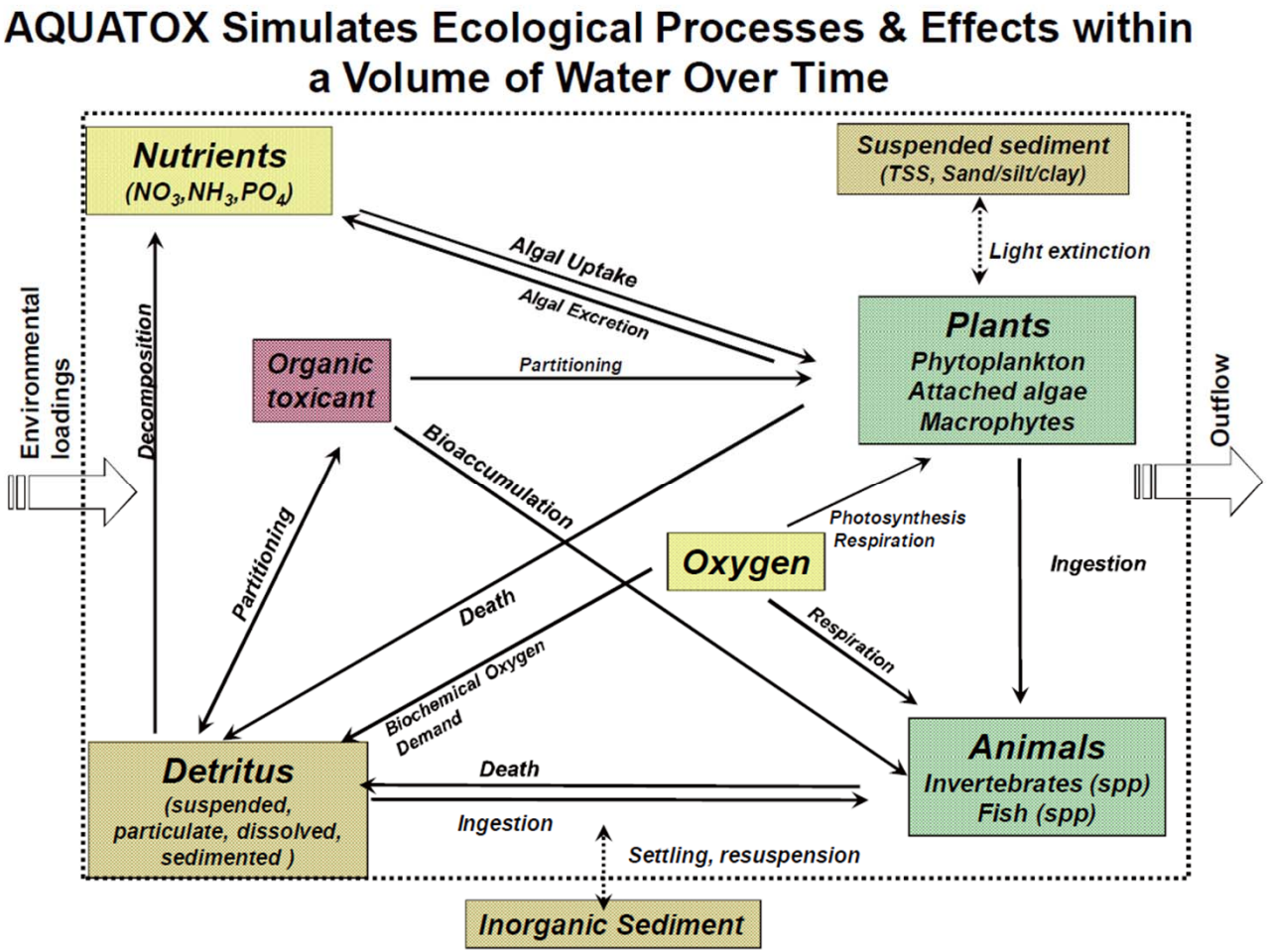
# Modeling Boise River and other consideration (??)




