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Wizard Lake

Preliminary Data Summary

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Overview

- Summary of Existing Documents – What do we know?
- Evaluation of Tributary Sampling Approach:
 - Locations
 - Sampling Procedures
 - Sampling Dates
- Tributary Water Quality Results + Interpretation
- Summary and Recommendations



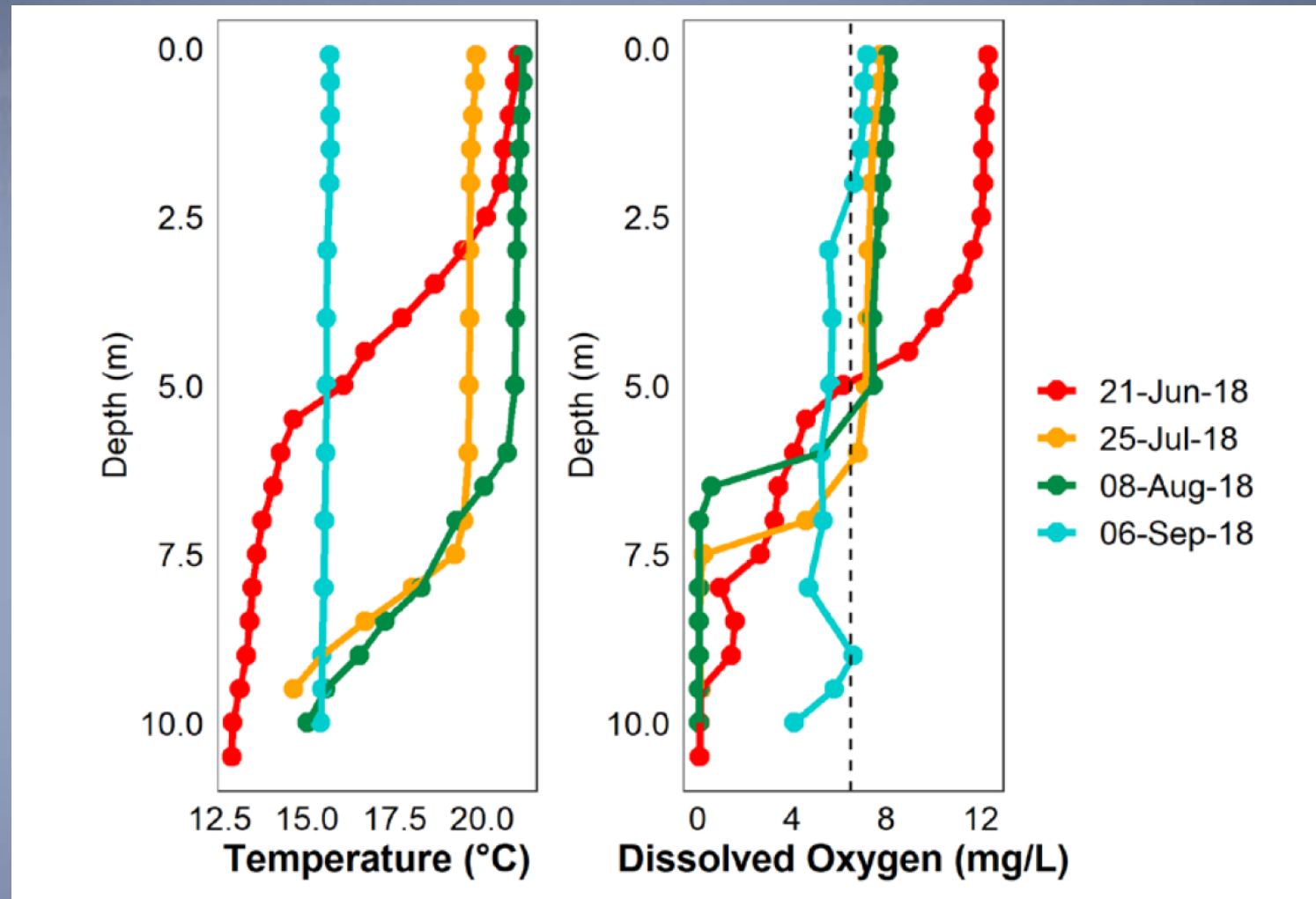
Lots of Work Done!

