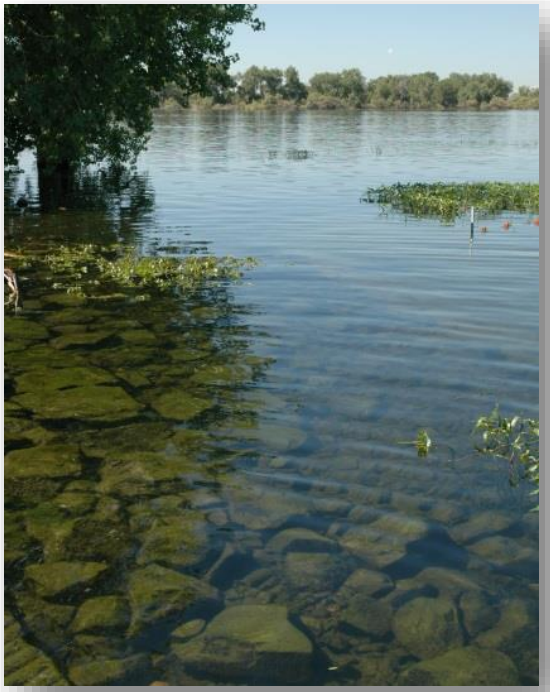
Then

Now



CFWE Webinar:

