





Better, Faster, Smarter: Utilizing Adaptive Management, Technology and Basic Science to Simplify Permitting Requirements for In- Water Work

John Spranza



Brief Introduction:

- John Spranza, HDR
 - Aquatic Ecologist and Regulatory Specialist.
 - 4 large dredge and fill projects completed.
 - Currently selected for Lake Isabella Dam Retrofit.
 - Over 10,000 hours of personal experience in managing and monitoring in-lake dredge and fill.
 - Numerous permit negotiations and amendments processed for in-lake projects.
 - New adaptive management approach developed.
 - USACE currently use my water quality program in their specifications.



Crane Valley Dam Seismic Retrofit 2009-2014

Key Project Details

- Excavation of existing fill material and unsuitable foundation materials and replacement with a competent rock fill buttress.
 1. Upstream (in-lake) excavation of and deposition of 58,000 cy of sediment via a suction dredge and barge-mounted long-reach excavators.
 2. The deposition of 80,000 cy of rock onto the upstream (in-lake) buttress



Folsom Dam Auxiliary Spillway

Key Project Details 2011-2015

- New spillway consisting of an approach channel, control structure, auxiliary spillway, chute basin, and stilling.
- Approximately 260,000 cubic yards of sand and soil and 1,400,000 cubic yards of rock will be dredged from and returned to the reservoir to construct the facilities.



Problem: Permit conditions can be hard/impossible to implement or meet

RWQCB (401 Water Quality Certification)

Basin Plan boilerplate:

- Shall not cause settleable material to exceed 0.1 ml/L in surface waters.
- Where natural turbidity is between 0 and 5 NTUs, increases shall not exceed **1 NTU**.
- Four hour averaging period.
- Stop work if exceeded until remedied and RWQCB allows resumption.

CDFG (Streambed Alteration Agreement)

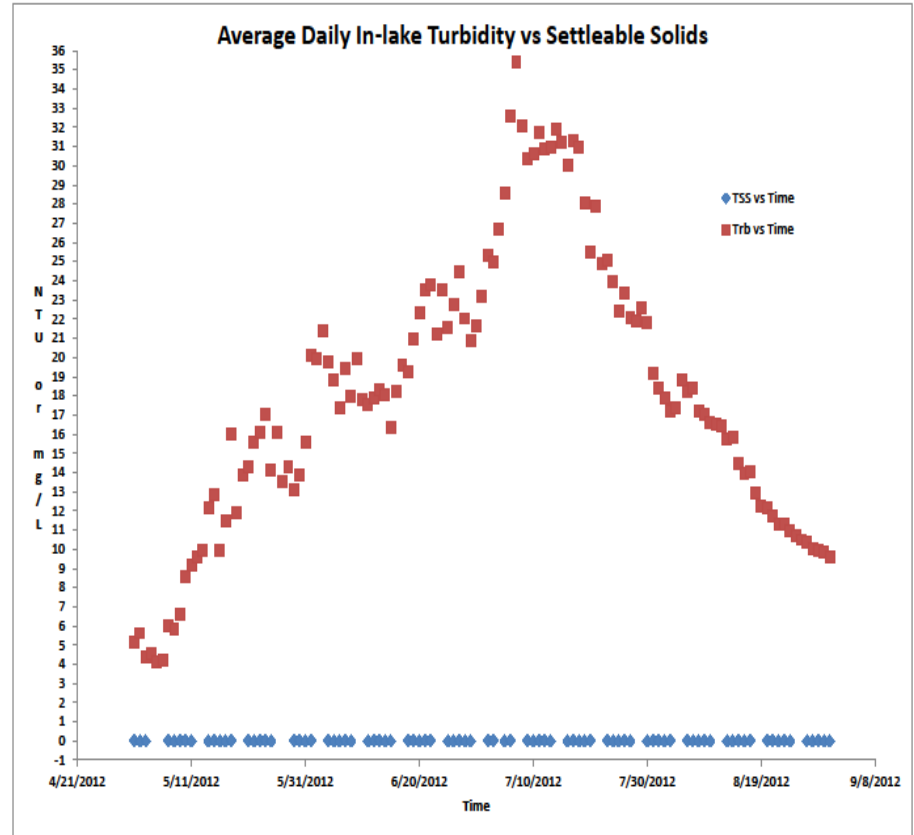
Even more difficult:

- Added in lake compliance points and additional constituents.
- “Instantaneous” exceedance threshold – no averaging period.