Jack Harrison

Notes on Boise TP TMDL

June 11, 2013

# Modeling…

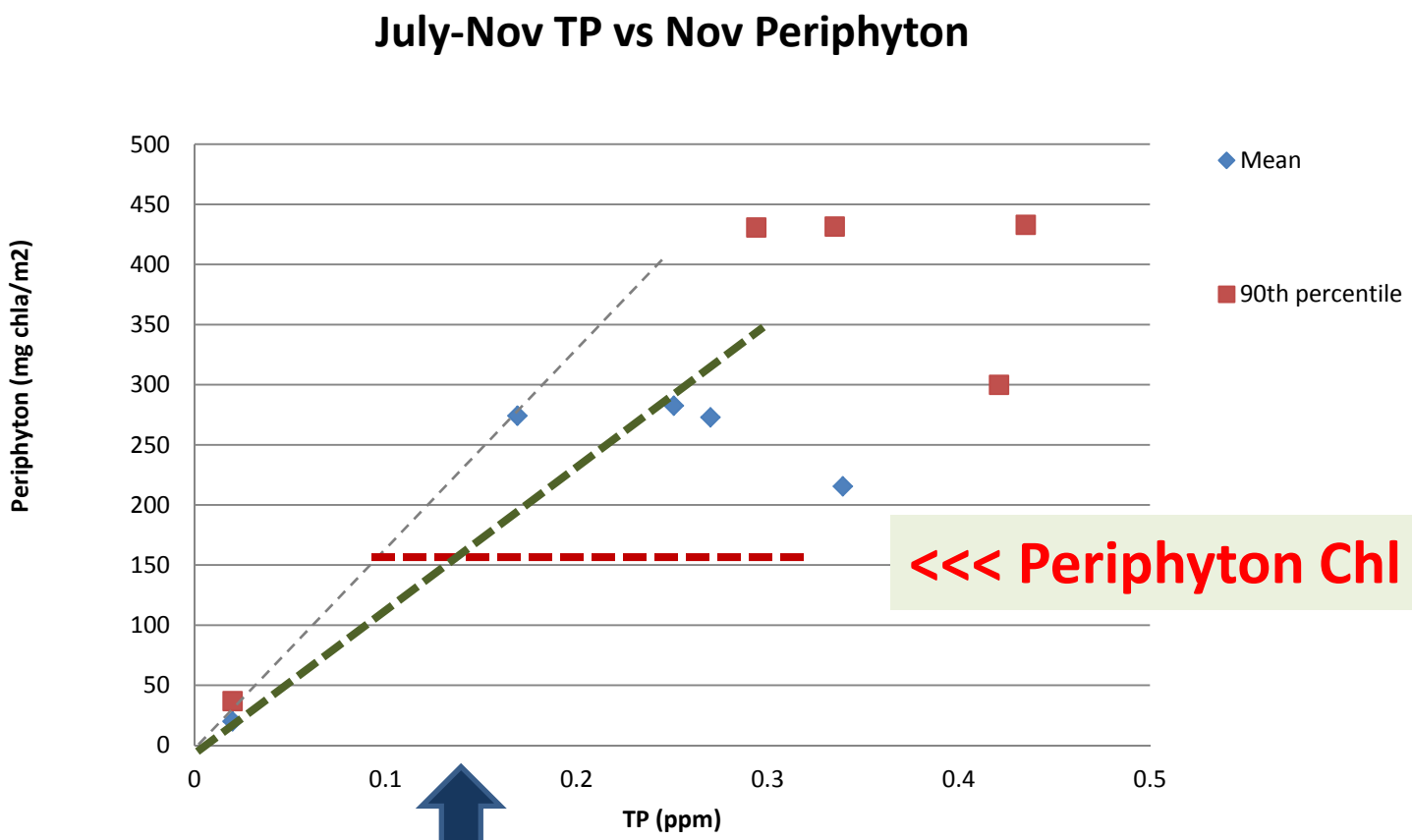
AQUATOX

- Flow/velocity
- Water Quality (Temp, DO, pH, nutrients, OM, etc)
- Periphyton
- Phytoplankton

