

Soil Carbon in
Natural vs
Constructed
Wetlands on
the Flathead
Reservation in
Montana



MARIAH DURGLO

WILDLIFE & FISHERIES

SALISH KOOTENAI
COLLEGE

MARCH 2023



Agenda

Introduction

Methods

Results

Discussion

Questions



Left to right: Mariah Durglo, Victoria White, Tabitha Espinoza, Dennis Lichtenberg, Robert Dempsey

Introduction





Why are wetlands important?

- Biodiversity hot spots
- Protecting & improving water quality
- Storing water
- Flood control
- Erosion control
- **Carbon Storage**



Cultural Connection to Wetlands



AN INDIGENOUS MAN
FROM THE URO PEOPLE
FISHING IN PERU.

FOTO: JANINA ZASCHE / UNIVERSAL
IMAGES GROUP / GETTY IMAGES



Study Question

1. How do natural wetlands compare to a constructed wetland within the same watershed?

Hypothesis: Soil carbon levels will be greater at pristine wetlands near the top of the Crow Watershed compared to the downgradient, highly disturbed constructed wetland.

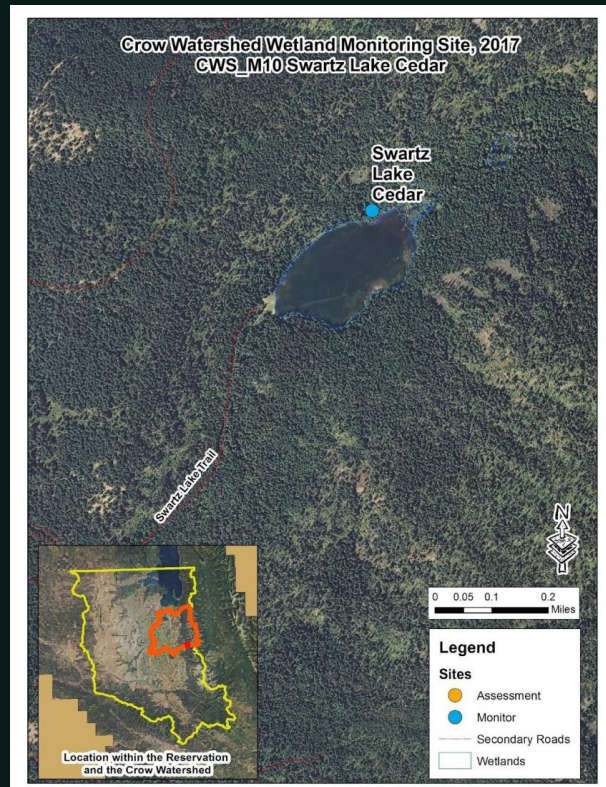


Methods