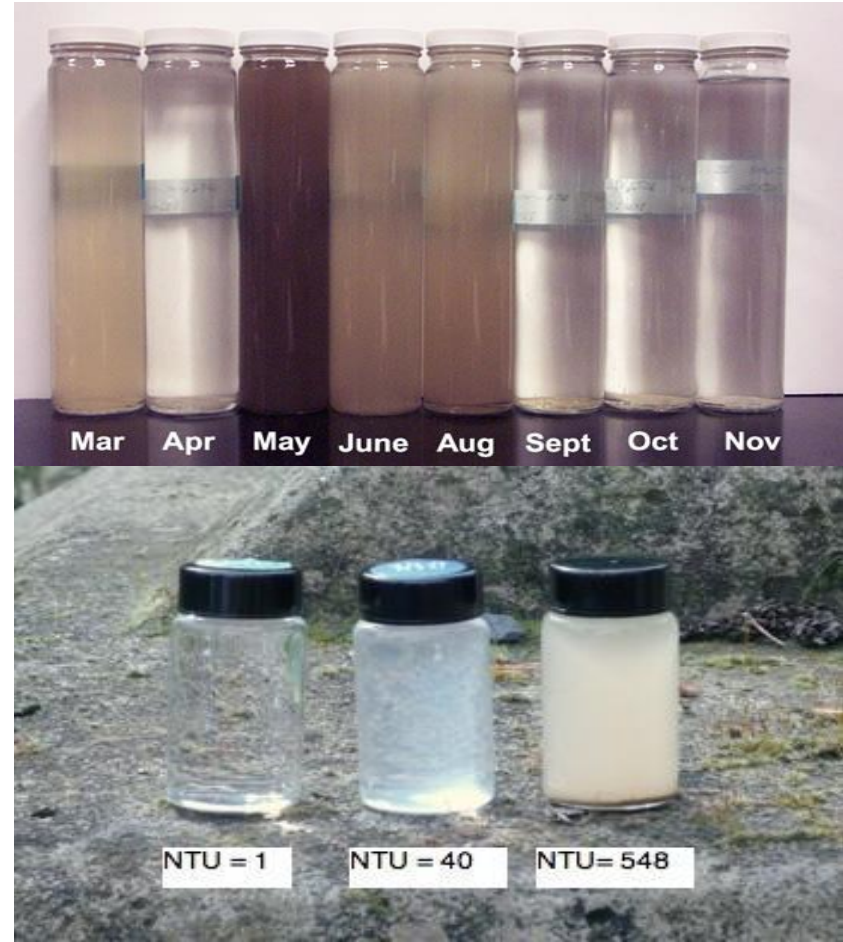
Example 1: Permits do not always incorporate science or common sense.

- Why and how are certain criteria thresholds set?
- Examples:
 - How is background defined and measured during project?
 - How are non-project activities accounted for
 - Operations.
 - Recreation.
 - Low natural turbidity provides only small allowable increase (1NTU).
 - Impractical.
 - Meaningless data collection: *Shall not cause settleable material to exceed 0.1 ml/L in surface waters.*



Example 2: Can permit conditions be met?

- Can the project comply with 401/CDFG requirements?
- Examples:
 - Natural (spatial and temporal) variation in WQ
 - WQ varies with location and depth.
 - WQ parameters vary throughout the season.
 - Low natural turbidity provides only small allowable increase (1NTU).
 - Effectiveness of the turbidity control system (curtains).
 - With such a low threshold can a system be designed to work?
 - How would reservoir operations effect compliance?



Solution:

Be realistic in the issues and permit limitations and utilize technology, science and data.



Use Technology: Remote Sensing for Water Quality

Remotely accessible water quality webpage for real time monitoring.

WQData

Web Interface for Real-Time Environmental Data

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Member Login

username:

password:

[Go](#)

Login Instructions

Login to enter your data center or click [here](#) to view a sample site.

[Forgot Password?](#)



The Orlando International Airport has a water management & flood control plan that uses a perimeter canals with gated back-up to protect an internal drainage & flood control system.

[Learn More](#)

Bass Lake

turbidity monitoring

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Project Description

WQData is a secure web datacenter providing an online interface for viewing environmental data. It offers 24/7 instant access to project data using any web browser. Specifically designed for environmental monitoring applications, WQData is easy to setup and maintain. The datacenter can be setup as a secure (password protected) site or an open site for easy access by anyone with the web address. Included with WQData is the NexSens Web-Data Applet. Simply embed the applet code on your webpage to present website visitors with project data. An 'ALL DATA' button on the applet directs the visitor to the project datacenter.

