



Lanthanum for Phosphorus Mitigation

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Nutrient Inactivation



Canyon Lake Alum Application

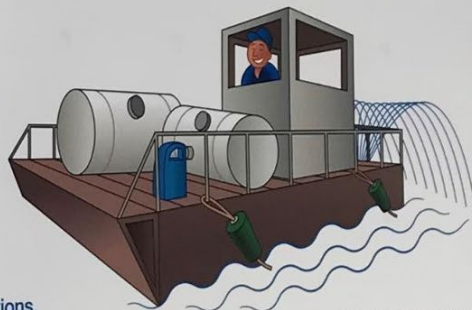
Algae blooms are a significant issue for Canyon Lake. Alum is a scientifically proven method to reduce algae blooms to maintain a healthy lake ecology. Alum is safe for human health and the environment.

Here is why alum is a good solution for Canyon Lake:

- **Phosphorus** is the primary food source for algae.
- **Excess phosphorus** in the Lake can cause algae blooms.
- **Alum** sprayed or injected into the lake will bind with phosphorus, making it inactive.
- **Less phosphorus** in the Lake will reduce the chance of future algae blooms.

Alum applications are an effective means to comply with State water quality regulations. Local agencies working together through the Lake Elsinore & Canyon Lake Nutrient Total Maximum Daily Load (TMDL) Task Force are committed to improving Canyon Lake water quality through alum water treatments.

For more information visit: www.MyWatersheds.com



Lake Elsinore & San Jacinto Watersheds Authority



City of Lake Elsinore • City of Canyon Lake • County of Riverside
Elsinore Valley Municipal Water District • Santa Ana Watershed Project Authority

LESJWA Project at Canyon Lake

- Contracted with us in 2010, have won RFP processes in the years since
- Two applications per year
- Spring application targets phosphorus inflows from the watershed and applied as rains end
- Fall application targets sediment release prior to turnover



Alum Operations

- We utilize the Canyon Lake Property Owners Association boat ramps for operations
- We generally receive and apply 4-5 truck loads per day
- Operations do not interfere with lake use or boat launching

Alum Floc Formation

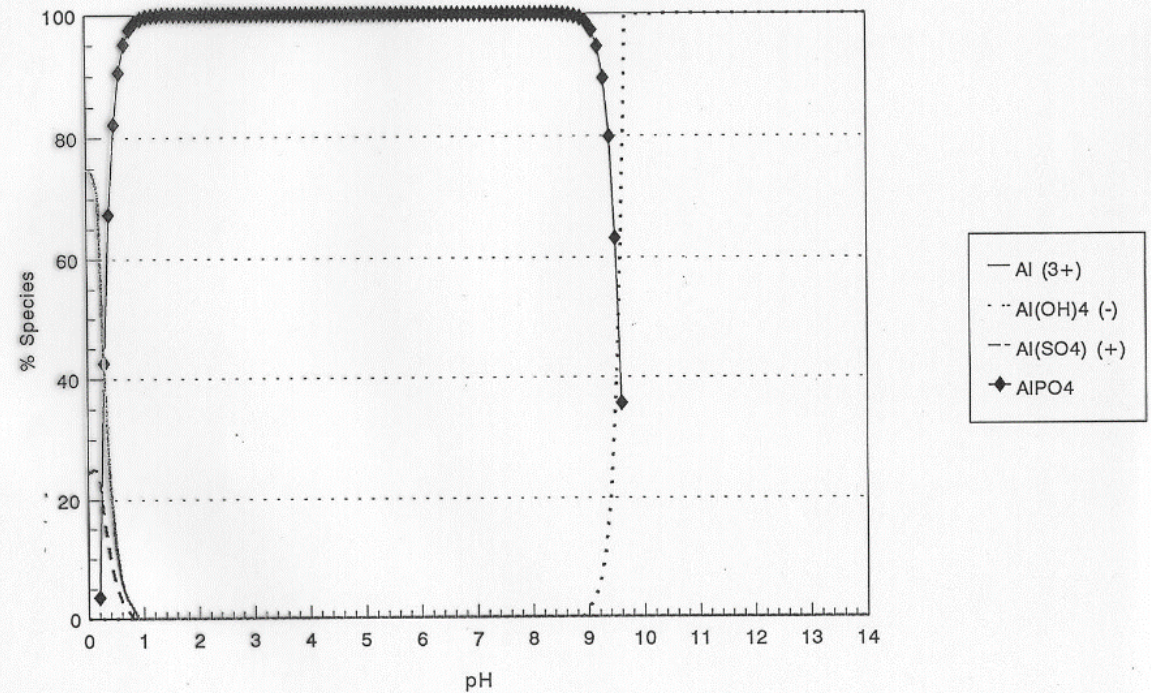
- Alum is applied to the lake surface
- It forms a floc shortly after application that sinks through the water column
- Alum will capture and strip phosphorus from the water column
- As it settles to the sediment it can form a cap to prevent P release



