

# NUMERIC NUTRIENT CRITERIA TECHNICAL FRAMEWORK

Utah Lake Water Quality Study  
Science Panel Meeting  
December 10-11, 2019  
Salt Lake City, UT



# GOALS

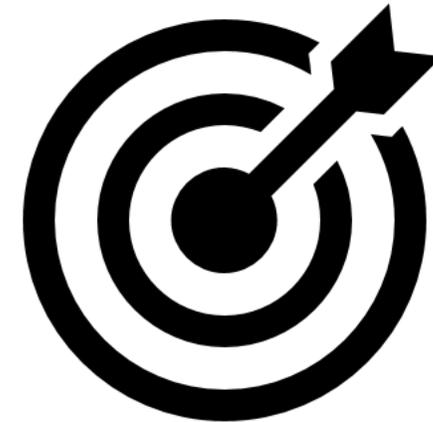
Review conversations

Introduce and discuss resulting issues

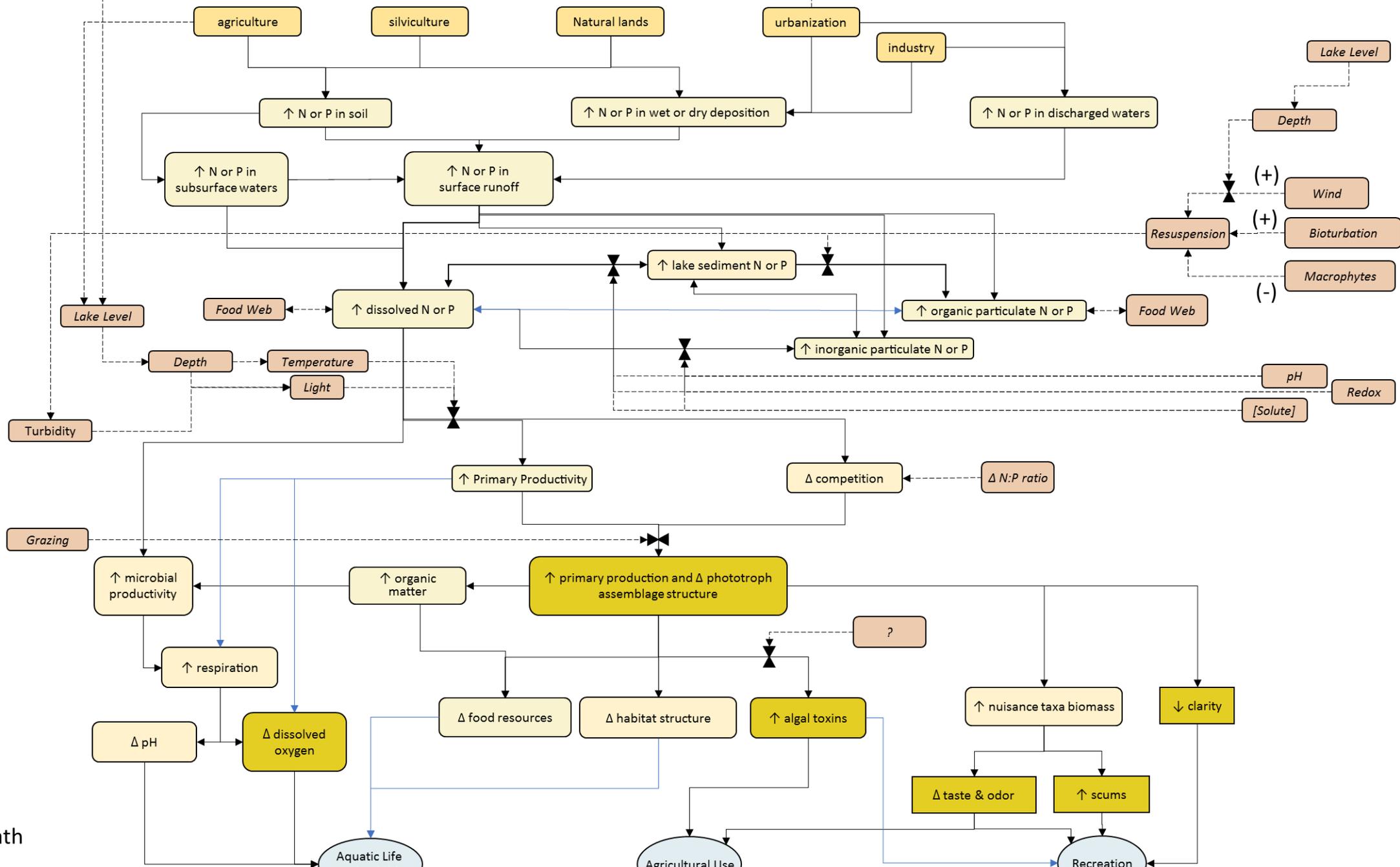
Try a multiple lines of evidence exercise and use to comment on process, develop feedback for revising/improving

# WHAT WE HEARD

- Clear Targets
  - What do decision makers want? What are valued endpoints?
  - In order to derive nutrient criteria, need endpoints clearly linked to nutrient effects. HABs seem like an easy target.



