

# Water Quality Model Updates and Special Studies

*M. Anderson*  
*Environmental Sciences*  
*UC Riverside*

# 1. Modeling

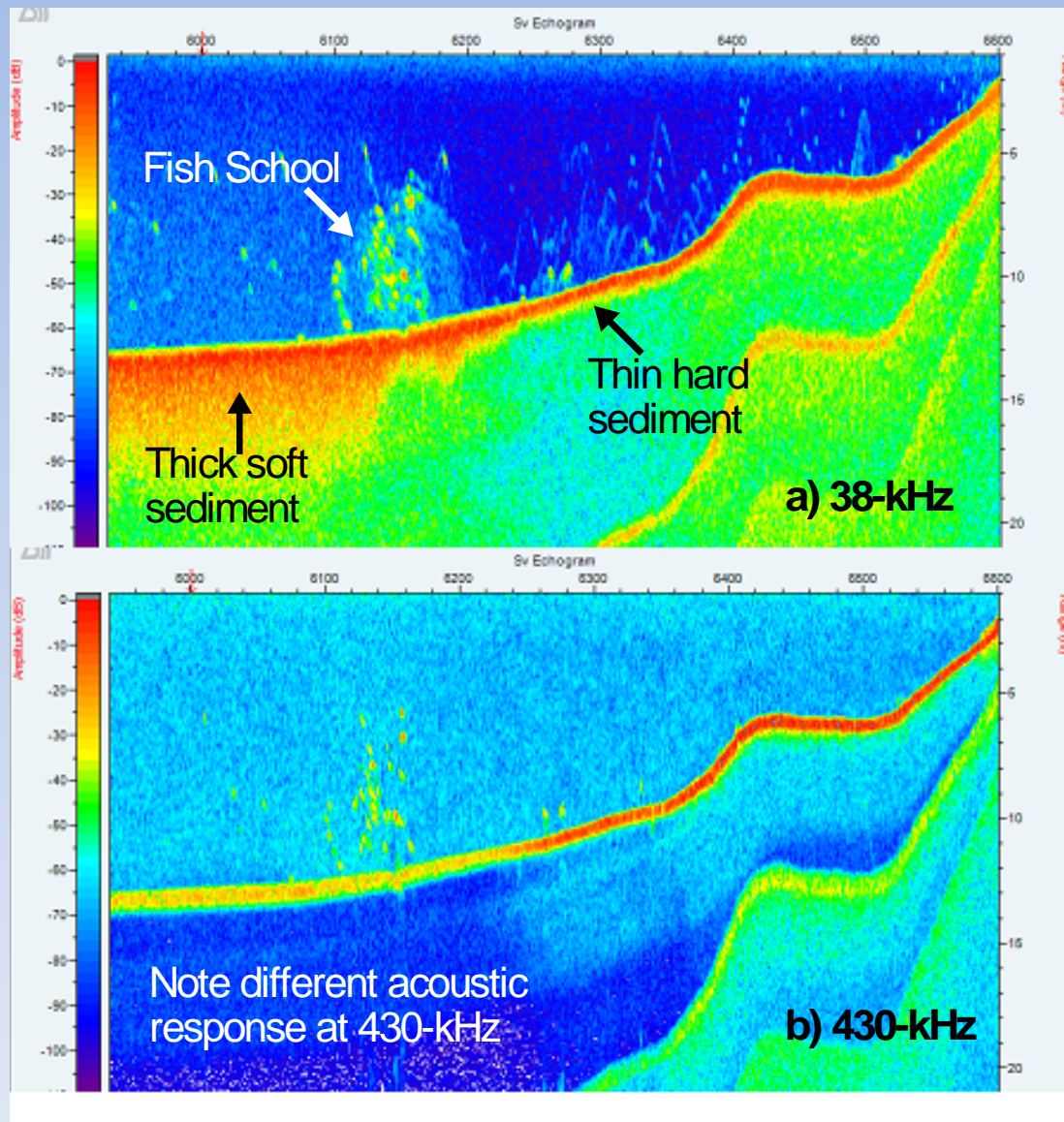
- Additional modeling is proposed to address a number of questions pertinent to the Lake Elsinore TMDL, goals and possible revision
- Additional 1-D hydrodynamic-water quality simulations will be conducted using DYRESM-CAEDYM
- Of particular note, CAEDYM has been updated to include sediment diagenesis, 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