With this web-enabled datacenter, visitors experience your project on a virtual instrument; selecting panel buttons to view project area maps, recent and historical data, time series graphs, statistical summaries, project-specific information or to join a community forum. Personalizing the project datacenter is in your hands. An administrator login provides a complete, yet simple interface to setup the project, data views and information that you wish to share. Select from a library of predefined themes for a unique look and feel, enter site descriptions, setup

Bass Lake

Middle DO	0.08 mg/L
Deep Temperature	8.36 C
Deep Sp Cond	59 uS/cm
Deep Turbidity+	11.50 NTU+

Site CP-01
at 10/21/12 5:35AM


Bat	13.0 V
Temp	17.24 C
Sp Cond	40 uS/cm
Turb+	5.20 NTU+

[ALL DATA](#) Powered by NexSens Technology

Limitation & Data Disclaimer

Uncertainty and potential for error can be associated with environmental monitoring data. Data users are cautioned to consider carefully the provisional nature of the information before using it for decisions that concern personal or public safety or the conduct of business that involves substantial monetary or operational consequences.

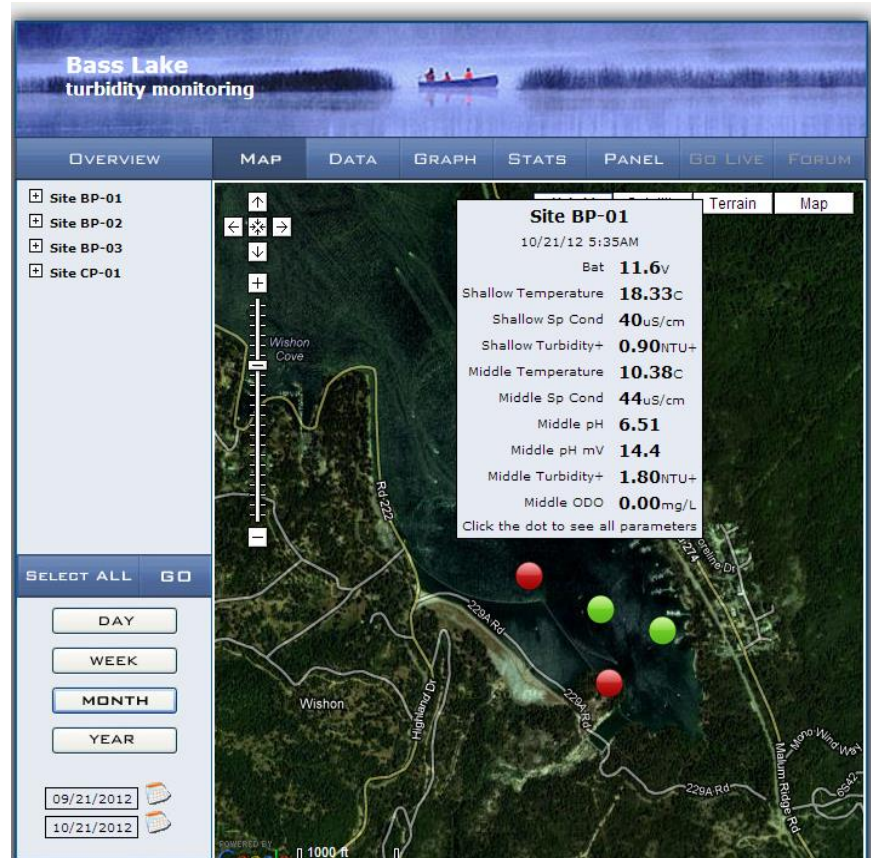
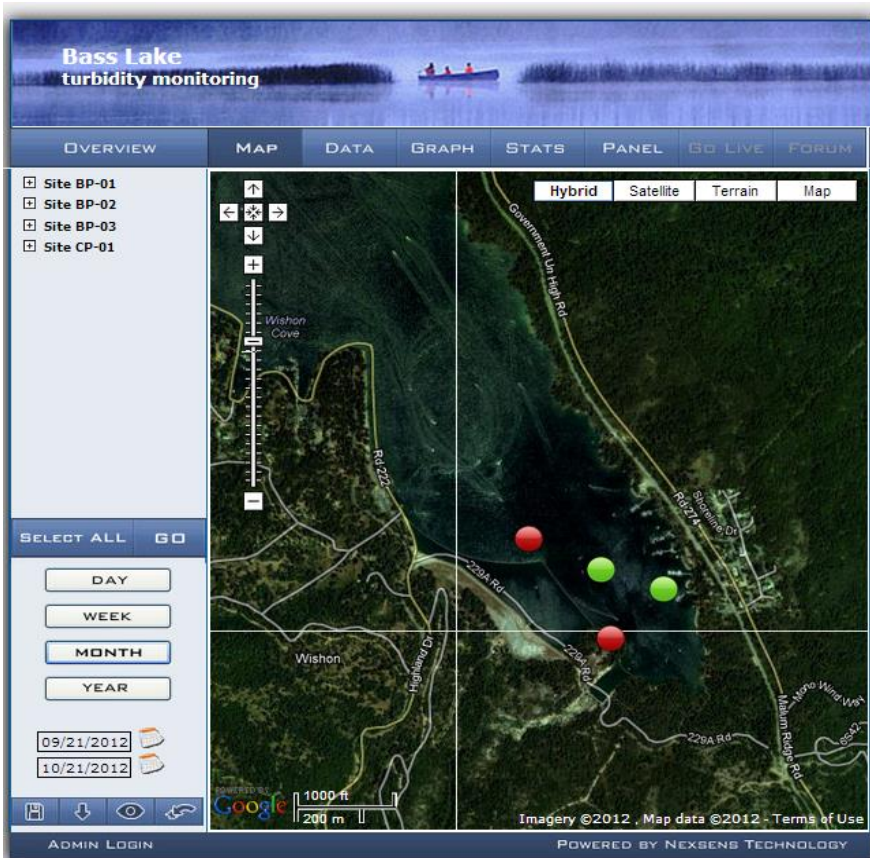
No warranty, express or implied, is given as to the accuracy, reliability, utility or completeness of the data hosted on this datacenter, and this organization shall not be held liable for improper or incorrect use of the data described or information contained on these pages.