Sample Collection Sites

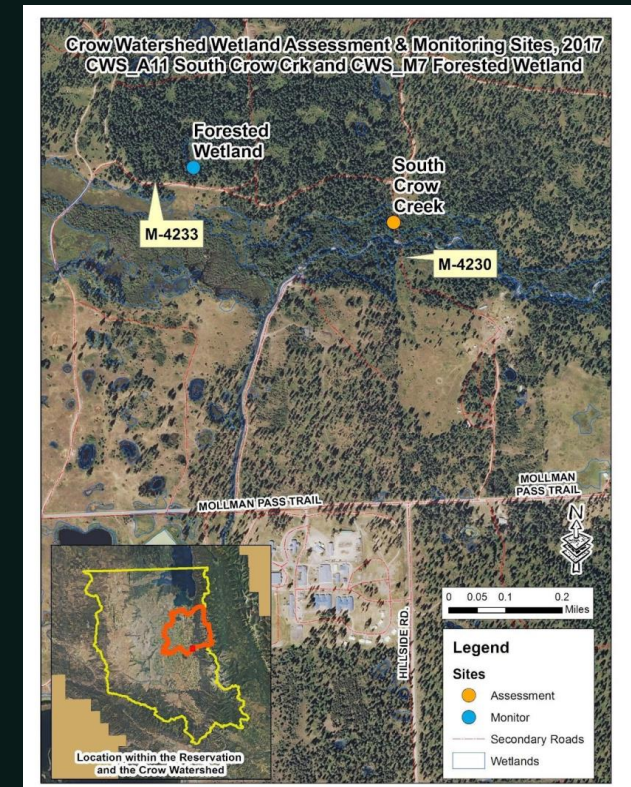
SWARTZ LAKE



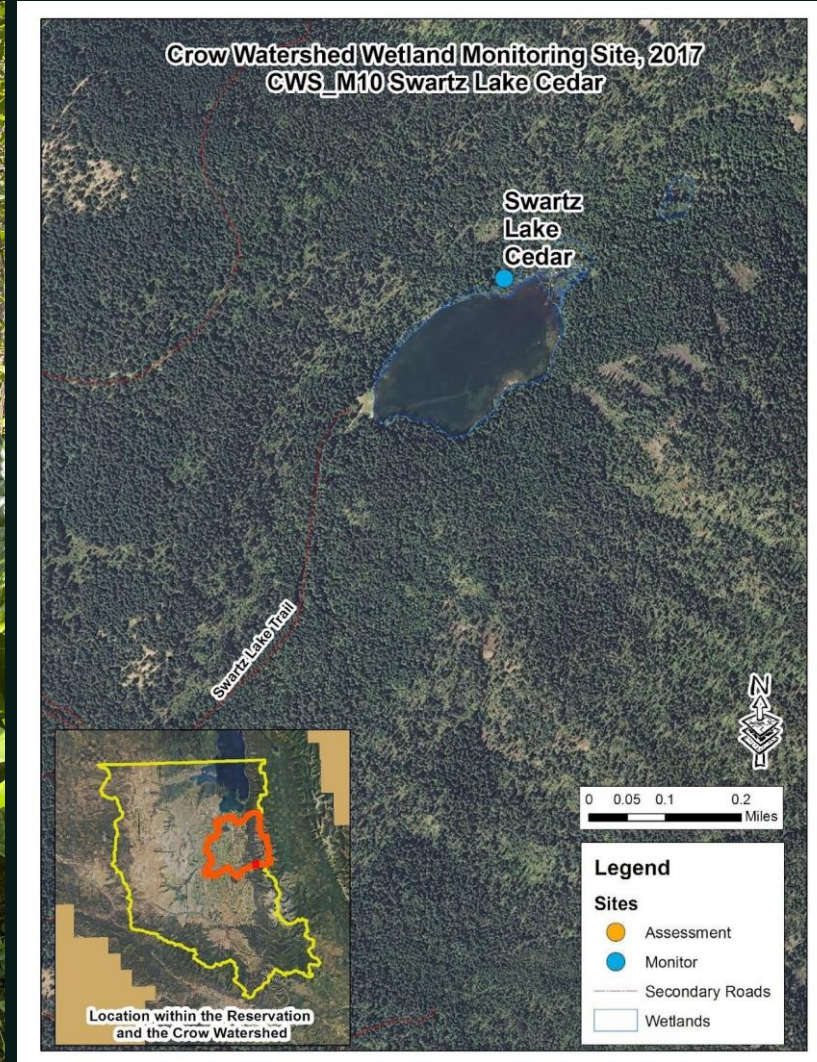
UPPER CROW



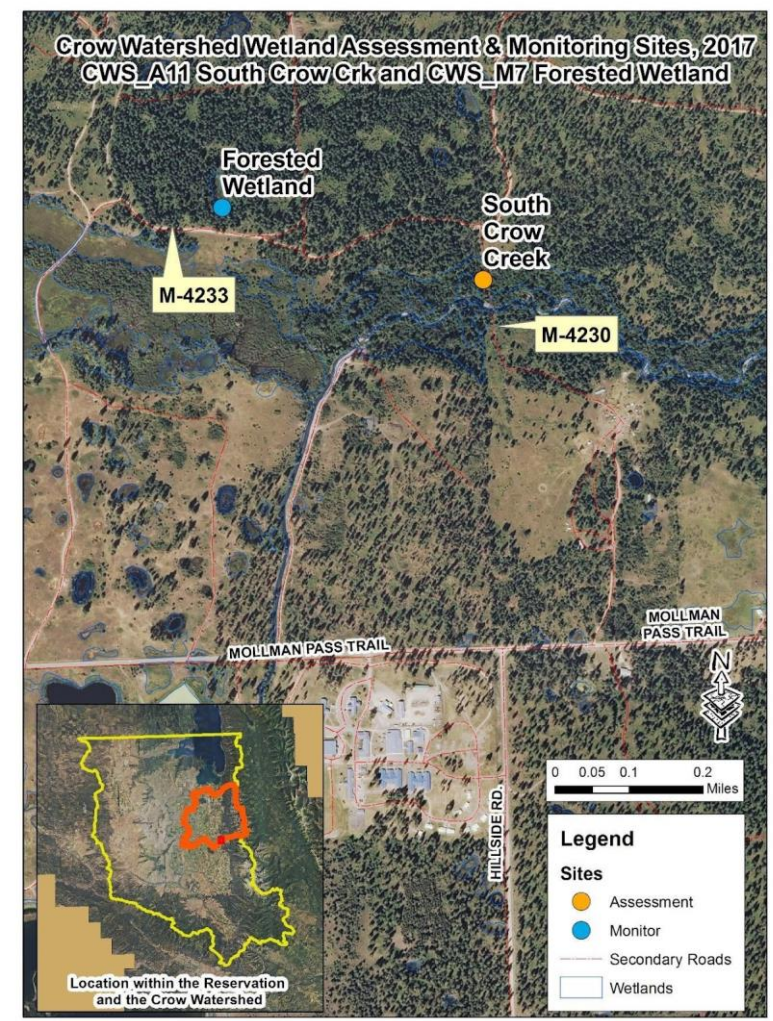
LOWER CROW



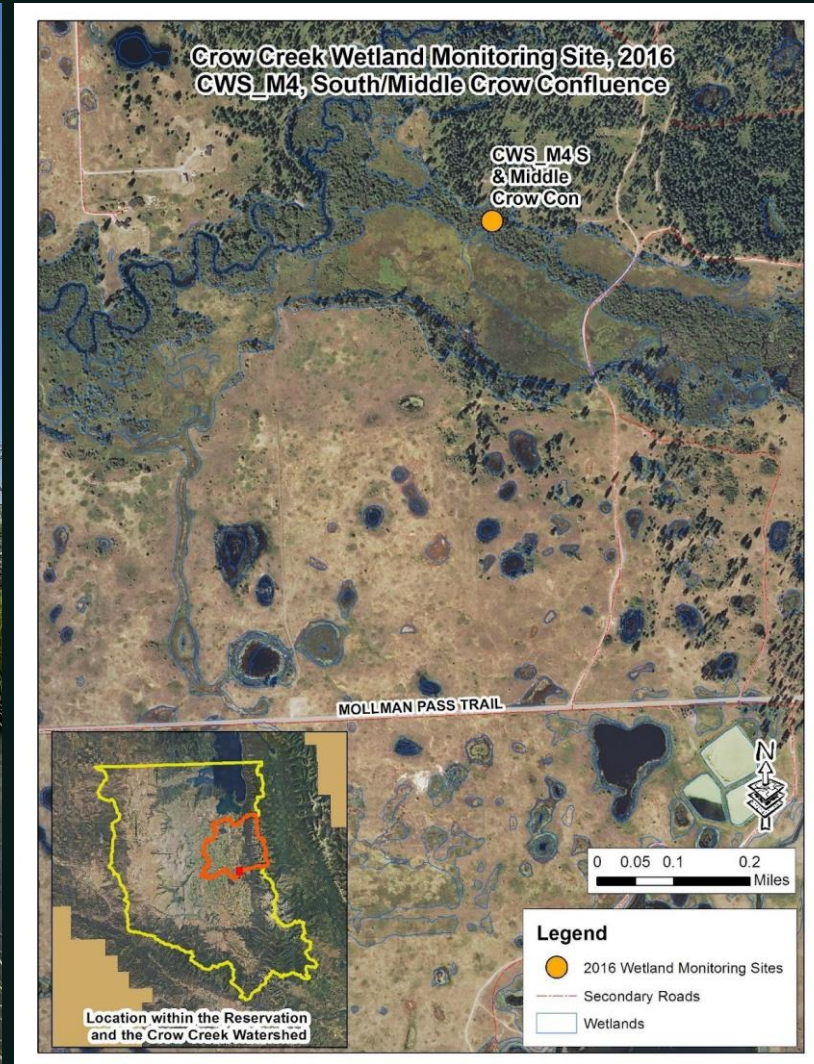
Swartz Lake Cedar



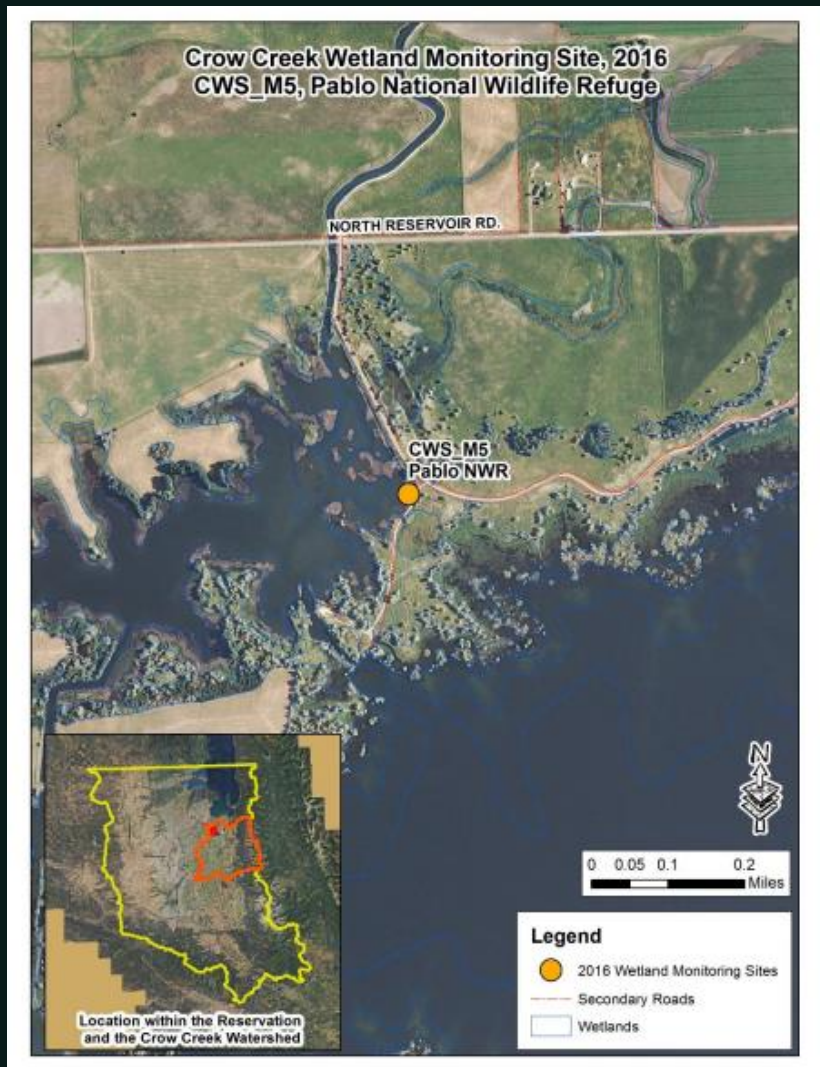
South Crow Creek



Middle & South Crow Creek Confluence



Pablo Reservoir



Sample Collection Methods

SOIL SAMPLER



MUNSELL COLOR CHART



COMPOSITE SAMPLES



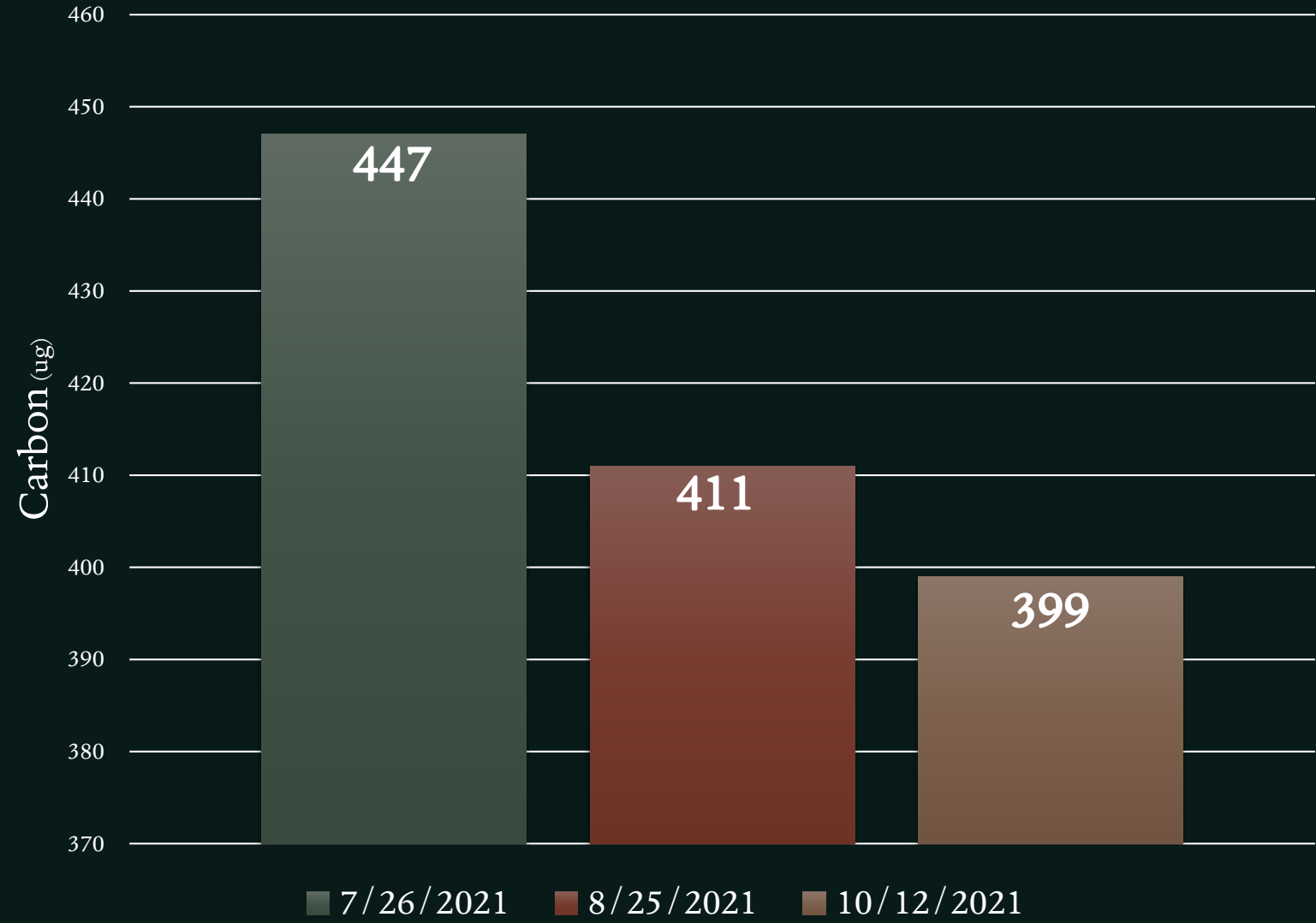
Results



