

Water Quality Model Updates and Special Studies

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1. Modeling

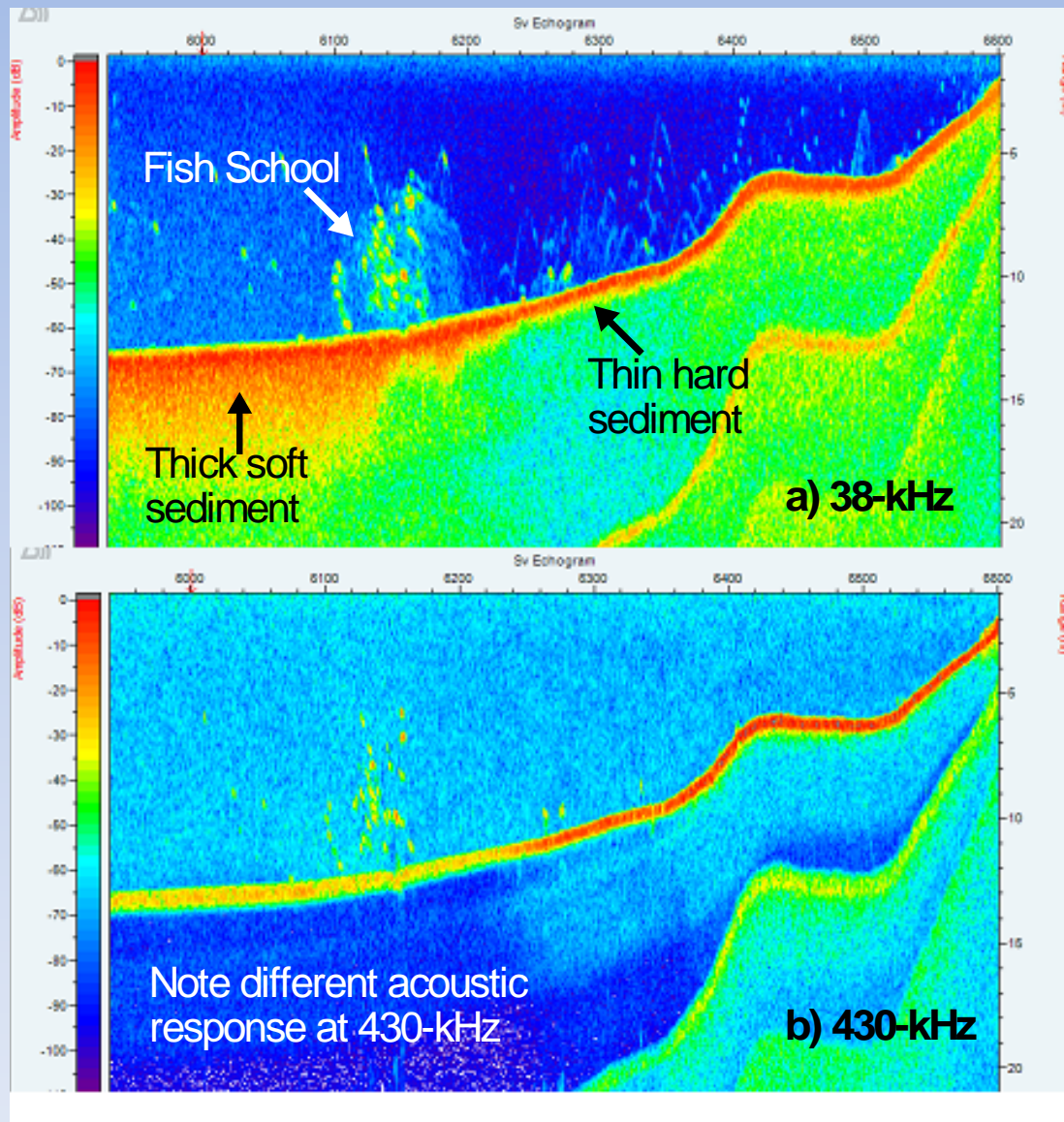
- Additional modeling is proposed to address a number of questions pertinent to the Lake Elsinore TMDL, goals and possible revision
- Additional 1-D hydrodynamic-water quality simulations will be conducted using DYRESM-CAEDYM
- Of particular note, CAEDYM has been updated to include sediment diagenesis, thereby allowing long-term simulations and influence of time on sediment quality and rates of internal nutrient recycling

