

Algae Biomass Production in Agricultural Drains

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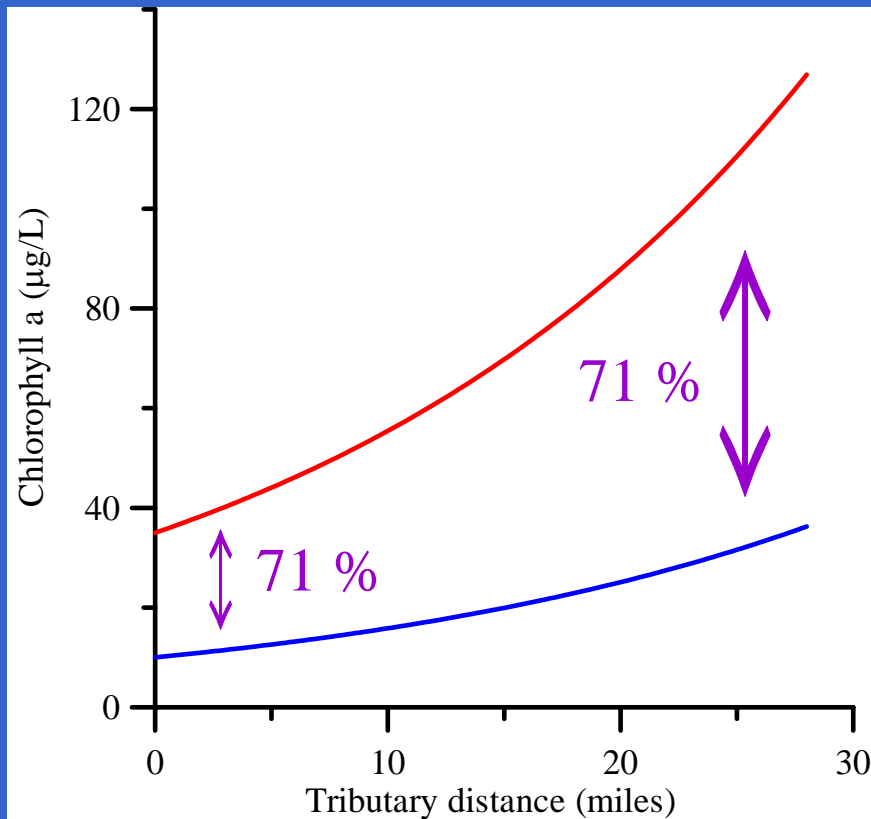
Berkeley National Laboratory

Objectives

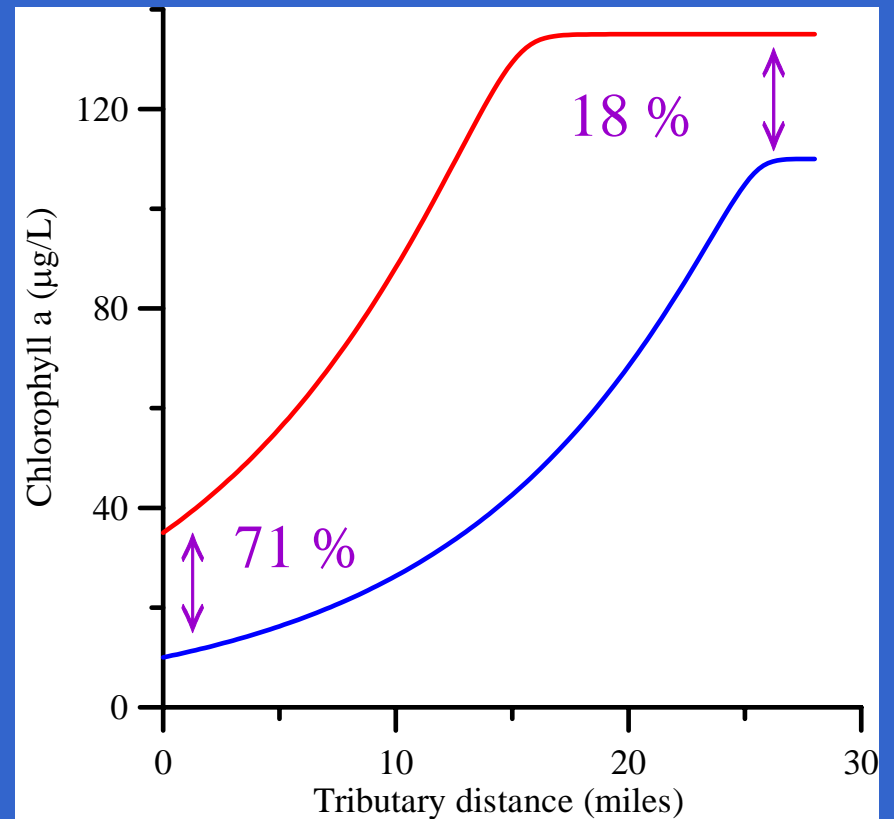
- Resolve outstanding issues concerning algal growth patterns in agricultural drains
 - Is algae growth in the San Luis Drain light limited?
- Test algal mass balance in simple system (relative to river)
- Develop methods and techniques for use in larger river study