Swartz Lake



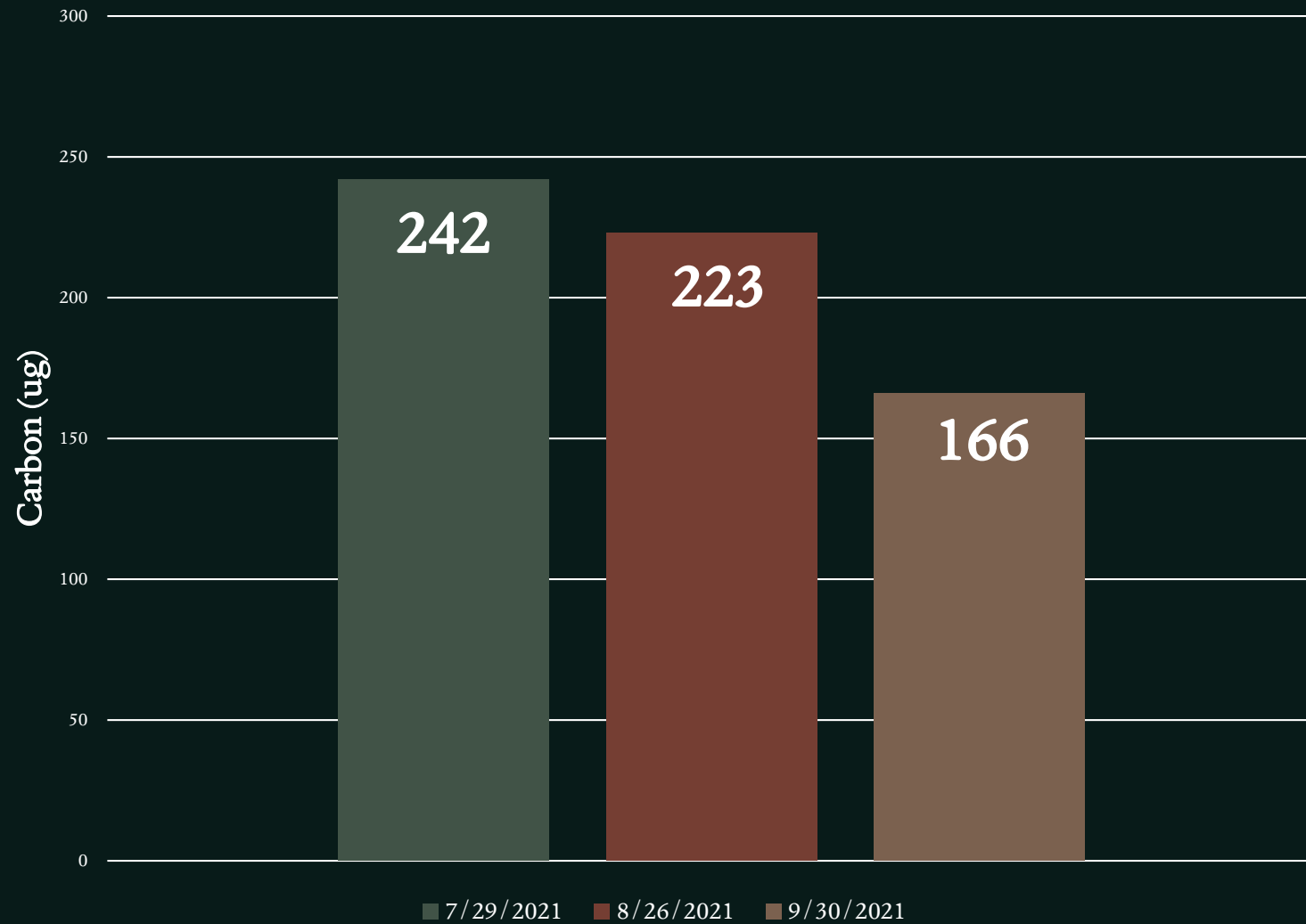
Swartz Lake Soil Carbon



South Crow Creek



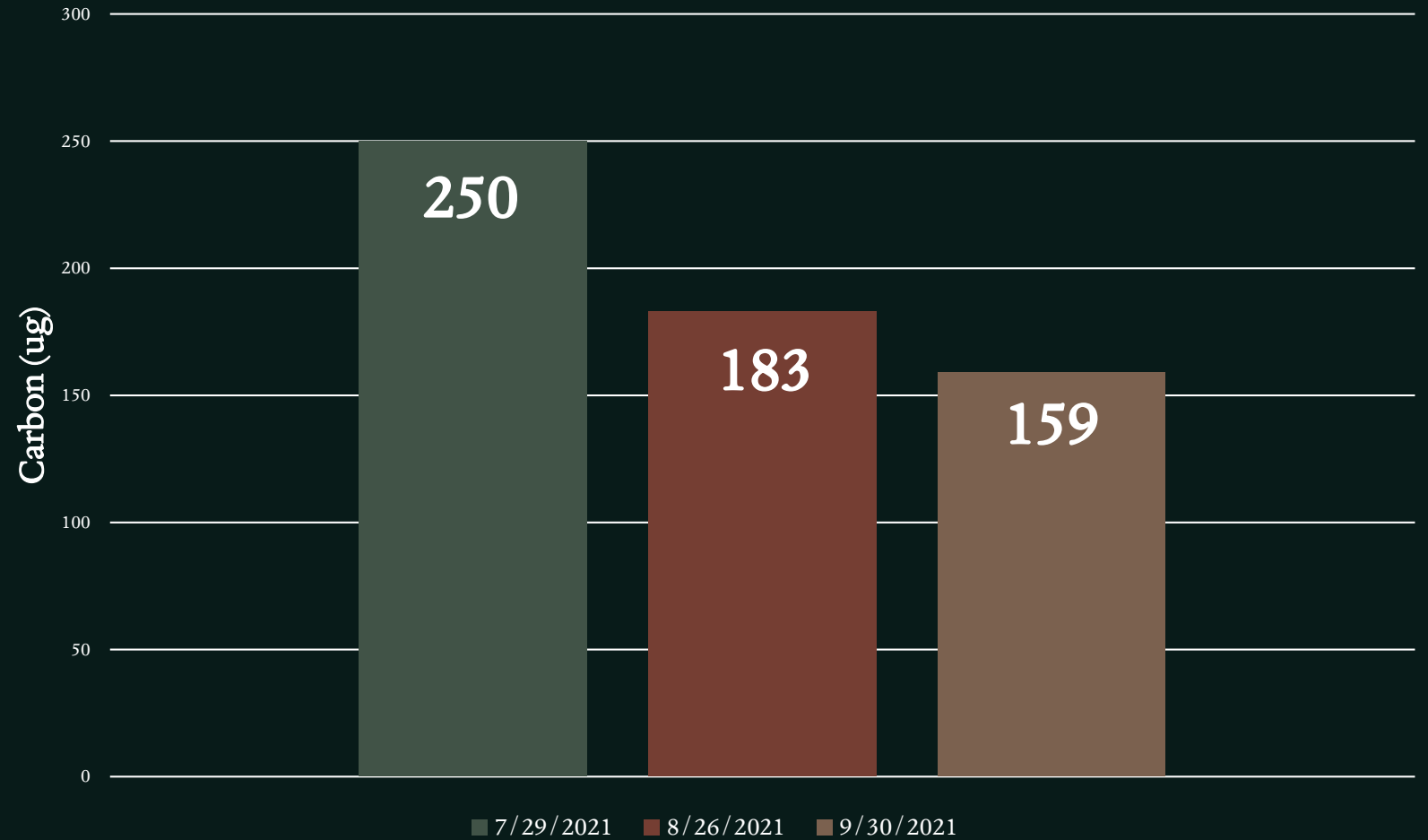
South Crow Creek



South & Middle Confluence



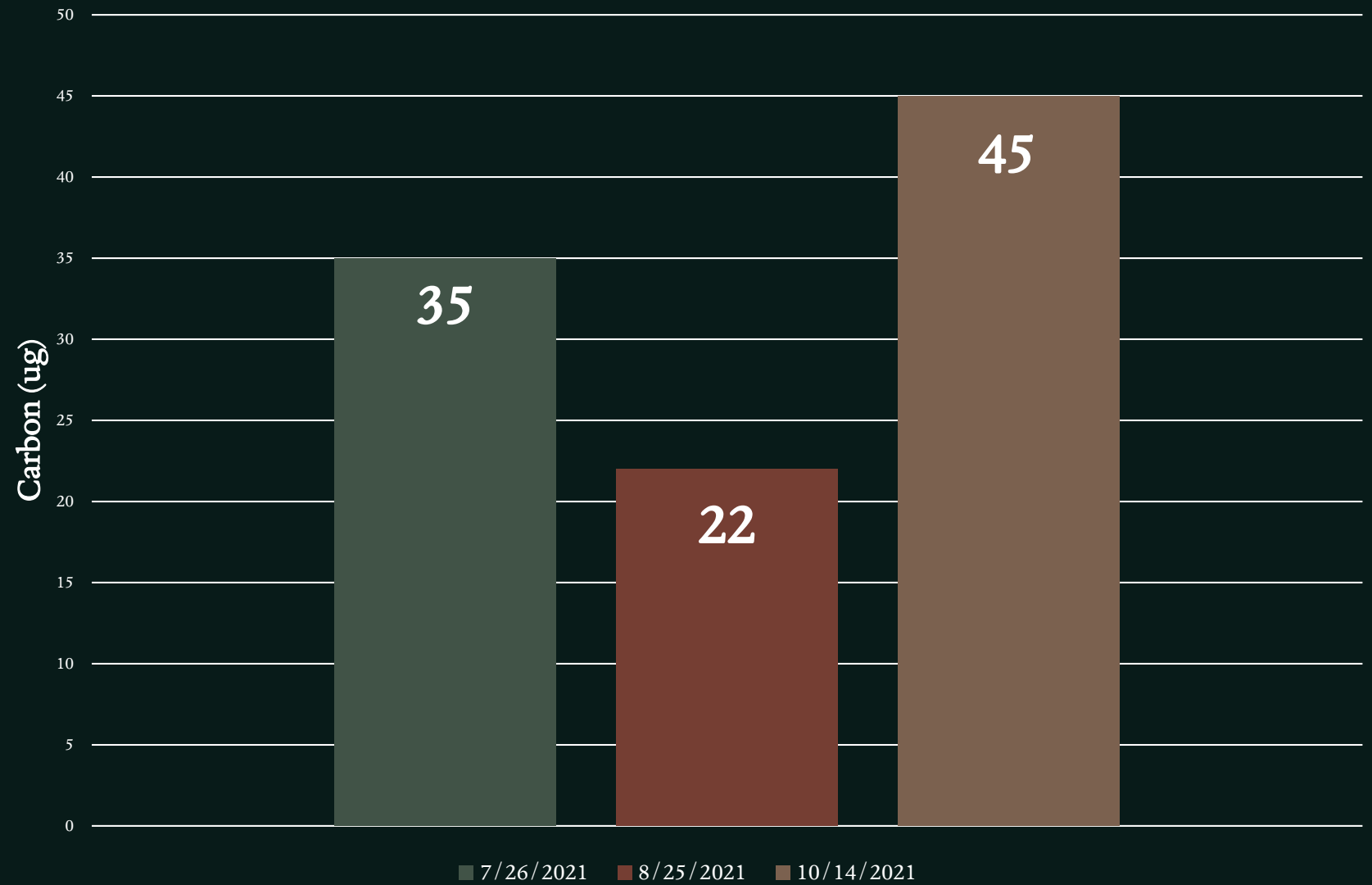
South & Middle Confluence



Pablo Reservoir



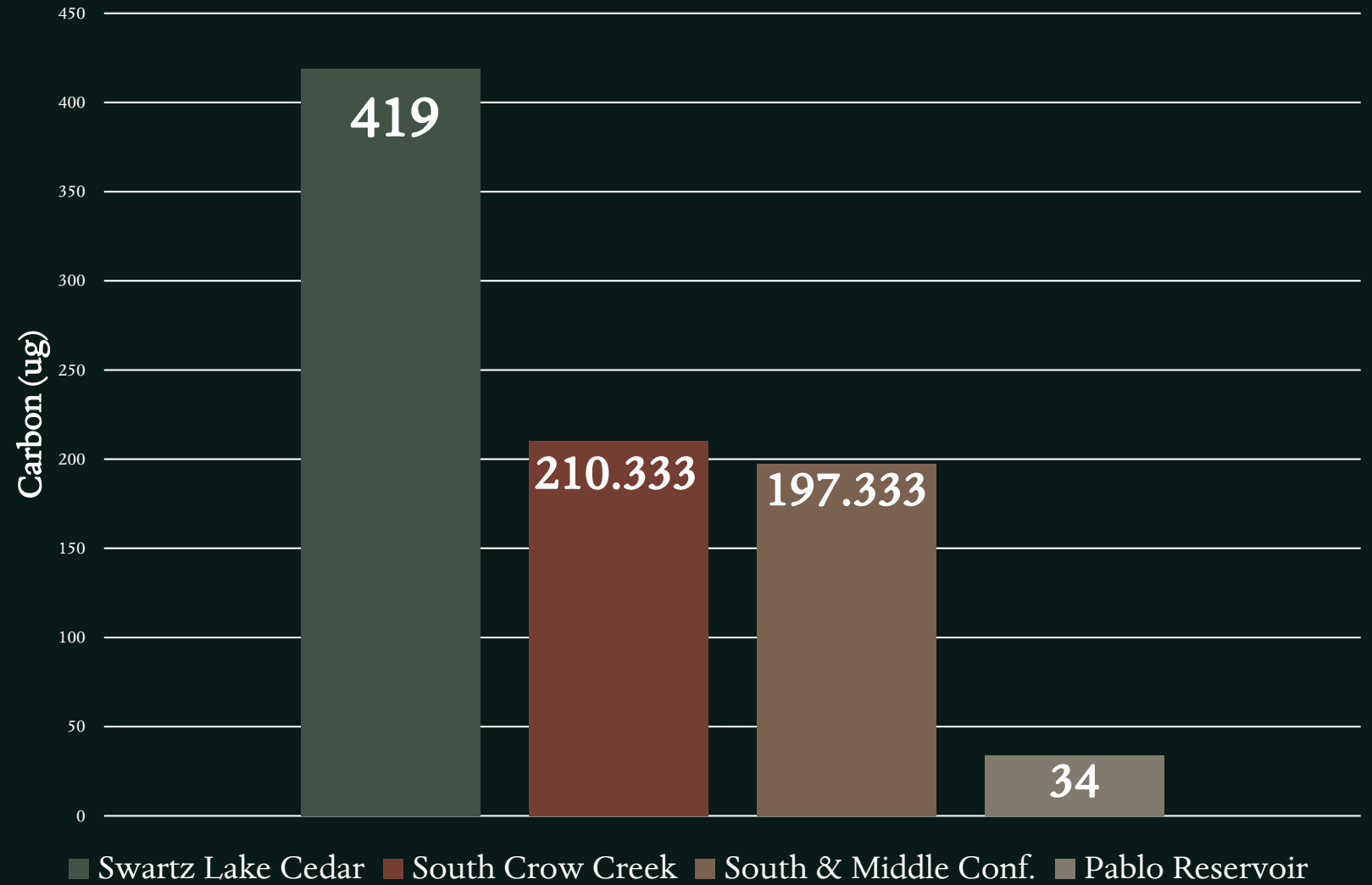
Pablo Reservoir



Site Averages



Site Averages





What does all this mean?



Wetlands are incredible habitats with numerous functions that deserve more protection.