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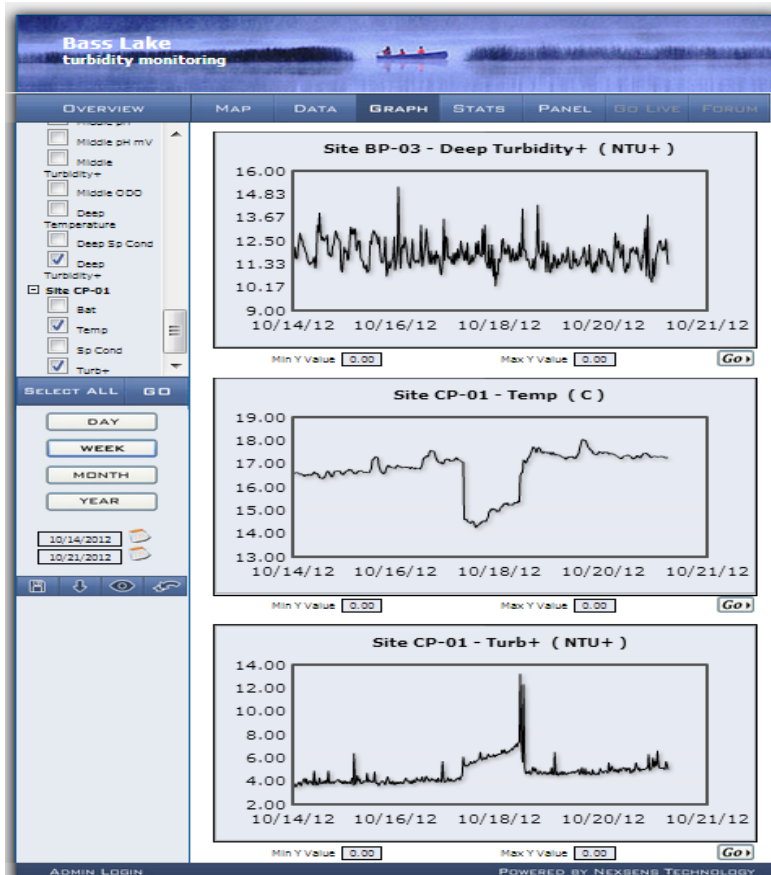
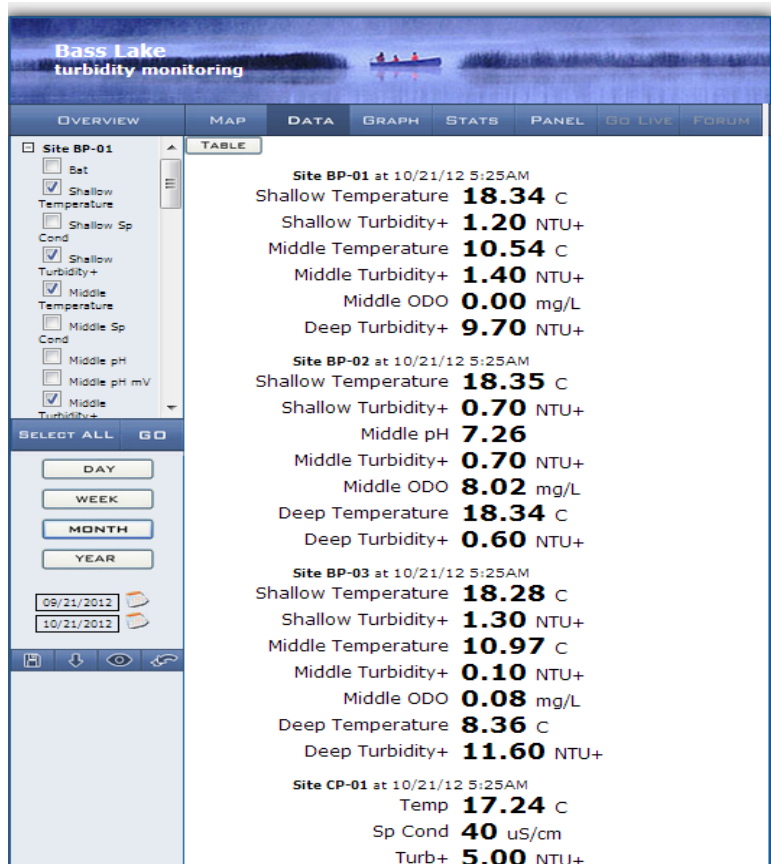
Real time monitoring

