

Sediment Phosphorus Survey in Little Hatchet Creek and Gum Root Swamp



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DB Environmental



Identify Hotspots of P-rich Materials

- Stream bank materials were surveyed along the incised channel north of the Gainesville Regional Airport in September 2014
- Areas of exposed clays along the stream bank were targeted, along with aggregates or “phosphate nodules” embedded in the clays
- High erosion potential inferred from stream bank slope and evidence of bank failure







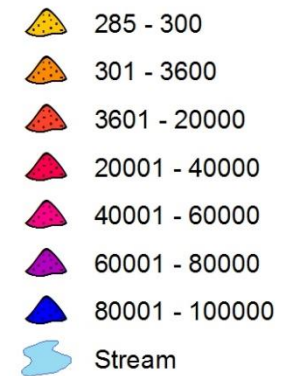




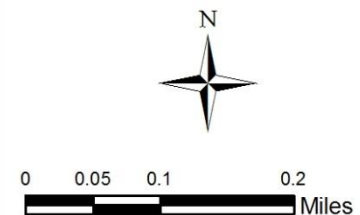
Little Hatchet Creek Stream Bank Sample Results

September
2014

Total Phosphorus mg/kg



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



Do the Downstream Sediments in the Stream Channel Show High P Levels?

- Follow-up survey in August 2015 and January 2016 focused on stream bed sediments (sands, with some additional gravel and clay samples)
 - Phosphorus fractionation and surface water sampling
- Recent survey of Gum Root Swamp in April-May 2016 included additional tributaries and outflow points, expanded the survey area and included organic soils that have accrued within the swamp



SB-7
TP in sand =
1580 mg/kg



SB-7

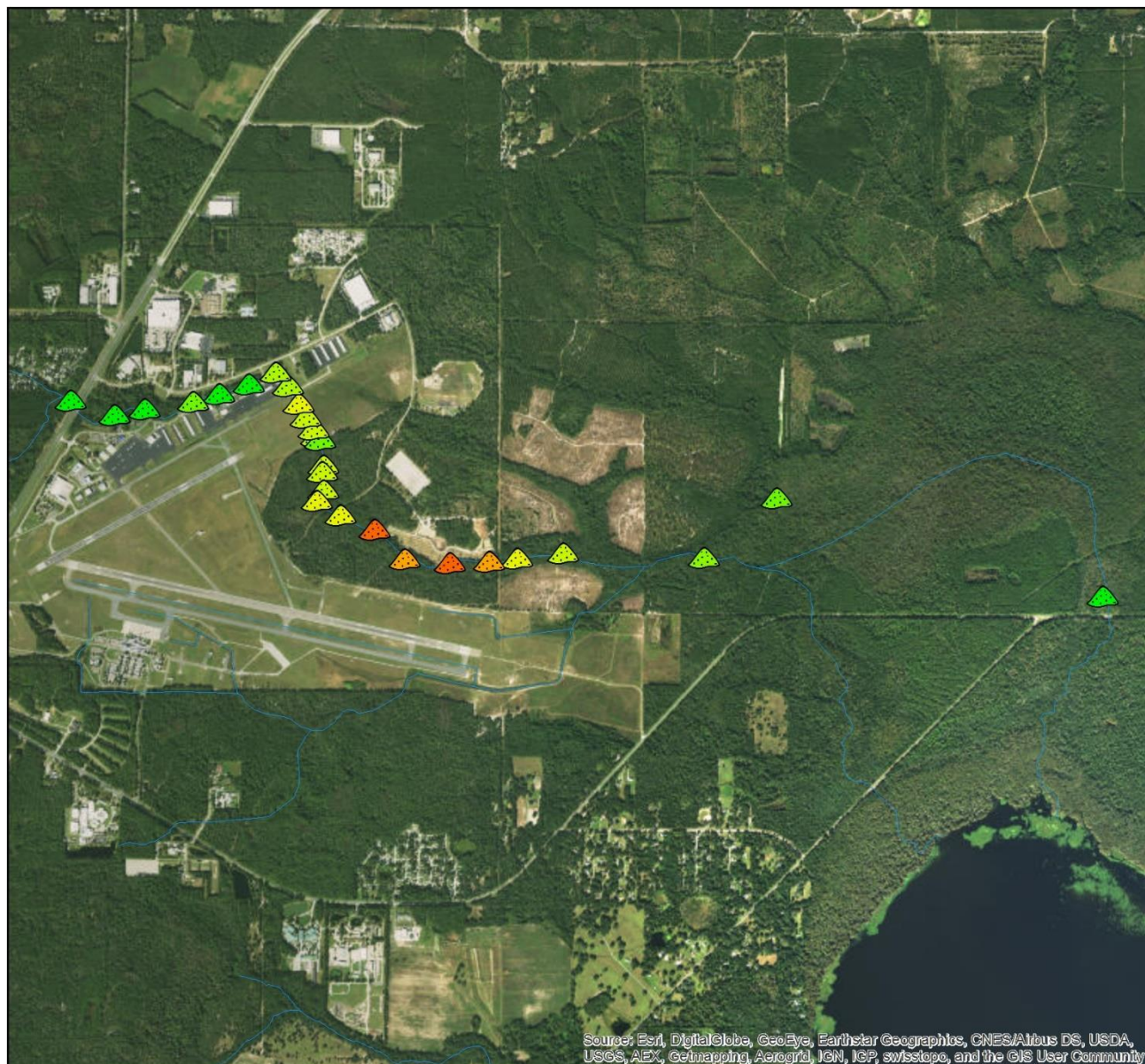
TP in gravel = 10.1%
(or 101,000 mg/kg)

