

Stakeholder Mindset and Ecological Impact: Effect of Personal Beliefs and Value Systems of Lake Residents on Lake Stewardship

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Figure 1. Image of Lake Papakeechee with test sites superimposed

Introduction

Natural environments are largely subject to anthropogenic forces. Preliminary research into the relationship between human interest/action and environmental quality will provide patterns of correlation. Water quality research was conducted on Lake Papakeechee in Syracuse, IN. This lake is privately owned, roughly 179 acres, and feeds into Lake Wawasee. 50 different tests sites were chosen for testing in the Summer 2013. Subsequent tests were repeated in 2014 with the addition of phosphorus. The tests chosen include:

- **Turbidity** – A Secchi disk was used to measure the amount of total suspended solid matter within the lake.
- **E. coli** – Coliscan Easygel was used to determine the amount of E. coli culture (bacteria found in lower intestine of warm-blooded mammals) within the lake.
- **Dissolved Oxygen** – YSI Environmental 550A Dissolved Oxygen Meter was used to measure the percentage of dissolved oxygen within the lake, which will indicate the amount of decomposition and viability of fish.
- **Phosphorus** – Solid phosphorus levels were gathered. This mineral is necessary for lake viability but can cause algae blooms in high quantity.

Surveys and interviews were also gathered of lake residents of Lake Papakeechee (LP) and Lake Wawasee (LW). LW has a long history of lake research, whereas LP has begun initial interest in water quality research in the last few years. An examination into the demographics, mindsets, and actions on both lakes will provide a better basis of understanding.