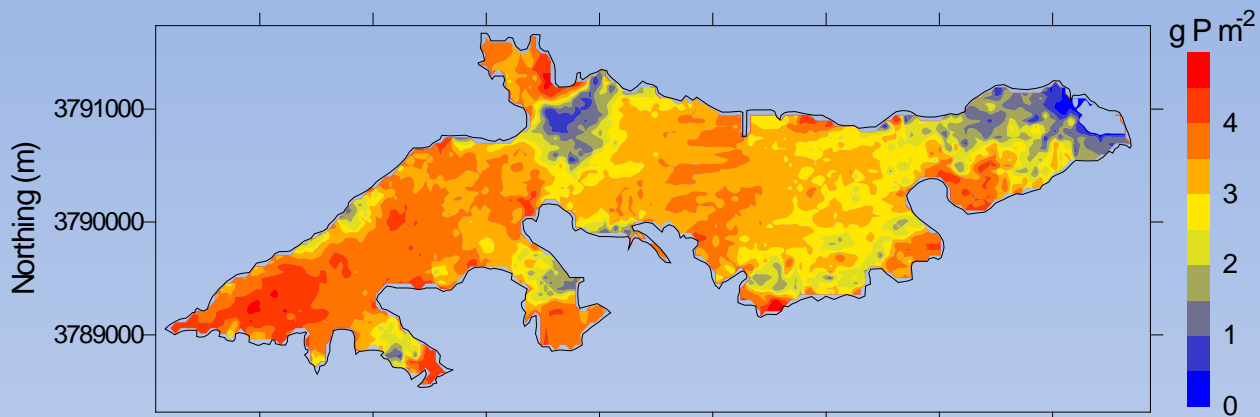
## 2. Special Studies

- 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

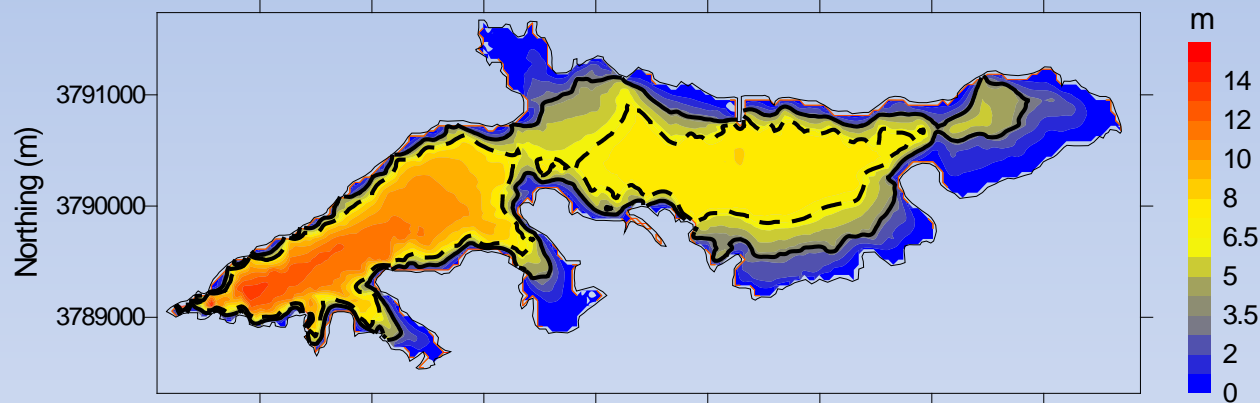
- Acoustic signature of bottom sediments contains valuable info



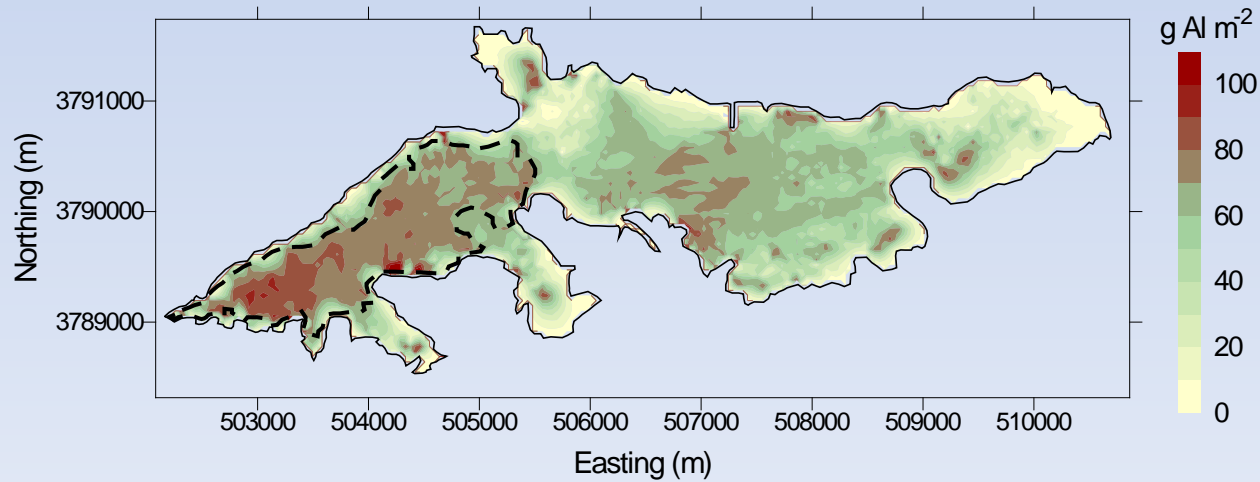
Mobile-P



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.*