Analysis of the UIW Riparian Environment

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Background

Characterizing outdoor sites is one of the first steps in environmental awareness of an area to understand its capabilities now and to create a baseline for future monitoring and remediation, if necessary. Exploring outdoors also has wide-ranging health benefits linked to better physical and mental health in addition to greater awareness of how humans may impact nature.

Two transects in an urban riparian forest were characterized for soil, water, and vegetation parameters using hands-on methods similar to what is used by industry professionals. The first area is at the headwaters of the San Antonio River. The second area is at the confluence of Olmos Creek, San Antonio River, and multiple natural springs. These areas are heavily vegetated and exist in a silty, clay floodplain where urban development has occurred. Comparison of site observations was attempted.

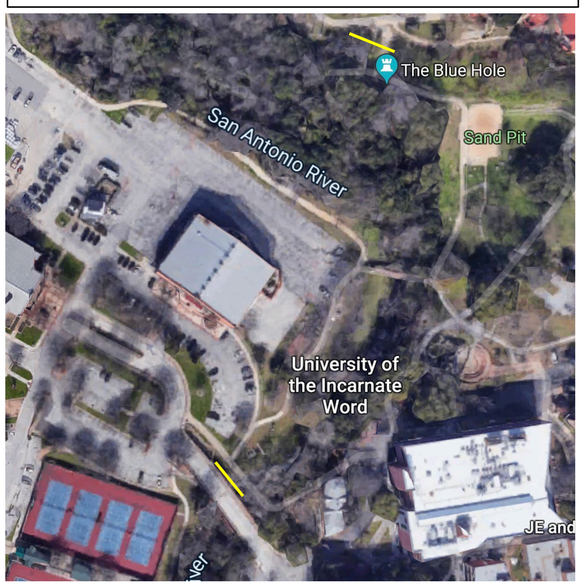
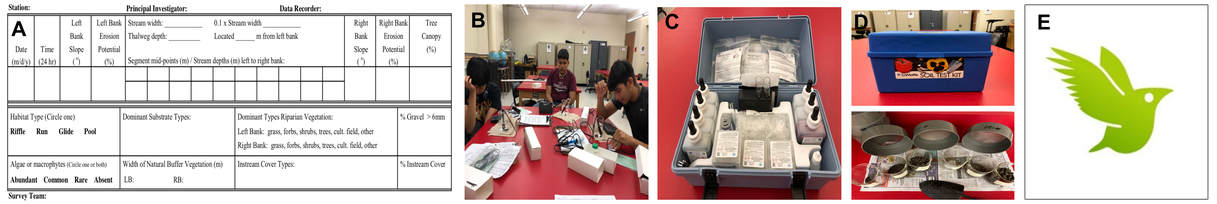


Figure 1 shows location of transects in San Antonio, TX, with yellow lines. Transect 1 (T1) lies perpendicular to the Blue Hole (Headwaters) and Transect 2 (T2) is downstream just past the UIW footbridge.

Experimental Methods



Figures 2A-E show examples of methods used to characterize the two transect sites: A) riparian protocols, B) Vernier LabQuest probes, C) Hach Water Ecology Field Kit, D) LaMotte Soils Kit, E) iNaturalist app.

Results

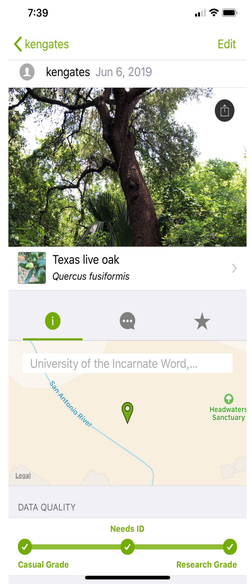


Figure 3 (left): Example of iNaturalist observation.

iNaturalist Identified Species:
Quercus fusiformis (Texas live oak)
Class Diplopoda (millipedes)
Malvaviscus arboreus (Turk's cap)
Dolichandra unguis-cati (catclaw vine)
Argia sp. (Dancers dragonfly)
Multiple unknown identifications

Test Completed	Equipment Used	T1	T2
Water Temp C	Vernier LabQuest	24.2, 24.3	24.4, 24.3, 24.3
Water pH	Vernier LabQuest	6.54, 7.00	7.16, 7.20, 6.72
Water flow rate (m/s)	Vernier LabQuest	0.69, 0.7	0.978, 0.97
Water conductivity	Vernier LabQuest	264, 264.4	419, 502, 484
Soil pH	LaMotte Test Kit	At least 8.0, 8.0	at least 8.0, 8.0
Soil potassium	LaMotte Test Kit	6 drops	2,6 drops
Soil phosphorus	LaMotte Test Kit	Medium, medium	Low, medium
Soil nitrogen	LaMotte Test Kit	No pink visible	no pink visible
Water DO	Hach Field Kit	8,8 mg/L	8,7 mg/L
Water pH	Hach Field Kit	7.5, 7.5	7.5, 7.5
Water alkalinity (HR)	Hach Field Kit	15, 14 gpg $CaCO_3$	16, 18 gpg $CaCO_3$
Water CO_2	Hach Field Kit	40, 30 mg/L	30, 35 mg/L

Table 1. Observations at Transect 1 (Headwaters) and Transect 2 (footbridge).