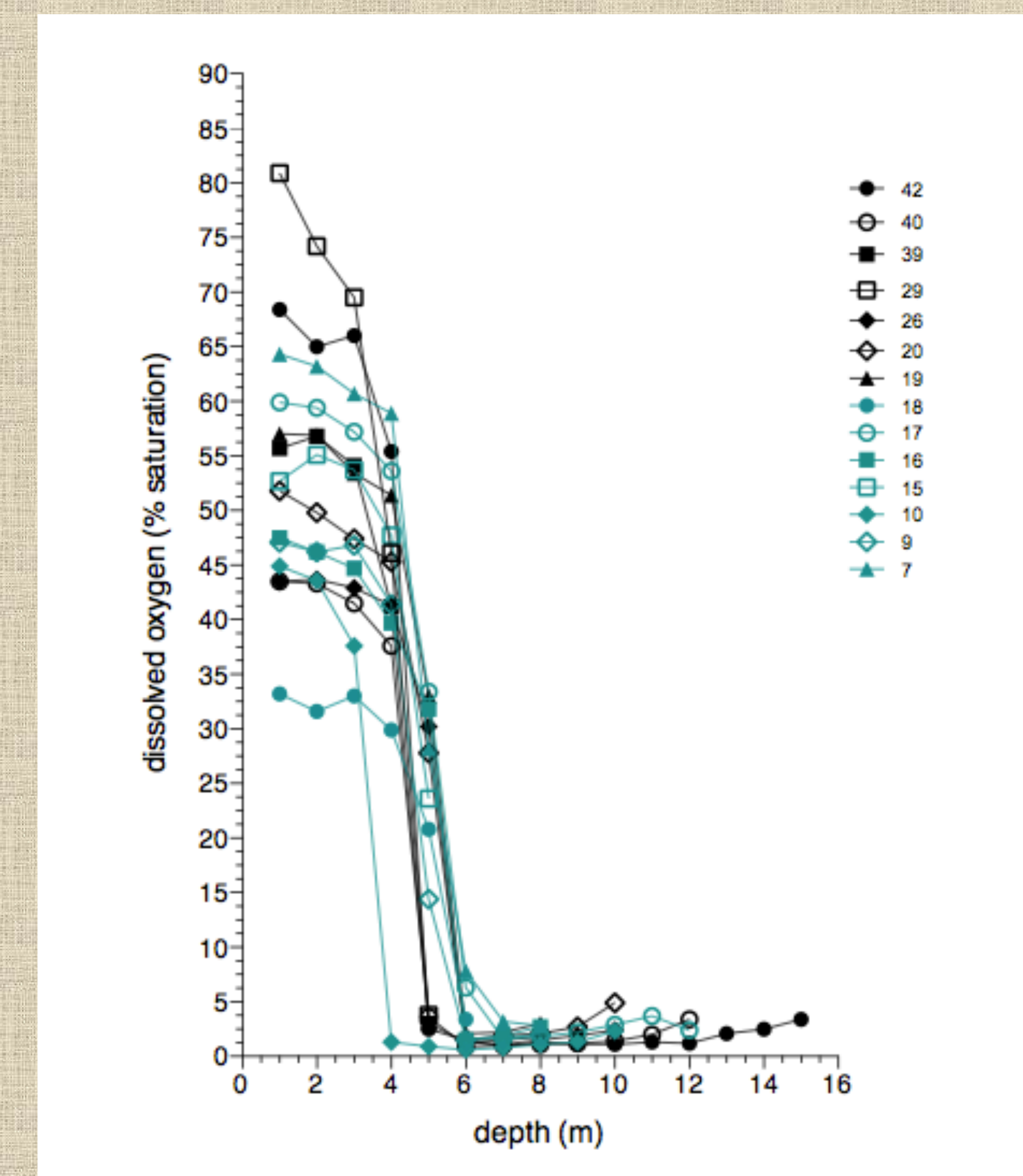


Figure 2. Graph of Dissolved Oxygen vs. Depth from Summer 2013 Data

Results of Limnological Studies

With an extensive 50 point system over Summer 2013, a comprehensive analysis of the lake quality was enacted. Secchi disk measurements of water turbidity gave depths of 1.5-3.0 meters depending on the measurement site. Dissolved oxygen concentrations were typically 33-93.3% in the epilimnion (top 4 m), dropped to 1.3-80.9% in the metalimnion (2-8 m), and fell to near zero %-saturation in the hypolimnion (< 9 m). *E. coli* load is minimal, with most sites testing at or below 50 cfu/100 mL. In the Summer of 2014, the sites were reduced to 16, but equally displaced throughout the lake. All three water quality tests were conducted again, with similar outcomes. Phosphorus was added to get a better sense of the future algal growth in Lake Papakeechee. It is well recognized that these tests can only count as foundational evidence for water quality, as it is hard to test fluids reliably. Weather, lake stratification, and human actions can vary throughout the seasons and thus this data can stand along only insofar as it is always being built upon.

Future Research Goals:

- Create a lake coalition of individual representatives from lakes in the Kosciusko County area to disseminate information and create active dialogue around the topics of water quality and lake sustainability
- Evaluate and improve residential survey for future use by lake groups online
- Extensive research paper that can be sent out to the public

Thank you to the organizations of which helped me with my research:

- Lake Papakeechee Sustainability Initiative (LaPSI)
- Papakeechee Protective Association (PPA)
- Wawasee Area Conservancy Foundation (WACF)

