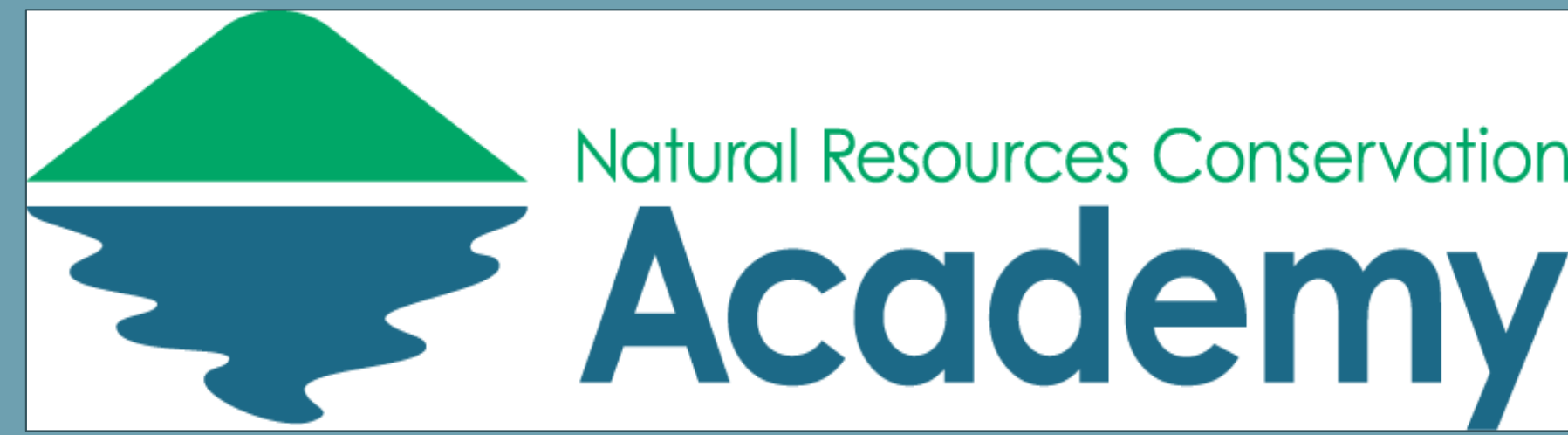


EFFECTS OF AN URBAN OASIS ON THE WINTERGREEN BROOK

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ABSTRACT

In Connecticut, there are 6,000 miles of streams and rivers (ct.gov/deep) and in New Haven the Wintergreen Brook is one of those streams. Starting from Wintergreen Lake and ending in Long Island Sound, the Wintergreen Brook has importance that most people in New Haven are unaware of. Being across the street from Common Ground High School, we have been interested in the health of this brook for about 5 years. In the summer of 2016, a group of students built an urban oasis along the bank of the river. This study assessed whether or not the urban oasis had a positive effect on the water quality of the brook. Water chemistry results (pH, dissolved oxygen, ammonia, nitrates, or nitrites) did not change from pre-urban oasis levels to post-oasis levels. Although no change was observed, this study was vital to collect baseline data in order to assess if the oasis would take more time to have an effect on water quality than in a span of 7 months.

INTRODUCTION

The Wintergreen Brook is in the 13 mile West River watershed in New Haven, Connecticut, which feeds into Long Island Sound. The Hamden Landfill is a main pollutant source for the Wintergreen Brook, as well as oil, gas, and road salt runoff from the streets surrounding the brook. West Rock (a state park in west New Haven) contributes by having sediment runoff into the stream. Consequently, Wintergreen Brook has had problems with the cleanliness of its water, which then affects the Long Island Sound (Figure 1). Although the Long Island Sound area of the mouth of West River is deemed a B+ (Figure 1), the health of the Sound is slowly degrading. This is due to the East Coast of the United States being in the Westerlies; because of this all the pollution on the West travels to the East making our air and water worse.

In the summer of 2016, the West River Stewards (a student group formed by my school that I was apart of) installed an urban oasis right next to the brook in order to not only encourage more public access but to also to improve the health of the brook—which was filled with trash, oil slicks, and iron oxidizing bacteria—and the surrounding area. Construction of the oasis included constructing a trail for public access, trash pick-up along the bank, and planting native plants that are safe for the area and the animals that come around the brook.

The question my study addressed was: did the urban oasis help improve the water quality of the brook?