Cyanotoxins, Nutrients, and Public Health

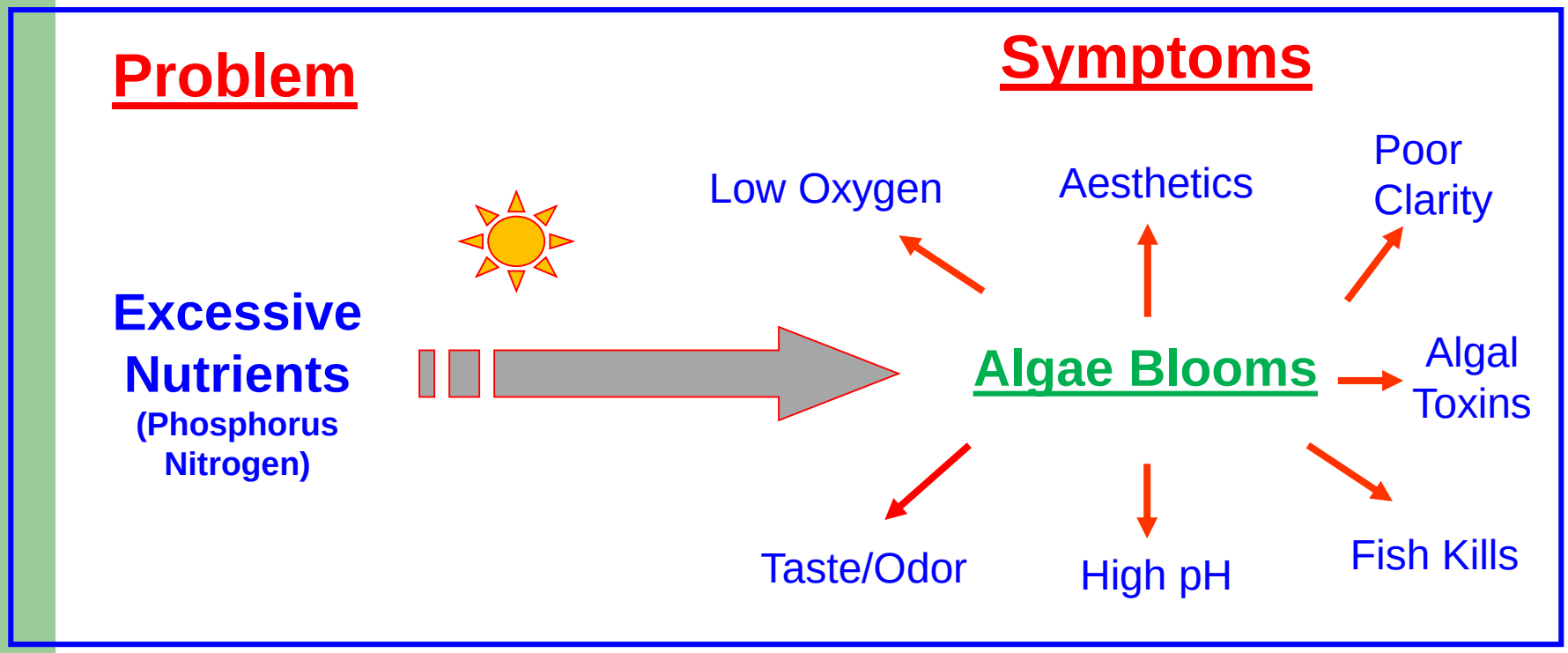
April 13, 2017

Reducing Algal Blooms at Barr Lake

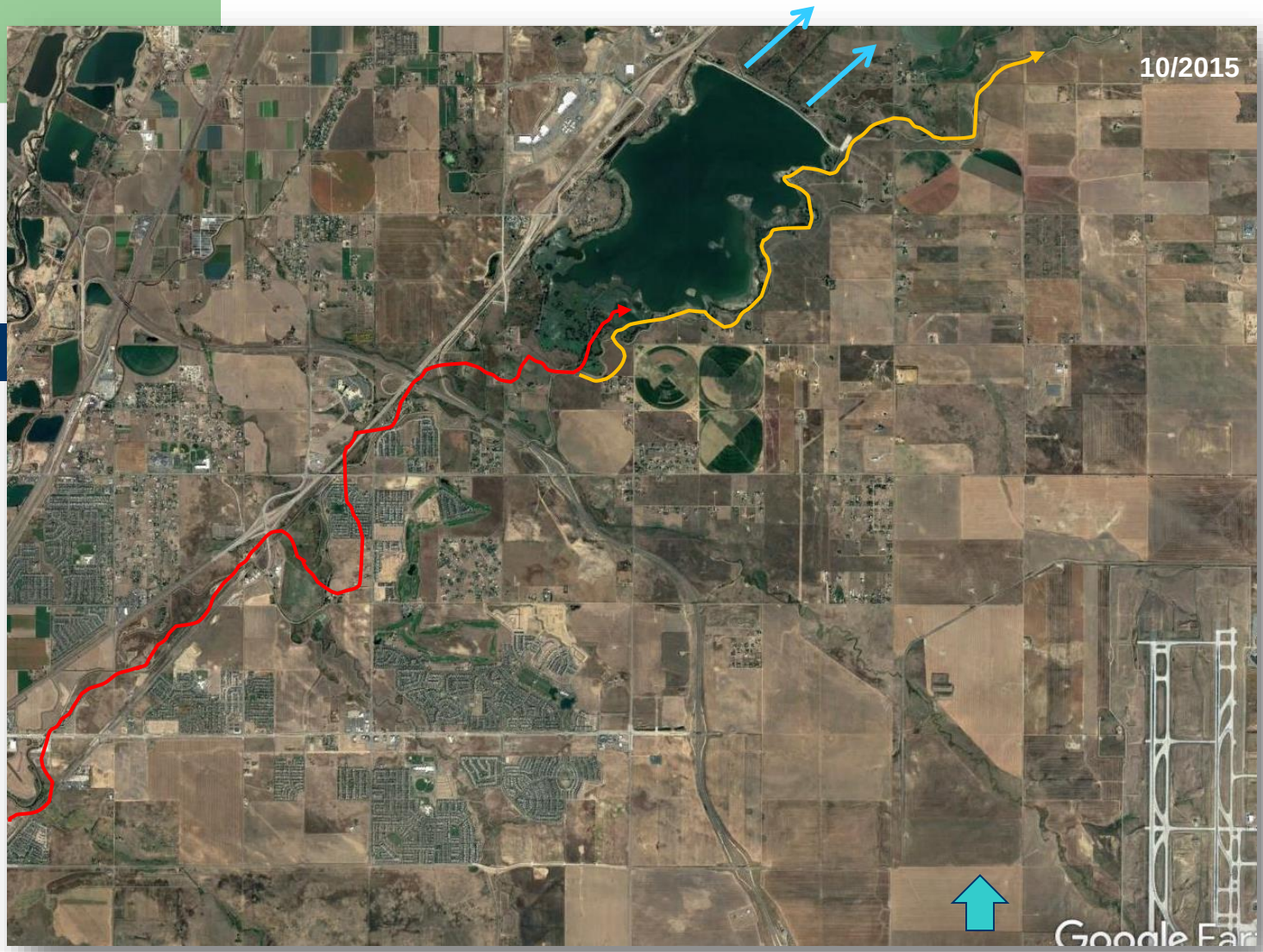
By: Steve Lundt, CLM

Cultural Eutrophication

The excessive addition of inorganic nutrients, organic matter, and silt to lakes, thereby causing increased biological productivity (Cook et al. 1993)