Importance of Models to Management

Light limited model



Nutrient limited model



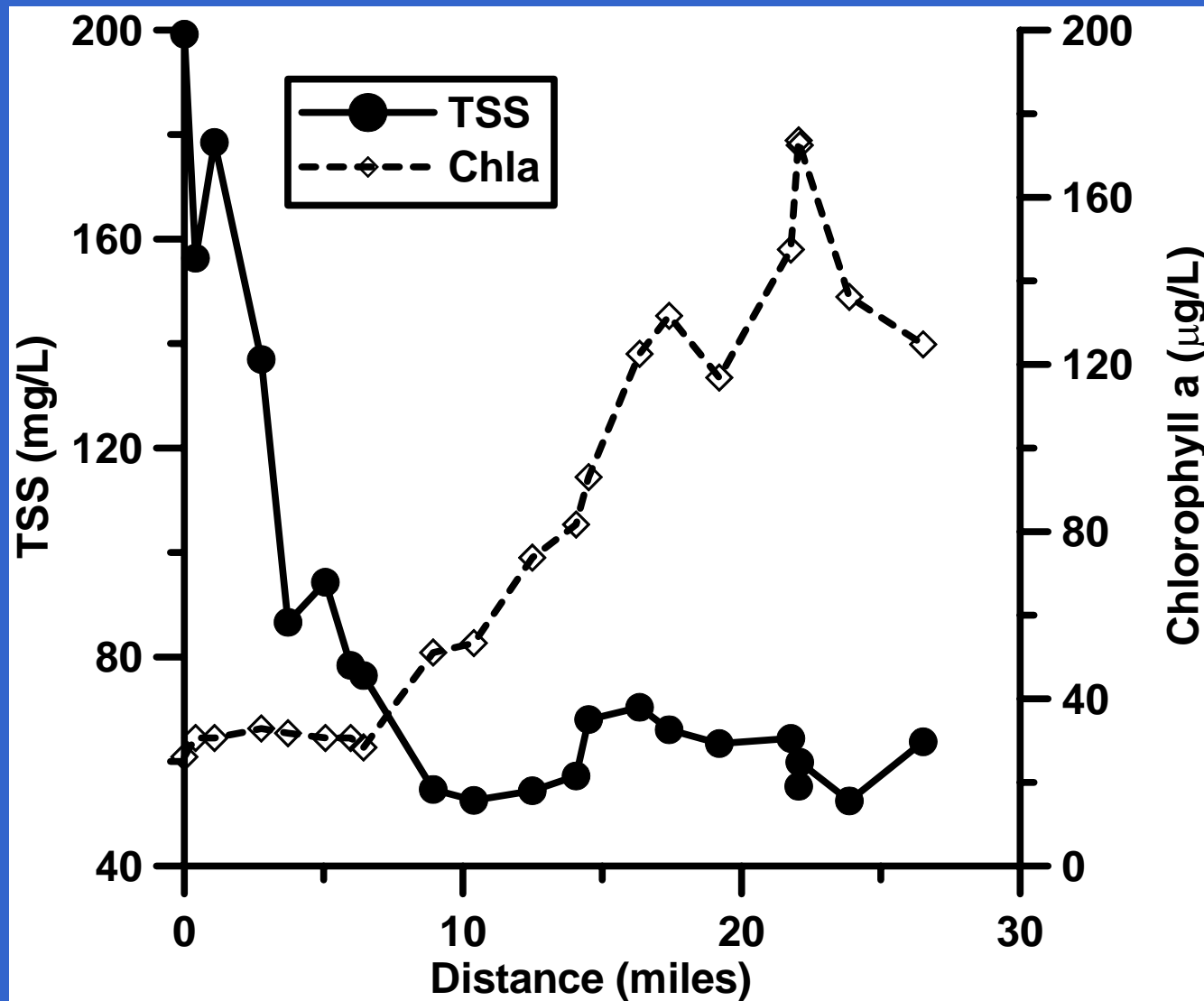
Study Area

- San Luis Drain
- Twenty-eight mile channel
- Hydraulically simple
 - One input & one output
- Conveys agricultural return flow
 - Nutrients needed for algal growth
- Warm temperatures & sunlight
- Ideal system for algal growth study
 - Model as plug-flow reactor

