Nutrient Budget for Nueces Bay

Presented by Daniel Opdyke, Ph.D., P.E.

October 17, 2016
Overall Concepts

• An adequate supply of nutrients supports ecological health and productivity
• Excessive nutrients can lead to undesirable outcomes, such as algal scums and low dissolved oxygen
• A nutrient budget can be evaluated like your bank account
  – Quantify inputs (nutrient sources)
  – Quantify outputs (nutrient sinks)
  – Evaluate changes over time
Scope of Work

• Compilation and review of available data
• Development of conceptual site models (CSM)
• Estimation of nutrient budgets for pre-development and present conditions based on CSM
• Recommendation for assessing pre-development conditions
Study Characteristics

• We will evaluate pre-development and post-development conditions
  – Dividing line set at 1986 (consistent with HDR 2015)

• Nutrient budget will focus on Nitrogen (N)
  – Evidence supports N as the limiting nutrient for Nueces Bay

• Relevant sources and sinks will be quantified to the extent allowable by data and literature
  – Effort for each source or sink will be scaled based on relative importance to the overall budget
The objective is to quantify these terms and build a nutrient budget for both pre-development (higher inflow) and post-development (lower inflow) conditions.
Recommendation for Assessing Pre-development Conditions

- The nutrient budget will be uncertain, particularly for pre-development conditions due to data limitations.
- This task will evaluate the potential for a paleolimnological study to provide relevant information for the NEAC/BBASC related to pre-development ecological health.
- Paleolimnological reconstruction
  - Years can be estimated for layers in sediment cores.
  - Preserved algal residues provide indication of water quality.

Illustrative Example

- 1950: Algae species A, therefore high nutrients.
- 1910: Algae species B, therefore low nutrients.
Timeline

2015
Sep
Contract signed, work begins
Oct
Met with HDR, obtained data
Nov
Present scope of work to NEAC/BBASC
Dec
Request model outputs from TWDB

2016
Jan
Present preliminary conclusions to NEAC/BBASC
Feb
Jun
Deliver draft report to TWDB by June 30
Mar
Jul
Aug
Deliver final report to TWDB by August 31
Nutrient Budget for Nueces Bay

Presented by Daniel Opdyke

Questions/Discussion