Ca in Gravel = 27.9%





Increase in stream
bed sediment TP
across the airport
runway, and
upstream of the
landfill project



Little Hatchet Creek Sediment Sample Results

Total Phosphorus

mg/kg

- 0 - 300
- 301 - 300
- 301 - 600
- 601 - 900
- 901 - 1200
- 1201 - 1500
- 1501 - 1800
- 1801 - 2100
- 2101 - 2400
- 2401 - 2700
- 2701 - 3000
- 3001 - 3300
- 3301 - 3600
- 3601 - 3900

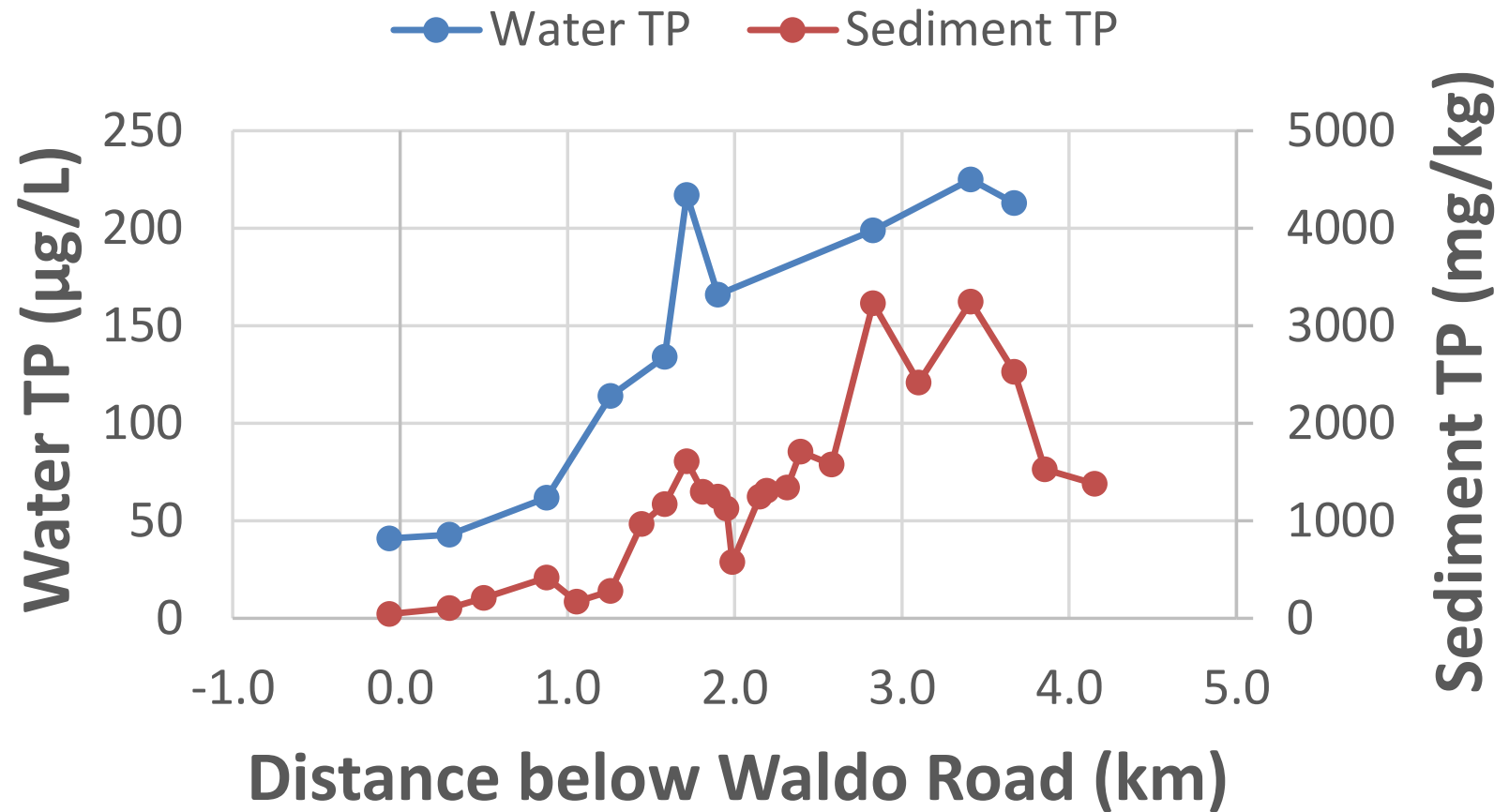


0 0.25 0.5
Miles

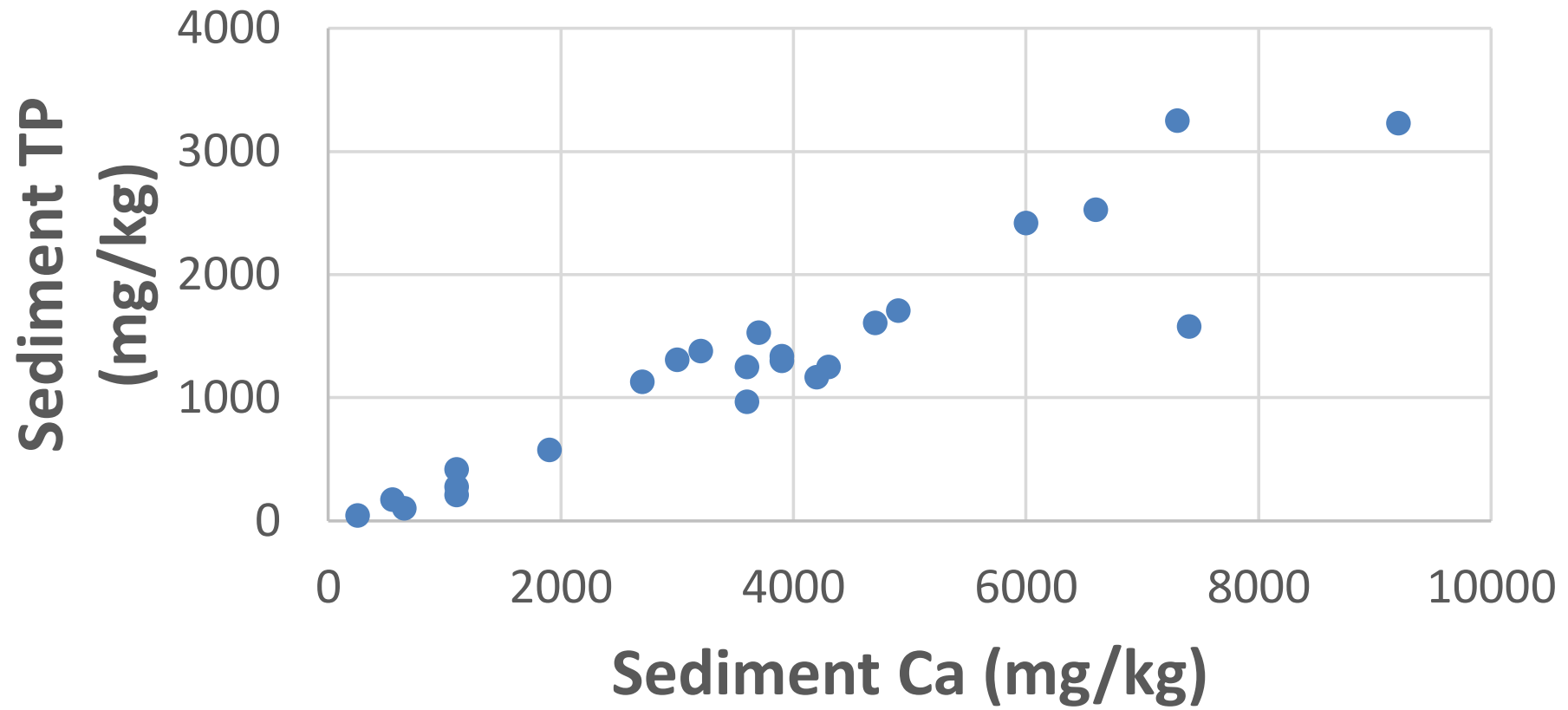
Created by: Jim Myles
Revised: June 30, 2016



Little Hatchet - January 6, 2016



Stream Bed Sediments



Is the swamp acting as a P sink?