Quick view of station and compliance (red vs. green dots).



Real time monitoring

Instant detail of current readings and graphical analysis.



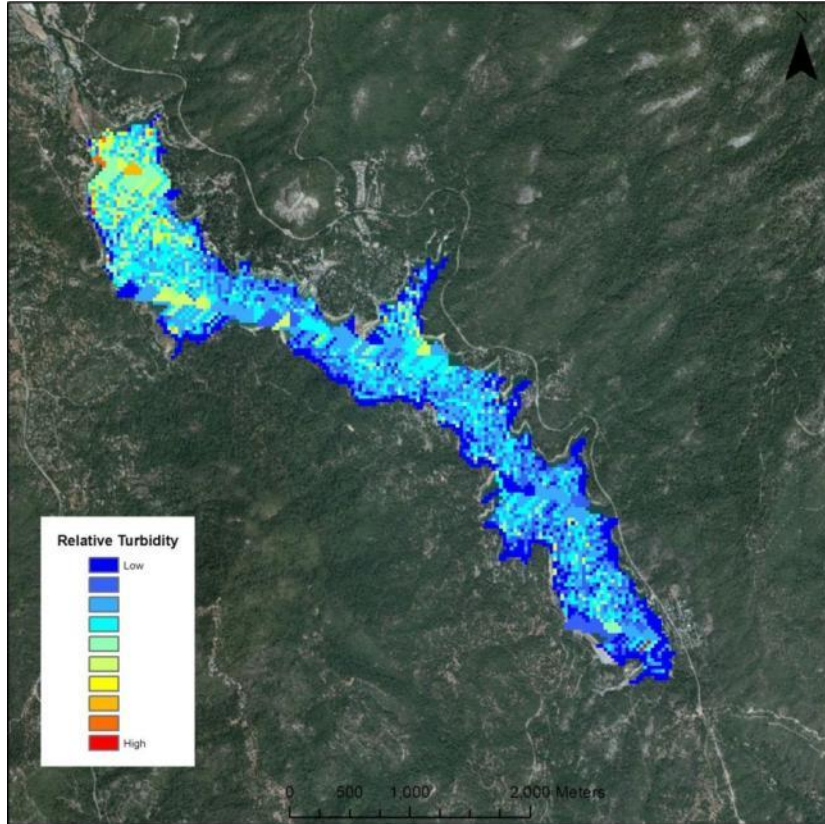
Output

- WQ recorded every 20 minutes.
 - Total of 72 readings per logger per 24 hr.
 - Hourly updates to base station and website.
- Custom reports generated automatically.
 - Daily, weekly, monthly and annual.
- Early warning system.
 - Text and email alarms to select individuals.
 - Allows the project to get ahead of potential compliance issues.
- Allows Agencies to get the information they need for the record.

