Grand Lake water clarity/quality.



**KEEP  
GRAND LAKE  
BLUE**

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