Hartung Lake Management

Water Quality and Sediment Reduction

Aquatic Insight
holistic water management

December 12, 2024

Agenda

- Introduction
- Current Lake State
- Sediment Reduction Options
- Water Quality
- Maintenance
- Budget

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Introduction

- Professional Limnologist with Masters degree in Environmental Management
- 25 years experience with lake research and managment
- Certified Lake Manager through the North American Lake Management Society (NALMS)
- Recent board member with NALMS
- Past President of Oregon Lakes Association
- Manage water quality and invasive vegetation for multiple HOA’s
- 22 years experience managing water quality for Oswego Lake
  - Designed alum injection and surface application program
  - Managed dredge permitting and implementation
  - Implemented traditional and novel algae and vegetation control techniques

Current Conditions

Sediment

Hartung Lake last dredged in 2004

Maximum depth ~13 feet

Cost ~$310,000

Current cost more that 2x

What is the sediment depth now?

What sections should be dredged?

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Current Conditions

Water Quality

Sedimentation from creeks
Invasive and nuisance aquatic vegetation
Invasive terrestrial vegetation
Filamentous algae
Potential anoxia during summer
Potentially high nutrients

Dredge Options

Hartung Lake last dredged in 2004

Maximum depth ~13 feet

Cost ~$310,000

Current cost more that 2x

What is the sediment depth now?

What sections should be dredged?

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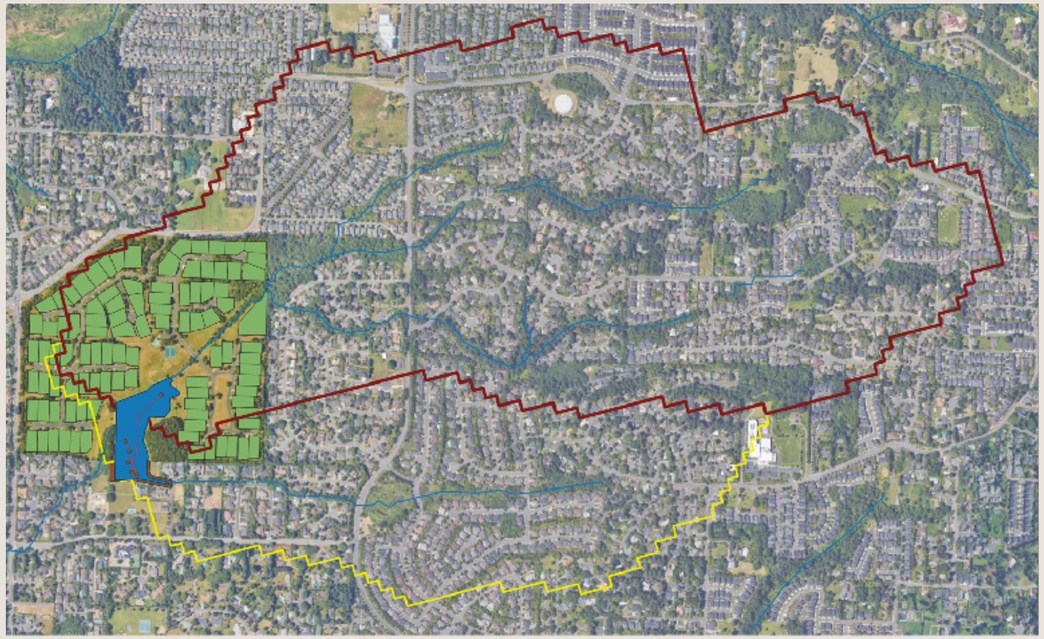
Sediment Sources

Willow Creek and Spring Creek

- urban drainage
- Very flashy during hard rains
- Sediment from erosion
- Pollutants from yards and roads



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Sediment Reduction

Sediment Traps in Willow Creek

- Capture sediment and debris
- Eventually raise creek bed
- Can be cleaned periodically

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Sediment Reduction

Native near-shore vegetation

- Reduces shoreline erosion
- Provides habitat for native species

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Sediment Reduction

Forebay Enhancement

- To better capture sediment and debris
- Keep sediment and nutrients from lake
- Annual cleaning (currently happening?)

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Sediment Reduction

Other Ideas?

