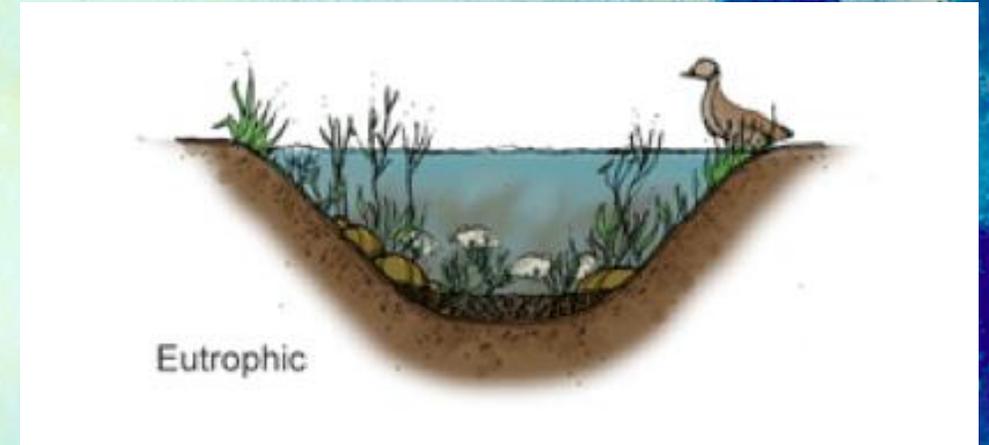




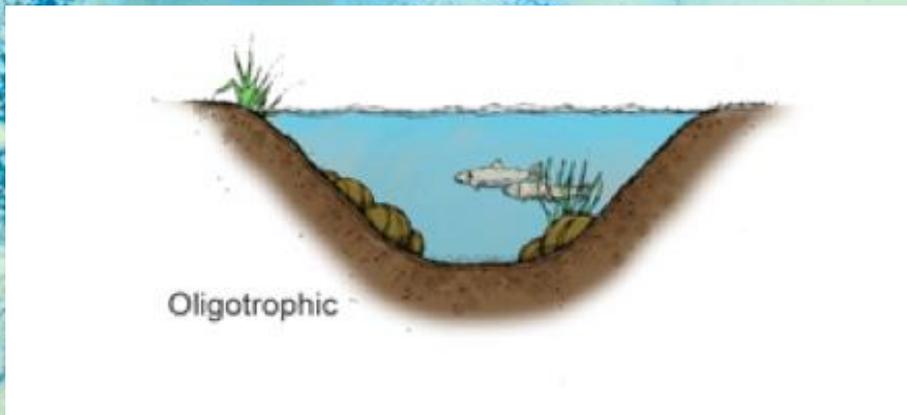
**EARLY STAGE
DECOMPOSITION OF
COONTAIL (*CERATOPHYLLUM
DEMERSUM*) IN EUTROPHIC
AND OLIGOTROPHIC
ENVIRONMENTS**

Breaking The Terms Down: Oligotrophic v. Eutrophic

Eutrophic: Aquatic environment (often lake) with many nutrients such as phosphorous and nitrogen.



Oligotrophic: Environment with few nutrients, often purer water and less plants.



Breaking The Terms Down Continued: What Is Coontail?

- **Native species to Teatown area**
- **Aquatic plant that often inhabits lakes**
- **Forms dense "colonies" / "mats" in lake that can sometimes be harmful to ecosystem**
- **Serves as extremely important habitat for small fish (bluegill, perch, etc.)**



Hypothesis

HOW DOES RECENTLY DEAD COONTAIL IN
ITS EARLY STAGES OF DECOMPOSITION
AFFECT EUTROPHIC AND OLIGOTROPHIC
ENVIRONMENTS?

Hypothesis: Coontail in early stage decomposition will affect the environments the same way as latter stage decomposing Coontail, just to a lesser extent. It will also have more have more of an effect on the "Eutrophic" system, as it is more prone to actual Eutrification.