Alum and Phosphorus Capture

- Not effective in high pH waters
- Southern California lakes with cyanobacteria blooms can have pH in the range that can be problematic
- Can leak back off Alum in anoxic situations
- We needed new tech, found Phoslock in 2010 and began use
- Phoslock company is in process of closing, EutroSORB is replacement Lanthanum technology

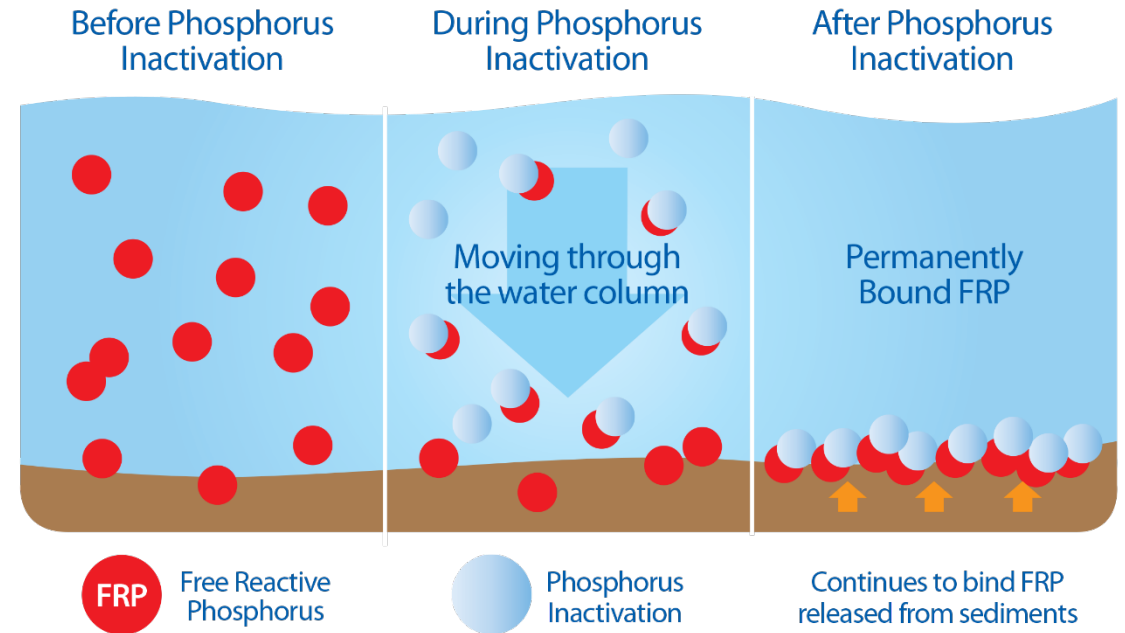
Aluminum Speciation in Water versus pH Phosphorus Present



Note: Above figure assumes only aluminum, sulfate, and phosphorus species are present.
Data generated using USEPA's Mineql+ Program.

Eutrosorb vs. Alum

- Primary Difference between EutroSorb and Alum, EutroSorb captures FRP, forms new compound not biologically available
- Water quality does not impact performance of P sequestration
- Application does not change water quality as alum can
- Does not require buffer
- Can calculate P removal, 50:1 ratio