Causal model



X Regulation of a path

Blue lines used to cross black line they do not join

Aquatic Life includes Birds

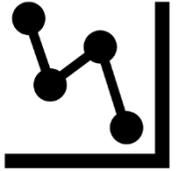


# WHAT WE HEARD

## ○ Clear Targets

- What do decision makers want? What are valued endpoints?
- In order to derive nutrient criteria, need endpoints clearly linked to nutrient effects. HABs seem like an easy target.
- What are current Assessment Endpoints/Standards that could be used?
- How might “free-from” criteria need to be interpreted to add more endpoints? And who selects those?
- What else could be added and who decides?

Use	Assessment Endpoints/Standards
Recreation (2A/2B)	Cyanobacteria < 100,000 cells/ml
	Microcystin < 4 ug/L
	Cylindrospermopsin < 8 ug/L
Aquatic Life (3B/3D)	Anatoxin-a < 20 ug/L
	Dissolved Oxygen (5mg/L 30d; min 5.0/3.0)
Agricultural Use (4)	pH (Provo)/NH4 (6.5-9.0)
	pH (6.5-9.0)



# WHAT WE HEARD

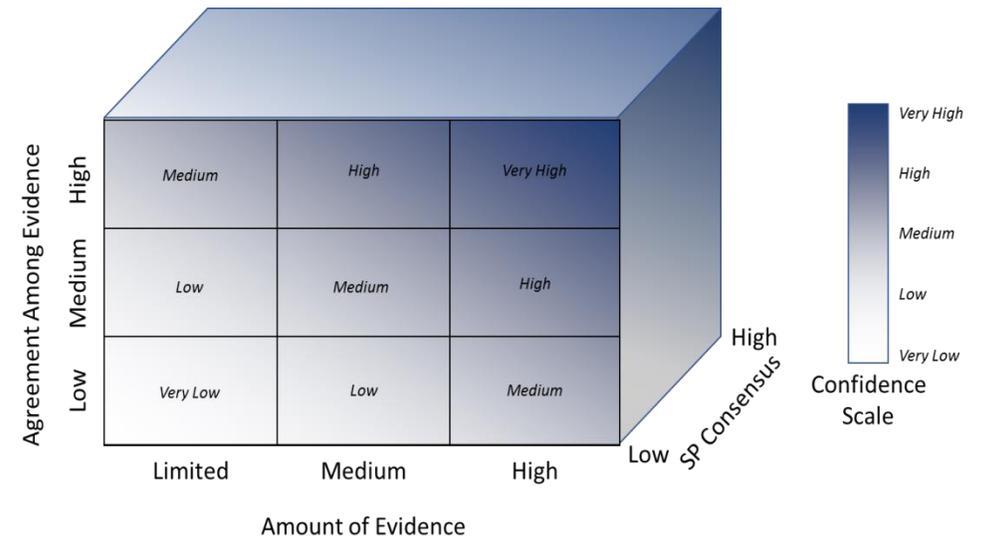
- Clear Targets
  - Confounding this discussion: alternative stable state questions
  - How can one derive nutrient targets for a macrophyte dominated state that does not exist?
  - What are the assessment endpoints? Are they the same?
  - Does the SP need to clarify/separate these questions:
    1. Nutrient concentrations to protect uses of the current stable state.
    2. What is the potential for achieving an alternative stable state
    3. What would be the nutrient targets to achieve an alternative stable state AND uses in an alternative stable state

## Macrophyte Dominated

Use	Assessment Endpoints/Standards
Recreation (2A/2B)	Cyanobacteria < 100,000 cells/ml
	Microcystin < 4 ug/L
	Cylindrospermopsin < 8 ug/L
Aquatic Life (3B/3D)	Anatoxin-a < 20 ug/L
	Dissolved Oxygen (5mg/L 30d; min 5.0/3.0)
	pH (Provo)/NH4 (6.5-9.0)
	Clarity (kd > x)
Agricultural Use (4)	pH (6.5-9.0)

# WHAT WE HEARD

- Generally comfortable with risk based approach
  - Devil in the details – how to do it (exercise will “try”)
  - Add consensus as a dimension
  - Needs to be interactive with Steering Committee
  - What happens at x, y, and z with likelihood and confidence
- This requires clearly stated goals or questions that can be communicated in likelihood and confidence terms





# WHAT (ELSE) WE HEARD

- SP recommendation could be an adaptive management framework
  - “Confidence in target of  $y$  as interim – reevaluate upon management to  $y$ ”
- SP should consider frequency and duration
- Should ULWQS add specific model expectations for RFPs?
  - E.g., Calcite scavenging, zero land use modeling, diagenesis model
- How important is watershed model to criteria setting?
- Reference line of evidence – generally ok with caveats
  - Use reference line for tributary inputs under natural conditions
- Fully fill out tables 5 and 6, add assessment endpoints and management goals
  - What would be differences if managing to a macrophyte versus phytoplankton dominated state

# SO, HOW IS THIS MLE GOING TO WORK AGAIN...

- Mock NNC derivation exercise
- Split into teams – one does TP, the other TN; Take data given to you
- Using the tabular examples from the Framework – fill out with your groups judgment based on available data at least one of the lines
- Using all the data, please come up with a version of the following: We are XXX confident that assessment endpoints are XXX likely to be exceeded above X mg/L and not exceeded below y mg/l.
- Provide a traceable account of your reasoning
- Keep track of feedback

# REPORT OUTS