Why I chose this topic

I also chose to pursue this topic because of its often ignored influence on its surroundings.

- As Coontail often live in dense colonies, even the very short preliminary stages of its decomposition can affect the ecosystem around it.
- All Coontail going through the same early decomposition stages after dying in a highly concentrated environment makes it so that even this smallest of occurrences has the potential be extremely important, especially to the fish that dwell within it



The Experiment





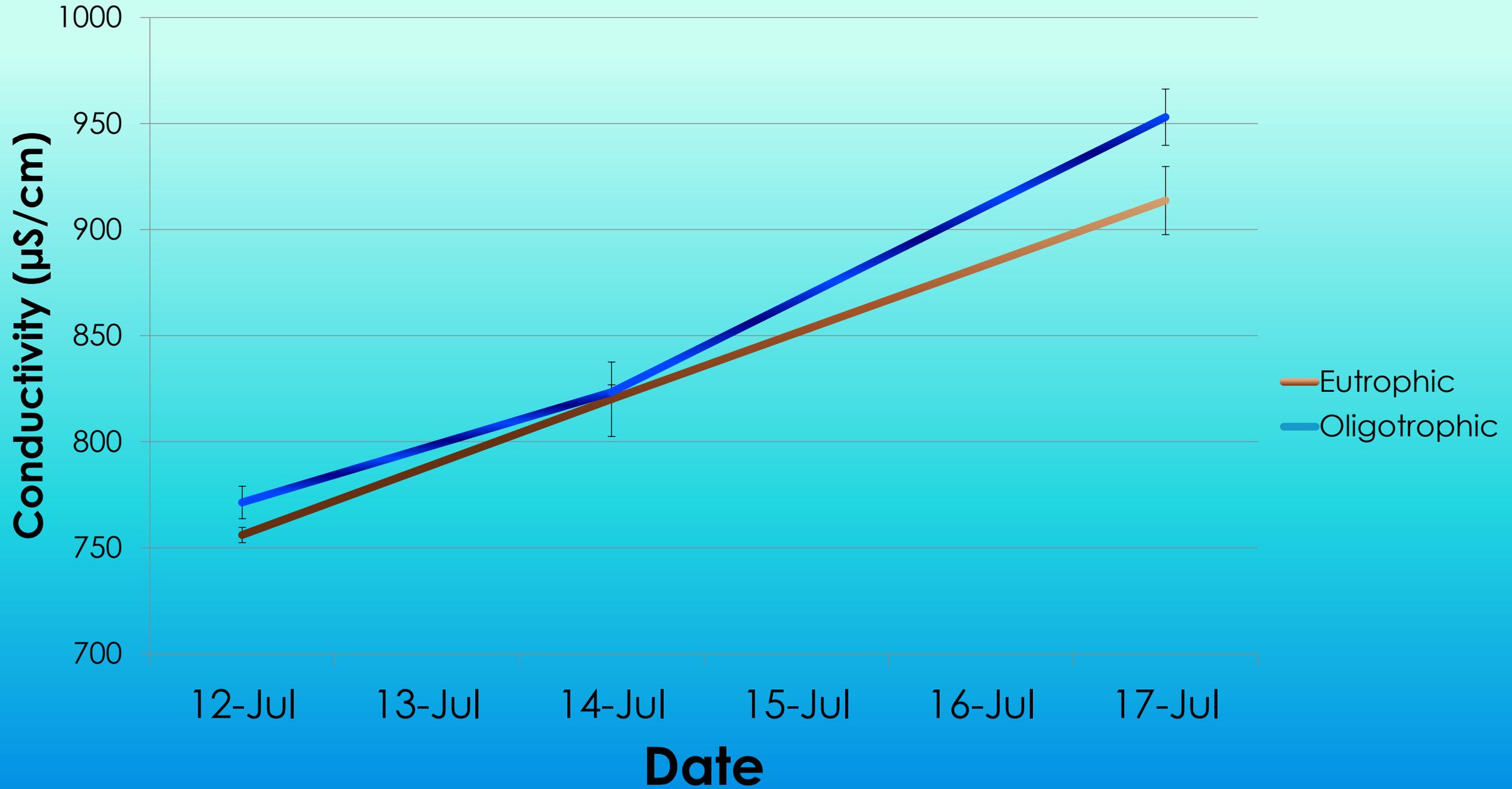
What I Measured and Why

- pH
 - Measures acidity of system
- Conductivity ($\mu\text{S}/\text{cm}$)
 - Purity of water
- Dissolved Oxygen Levels (milligrams/litre)
 - Oxygen available for
 - consumption by aquatic life
- Algae (rfu)
 - Relates to conductivity and
 - dissolved oxygen.