Report	Author	Years of Report(s)
The Alberta Lake Management Society Lakewatch Program: Wizard Lake Water Quality	Alberta Lake Management Society	2006, 2008, 2009, 2010, 2011, 2013, 2016, 2018
Wabamun–Genesee Area Biomonitoring Program	TransAlta	2015, 2016, 2017
Regional Groundwater Assessment Leduc County	Hydrogeological Consultants Ltd	1999
Regional Groundwater Assessment Wetaskiwin County	Hydrogeological Consultants Ltd	2008
Shoreline Assessment - Wizard Lake	North Saskatchewan Watershed Alliance	2016
Wizard Lake State of the Watershed Report	Aquality Environmental Consulting	2012
Strawberry Watershed Riparian Area Assessment	Fiera Biological Consulting	2018
Water Quality of Wizard Lake	Alberta Environmental Protection	1998
Tracking changes in water quality due to catchment land-use and lake morphometry across spatial and temporal scales	Zofia Taranu, McGill University (Thesis)	2007

What do we know about Wizard Lake?

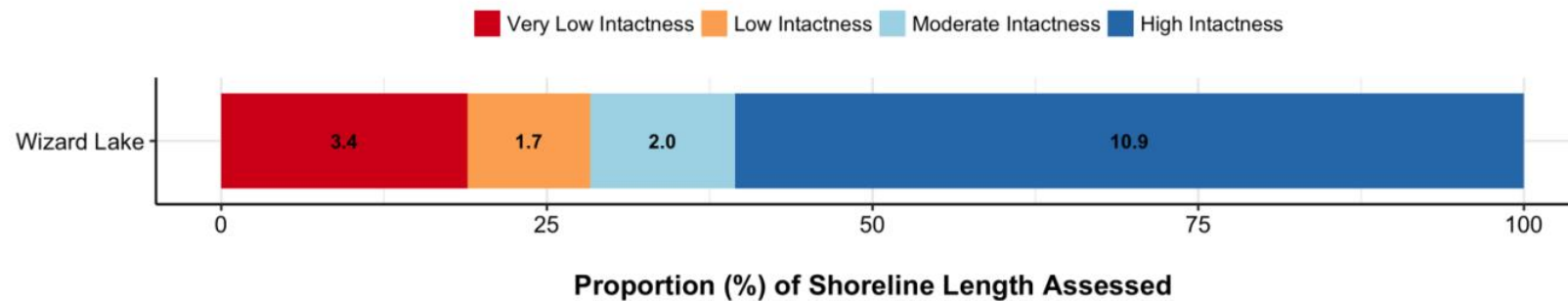
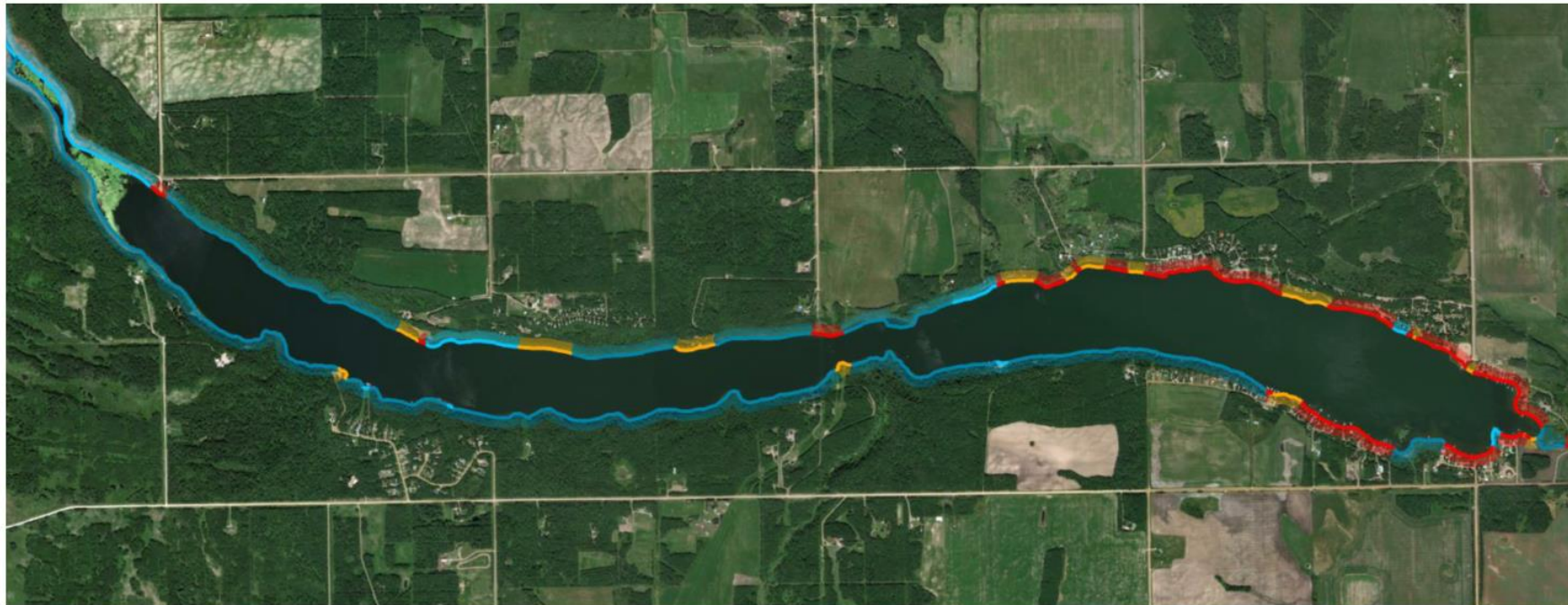
- Eutrophic: nutrient rich, plenty of algae: average for AB
- Deep (max. depth: 11 m) and stratified (see next slide)
- Water quality did not change 2006-2018
- Water levels vary with no trend