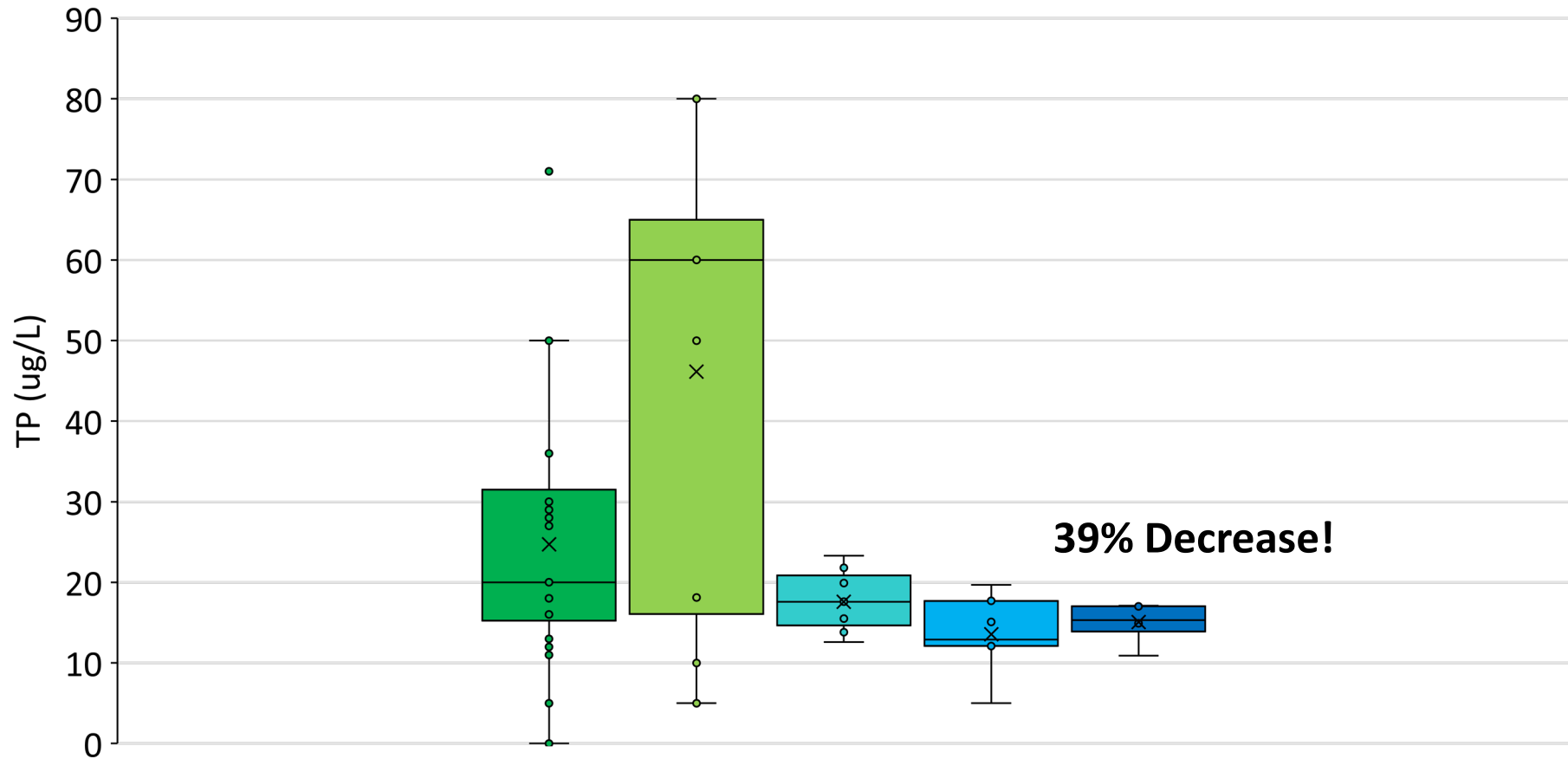


Kitsap Lake, WA

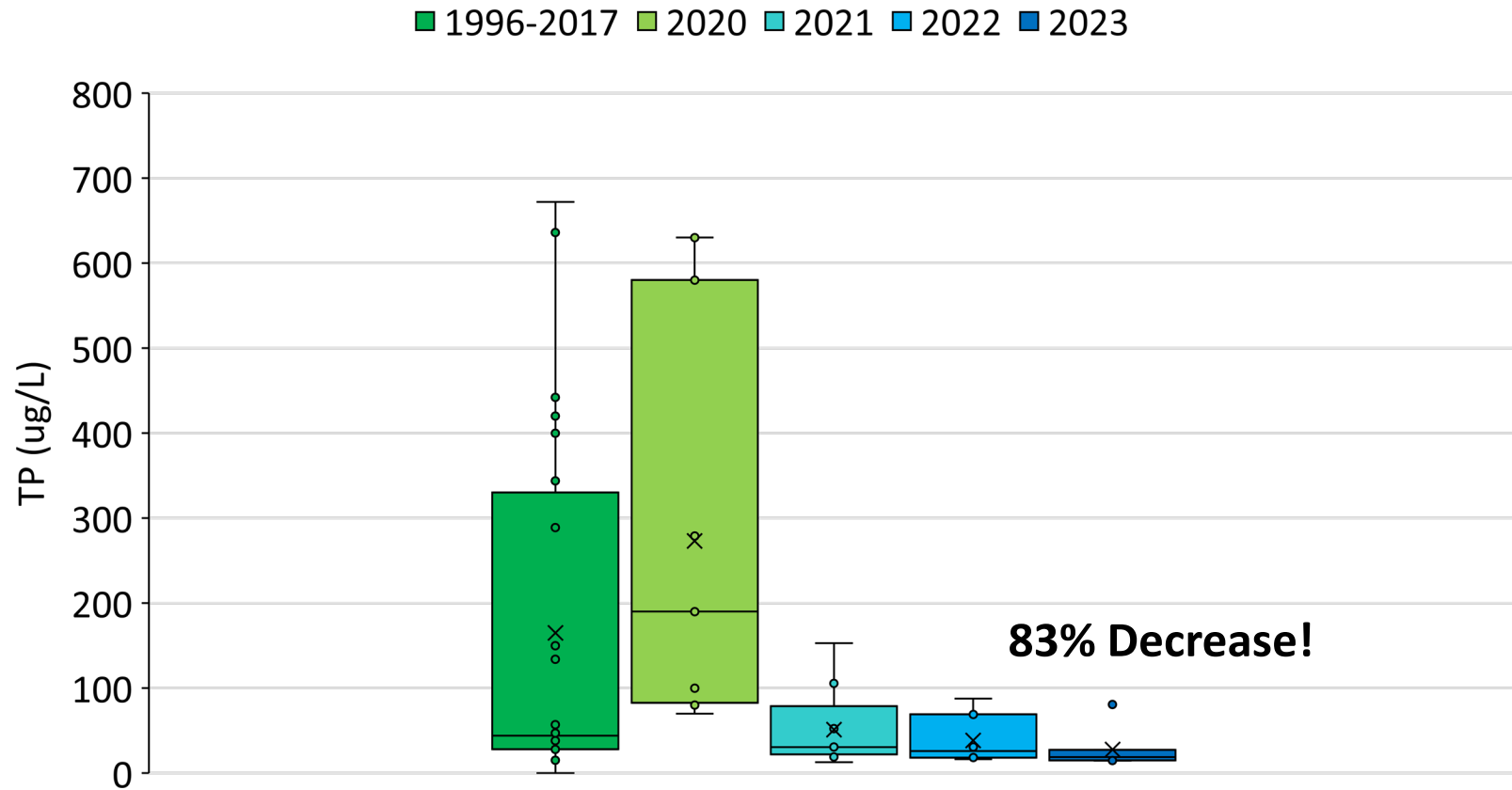
- 245-acre lake, West of Seattle, WA
- Has had toxic algae closures for several years
- Issued RFP for Phosphorus management plan, 2019, we competed and were selected
- Completed fall 2019
- After community input, program was implemented summer 2020
- Phoslock was selected by community as primary tool

Epilimnion Phosphorus (May-Oct)