Reservoir



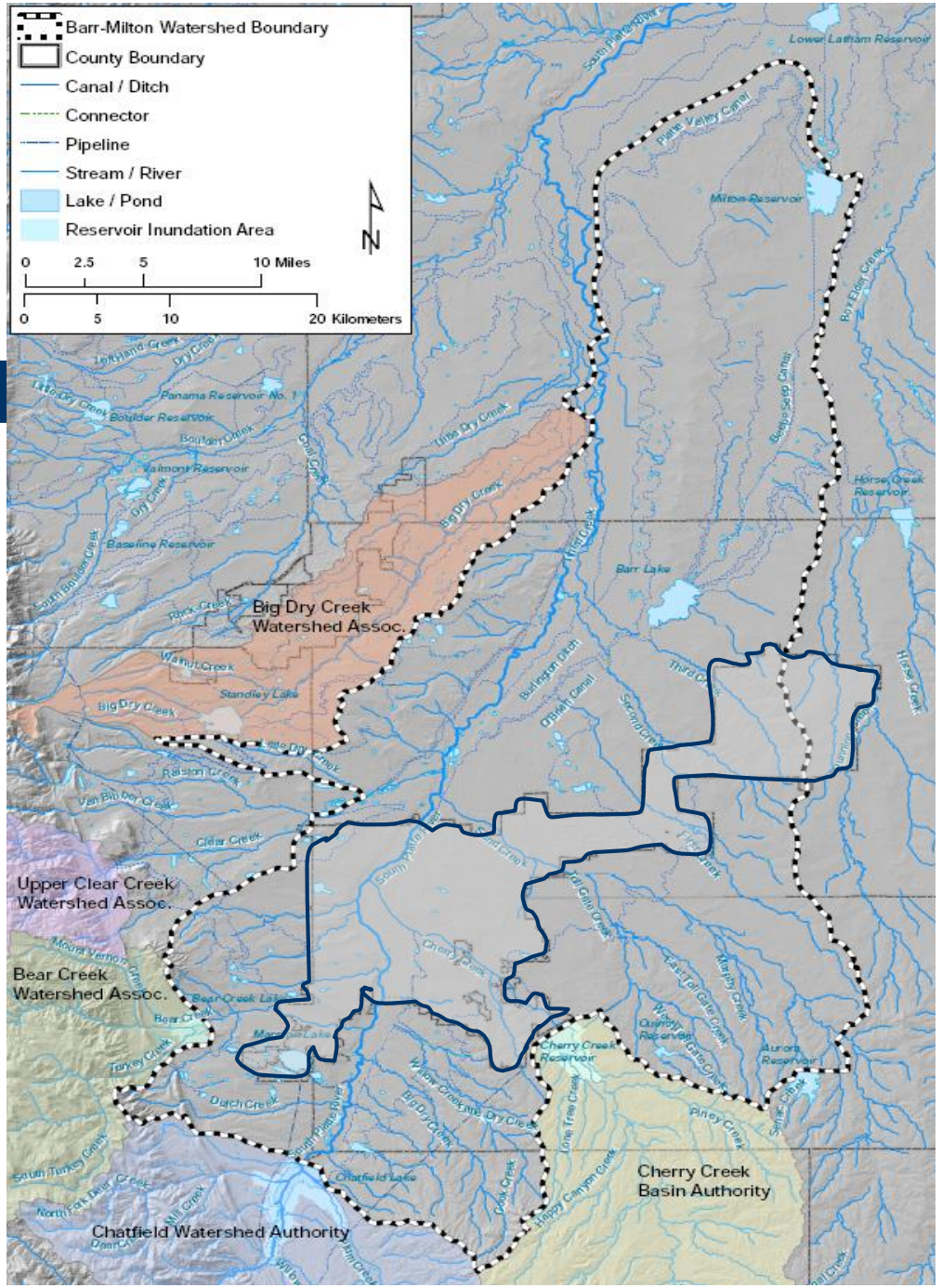
- 32,000 a-f
- 34 ft at dam
- 1,835 acres

- 8 months Residents Time
- Rec, Aq. Life, Ag, & Drinking
- Eutrophic to Hyphereutrophic

- State Park since 1975
- Winter Fill
- S. Platte River Water

Watershed

- **Listed for pH – 1998**
- **BMW Association – 2002**
- **3rd Party TMDL – 2010**
- **2.5 Million People Upstream**
  - Excessive Phosphorus
  - 105 NPDES Permits
  - 21 MS4 Permits