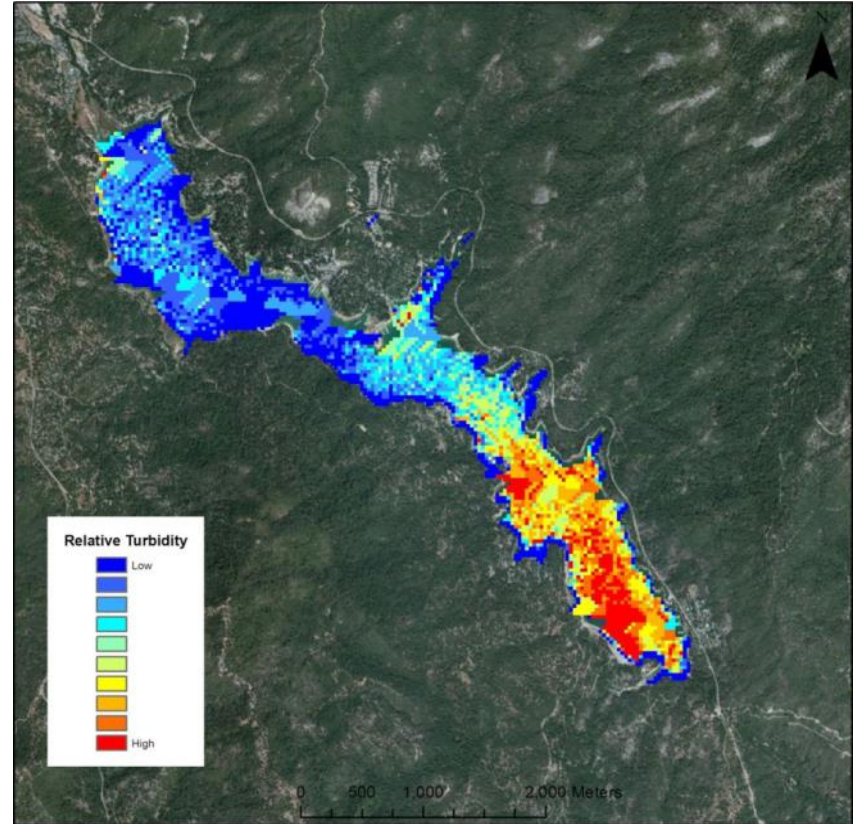
Folsom Daily Compliance Assessment				
Tier Level		Data Date / Time Range		
Report Date	I	9/23/2013 8:20 to 9/25/2013 8:00		
Settleable Solids	N/A			
In-Water permit Conditions?	No			
48 hr BK Turbidity Average	0.45			
48 hr CP-01 Turbidity	0.60			
+2 NTU Threshold	2.45			
In Compliance	Yes			
4 Hour Assessments				
	Time	BK*	CP-01	In Compliance
pH 6.5 < CP-01 > 8.5	8:00:00 AM	7.56	7.72	Yes
	12:00:00 PM	7.04	7.83	Yes
	4:00:00 PM	7.24	7.65	Yes
	8:00:00 PM	7.38	7.40	Yes
	12:00:00 AM	6.83	7.44	Yes
	4:00:00 AM	7.75	7.60	Yes
	8:00:00 AM	8.15	7.58	Yes
DO @ CP-01 > 5.0 (WARM)	8:00:00 AM	6.94	8.51	Yes
	12:00:00 PM	5.93	8.54	Yes
	4:00:00 PM	6.79	8.20	Yes
	8:00:00 PM	7.30	7.61	Yes
	12:00:00 AM	4.68	7.76	Yes
	4:00:00 AM	4.93	8.15	Yes
	8:00:00 AM	8.15	8.12	Yes
Notes:				
* Per the RWQCB, when background DO or pH are above permit thresholds the 4 hour "grab" sample compliance assessment is a comparison between the compliance station and one data point at one background station.				

Going off-planet for answers:

Satellite WQ profiles: Turbidity 2011/2012



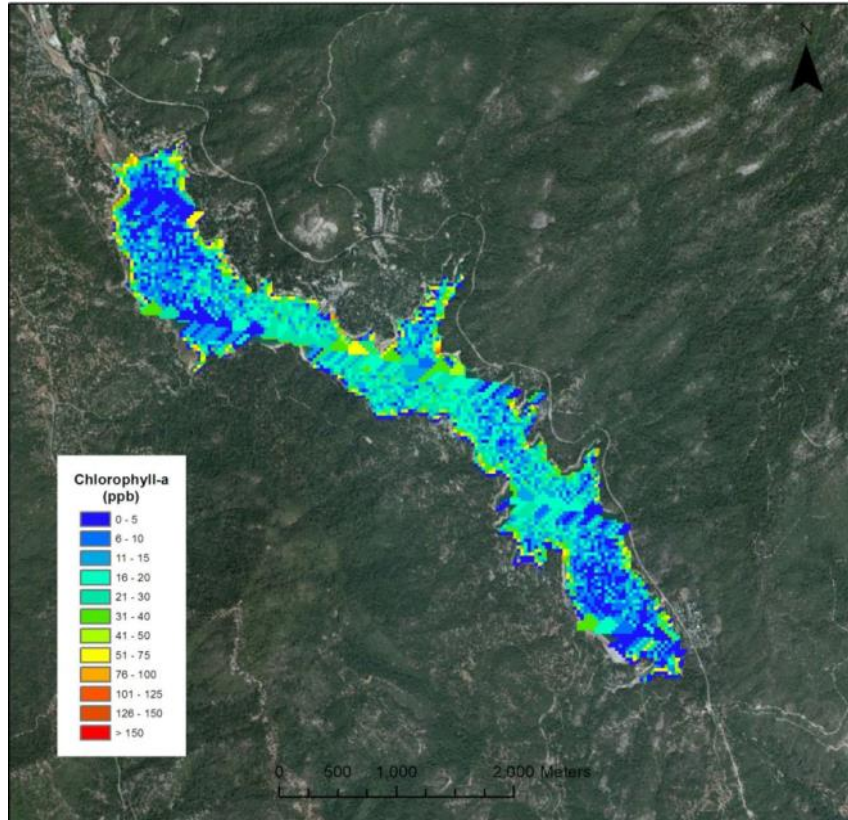
June 24, 2011



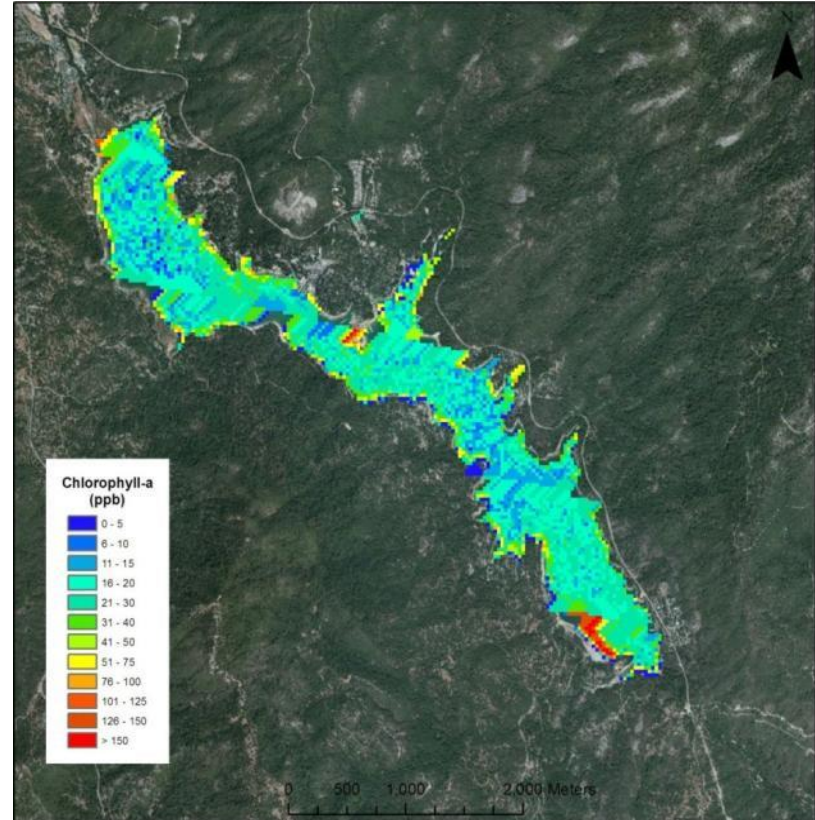
June 26, 2012

Going off-planet for answers:

Satellite confirms WQ profiles: Chl-a 2011/2012



June 24, 2011



June 26, 2012

Why do all this?

- It costs less in the long run.
 - In-person monitoring time reduced.
 - Largely automated collection, analysis and distribution.
 - Fewer shutdowns.
 - Less risk to owner and contractors.
- Lots of timely data = Significant evidence for Agency.
 - This will allow agency staff to safely utilize their discretionary ability to keep projects moving.
 - Will build faith in process and help if/when issues arise.
 - Will feed into an adaptive monitoring program and ease compliance with permits.