Water and Mass Balance

- Flow
- Total Phosphorus

# Periphyton, TP, and target…(??)




**<<< Periphyton Chl a Target**

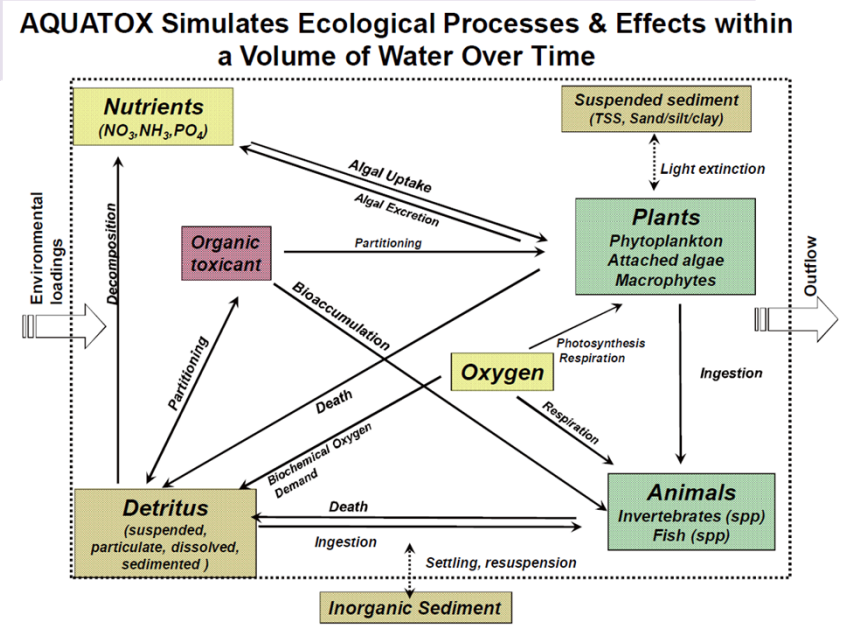
**<<<TP Target: about .09 to .15 or (??)**

Decided to use >>> AQAUTOX

# Chl a (Periphyton and Phytoplankton) in the Boise River??

Linked model

- 13 segments
- XX Tributaries
- Groundwater
- 18 month period
- Daily time steps




**Modeling Algae with AQUATOX Richard Park, 4/23/13**

- If sestonic chlorophyll a is a target endpoint, additional calibration may be required because of sensitivity to site-specific conditions such as variable retention times

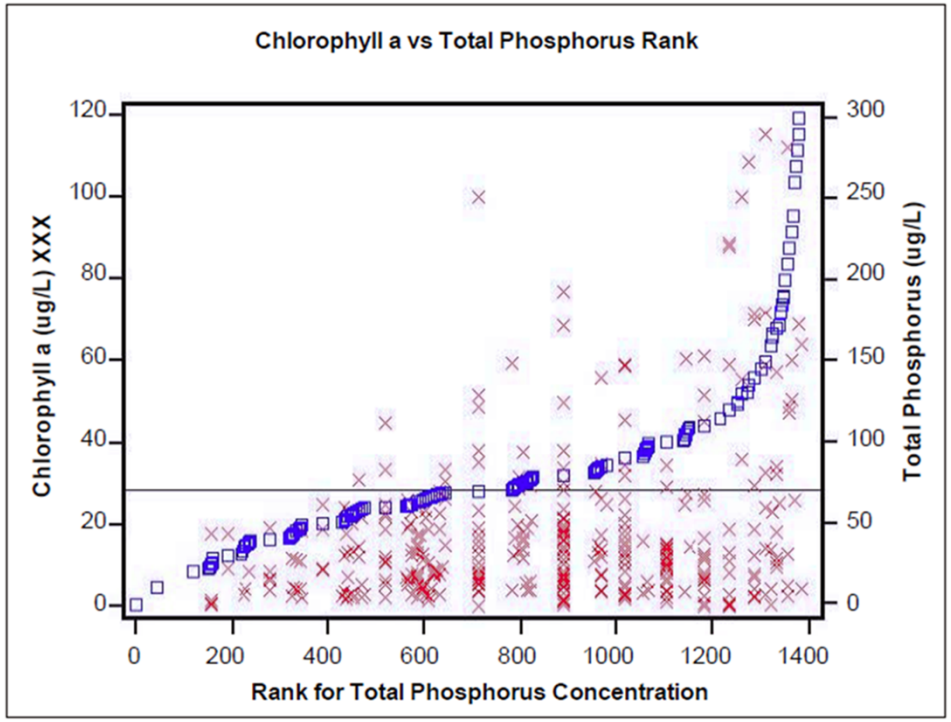
# Phytoplankton Chl a Targets and Standards

