UNDERSTANDING SPANAWAY LAKE'S CURRENT CONDITION January 2020 Friends of Spanaway Lake [FOSL] Sandy Williamson, FOSL chair & Don Russell, Basin BioChemist

WHAT ARE THE BIGGEST
PROBLEMS TO BE SOLVED?
1. Toxic algae blooms
2. Nuisance aquatic plant growth

TOXIC ALGAE [CYANOBACTERIA] BLOOMS?



LAKE CLOSURE TO ALL USES 8-22 TO 11-5-19



EXCESSIVE INVASIVE AQUATIC PLANT GROWTH



WHAT ARE THE CAUSES?

- 1. Phosphate [P] & Nitrate Pollution Of Groundwater Flowing In
- 2. P Is The Nutrient Controlling Algae And Plant Growth
- The Buildup Of Phosphate Rich Sediment From Dead Plants On Its Once Gravel Lakebed

SOURCES OF SPANAWAY LAKE INFLOW -PER Brown & Caldwell, 2016



Aerial Deposition (precipitation)

- Inflow from Coffee Creek (SW2)
- Local Stormwater (recharge) from runoff)
- Groundwater

Figure 1. Distribution of inflow to Spanaway Lake

SOURCES OF Phosphate

- 1. Ground Water Inflow [Septics & Storm Flow Basins]
- 2. Release From Bed Sediments
- 3. Coffee Creek [with Iron that helps]
- 4. Aerial Deposition And Storm Water Small Amounts

Unusual things about Spanaway Lake

- Large impacts of algae and plants but Phosphate lower than other Pierce County lakes
- The volume of surface flow in and out whereas many lakes in Pierce county have most or all inflow and outflow from and to ground water, except for Steilacom
- 2019 summer had unusually clear water in June&July
- 2015 and 2019 showed sudden changes in nutrient concentrations and Algae bloom occurred during an August rainstorm
- High inflow of Iron from Coffee Creek makes it look cloudy and should limit effects of Phosphate

IRON FROM "COFFEE" CREEK MARSH



Ground Water Flow Goes From SE To NW

1/3 Of The Drainage Basin Is In Undeveloped Parts Of JBLM



Figure 4. Satellite imagery of Spanaway Lake watershed



continue Syntem, 4+0, 1963 A+PA State Flare Interting in South FIPS, 482 Feelbander/Continuel Conc.

Figure 6. Spanaway LMP monitoring locations

Brown MD Caldwell

Brown & Caldwell study sampling sites – wells {GW} and streams {red-SW}

Temperatures measured 1-19-20 by Ed & Sandy: <u>GW is 49-</u> 50 deg. ALL YEAR

UNDEVELOPED SPANAWAY LAKE WATERSHED GROUNDWATER – N AND P UNPOLLUTED

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GROUNDWATEN

PRIMARY P & N from properly working septic tanks to GROUNDWATER FLOWING TO SPANAWAY LAKE







Figure 5. Stormwater infiltration systems and septic systems in Spanaway Lake watershed

About 1000-1500 **Home Septic Tanks** Flow Have Reached The Lake In The Last 50 Years And Will Increase More Rapidly Due To An Increasing Radius Of **Properties Whose** Septic Water Will Reach The Lake.

Less Than 200 Homes Are On The Lake

Some SUBSURFACE GROUNDWATER DISCHARGE SITEs have sand/gravel beds with few anchored plants We found one like this in shallow SE bay – note opening video



We Are Looking For More Of These Beds **On South And East** Sides Of The Lake Where Most GW Comes In. Another Indication Is **Good Fishing Spots** Where The Cool Groundwater Attracts Fish In The Summer.

This video will play during opening?



gw.vent.video.19-10-19.mp4

LIKELY SOLUTIONS

- Inactivate Phosphorus In Incoming Ground Water And Surface Water By ____Iron Or __?
- Maintain Lake Water Phosphorus Concentration At Or Below 20 Parts Per Billion [Ppb] To Limit Plant And Algae Growth
- Mechanical Harvesting Of Excessive Aquatic Plant Growth To Minimize P Additions To Bottom Sediments And Rid The Lake Of Excess Plants

USING IRON PARTICLES TO REMOVE PHOSPHORUS FROM DISCHARGING GROUNDWATER



WHO May Be RESPONSIBLE FOR Correcting SPANAWAY LAKE'S NUTRIENT PROBLEM?

- Lake Users? Who benefit most
- Septic System Owners? Septics caused most of the problem
- Pierce County Storm Water Management? Storm basins...
- Tacoma Pierce County Health Department?
- Department Of Ecology?
- Department Of Natural Resources? [Owner of the lake]

The End

FOSL Bylaws change for a voice Vote:

- Article IV. Section 1. Officers
- "f. The Board <u>shall (MAY)</u> establish standing or temporary committees and task forces with a majority vote; standing committees shall be:
- a. Finance / Audit,
- b. Engagement,
- c. Projects,
- d. Government liaison,
- e. All committees shall have a timeframe, goal and defined task to help advise the Board in its decisions."