Gum Root Swamp

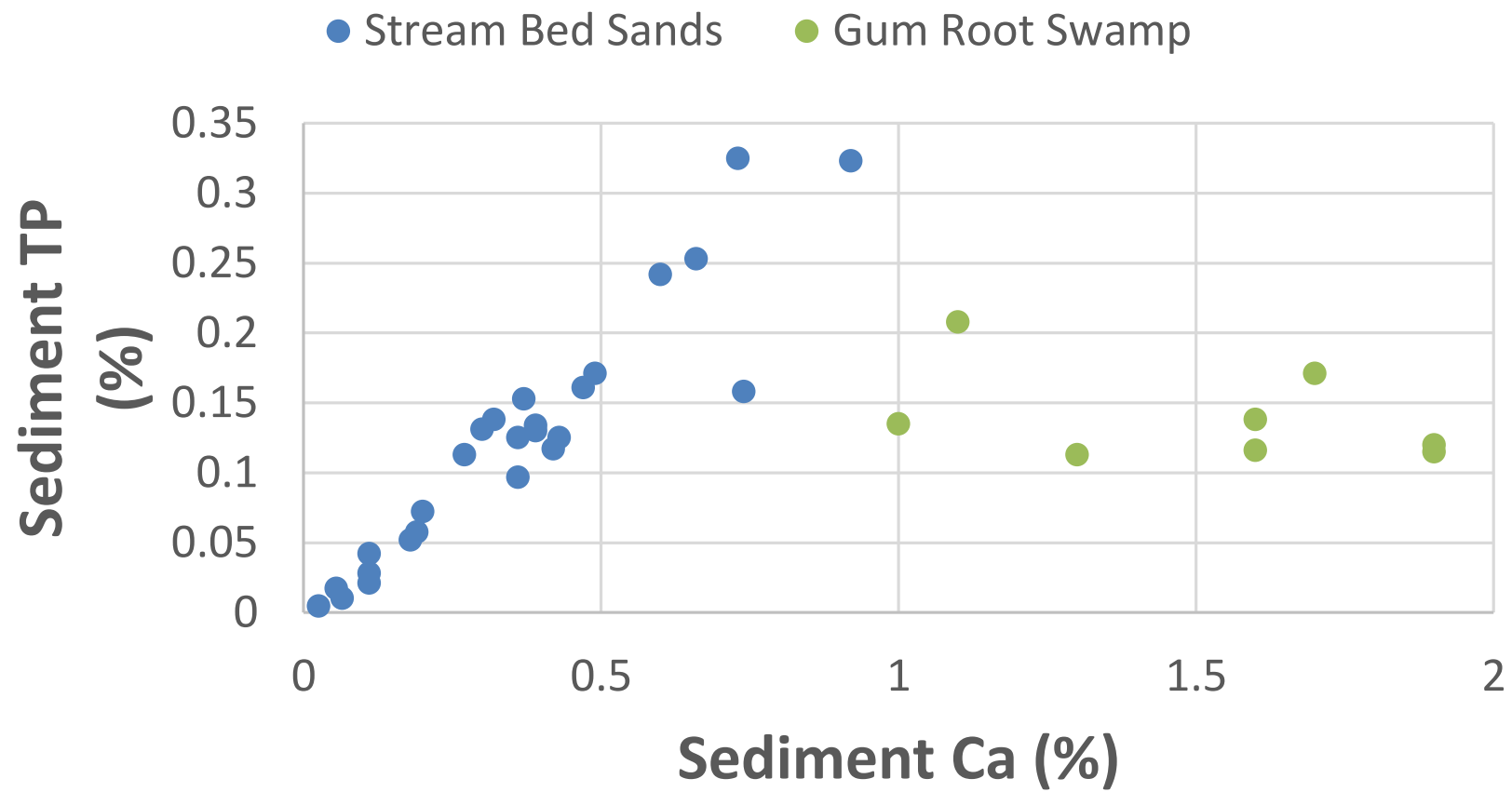
- Falling water levels at onset of dry season conditions
- Channel became braided, then broad areas with standing water and lack of well-defined flow path
- Deep muck (> 3 ft) in many places