Phosphorus Timeline

1960's (3,400 – 10,300 µg/L TP)

Nobody Cared

Improve WW Treatment

1970's (1,100 µg/L TP)

WQ Improvements

More Data

1990's (660 µg/L TP)

Watershed Planning

2000's

2013 Flood

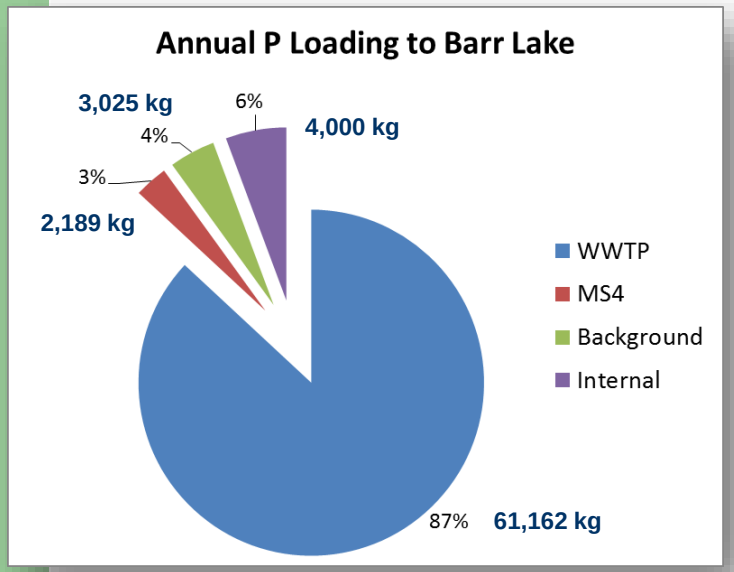
2015 (250 µg/L TP)

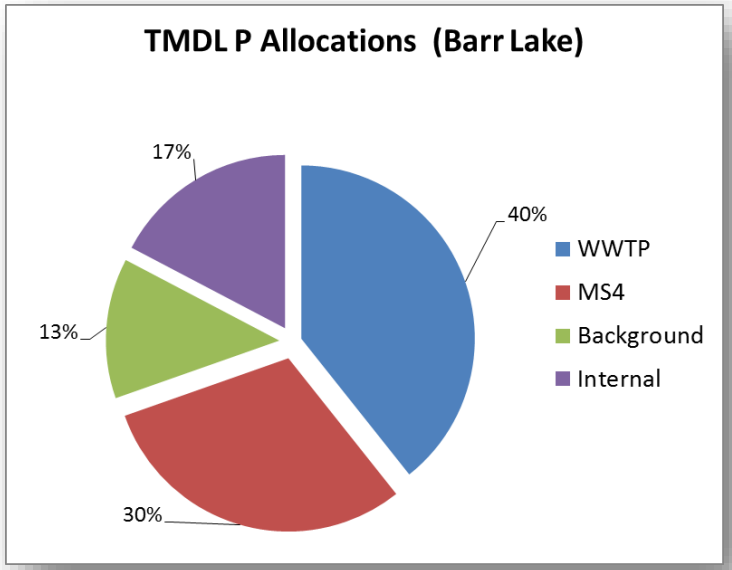
Implementation

Goal (<100 µg/L TP)

pH TMDL

(92% reduction)





70,000 Kg/yr

5,800 Kg/yr

The Plan

Wastewater – Tertiary Treatment ($$$$ Billion)