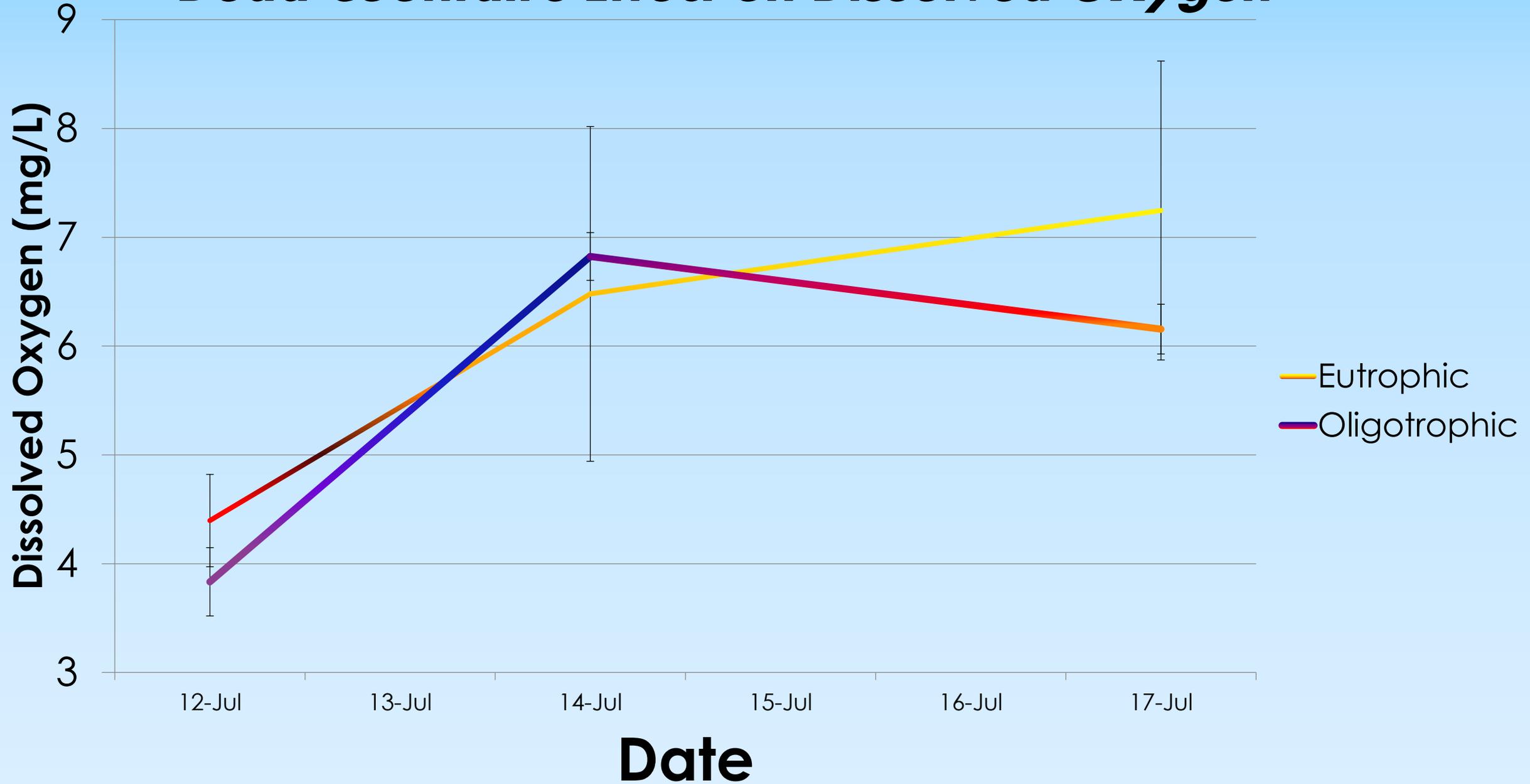


	uS/cm
DISTILLED WATER	0.5 - 3
MELTED SNOW	2 - 42
TAP WATER	50 - 800
POTABLE WATER IN THE US	30 - 1500
FRESHWATER STREAMS	100 - 2000
INDUSTRIAL WASTEWATER	10000
SEAWATER	55000