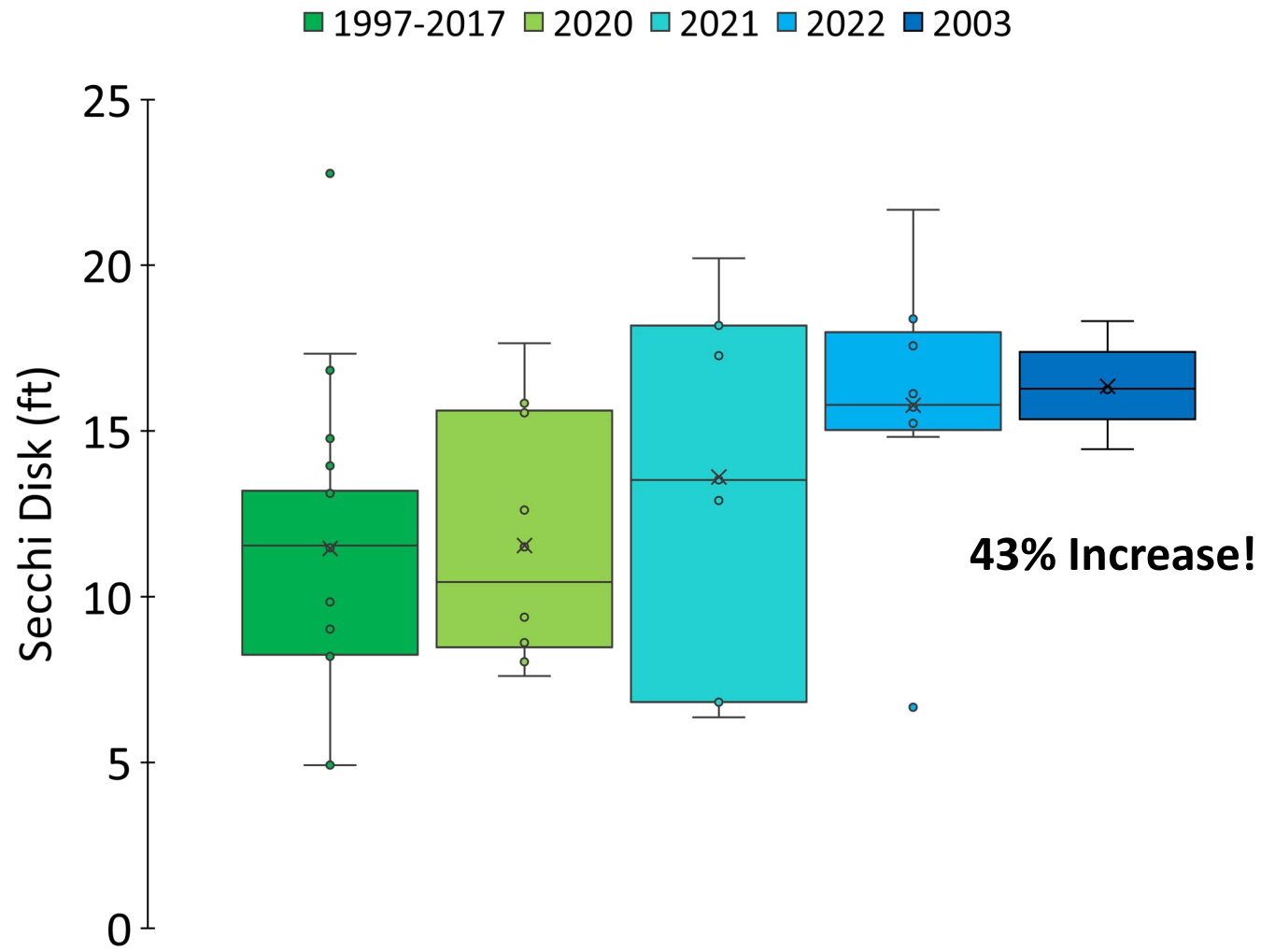
■ 1996-2017 ■ 2020 ■ 2021 ■ 2022 ■ 2023



Hypolimnion Phosphorus (May-Oct)



Water Clarity (June-Oct)



Moses Lake P mitigation project 2024



Rocky Ford Creek

Autonomous Phosphorus Data system –
80-120 ug-P/L SRP

SATT system to treat with EutroSORB
WC



In-Lake Sediments

Target upper 1/3 of lake

Mitigate internal loading of phosphorus
using EutroSORB G



Inflow injection system EutroSORB WC

- Set up upstream from Moses Lake, good mixing site
- Totes on shoreline store material, injection hoses on the dam
- Greeneyes remote P sampling lab captures sample throughout the day, chemistry takes place in the field and sent to cloud
- SATT system we direct dose based on water flow and P readings
- Could be set up for storm events



Moses Lake EutroSORB G

- 2,500 acres treated week of June 3rd
- 500,000 pounds applied
- 14,400 pounds of P targeted within lake and inflow injection system



EutroSORB[®] G

Phosphorus Locking Technology

A high-efficiency Lanthanum Modified Bentonite (LMB)

- 10% Lanthanum
 - ½ the material required compared to 5% LMB
- **50 lbs. EutroSORB G binds 1 lb. of P**
- Binds specifically to P across a wide range of water chemistries
- Permanent P binding: pH 4-11 & anoxic/oxic conditions
- Excellent environmental ecotox profile



EutroSORB[®] WC

Water Column Phosphorus Inactivator

A concentrated solution of phosphorus-binding minerals

- Rapid and permanent inactivation of SRP
- Easy to use formulation
 - No slurry
 - Low volume use rates
 - **1 to 1.5 gallons to bind 1 lb. of P**
- Safe for fish and invertebrates
- No irrigation restrictions
- *Patent pending*



Summary

- Costs for EutroSORB G is \$187.50 for 50 pounds, captures 1 pound of P (plus application)
- Cost for EutroSORB WC is \$250.00 for 10 PDU, captures 1 pound of P (plus application)
- We would want to do sediment analysis and obtain more P data for Canyon Lake to determine cost comparison