- Key questions that will be addressed include:
 - What are naturally occurring fluctuations in nutrients-algae-DO-TDS in Lake Elsinore in an undeveloped watershed
 - How do salinity and other variables affect foodweb (e.g., zooplankton and fish species and effectiveness of top-down control of algae)
 - What are impacts of the various lake management efforts that have been implemented to date:
 - LEMP
 - Aeration/mixing
 - Lake level stabilization with recycled water
 - Fishery management
 - What opportunities exist for further improvements
 - Microfloc alum treatment of RW inflow or lake alum application

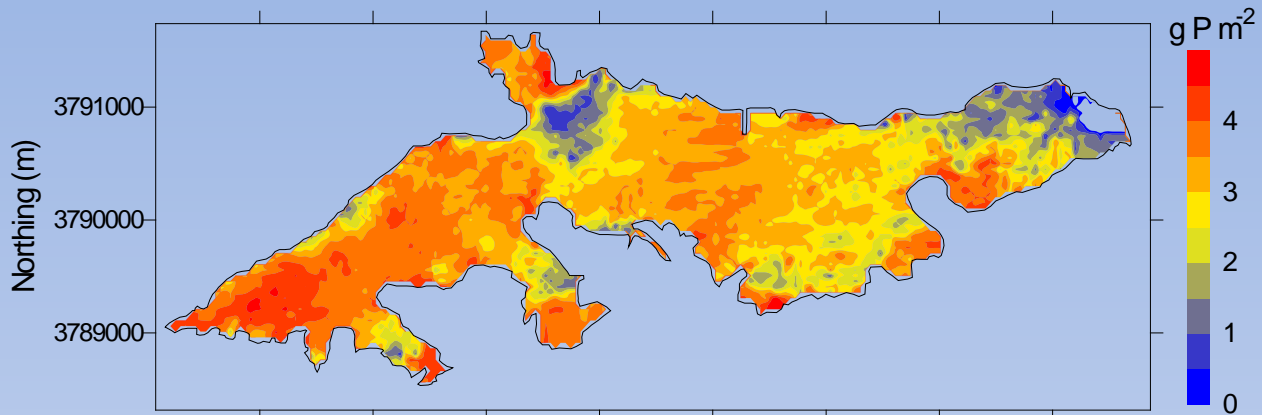
2. Special Studies

- Lake Elsinore
 - Stable isotope study to quantify:
 - persistence of N and P in labile forms, number of “trips” to water column before permanently sequestered
 - “fingerprinting” of N and P in recycled water and in water column/sediments to estimate persistence/fate
 - Fishery hydroacoustic survey to track fish populations by size class (and infer species to the extent possible based upon habitat use, DFG electrofishing survey, and/or gill netting)
 - Determine mobile-P content in sediments and use acoustic signature to develop maps, alum dose

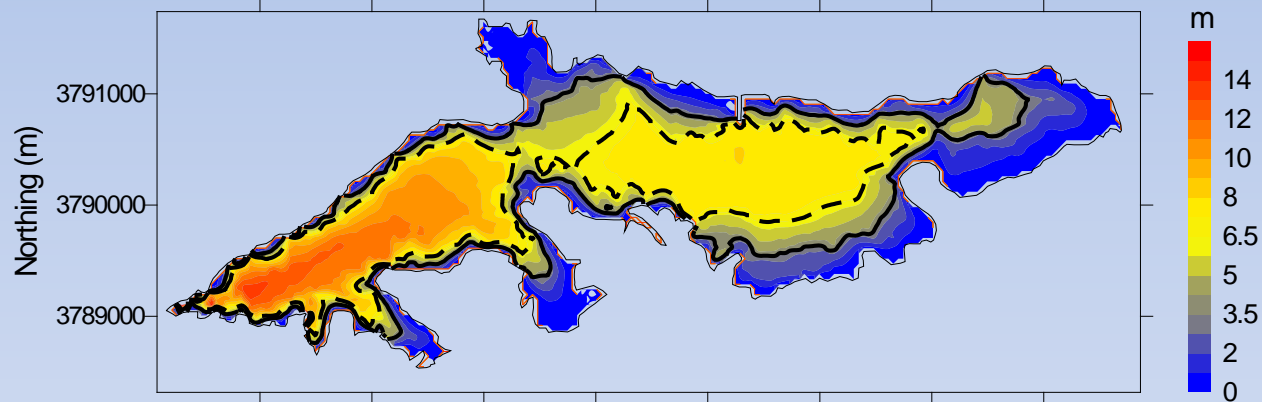
- Acoustic signature of bottom sediments contains valuable info