- Second forebay in lake
- Suction dredging
- Limited dredging in specific areas
- Shift material instead of removing

Data Gathering

Measure current sediment depth

Measure creek flow

Then:

- Forebay design
- Silt dam in Willow Creek
- Determine dredge needs
  - Permits if dredging is desired
  - Sediment characterization
  - Joint permit application, and Clean Water Services consultation

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Water Quality

Current water quality needs

Non-native vegetation control

- yellow flag iris
- reed canarygrass
- curlyleaf pondweed

Nuisance native vegetation control

- pennywort
- cattail

Biology and chemistry conditions

- Nutrient concentration
- Oxygen levels
- Phytoplankton population

Water Quality

Current WQ Conditions

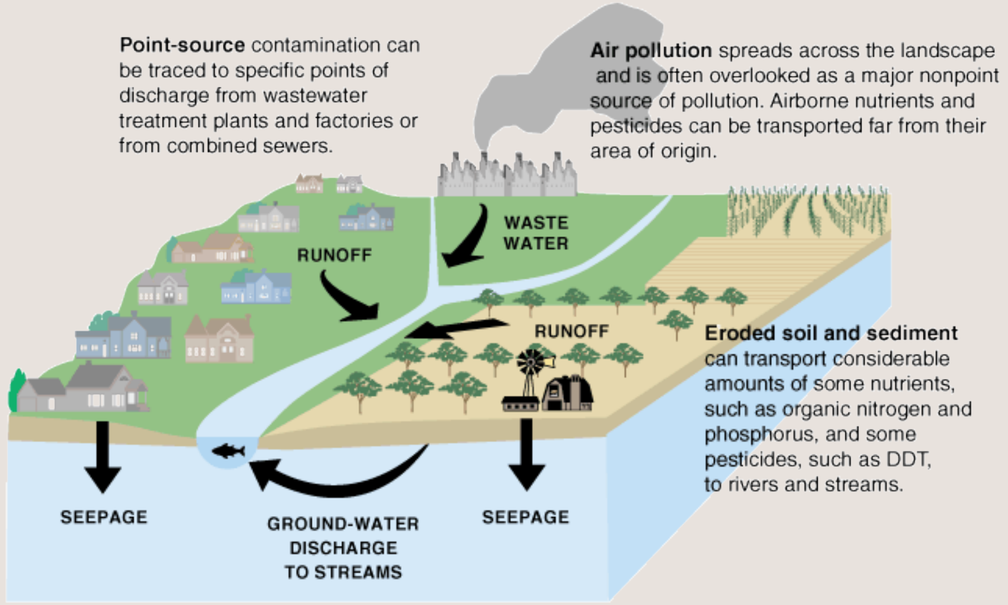
Nutrient Sources

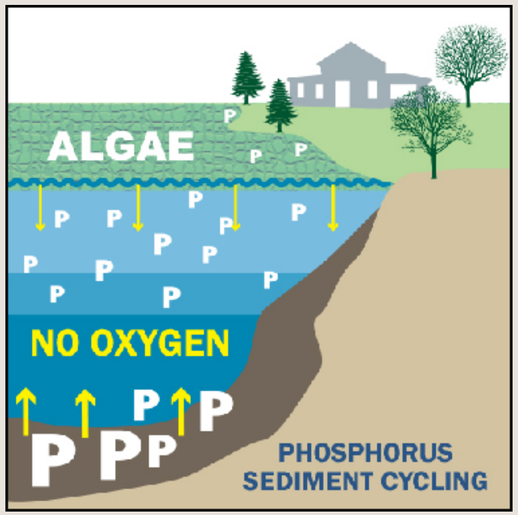
External Loading

- Rainfall
- Runoff from immediate shoreline
- Point sources from streams or pipes

Internal Loading

- Anoxic conditions in sediment
- Seepage entering lake from watershed





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Water Quality

Sampling

Why are there plant and algae problems?

Nutrient concentration

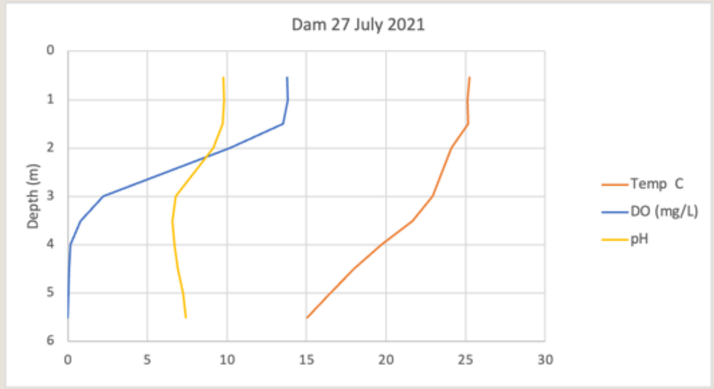
- How much phosphorus is in the lake?
- How much comes from the creek?
- Internal or external loading?