Types of Lake Activities Enjoyed By Residents

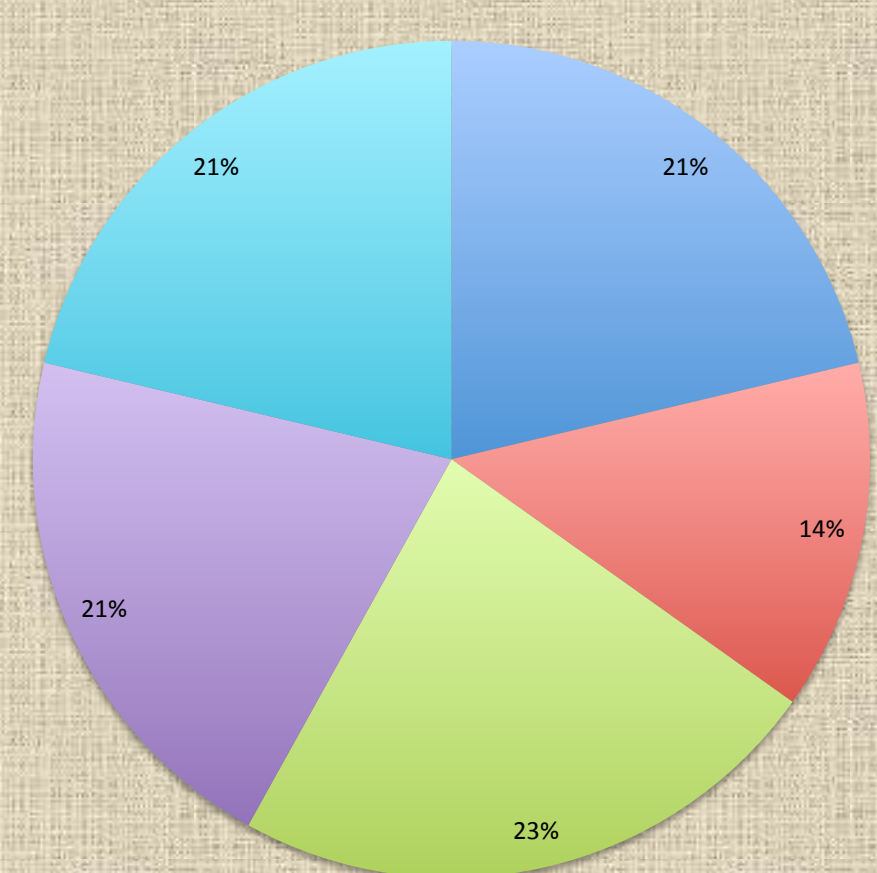


Figure 3. Lake Wawasee Resident Responses

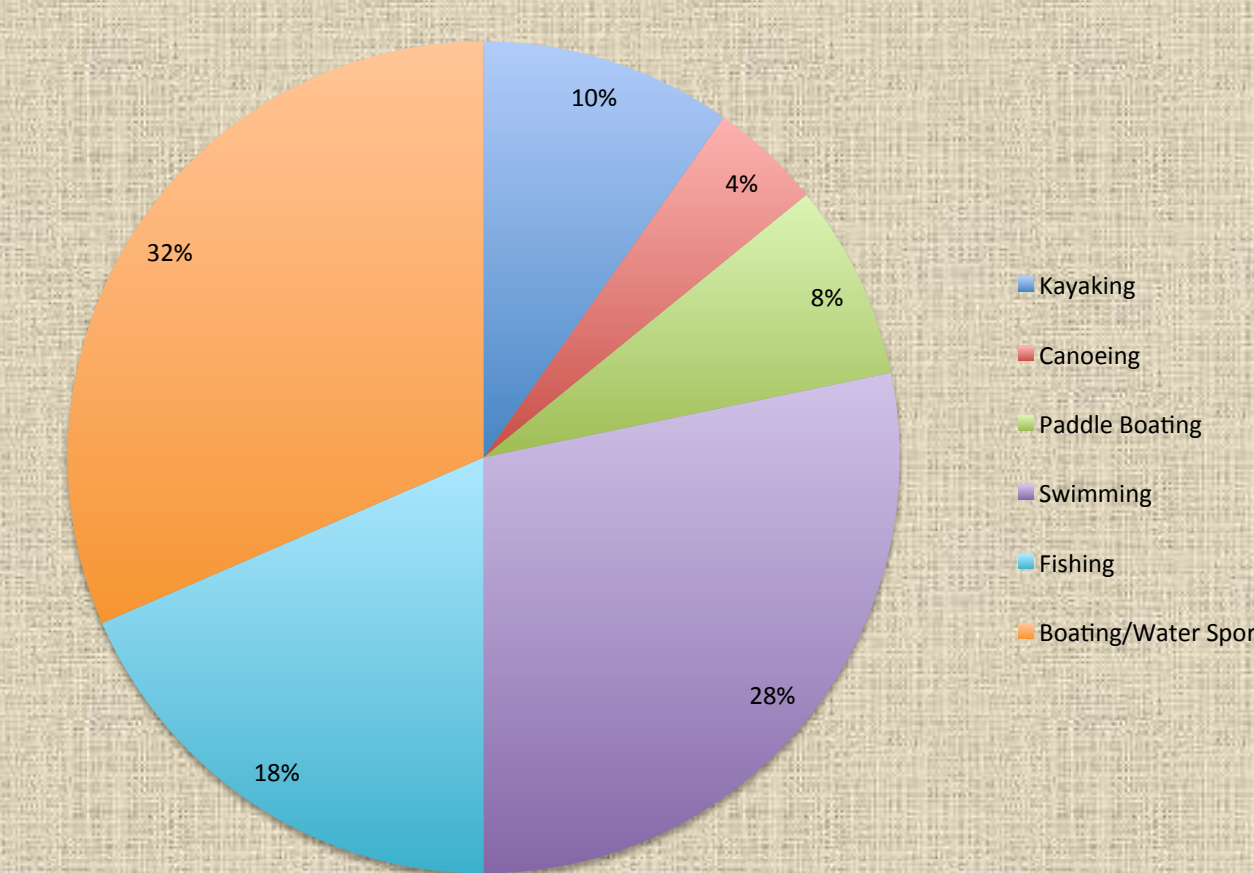


Figure 4. Lake Papakeechee Resident Responses

Sociological Observations

As a new member of the Syracuse community, I had 8 weeks in the Summer of 2013 to weave myself into the lake culture as well as make observations about the local mindsets on Lake Papakeechee and Lake Wawasee. I conducted residential surveys at the annual meetings of LP and LW to compare and contrast the demographics and sustainable notions of the residents. Sample questions covered:

- Level of education
- Permanency of resident on the lake in next 10 years
- Activities connected to the lake
- Mindfulness of lake quality
- Relationship with neighboring lake resident

Through these survey results I made several distinctions. LP residents tend to be slightly older, year-round residents. They have fewer to no children living in the household. LP residents also incorporate more leisure-type activities into their lake routines. LW residents are slightly more educated, attend more environmental seminars, and claim to be less familiar with their LP neighbors. They also involved themselves in more water sports and fishing than LP residents. Both the LP and LW residents have similar attitudes about the perceived health of the lake (neutral to moderately healthy). Also, both parties tested very similar when asked how likely they are to remain on the lake over the next 10 years (85% said yes). This helps create a foundation for future researchers to understand the social dynamics as well as connect lake residents from both lakes together through knowledge of similarities and differences.