Stratification and Anoxia



Thermal layering (Stratification) results in oxygen depletion in bottom waters

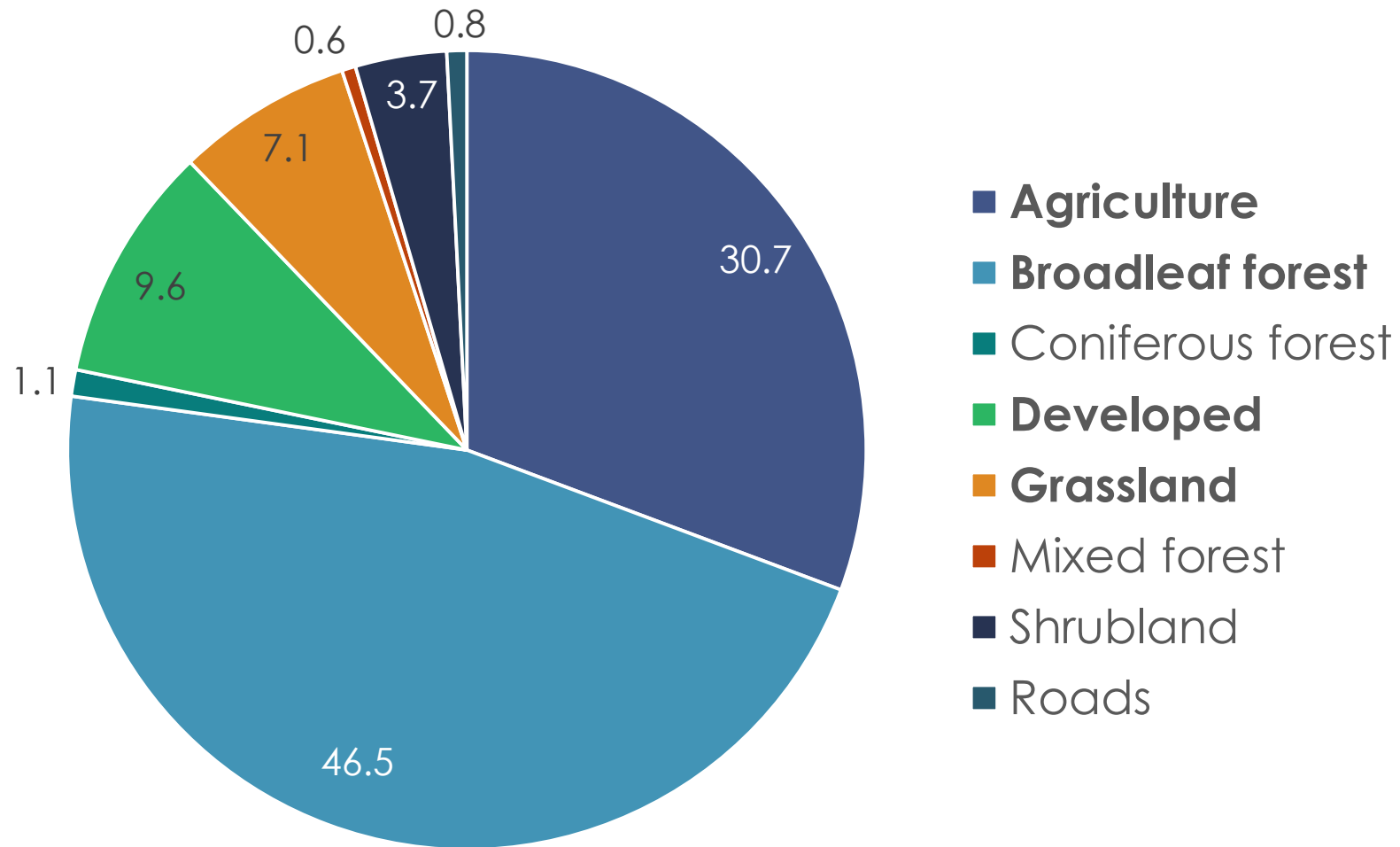
Shoreline Health: 75% Moderate – High Intact