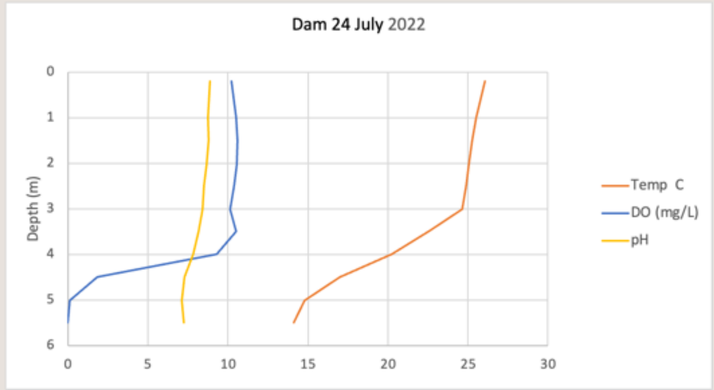
Oxygen

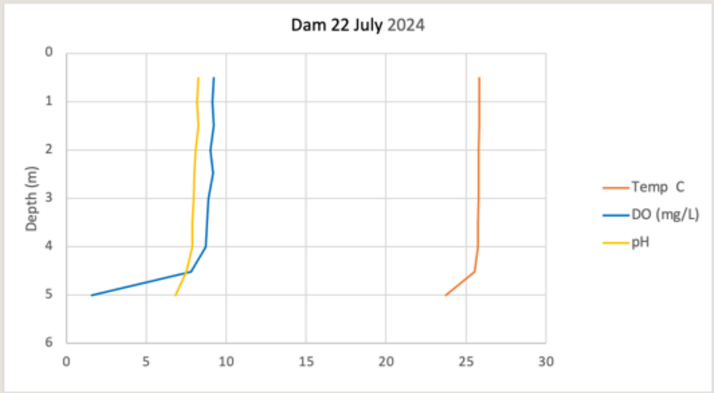
- What is the oxygen concentration?
- Are the aerators working properly?

Phytoplankton

- What is the algae population?
- Any cyanobacteria?







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Water Quality

Sampling

What data to gather?

Nutrient concentration

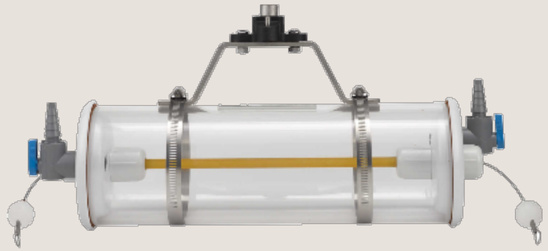
- Measure nutrients in the lake
- Collect data from streams entering the lake

Oxygen

- Regular profiles of temperature and oxygen

Phytoplankton

- Collect samples to analyze algae population



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Maintenance

Ongoing Maintenance

Aeration

- Optimize based on nutrient and profile data
- Service compressors as necessary
- Potential to leave aerators off during winter

Vegetation Control

- Spray or manually remove invasive vegetation
- Work with landscape contractor on yellow flag, cattail, and reed canarygrass control

Shoreline Stabilization

- Work with homeowners on shoreline plantings

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Schedule

Sampling

- Every two weeks during summer (May-Sept)
- Monthly in winter

Vegetation Control

- Treat as necessary every two weeks
- Combined with sampling trips

Maintenance

- Every two weeks as necessary
- Available for emergency trips if necessary

Budget

Specific budget categories are listed below. Tasks are billed time and materials

Item	Cost	Notes
Task 1 Aquatic Vegetation	$ 8,100	Aquatic vegetation monitoring and control
Task 2 Sampling detailed budget	$ 18,484	Baseline water quality sampling
Task 2a labor $10,391		
Task 2b analytical $8,092		
Task 3 Creek Flow	$ 2,600	Measure flow for forebay
Task 4 Shoreline Vegetation	$ 850	Plants and labor in limited, test area
Task 5 Dredge Planning	$ 3,701	Measure sediment, update bathymetry
Task 6 Willow Creek Restoration	$ 0	Included in Task 8
Task 7 Aeration Maintenance	$ 500	Labor only, parts not included
Task 8 Project Management	$ 1,750	Manage several proposed projects
Total	$ 35,985	Time and materials

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