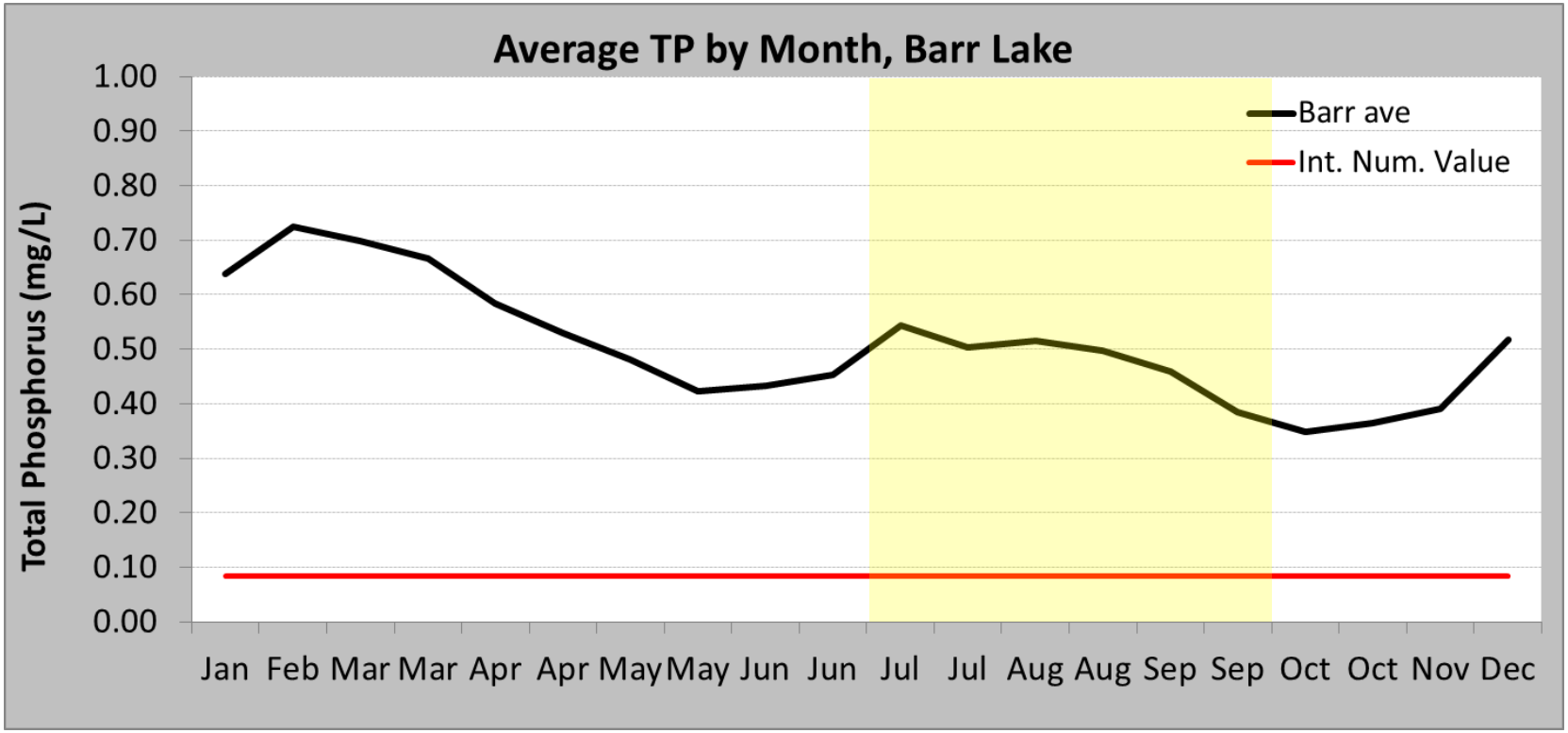
Stormwater – Best Management Projects ($$$ Millions)

Internal – Whole Lake Treatment like Alum ($$ Million)