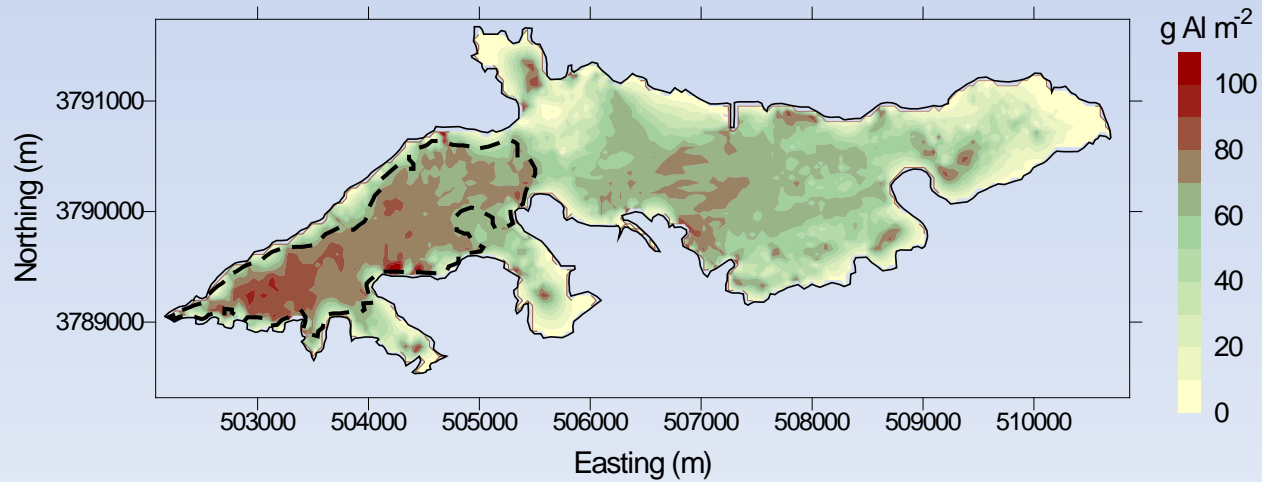
Mobile-P



Wave-zone



Alum dose



- Canyon Lake

- Measurement of internal nutrient loading rates for comparison with prior (pre-alum) studies
- Determination of mobile-P and Al-P in surface grab samples and cores to assess conversion of mobile-P to immobile-P (bound as Al-P to floc)
- Hydroacoustic survey of all 3 basins of Canyon Lake
 - determine sediment thickness
 - map mobile-P contents, etc.
 - fishery/zooplankton survey
 - improve modeling, water budget calculations, update elevation-storage data for lake

Budget

• Lake Elsinore studies, reports:	\$96K
• Canyon Lake studies, reports:	<u>\$26K</u>
Total	\$121K

Work conducted through research agreement with UCR similar to Biological Monitoring and other studies.

Plans for Future Monitoring by WRCAC; Report from a Field Survey in Canyon Lake Watershed