SR-HC TMDL Target for Nuisance Algae

- 14 ug/L mean growing season limit (nuisance threshold of 30 ug/L with exceedence threshold of no greater than 25%)

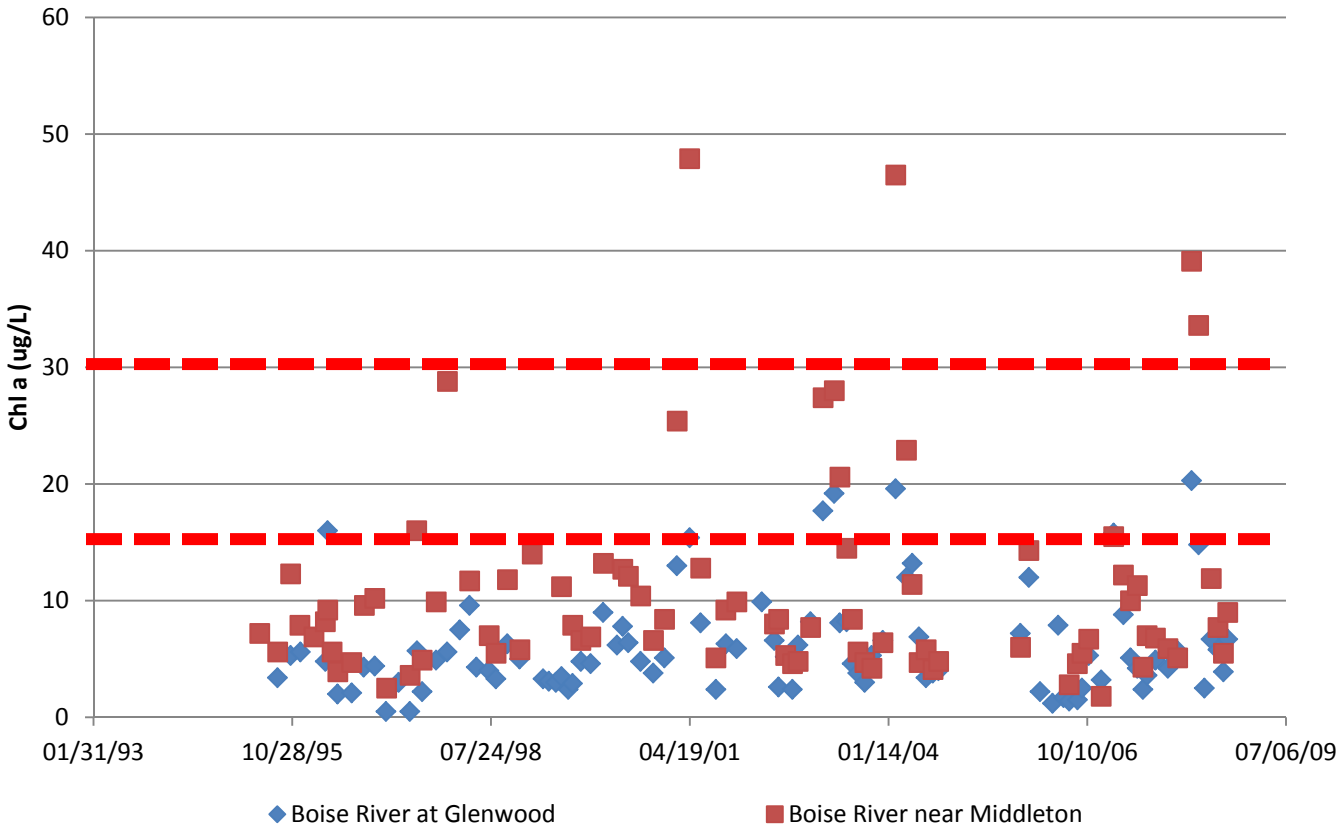
Oregon Std

- 15 ug/L year-around??