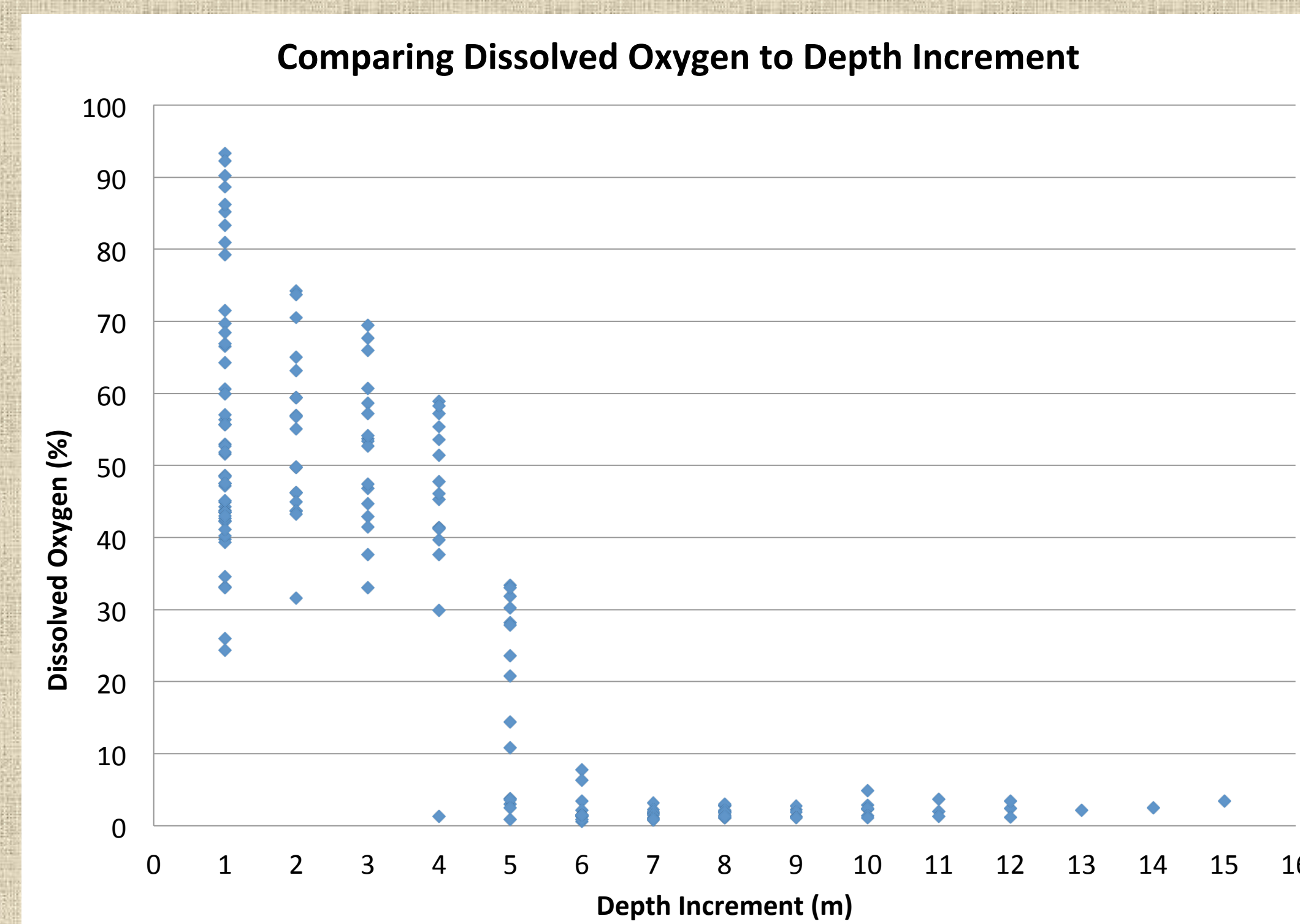


Figure 5. Lake Stratification Explains the Demarcations in Dissolved Oxygen