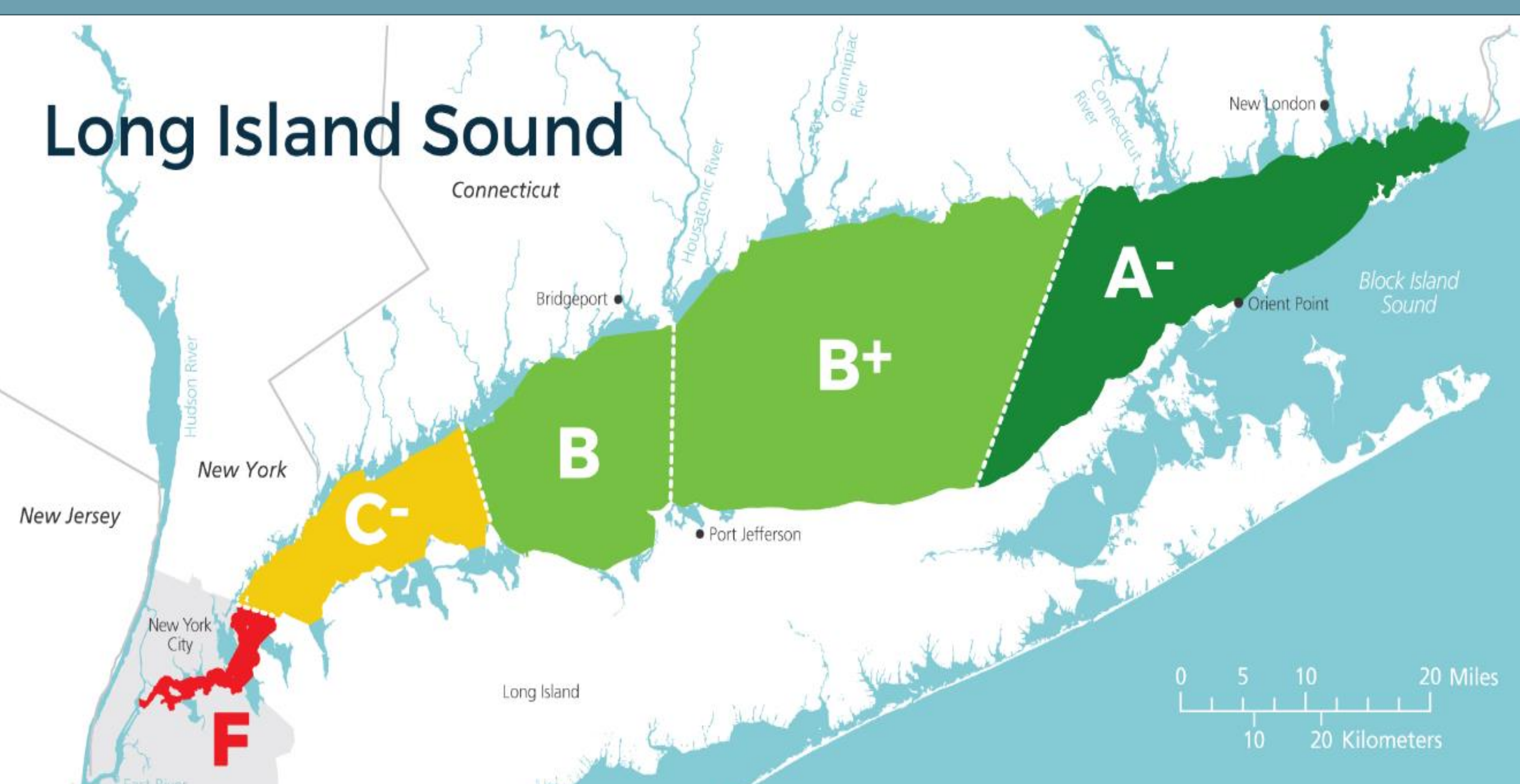


Figure 1. A map depicting the health of different sections of the Long Island Sound, with an A indicating excellent health and an F indicating poor health. Image from <https://ecoreportcard.org/report-cards/long-island-sound/>.

METHODS

The objective of my study was to assess the influence of the newly installed urban oasis on the water quality of the Wintergreen Brook.

Study Area

- Study was conducted in the Wintergreen Brook in New Haven, CT.
- The site is near residential areas as well as Southern Connecticut State University.
- This site is located in South Central Coast watershed, and the local environment surrounding the brook faces trash issues (Figure 2).
- In July 2016, West River Stewards at Common Ground High School installed an urban oasis near the river to help improve water quality as well beautify it for potentially public access.

Data Collection Protocol

- I assessed water quality before and after the installation of the urban oasis.
 - Before: July 2016
 - After: November 2016
 - After: February 2017
- I collected water in three different jars from Wintergreen Brook.
- Afterwards, five tests were conducted: pH, dissolved oxygen, ammonia, nitrates, and nitrites.
- Test kits used were Aquarium Pharmaceuticals (Api) Master Liquid Test Kit Freshwater tests.