# Boise River "Chl a" Data

(USBR data; compiled and provided by Boise)



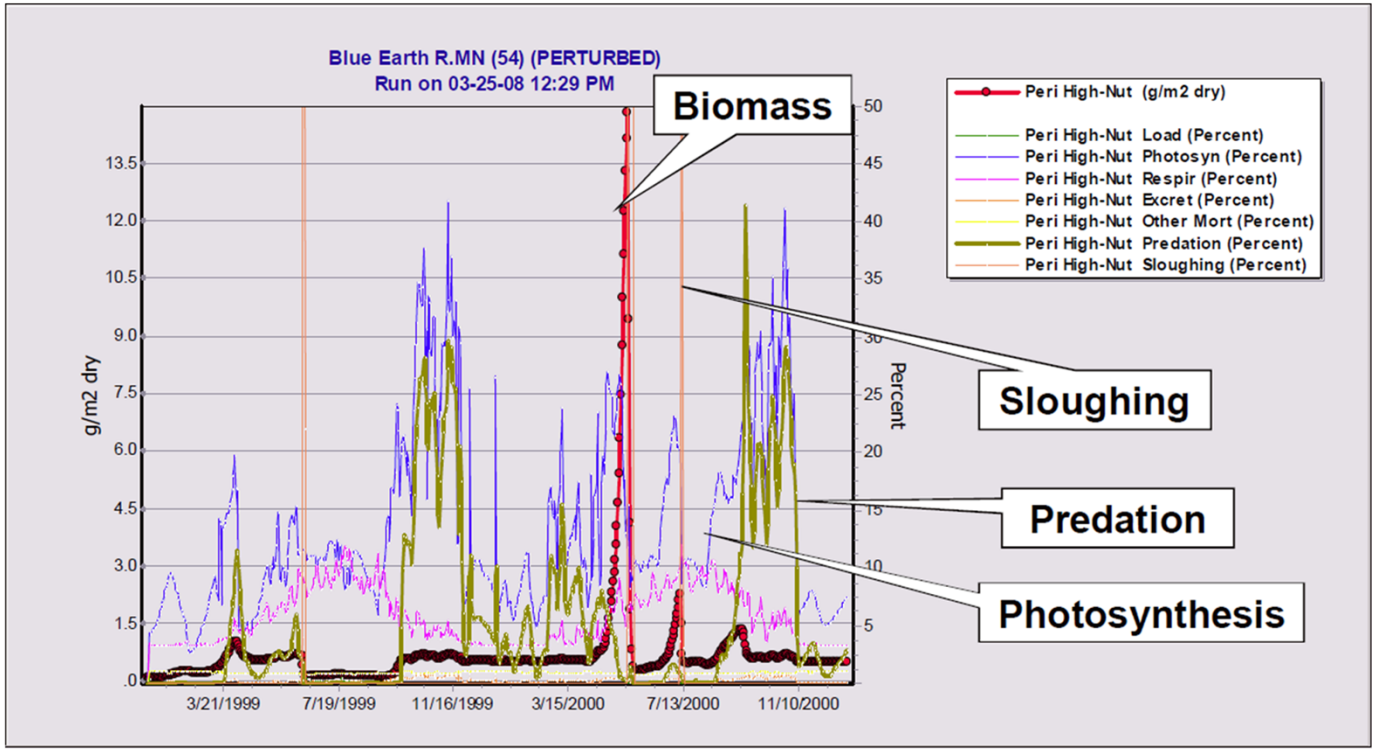

Sestonic Chl a

- Periphyton
- Phytoplankton

Downstream Targets?