Shoreline Health: Examples



Watershed Land Cover



Evaluation of Tributary Sampling Approach

Sampling Locations



- Inflows 1-4 are useful to study watershed water quality
- Trib A, Trib B are outside of Wizard Lake watershed, so they are not directly relevant for Wizard Lake water quality



Sampling Methods

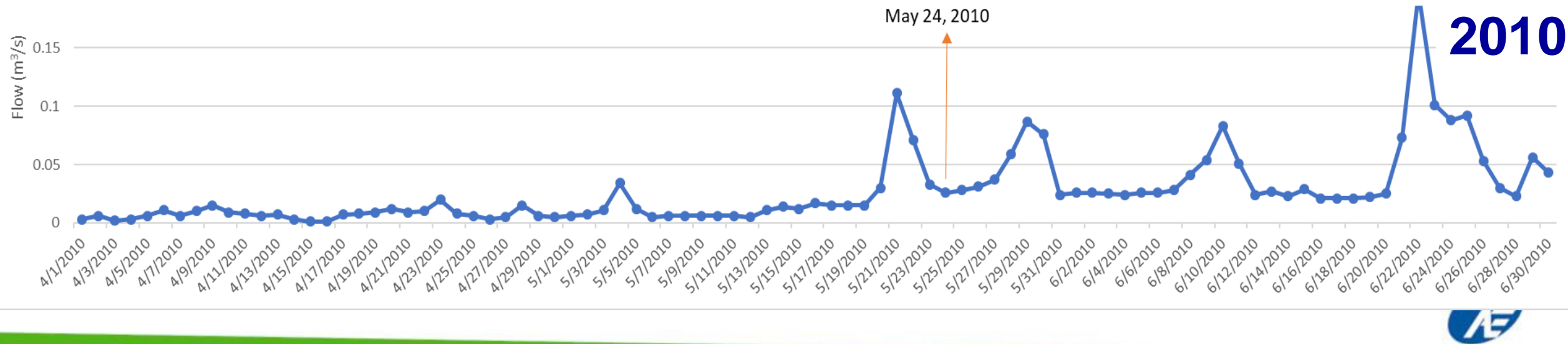
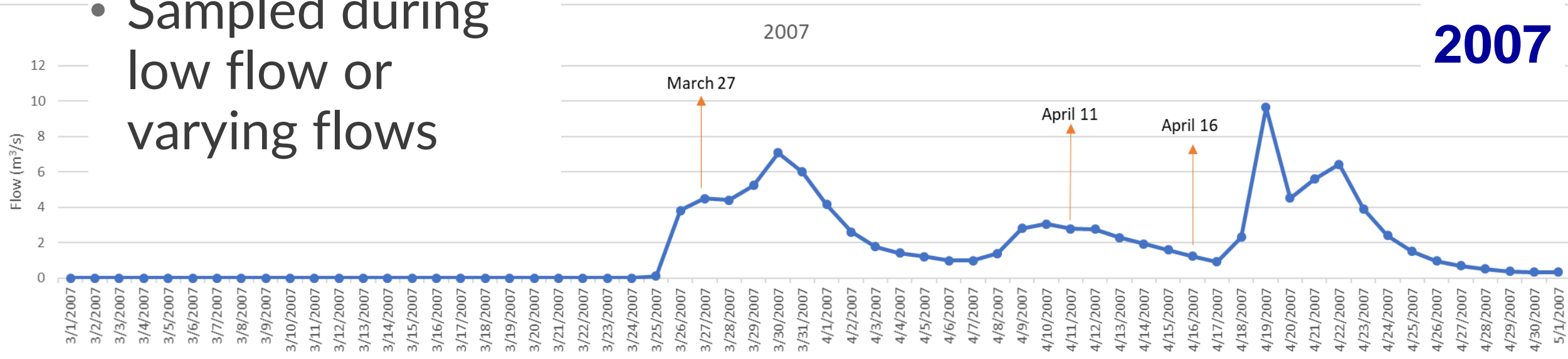


- Overall sampling methods were like those of environmental scientists
- In the future, consider field filtering samples for dissolved parameters