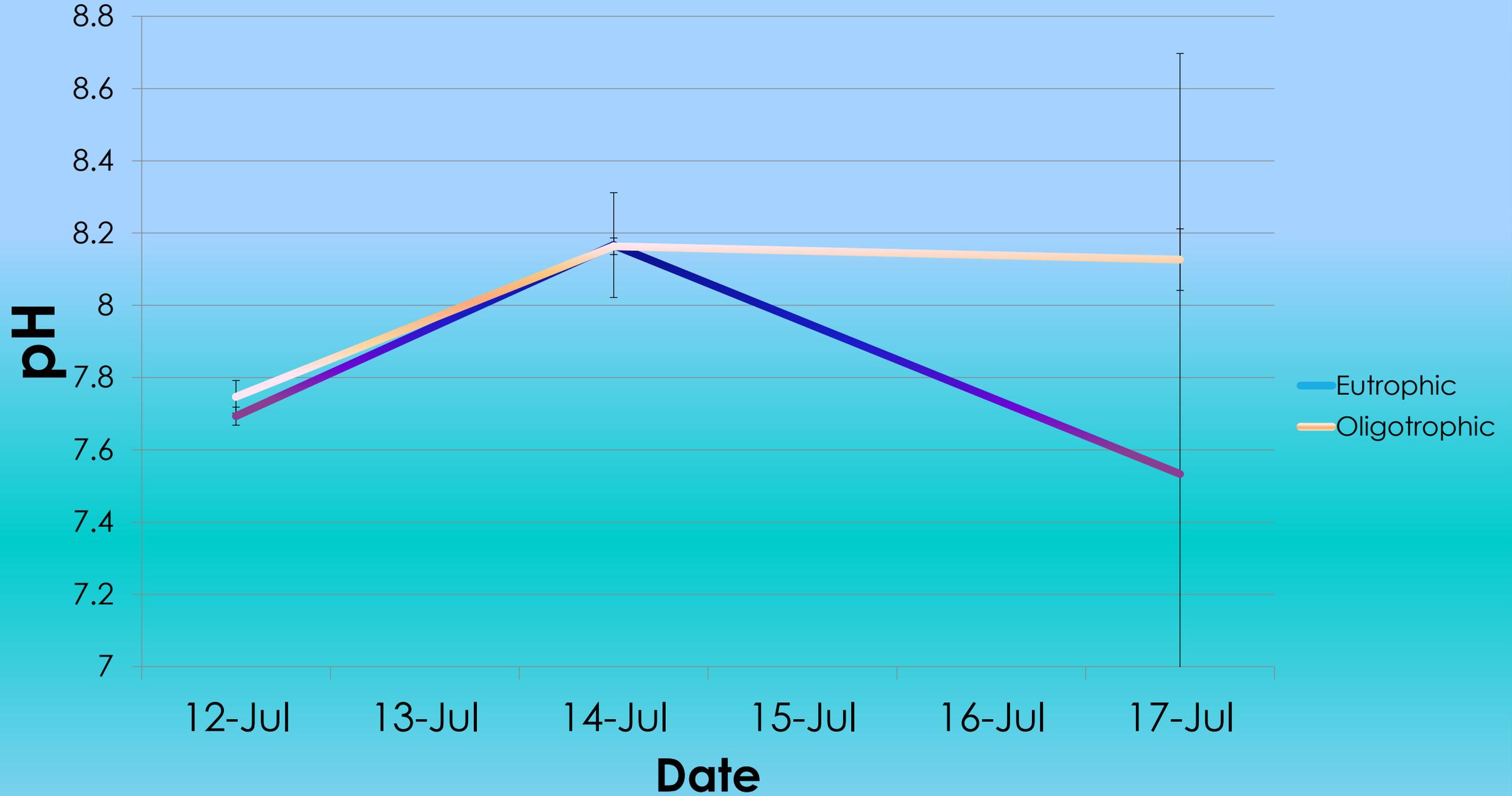
Dead Coontail's Effect on Conductivity



