Using GoldSim in a Missouri River Oxbow Lake Restoration Project

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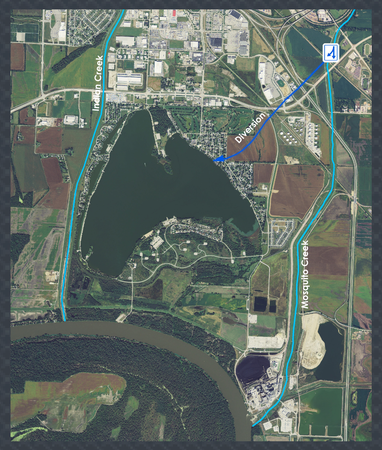
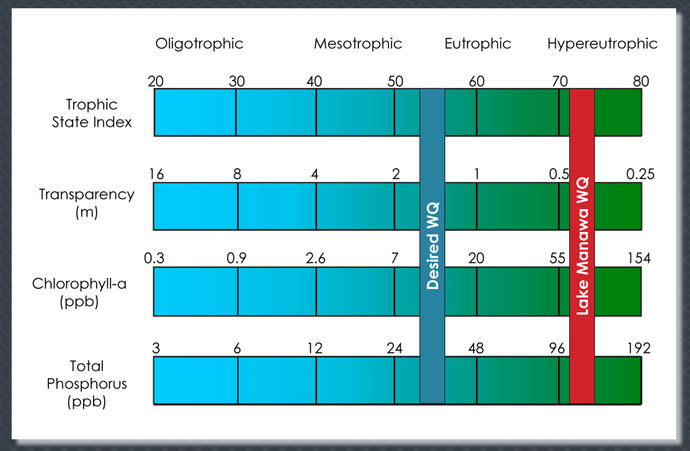
BACKGROUND

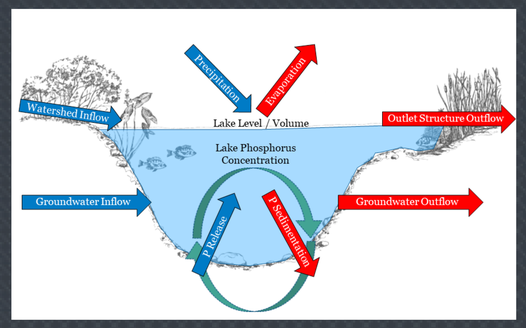
- Excessive algal growth (eutrophication) often hinders water supply, recreation, and aquatic life in freshwater lakes.
- Lake Manawa, in Council Bluffs, Iowa, is a shallow oxbow lake that experiences frequent algal blooms due to excessive levels of phosphorus.
- This poster describes the development of a comprehensive mass balance model that quantifies water and phosphorus fluxes and evaluates potential benefits of various water quality improvement strategies.





CONCEPTUAL FRAMEWORK

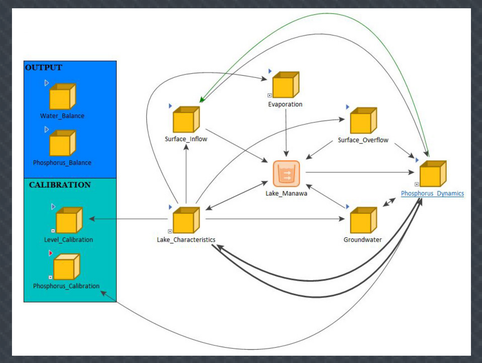
- Water balance is dictated by local groundwater, the adjacent Missouri River, and inflows diverted from nearby Mosquito Creek.
- Water quality in Mosquito Creek and internal loading are primary drivers of in-lake water quality.



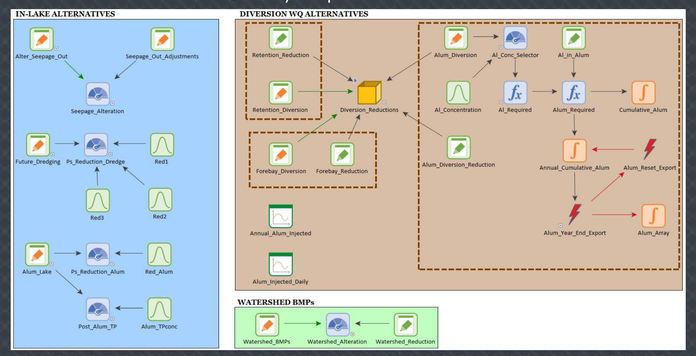
MODELING APPROACH

Water and Phosphorus Mass Balance Model

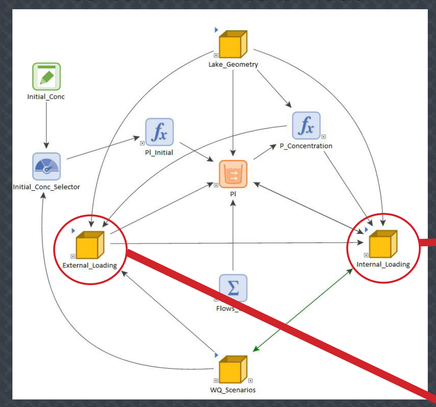
Lake Manawa Water & Nutrient Balance

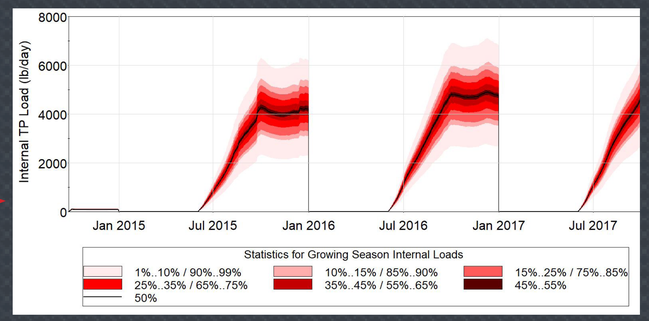


Water Quality Improvement Scenarios

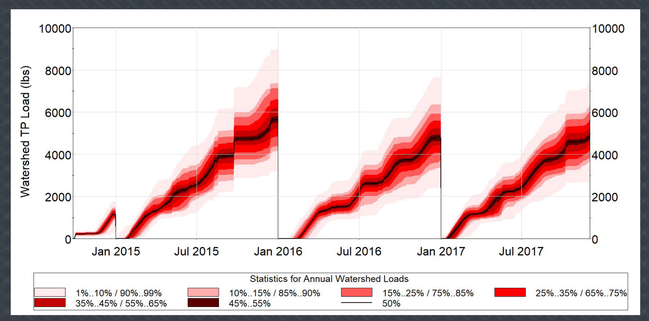


Jensen Shallow Lake Model



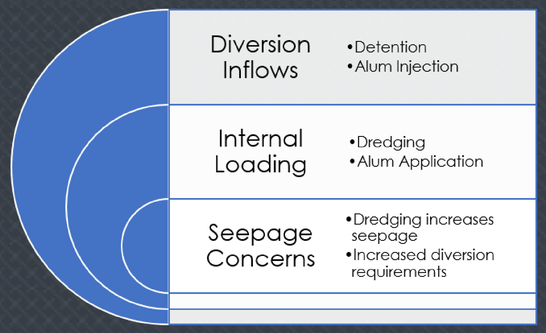


Internal Loading



External (Watershed) Loading

LAKE MANAGEMENT SOLUTIONS



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