Sampling Dates 2007, 2010



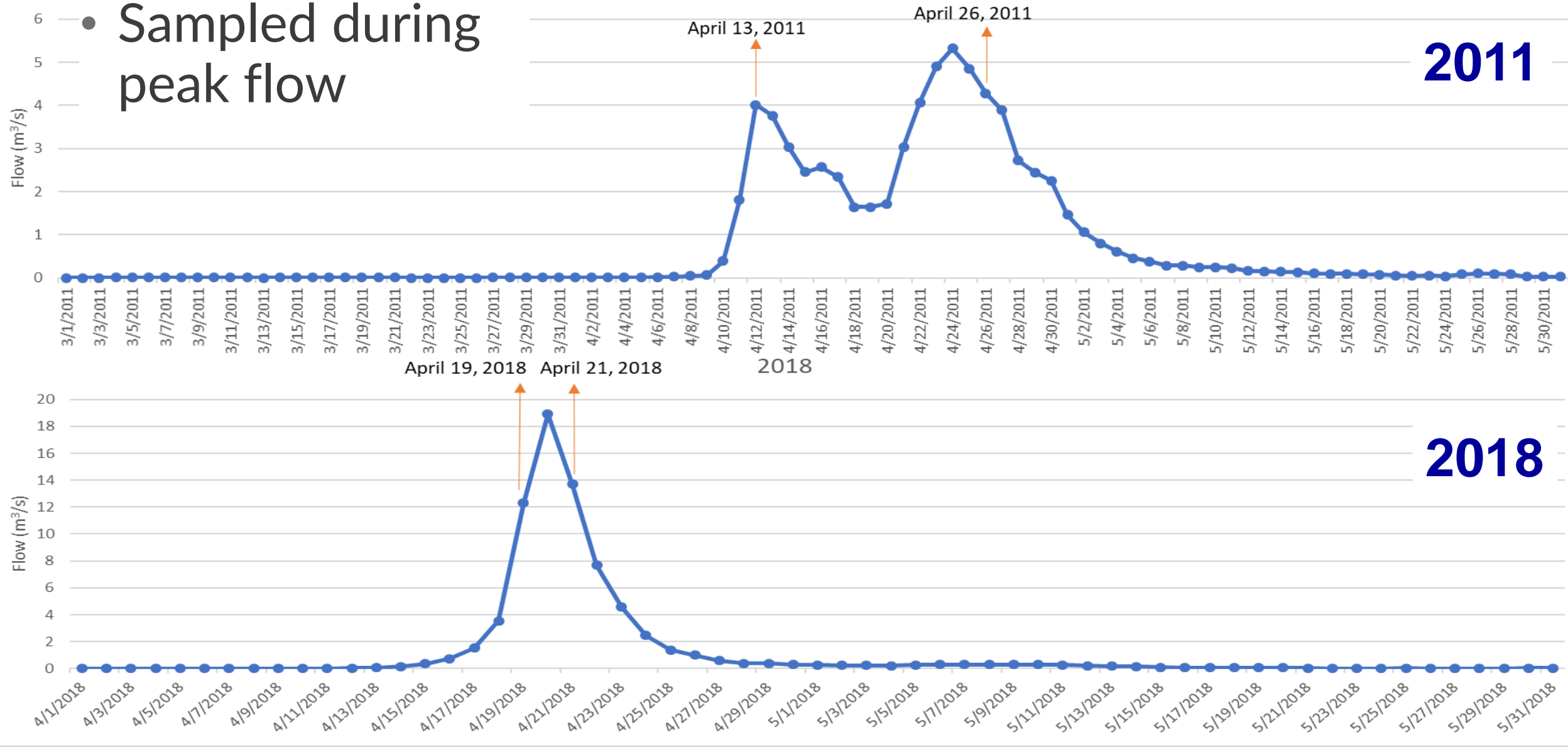
- Sampled during low flow or varying flows