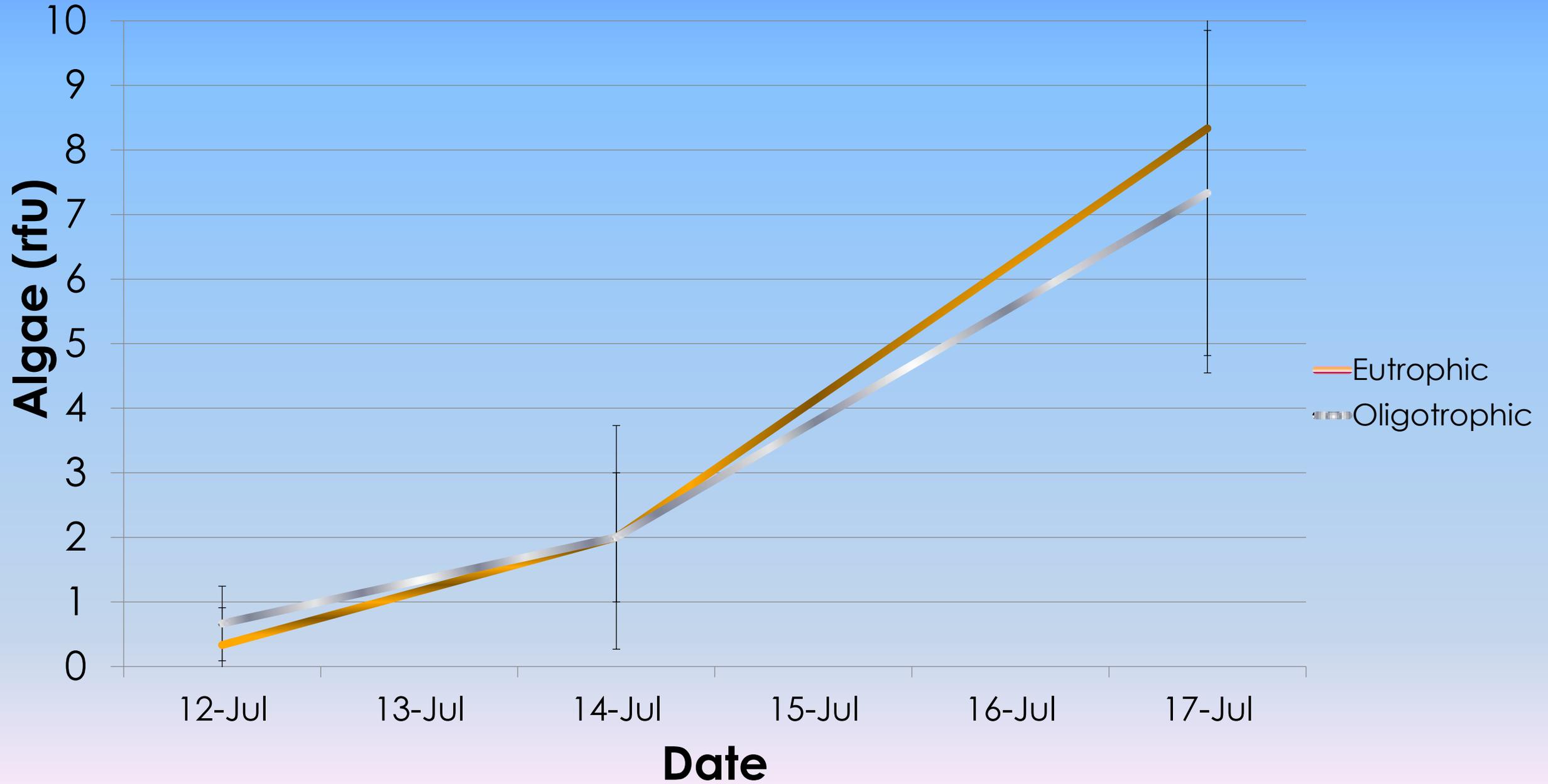
Dead Coontail's Effect on Dissolved Oxygen