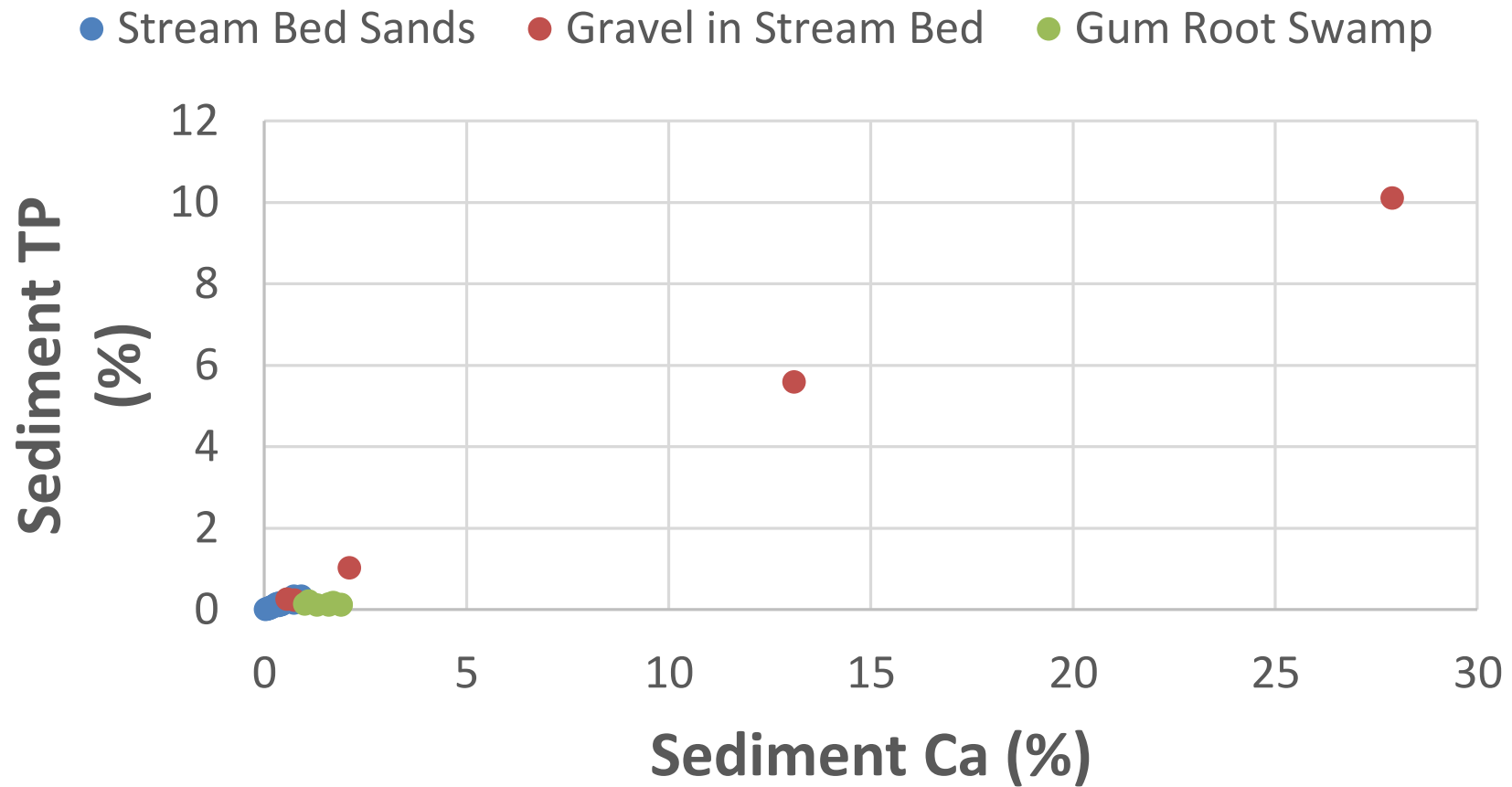






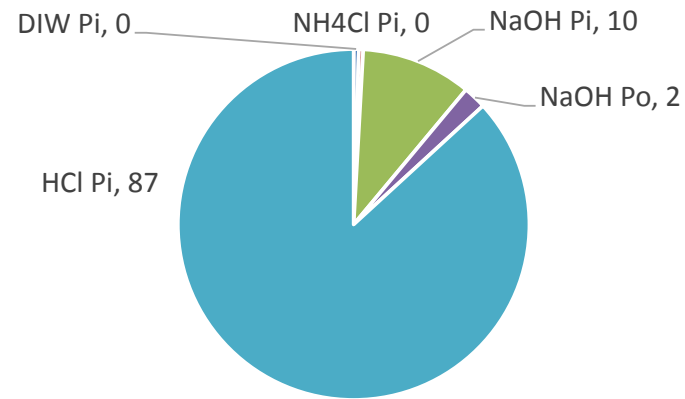




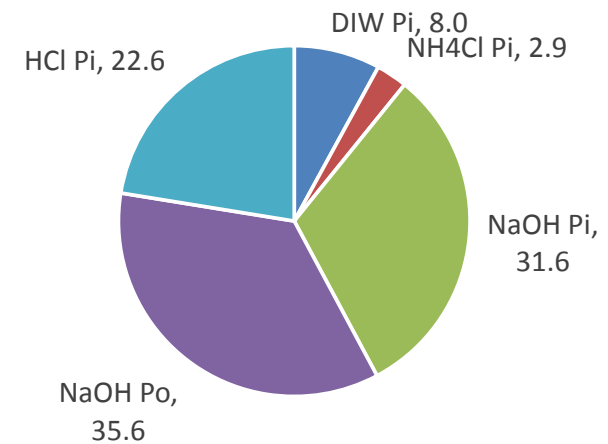


Sediment Phosphorus Fractionation

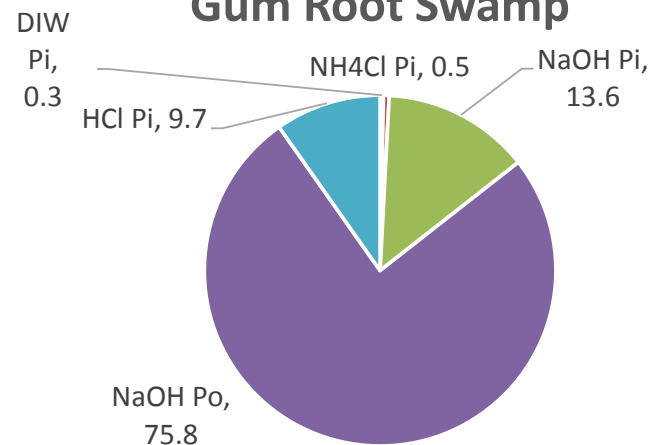
Little Hatchet Main Channel



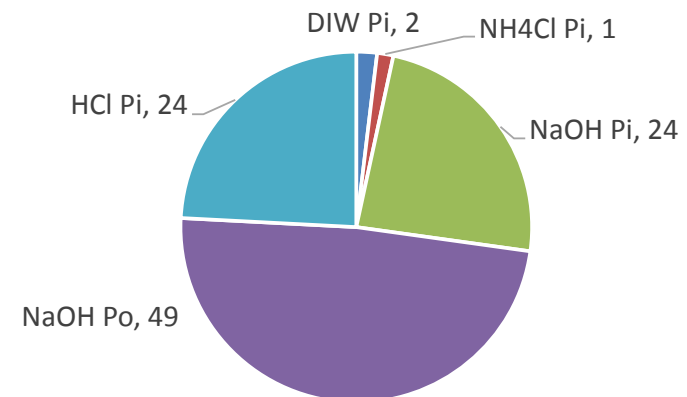
Tributaries



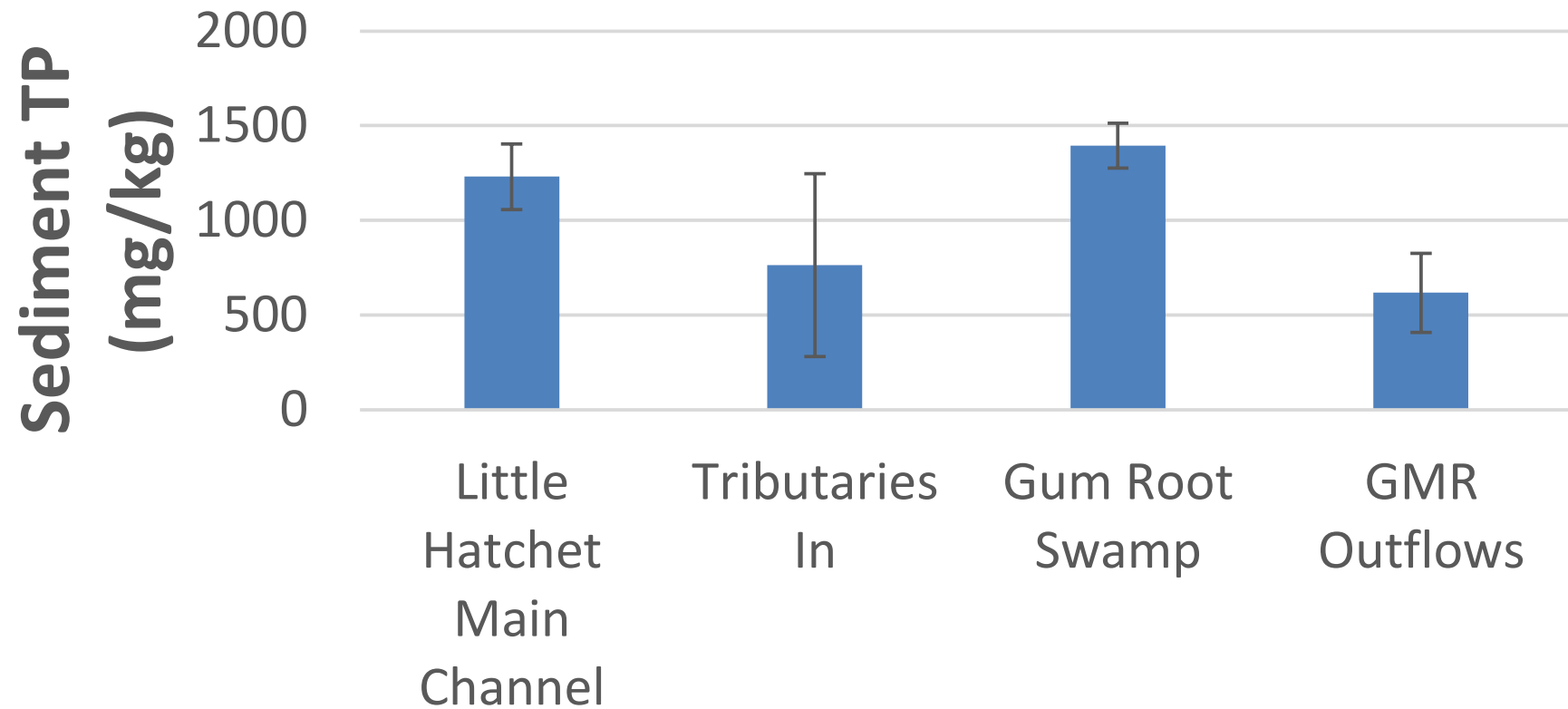
Gum Root Swamp

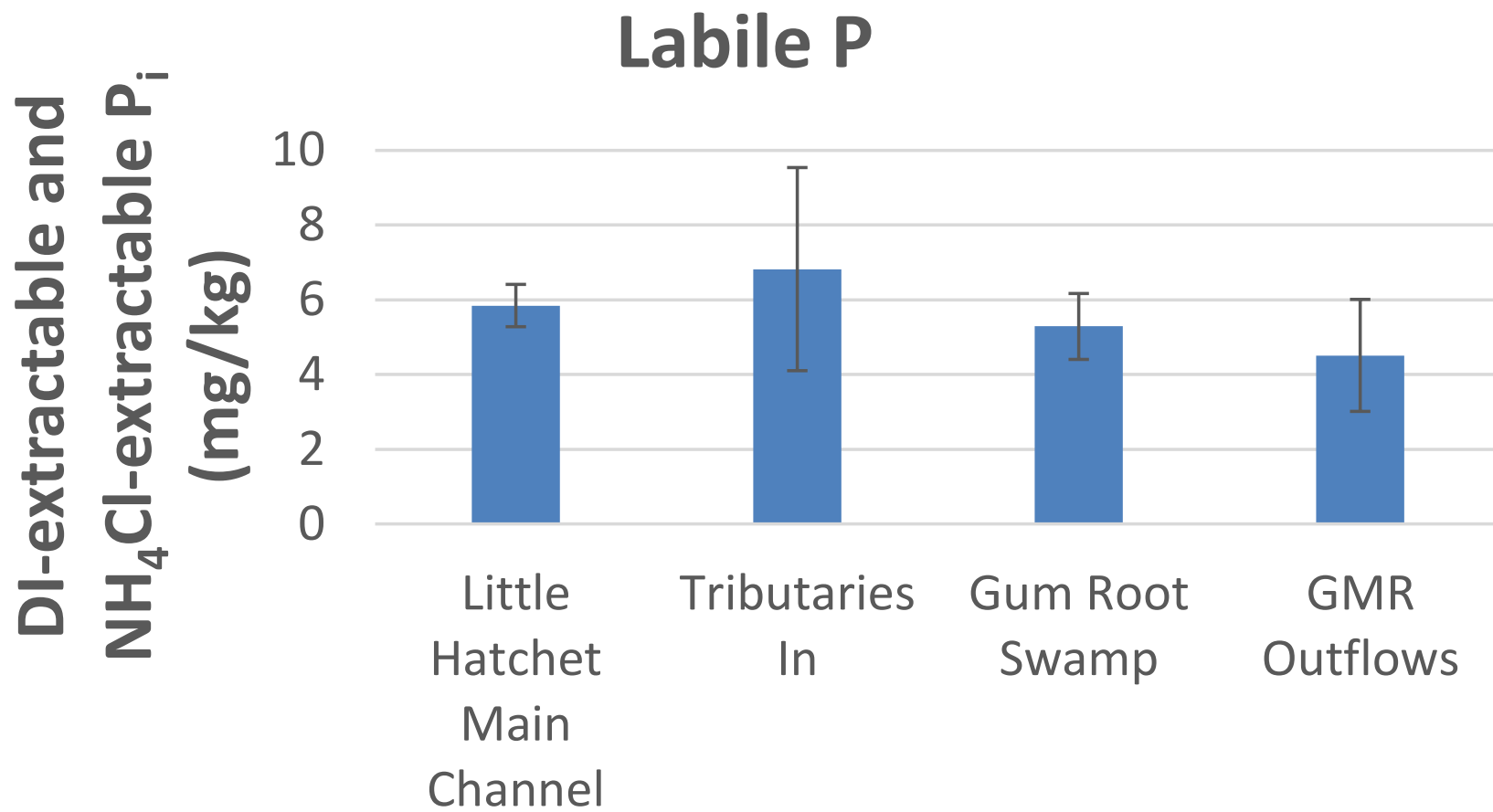


GMR Outflows