Sample Dates 2011, 2018



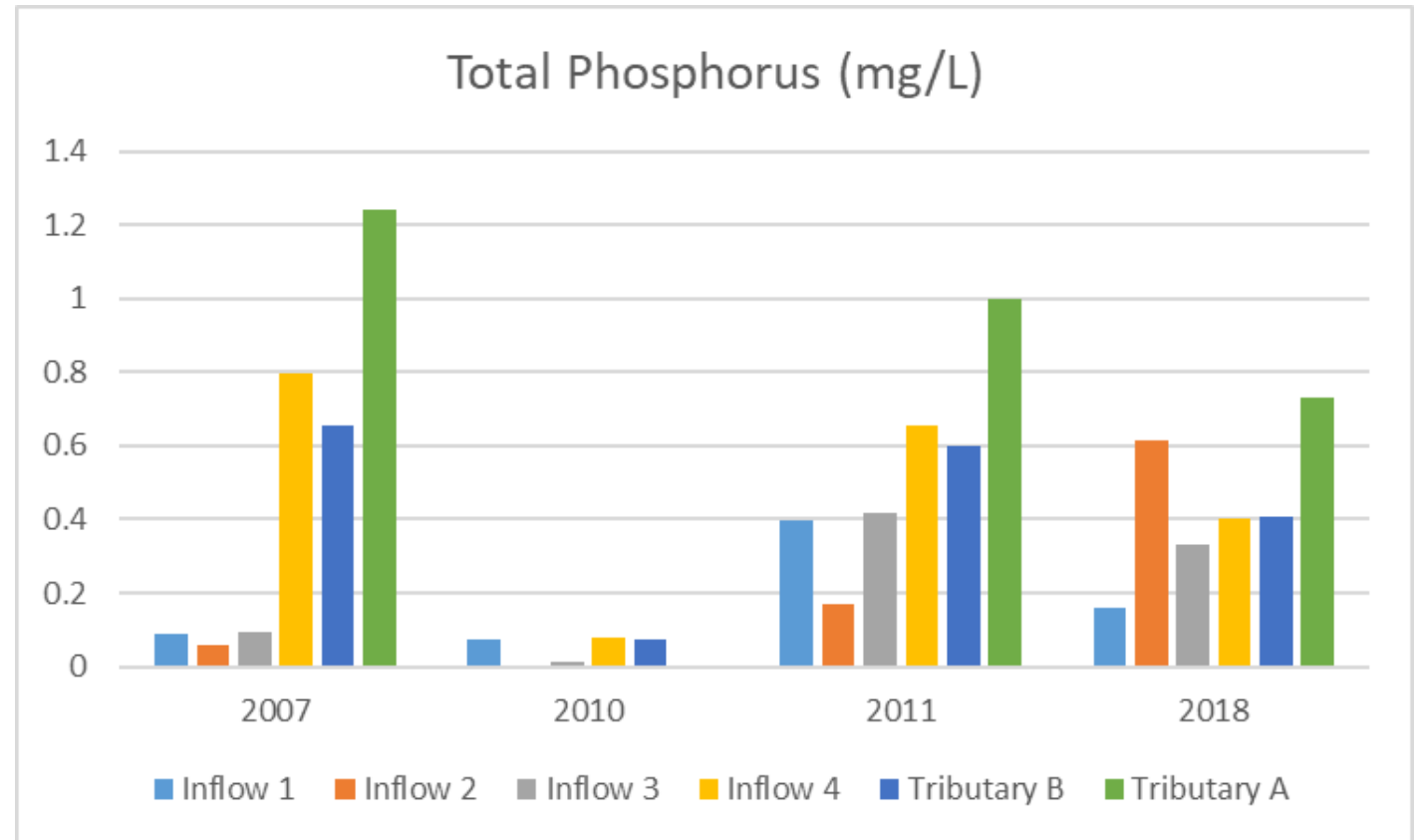
- Sampled during peak flow



Tributary Water Quality Results

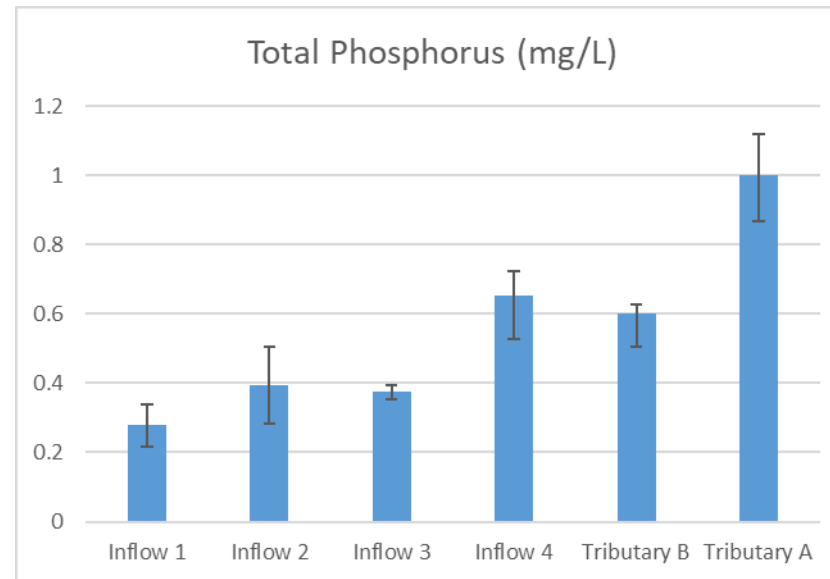
Total Phosphorus (TP): compare years

- 2011, 2018 – generally highest TP concentrations
- 2007 - Highest TP concentrations in late March, (sites 4, B, A) compared to mid-April (sites 1-3)
- 2010 – low concentrations due to low flow