The CSKT Natural Resource Department now has a data set, as small as it may be, that can grow and become something of major importance.





“We must do all that we can to protect wetlands, and wherever possible, to restore those that have been damaged or destroyed. In this way, we are carrying on a central part of the cultural ways handed down to us from the ancestors: our sacred relationships of respect with all living things.”

L E M L M T Š

References

Adhikari S, Bajracharaya RM, Sitaula BK. 2009. A Review of Carbon Dynamics and Sequestration in Wetlands. *Journal of Wetlands Ecology*. 2:42–46. doi:10.3126/jowe.v2i1.1855. [accessed 2021 Nov 5]. file:///C:/Users/stumld4/Downloads/gpnpy6vdd7i_5.pdf. [https://doi.org/10.1672/02775212\(2006\)26\[889:TCBONA\]2.0.CO;2](https://doi.org/10.1672/02775212(2006)26[889:TCBONA]2.0.CO;2).

Chmura GL, Anisfeld SC, Cahoon DR, Lynch JC. 2003. Global carbon sequestration in tidal, saline wetland soils. *Global Biogeochemical Cycles*. 17(4):n/a-n/a. doi:10.1029/2002gb001917.

Flynn K. 1996. *Understanding Wetlands And Endangered Species: Definitions And Relationships*. Alabama Cooperative Extension System. <https://www.nrc.gov/docs/ML0427/ML042790486.pdf>.

Margaryan L, Prince S, Ioannides D, Röslmaier M. 2018 Dec 28. Dancing with cranes: a humanist perspective on cultural ecosystem services of wetlands. *Tourism Geographies*.:1–22. doi:10.1080/14616688.2018.1522512.

Mitsch WJ, Bernal B, Nahlik AM, Mander Ü, Zhang L, Anderson CJ, Jørgensen SE, Brix H. 2012. Wetlands, carbon, and climate change. *Landscape Ecology*. 28(4):583–597. doi:10.1007/s10980-012-9758-8.

Silvius MJ, Oneka M, Verhagen A. 2000. Wetlands: Lifeline for people at the edge. *Physics and Chemistry of the Earth, Part B: Hydrology, Oceans and Atmosphere*. 25(7-8):645–652. doi:10.1016/s1464-1909(00)00079-4.

US EPA. 2019 Jun 4. How do Wetlands Function and Why are they Valuable? | US EPA. US EPA. [accessed 2021 Nov 5]. <https://www.epa.gov/wetlands/how-do-wetlands-function-and-why-are-they-valuable>.