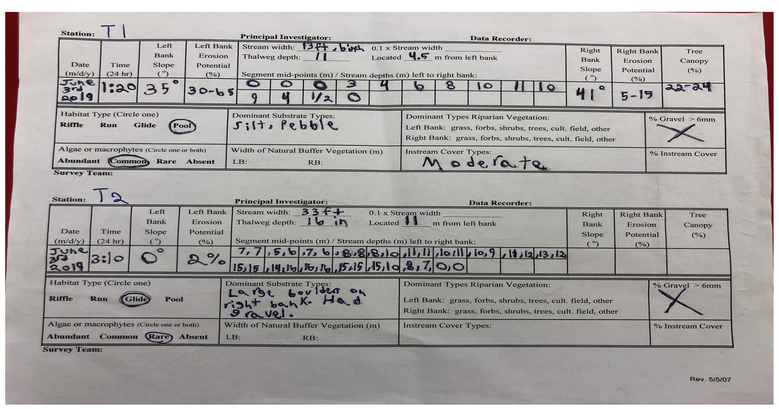
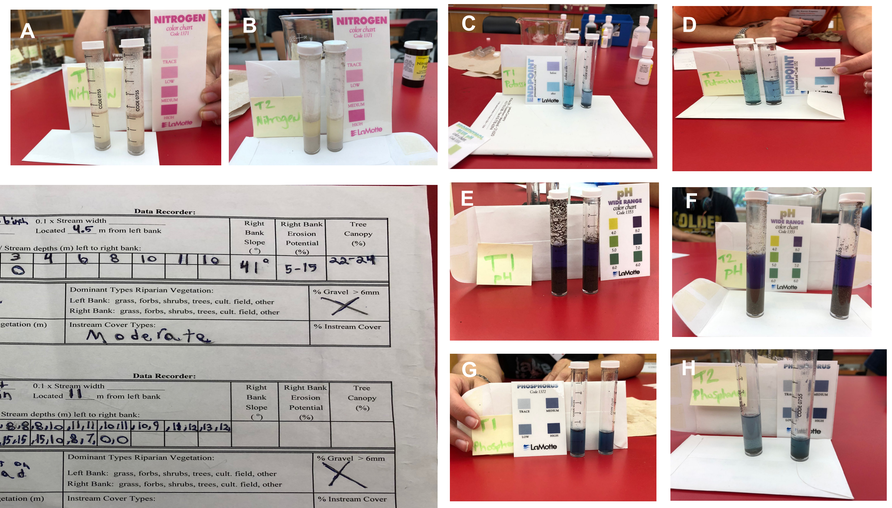


Figure 4 shows riparian habitat protocol data observations.



Figures 5A-H show soil testing results. A-B nitrogen; C-D potassium; E-F pH; G-H phosphorus.

Conclusions

- The pH of natural waters is 6-8.5 so both transects fall into the range of what is considered acceptable though slightly basic.
- Flow rate at T2 was greater than T1 as expected due to the merging of several water sources.
- Conductivity values fell within natural water range (100-1000 uS/cm) and therefore did not indicate industrial waste present (10,000+ uS/cm).
- No confidence was given to soil nitrogen results indicating lack of nitrogen because the area is heavily vegetated and therefore much nitrogen exists. Soil phosphorus was indicative of this type of area.
- Dissolved oxygen values indicated a healthy water source for living organisms with the minimum being 5 mg/L.
- iNaturalist app was easy to use to attempt to identify organisms, but not all images were able to be identified.
- Exploring the environment leads to personal, conservation, and potential remediation monitoring benefits.

References

Cibolo Nature Center Riparian Protocols CSR-4
Hach Water Quality Field Interpretation Manual
LaMotte Soil Interpretation Manual
San Antonio Headwaters Sanctuary (headwaters-iw.org)
Google Maps (https://www.google.com/maps)
iNaturalist app (https://www.inaturalist.org/)
[Other online sources available at request]

Acknowledgements

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