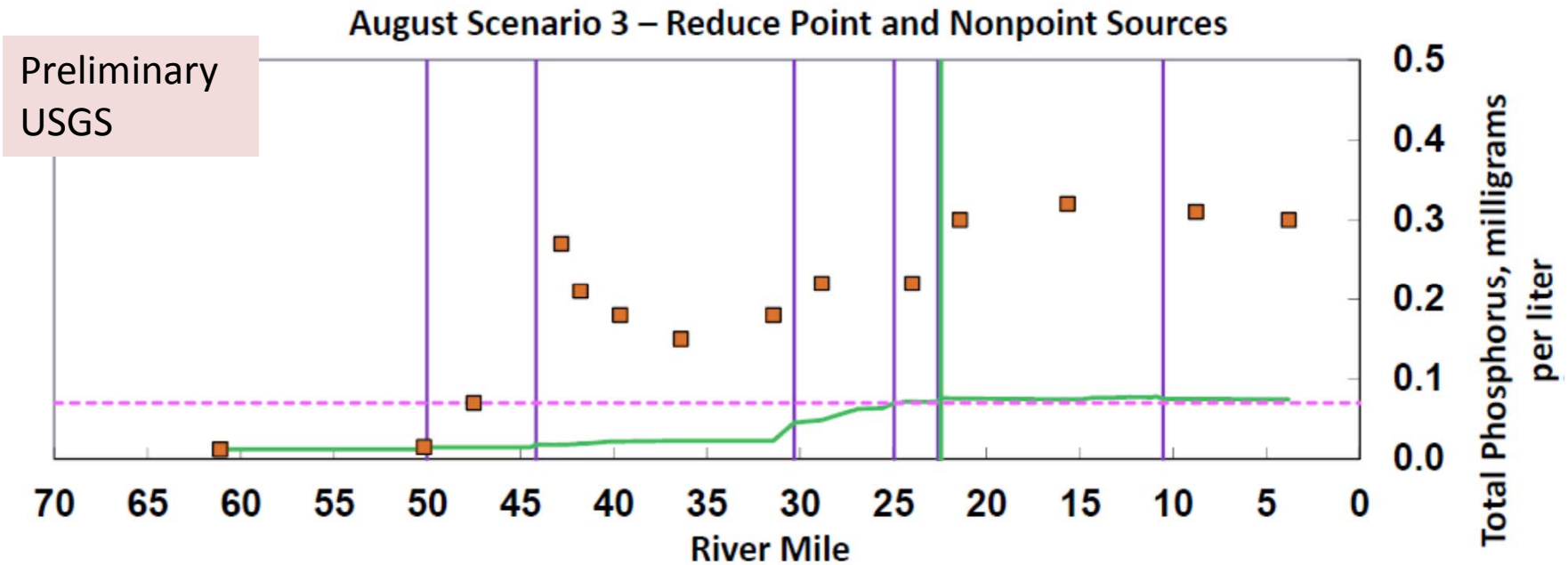
# What are steps needed for modeling phytoplankton?

- Determine implications of SR-HC target and Or Standards
- Review Boise river data
- Set up appropriate boundary conditions
- Assess calibration
- Review results
- ???



# Mass Balance Model (Scenario 3)

Reducing : Point Sources and major tributaries to 0.1 mg/L;
Indian Q = 0; Dixie = 0.07 mg/L; GW = 0.07 mg/L



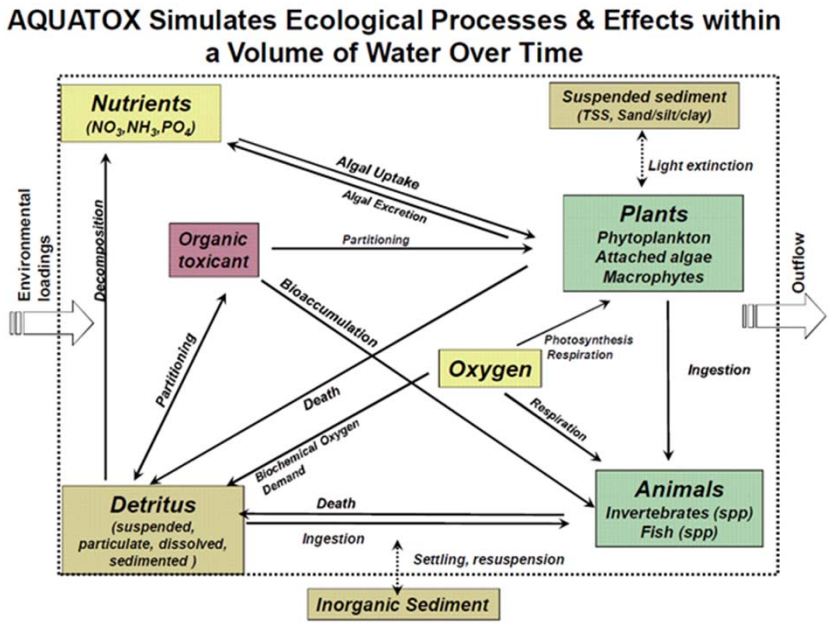

Question: is there “reasonable assurance” that ALL tributaries will/can meet 0.10 at mouth?? ... And within an “Acceptable” time frame