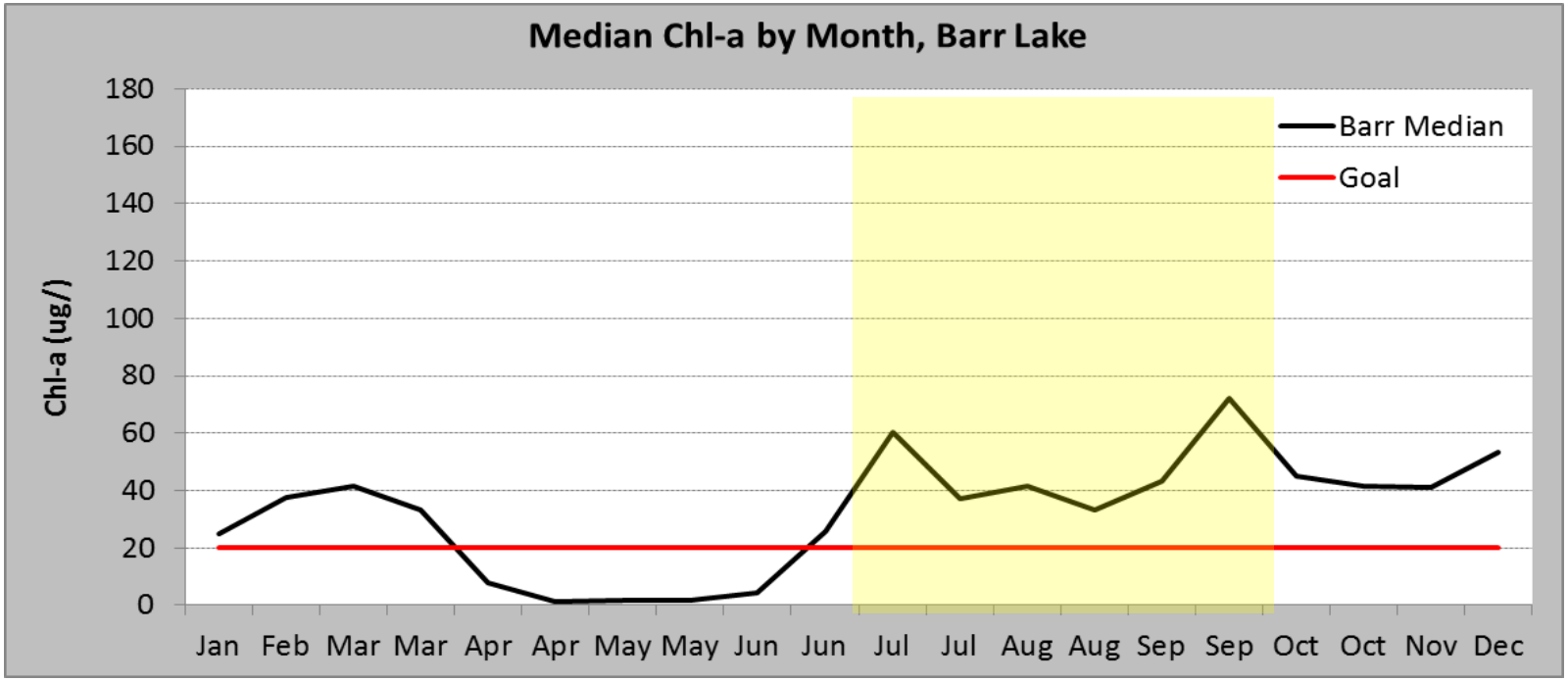
Background – Phosphorus Interception ($$ Million)

Public Education – P-free Lawn Fertilizers ($ Thousands)

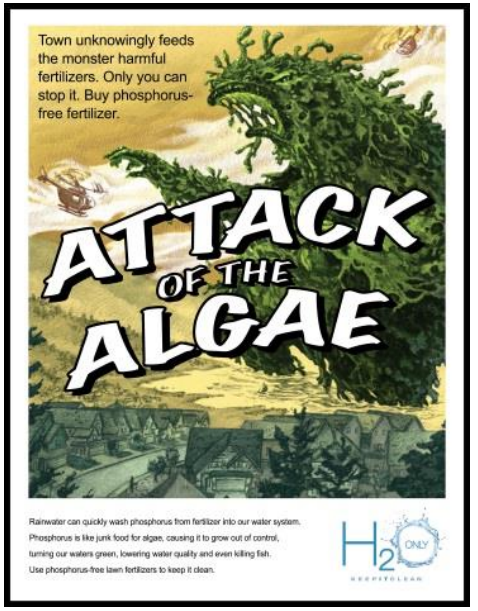
Phosphorus


Average TP by Month, Barr Lake
Total Phosphorus (mg/L)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
Barr ave
Int. Num. Value
Jan Feb Mar Mar Apr Apr May May Jun Jun Jul Jul Aug Aug Sep Sep Oct Oct Nov Dec

Chlorophyll-a



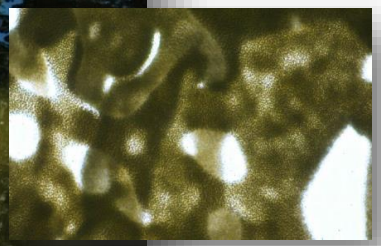
Cyanobacteria

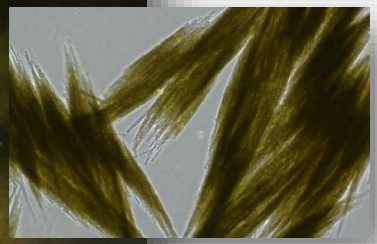


Diatoms

Cyanotoxins

2015 sampled for Cyanotoxins, open water and near shore (Abraxis and GreenWater)





The Big Picture

Aquatic Life – Support Healthy Environment, Fish, $$$

Recreation – Aesthetics, Enjoyment, State Parks, $$$

Agriculture – Grow Crops, Food Supply, Jobs, $$$

Water Supply – Provide Safe Water, Support Development, $$$

Goal: reduce bloom intensity and duration, support the uses, and maintain a healthy reservoir system

Thank You