Total Sediment P





N=29

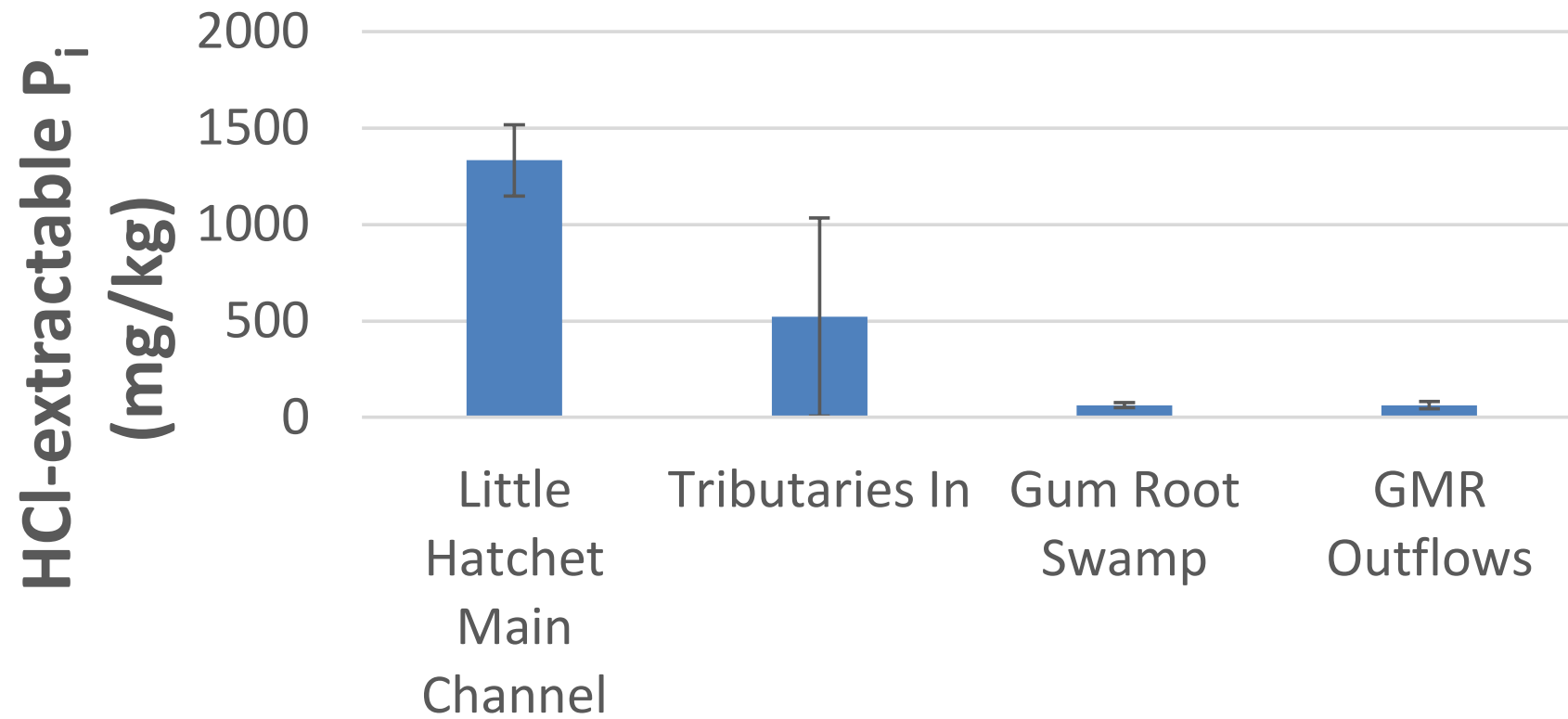
N=5

N=8

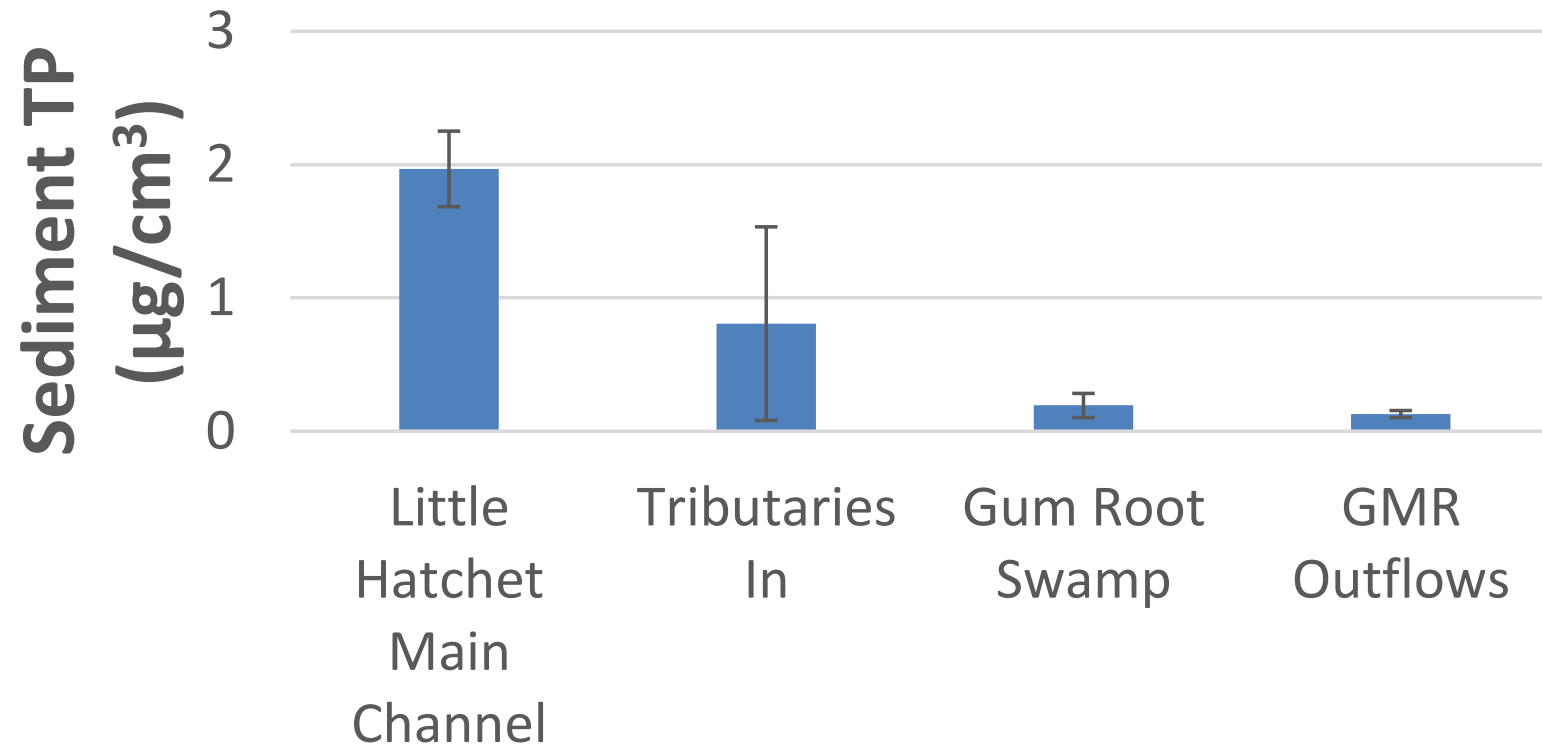
N=9



Ca- and Mg-bound P



Total Sediment P Storage by Volume



Preliminary Findings

- High P stream bank materials in the incised channel were also found within the stream bed, though most sand deposits were much lower in P
- Stream bed sands contained mostly stable Ca-P compounds, with little increase in labile P pool
- Increases in sediment P found where scour pools have deposited gravel-sized materials that are high in P



Preliminary Findings

- Gum Root Swamp organic soils are elevated in P compared to tributary inflows, but only slightly higher than Little Hatchet sands
- Higher density of Little Hatchet stream bed sands indicates higher P per unit volume, and higher potential for removing P through settling, than P in Gum Root Swamp soils.
- Some deeper muck deposits may contain large pools of P, the material is bound in organic P forms that are likely unstable during dryout



Acknowledgements

- Thanks to Alachua County Environmental Protection Department and Robin Hallbourg for study design and funding the surveys and laboratory analysis
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