Pat Boldt, WRCAC
Steven Wolosoff, CDM Smith

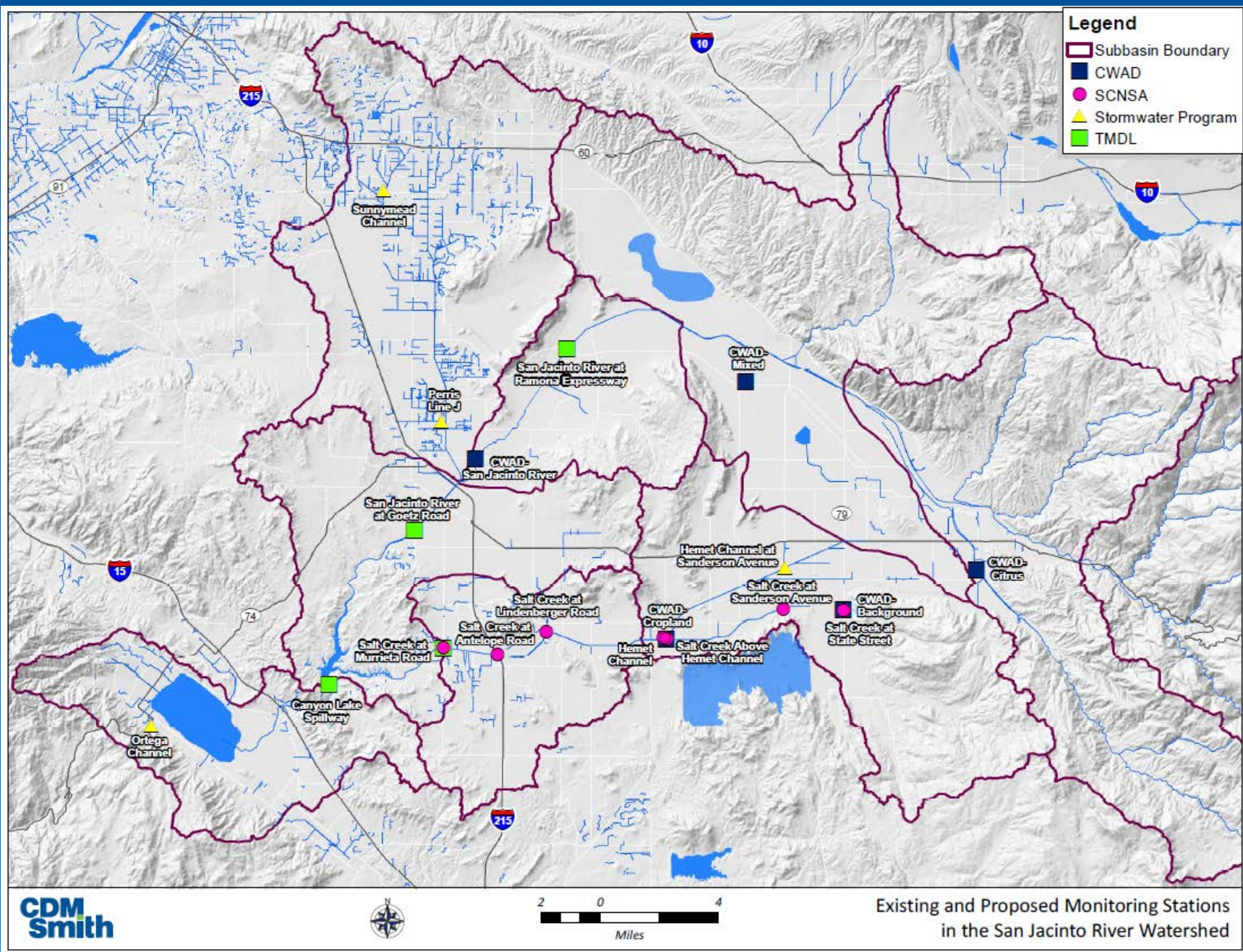
Presentation to LE/CL Nutrient TMDL Technical Advisory
Committee
May 20, 2014

Agenda

- Monitoring plans under development
- Field survey of potential sites
- Observations from field

Upcoming WRCAC Monitoring Plans

- **Salt Creek Nutrient Source Assessment**
 - Longitudinal sampling of nutrients along Salt Creek
 - Two events in 2014/15 wet season, 1-2 grabs/event
 - Seven sampling locations
- **CWAD Compliance Monitoring**
 - Regional monitoring of different agricultural types as well as natural background
 - Annual monitoring (1-2 events/yr) beginning in 2015/16 wet season depending upon CWAD adoption date
 - Four of five sampling locations



Salt Creek Nutrient Source Assessment



Murrieta
Road

Dead fish on dry
channel bottom

Salt Creek Nutrient Source Assessment



Antelope
Road

Salt Creek Nutrient Source Assessment



Lindenberger
Road

Salt Creek Nutrient Source Assessment



Hemet
Channel

Salt Creek Nutrient Source Assessment



Salt Creek
Olive /
California
Ave

Salt Creek Nutrient Source Assessment



Sanderson
Ave

Salt Creek Nutrient Source Assessment



S. State
Street

CWAD Core Monitoring



**Salt Creek at
S. State
Street**

**Natural
Background**

CWAD Core Monitoring



**Salt Creek
Above Hemet
Channel**

Cropland

CWAD Core Monitoring



**Bautista
Channel at
Fairview Ave**

Citrus

CWAD Core Monitoring



**Bert Lauda
Farm**

**Mixed Use /
Septics**

CWAD Core Monitoring



**San Jacinto
River above
Perris Valley
Channel**

**Agriculture
within SJR
watershed**

Observations

- Dead fish in dried section of Salt Creek



Observations

- Salt Creek bottom is a massive, very green golf course that runs almost 2 miles within the City of Menifee



West
(downstream)



East
(upstream)

Observations

- Salt Creek and SJR are wide soft bottom channels with potential for significant pollutant removal prior to reaching Canyon Lake



East
(upstream)



West
(downstream)

Observations

- Composting near channel with no erosion control BMPs
- WRCAC was made aware of this potential source of pollution in 2014 dry season and is taking steps to ensure the piles will be moved and no longer allowed



Next Steps

- Prepare draft monitoring plans
 - Salt Creek Nutrient Source Assessment (July 21)
 - CWAD Core Monitoring (September 8)
- Prepare for field work in 2014/15 wet season
 - Select a firm / agency for monitoring (inquire with Haley and Aldrich about combining with TMDL sampling)
 - Obtain access permissions and gate keys from RCFC&WCD
 - Select laboratory
 - Track weather for mobilization