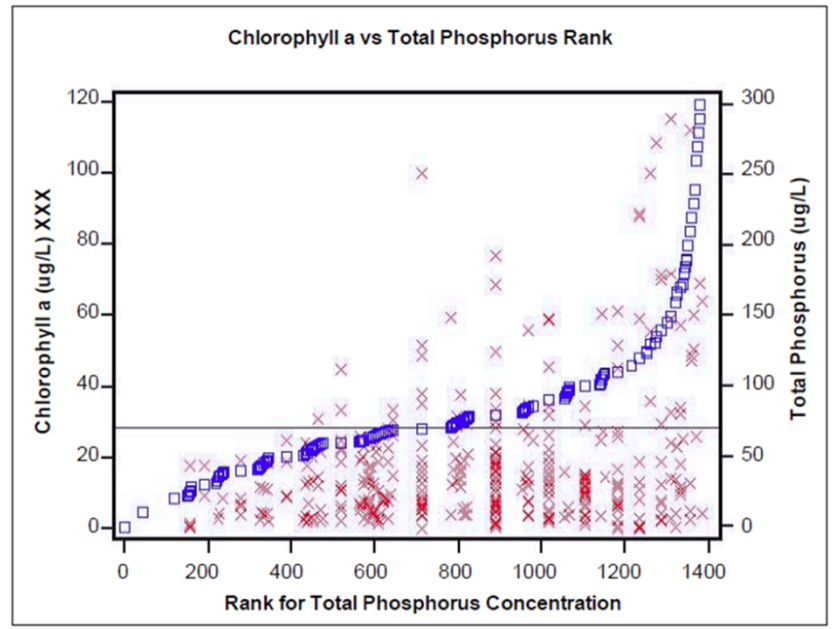
# Other TMDL considerations:

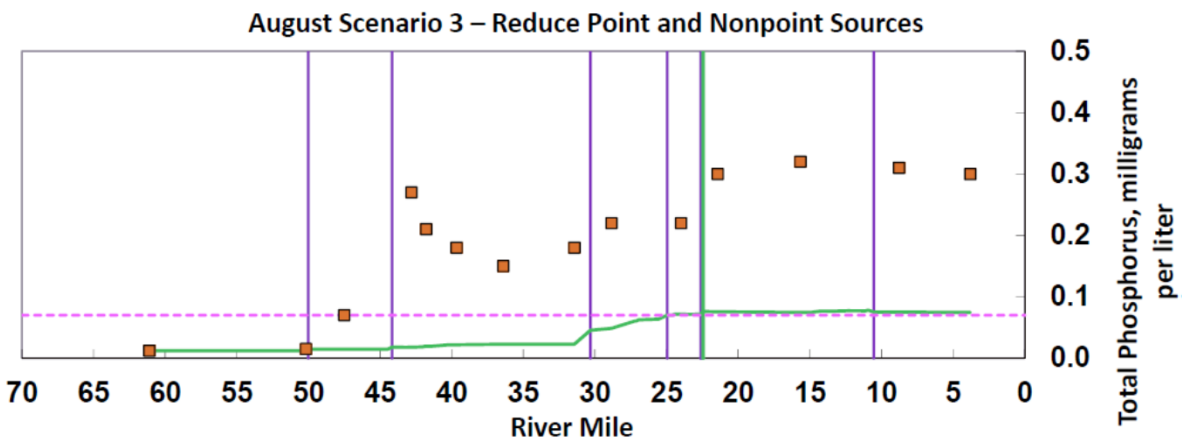
- Load Allocations?? (general introduction to date)
  - WWTF (point sources to River and selected tributaries)
  - Stormwater (point sources, diffuse)
  - Agriculture (nonpoint, diffuse)

- Groundwater (what is it; how will it change??)
- Reserve for Growth (can there be any??)
- Reasonable Assurance (what non-point source reductions are realistic??)

# Questions / Discussion / Tomatoes?




- ✓ Assimilative capacity??
- ➢ Allocations??
- ➢ Reserve for Growth??
- ➢ Reasonable assurance??