John,

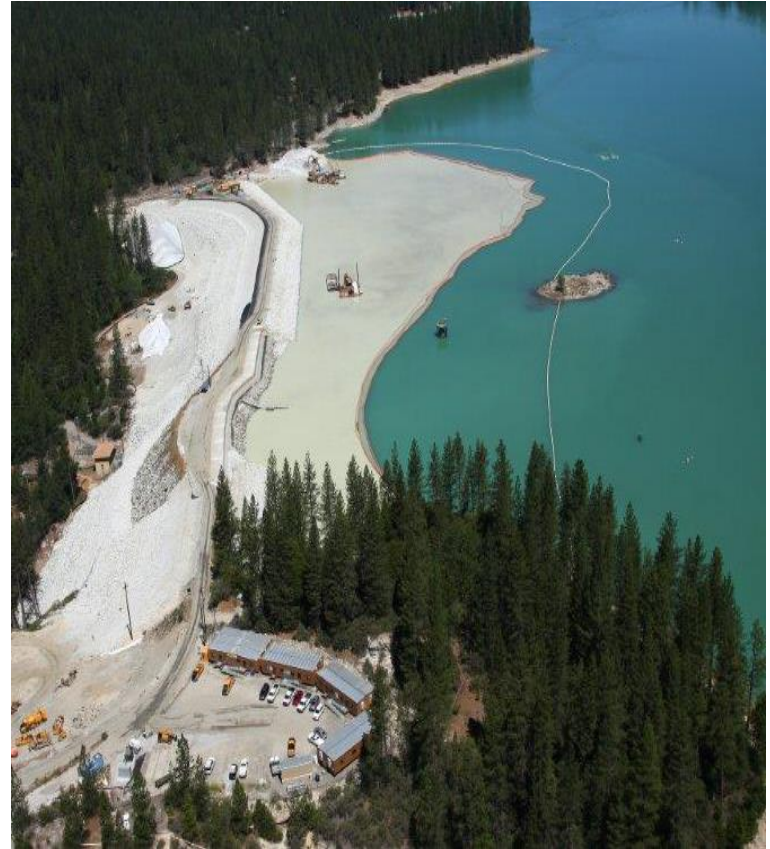
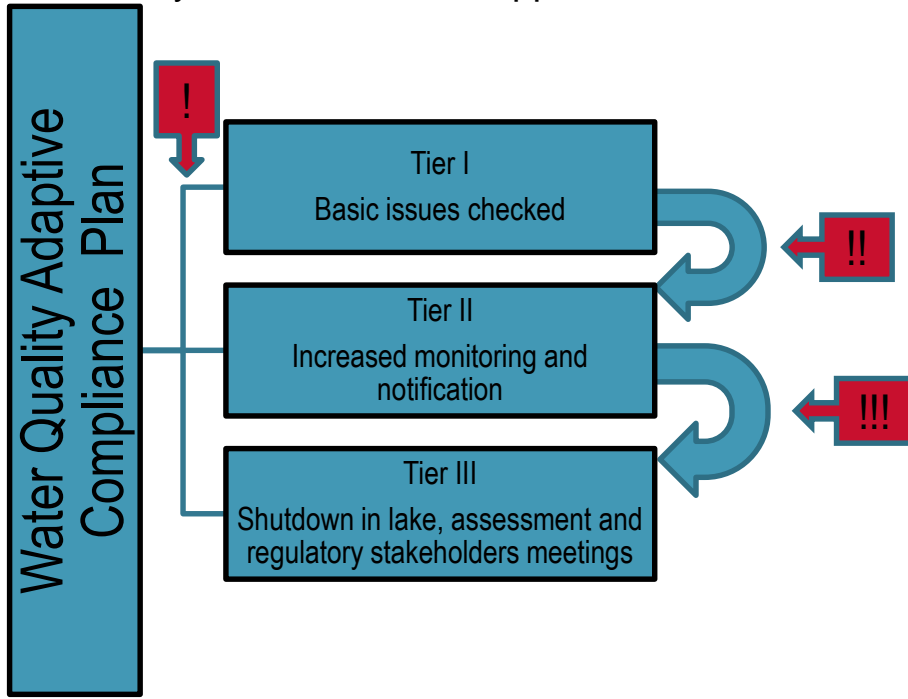
Thank for providing the science to assist us in protecting the resources and to allow us to meet the public expectations of the Department.

Hopefully, we can work cooperatively together in future projects.

*Andrew G. Gordus, Ph.D. California
Department of Fish and Game*

Putting it all together and monitoring with technology.

- Combine remote sensing data with a fresh compliance approach to simplify compliance.
- Adaptive management monitoring plan.
 - Flexibility is inherent in this approach.



Questions or comments?

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