Figure 2. (A) A partition of the Wintergreen Brook dammed by trash. (B) Some of the iron oxidizing bacteria often found in the Wintergreen Brook. (C) My former West River Stewards team in 2015 walking in the Wintergreen Brook.

REFERENCES

http://www.ct.gov/deep/cwp/view.asp?a=2719&q=325526&depNav_GID=162
<https://ecoreportcard.org/report-cards/long-island-sound/>

RESULTS

- Nitrates, nitrites, and ammonia levels remained below detectability of the test (e.g. 0 ppm).
- Dissolved oxygen was initially 0 mg/L but skyrocketed to 8 mg/L in November and 9 mg/L in February (Figure 3A). A possible factor can be due to seasonal effects.
- pH remained around 7 and increased to 8 in February (Figure 3B). This also can be due to seasonal effects.
- Observations after urban oasis installation:
 - Oil Slicks present in brook persisted.
 - Miscellaneous trash along bank from Springside Avenue.

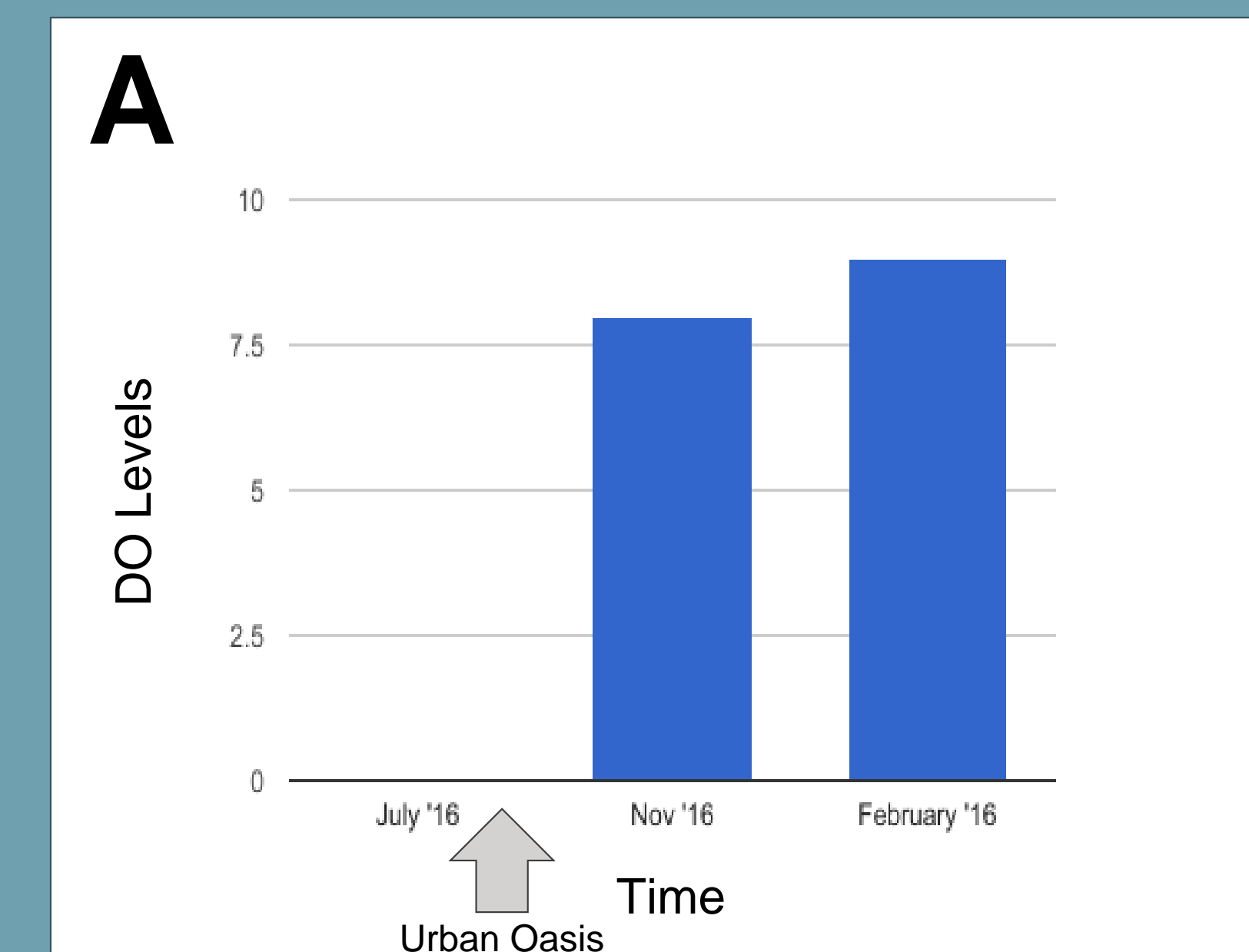
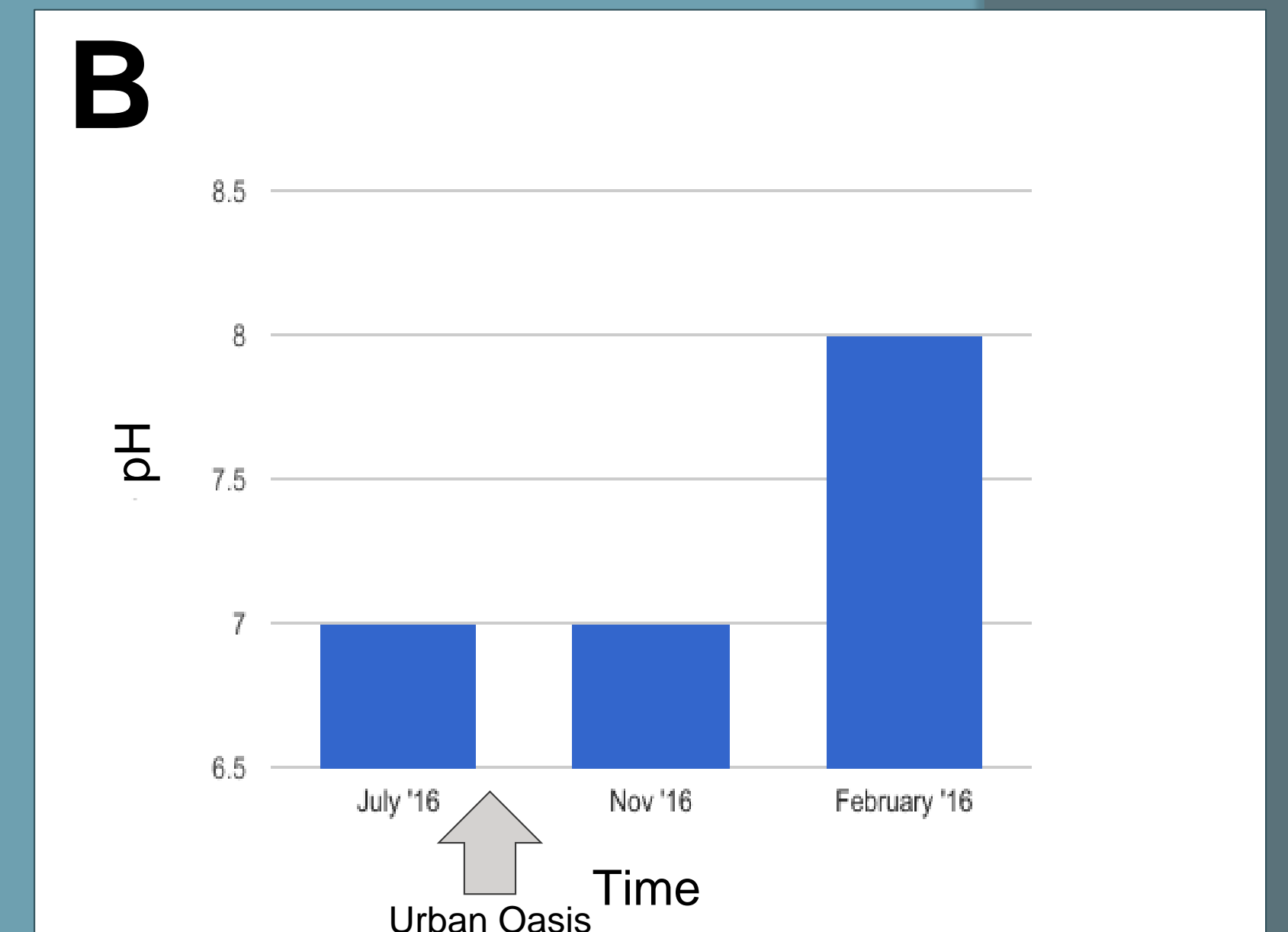


Figure 3. Water quality measurements were taken before the urban oasis installation in July as well as multiple times after the installation (November and February). (A) Dissolved oxygen levels during three months of surveys. (B) pH levels during the three months of surveys.



CONCLUSIONS

- This change in DO can be due to the water being warmer and the drought in July 2016 while the testing happened. In November and February, there were significant amounts of precipitation. Low DO in the brook means not many fish can survive in the water. However, there have been no fish reported in that stream.
- The range of pH seen is around average for freshwater that are not as deep as larger lakes and rivers. The potential change in February may have come from the farm near the school not using as much fertilizer due to it not being farming season.
- Although there was not much change seen, the time since the urban oasis installation is a relatively short time span, and significant change may occur over a longer time span. However, this study was important for establishing a baseline dataset.
- More urban oases along with trash management may also be needed to improve water quality.

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