Dead Coontail's Effect on pH



Dead Coontail's Effect on Algae



What Can We Take Away From This Data? Part 1

Algae's Relationship with Dissolved Oxygen levels

- Even though decomposition uses up dissolved oxygen, in this experiment that was offset by the creation of dissolved oxygen by the algae. After the algae dies off the Dissolved Oxygen can be expected to drop.
- Algae levels were relatively low (a system is considered healthy if Algae levels are under 30 rfu) but the equipment used has a tendency to not detect high levels of algae, so this is not alarming.

What Can We Take Away From This Data?

Part 2

Evidence of Decomposition from Conductivity Data

- **Conductivity measurements are able to determine the purity of a water sample by detecting the amount of dissolved solids (like chlorides and calcium) in it.**
 - **Higher $\mu\text{S}/\text{cm}$ means higher concentration of dissolved solids in water.**
 - **These dissolved solids, in our experiment, are indicative of decomposition. Thus, the Conductivity data show that decomposition of the Coontail occurred.**

What Can We Take Away From This Data? Part 3

pH Not Affected by Early Decomposition of Coontail

- **Though the pH of the Eutrophic samples increased from July 12th-14th and then sharply dropped to a lower pH by July 17th, the Standard Deviation for the measurements on July 17 are very high. This puts the extent of that recorded pH drop into question.**
 - **In addition, the full range of pH on the graph is low at ≈ 0.65 . Thus, though the graph exaggerates the drop, the drop is in reality quite miniscule. Because of this, the small increase and drop in pH in both environments make it very unlikely that it was directly influenced by an aggressor.**

What Can We Take Away From This Data? Part 4

Water Quality's Reaction to Early Decomposition of Coontail Independent of Oligotrophic or Eutrophic state of the Environments

- Despite the difference in nutrients between the Eutrophic and Oligotrophic samples, both samples reacted very similarly all things considered, with no distinct difference in their reactions to the dead Coontail that could be attributed to the presence or absence of nutrients.
- In continuing this experiment, I would definitely try to use more authentic models of Eutrophic and Oligotrophic environments.
- I would also expect that if I had continued this experiment to include latter stages of Coontail decomposition, a clearer difference between environments would emerge, especially in algae mass.

IN CONCLUSION

Hypothesis v. Final

- Though my algae data did support my hypothesis, that same algae created dissolved oxygen, throwing my hypothesis off. My hypothesis was incorrect in its assumption that the Eutrophic system would react differently and to a greater extent. Conductivity went as expected and pH failed to even respond, an interesting aspect that I hope I can explore in later experiments.

Continuing on from here

- After this experiment, I hope to delve more deeply into the effects of preliminary Coontail decomposition and to also redo some of my tests with more accurate instruments in a more consistent and streamlined way. I would also strive to creating more accurate trophic environments for the plants. Finally, if that goes well, the next step would be to actually go to the Coontail beds and observe the effects of early stage decomposition myself, especially on the fish that rely on these Coontail to survive.

Thank You

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