Introduction

• Freshwater wetlands have the capacity to store more carbon in soil than other terrestrial habitats in the U.S. (Nahlick & Fennessy, 2016)
• Understanding variability among wetlands informs management efforts for ecosystem services to local communities
• This project explores surficial and historic storage of carbon in wetland settings at Fairfield Osborn Preserve

Methods

• Sediment cores extracted with a Livingston corer and auger, divided into 2 cm (by depth) samples
• 61 total samples processed
• Magnetic susceptibility (MS) measured using a Bartington MS meter
• Geochemistry:
  i. Samples sieved to remove large organics (< 200 um) sieve
  ii. 10% HCl added to decalcify inorganic carbon
  iii. Returned to neutral pH
  iv. Dried at 60 °C and ground to fine powder
  v. Mass spectrometer (UNC Wilmington) to quantify isotopic values of Total Organic Carbon (TOC), δ13C, δ15N, C/N

Results

Surface (modern) samples:
• Lake margin wetlands (KP, TP, and SW in Fig. 1) greatest amount of TOC and inferred ability to sequester carbon, followed by marsh.
• Lowest sequestration in sag pond samples (SP).

Temporal (historic) analysis of Typha Marsh (Fig. 2) and the Sag Pond (Fig. 3)
• Greater amounts sequestered within top 20 cm equates to 1950’s in Typha marsh (Goman, 2012)
• MS corroborates decline in inorganic content

Future Work

Explore historic successional changes
• Microscopic analysis of macrofossils in process
• Seek further insights into changes in plant dominance over time, and fluctuations in carbon intake through photosynthesis

Additional wetland/lacustrine sites needed
• Increase historic analysis of differing lacustrine ecosystems and sequestration rates

Dating SP pond deposits using Cs-137 & Pb-210
• Establish sedimentation rates for temporal analysis

References:

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Contact:
riordane@sonoma.edu