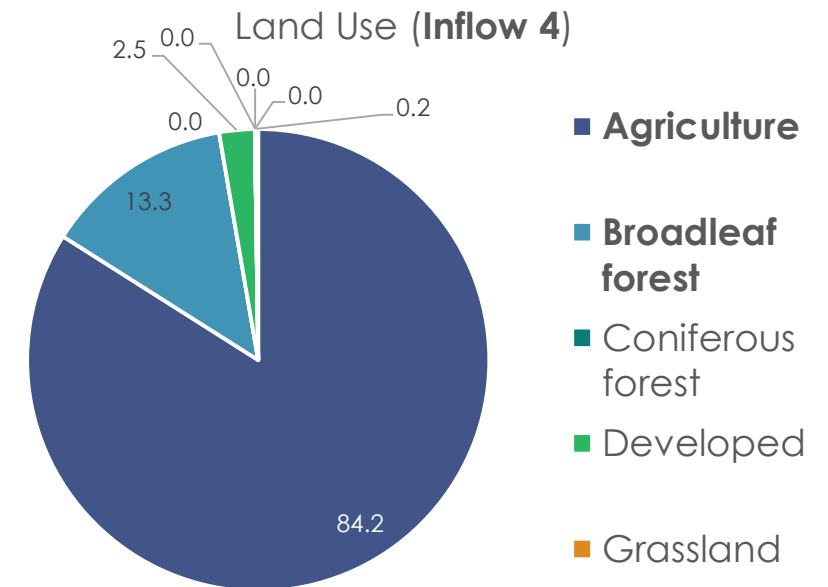
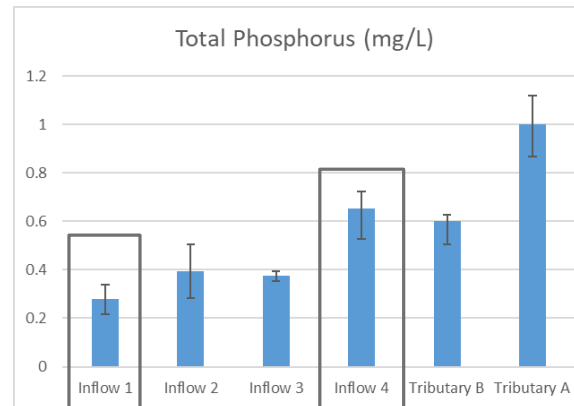
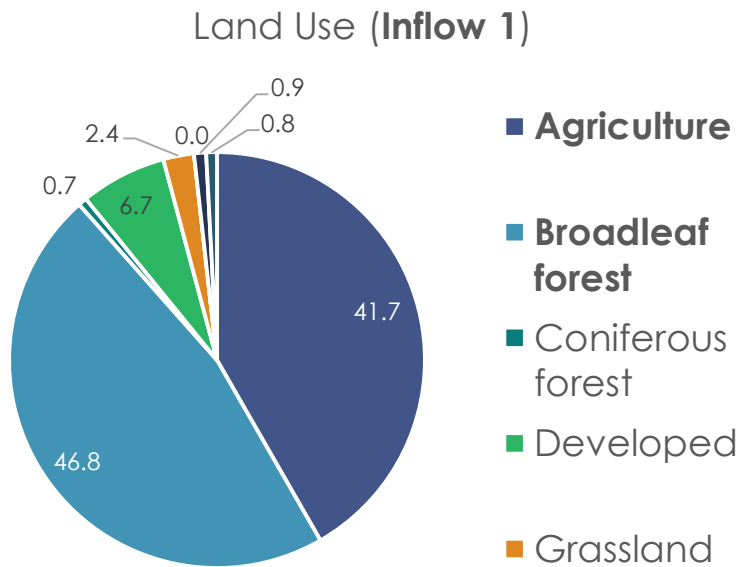
Total Phosphorus: compare locations

- Highest TP concentrations found at Tributary A (downstream of farm) and Inflow 4 (most eastern inflow to Wizard Lake)