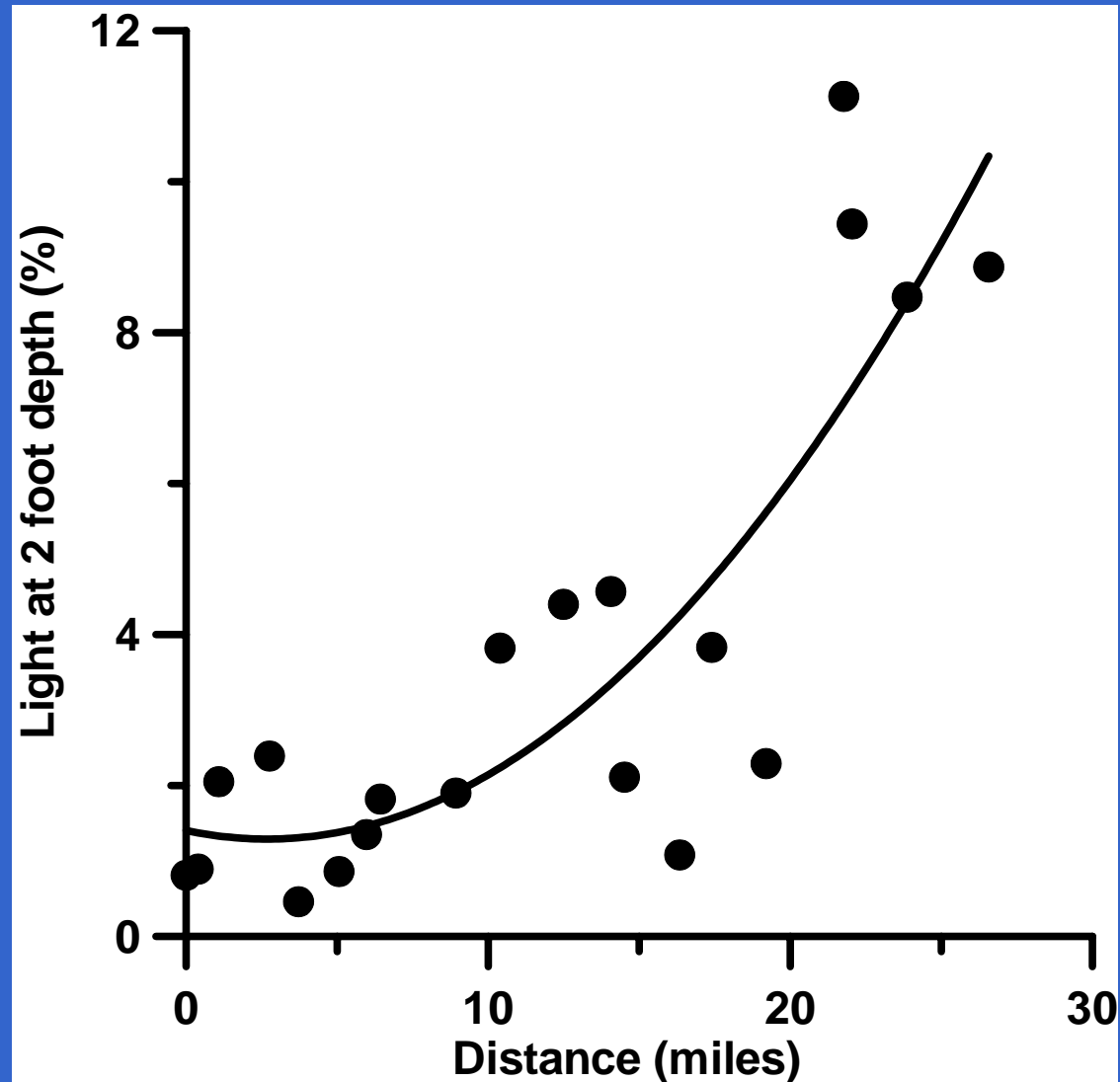
Methods

- Survey San Luis Drain
 - Combine traditional (grab) sampling with use of field measurement devices
- Relate distance in drain to algal residence time
- Determine if algal growth pattern fits model
 - Light limited or other model (nutrient)