Projected Schedule >>> 3 years ?? (my estimate)

# SR-HC TMDL TP vs Chla

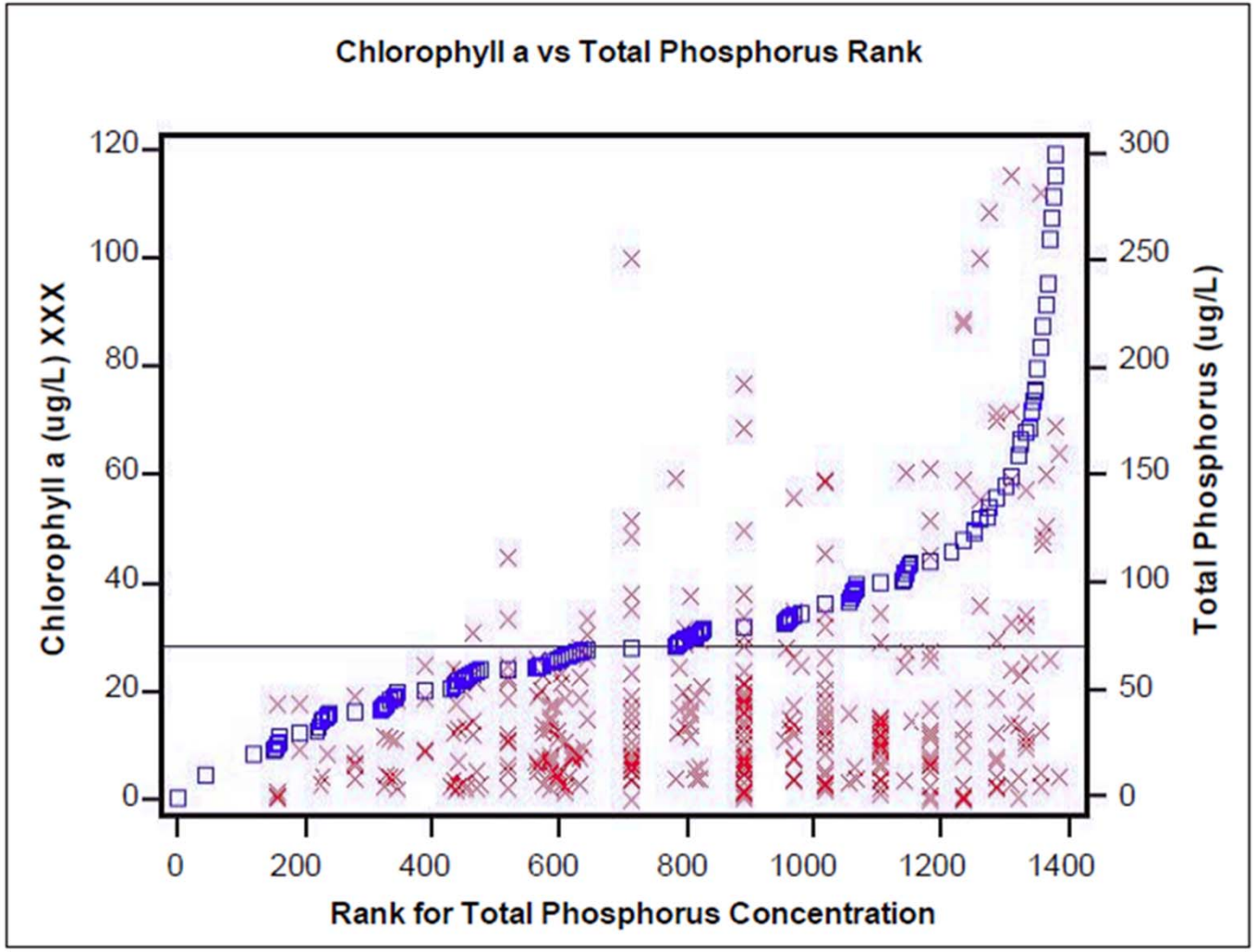



Figure 3.2.13 a. Chlorophyll a concentration data as correlated with increasing total phosphorus concentration for the Upstream Snake River segment (RM 409 to 335) of the Snake River - Hells Canyon TMDL.