Tributary Phosphorus and Land Use

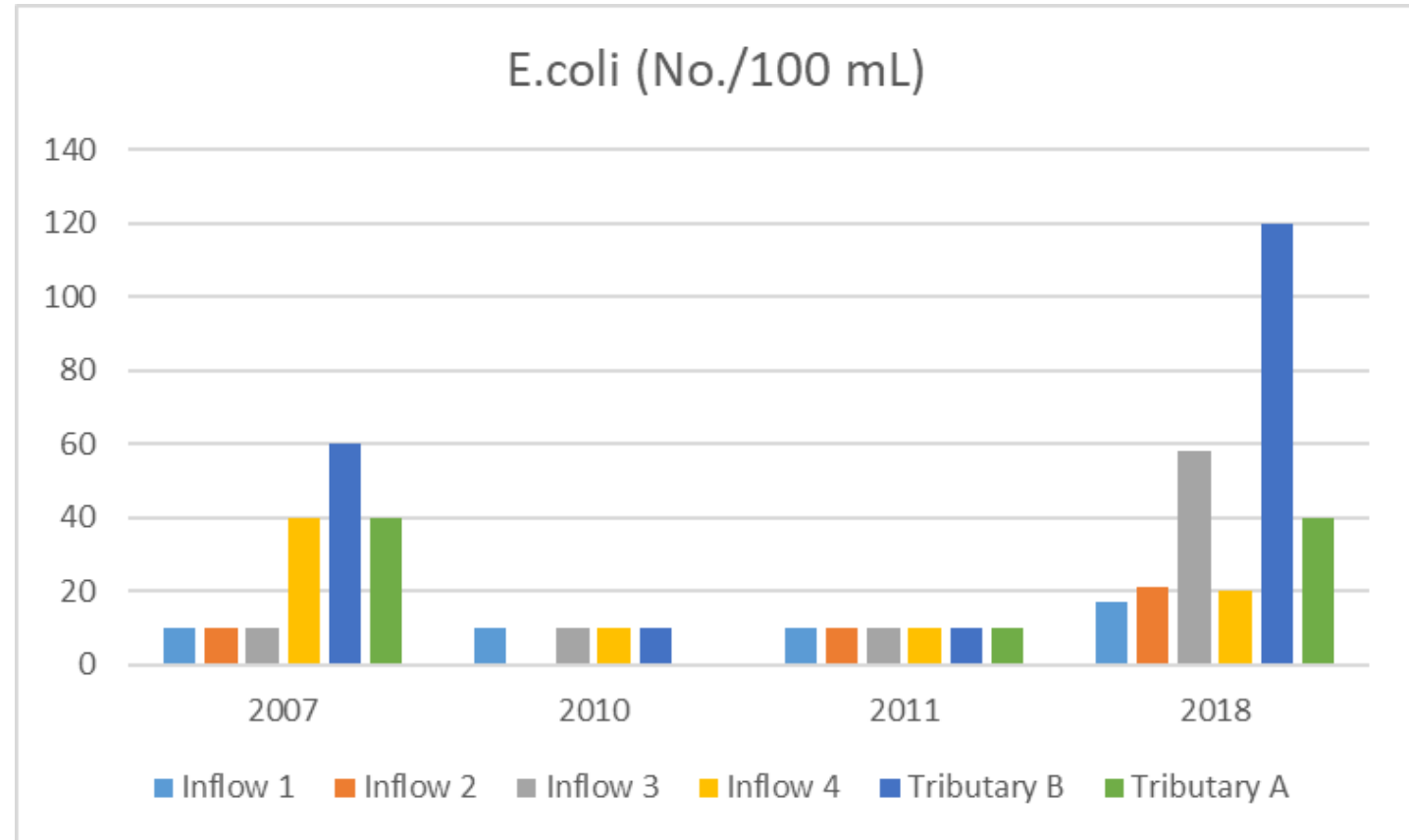
- Highest TP at Inflow 4 related to highest proportion of agricultural land use



- Phosphorus Budget will evaluate impact of these inputs on lake water quality

E. Coli (coliform bacteria)

- Generally low: meet recreational guideline of 100#/100mL (except Tributary B in 2018)
- Inflow 4, Tribs A+B highest



Summary and Recommendations

- Citizen Monitoring Programs: successful and meaningful
- Tributary water quality is worst in areas with most agriculture
- 25% of riparian areas are impacted
- Current conditions well know, long term trends not
- Phosphorus Budget ?
- Sample Inflows 1-4 for 2-3 more years, continue ALMS monitoring
- Work with farmers on BMP implementation
- Look into shoreline restoration options
- Study long-term trends (paleolimnology)
- ?





Questions?

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Ammonia: compare locations

- Highest concentrations at Tributary A