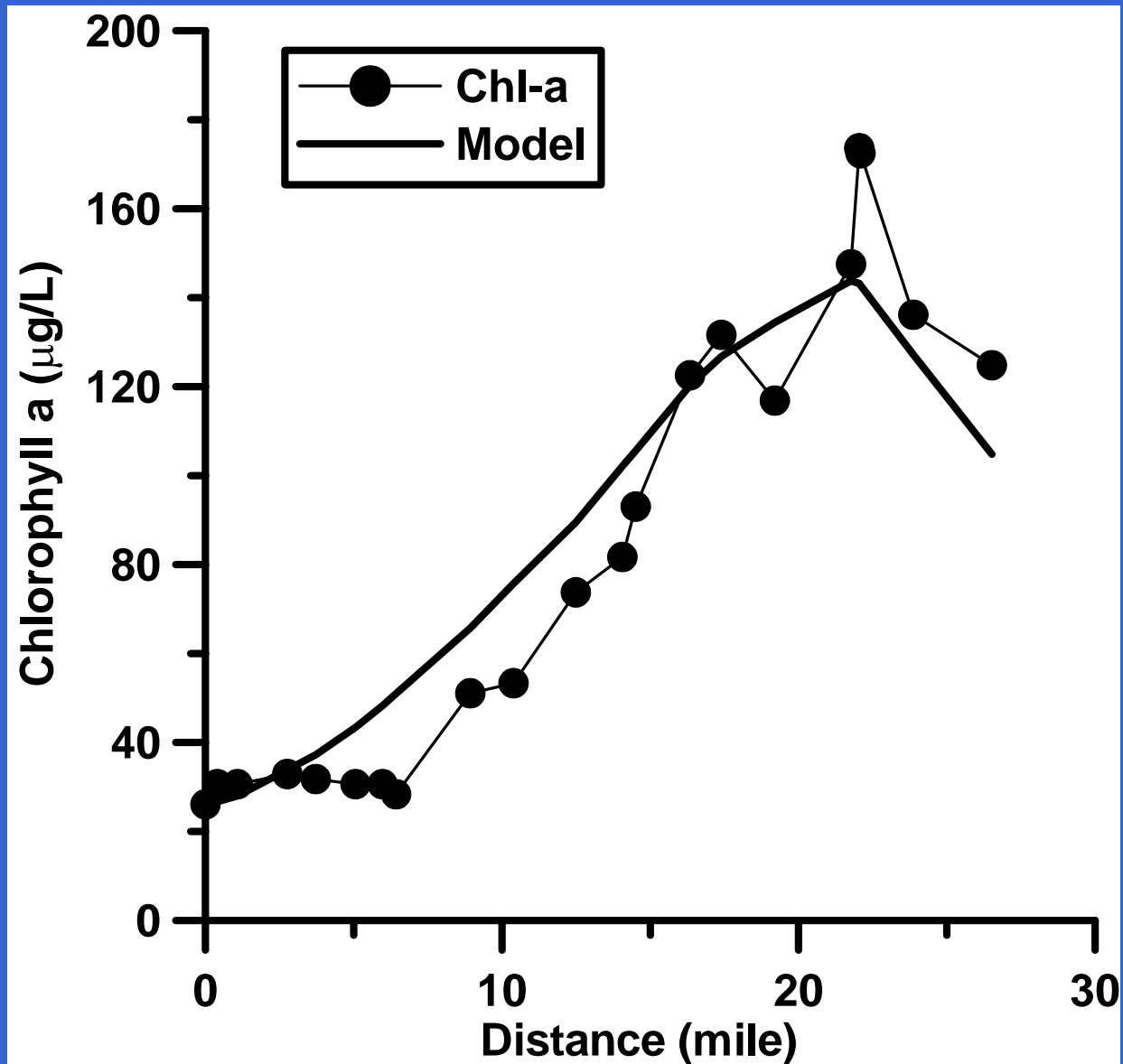
Chlorophyll-a & TSS Along Drain



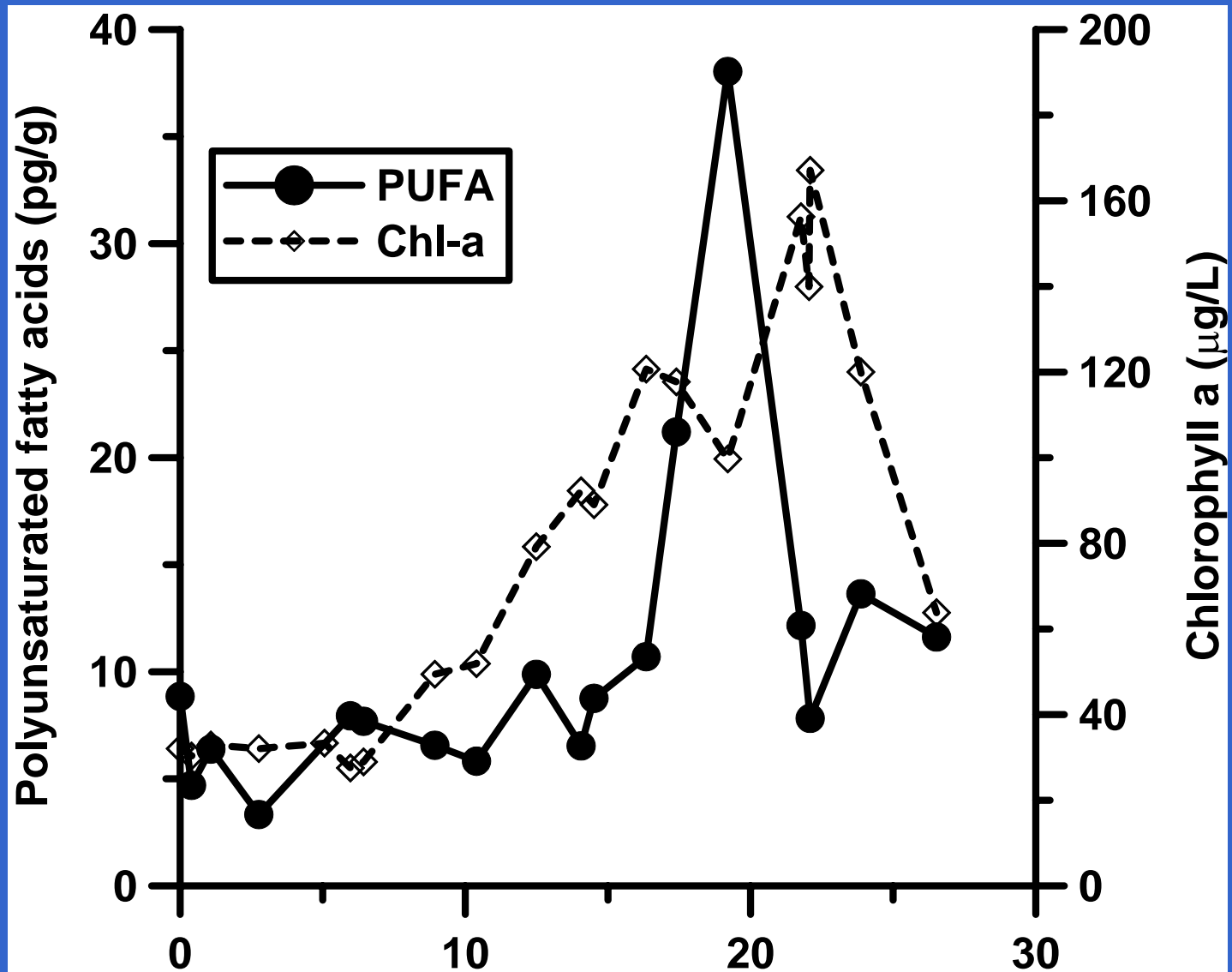
Light Availability Increases



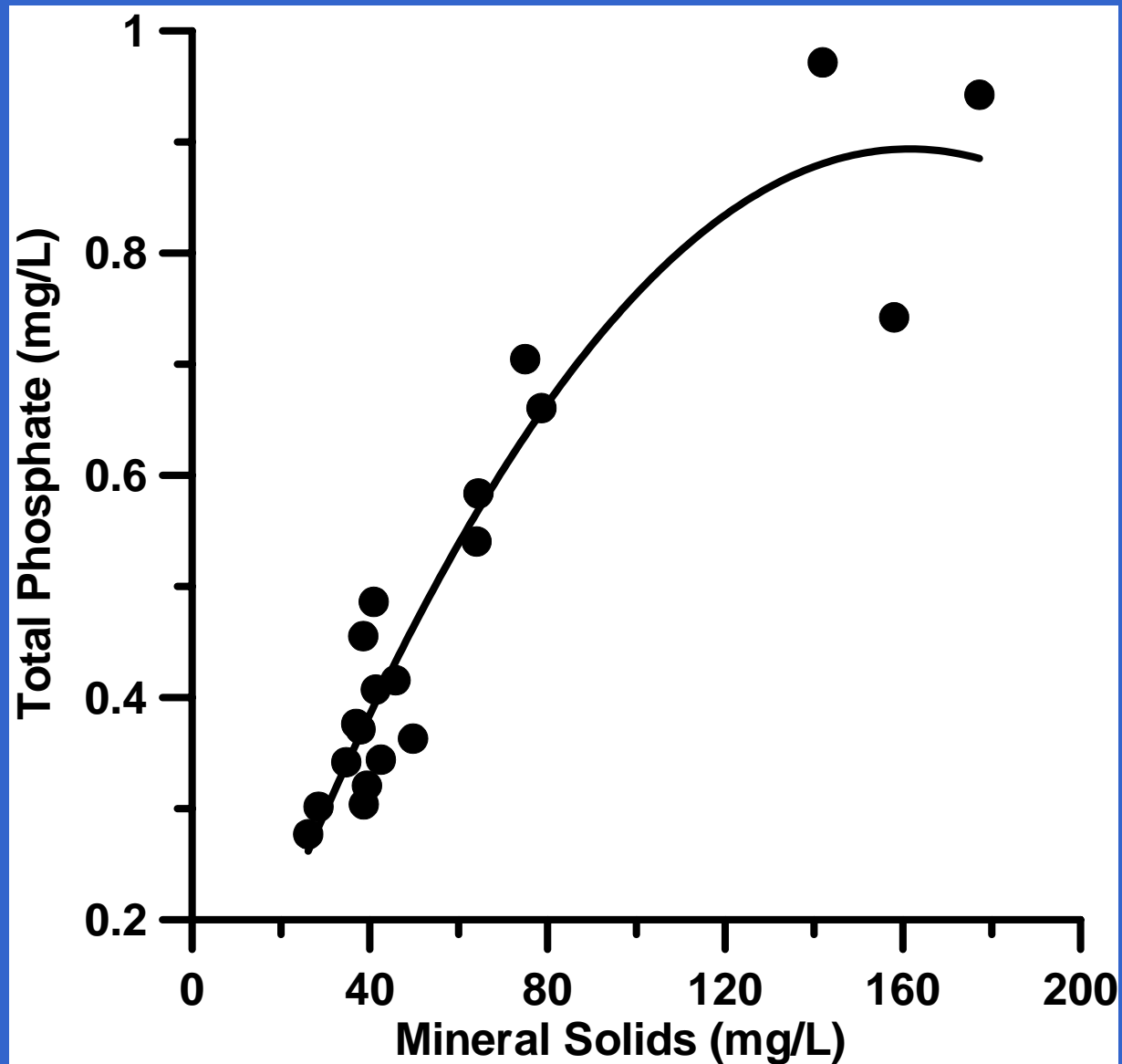
Combined Nutrient & Grazing Model



Independent Confirmation



Independent Confirmation



Conclusions

- Algal growth in SLD is not light limited
- Algae growth may be limited by a combination of factors
- Nutrients in equilibrium with mineral solids at low concentrations
- Proposed strategies for algae management need to consider implications of alternative growth models