Phosphorus concentration and load dynamics in the Western Lake Erie Basin under recent nutrient management regulations

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# **Introduction**

The introduction should include the following elements:

## **Background and Context**

The 21st century has witnessed the re-eutrophication of Lake Erie (Baker et al., 2014; Scavia et al., 2014). This re-eutrophication has been driven by increasing nonpoint source soluble reactive phosphorus (SRP) loads from major tributaries in the Western Lake Erie Basin (WLEB) like the Maumee and Sandusky Rivers (Baker et al., 2014; Jarvie et al., 2017; Michalak et al., 2013; Scavia et al., 2014). In tandem with this re-eutrophication, pervasive harmful and nuisance algal blooms (HNABs) have returned to Lake Erie, including massive HNABs in the summers of 2011 and 2015 and the microcystin containing HNAB in August of 2014 that led to 400,000 Ohio residents unable to drink or use their tap water (Smith et al., 2015).

## **Problem Statement**

Describe the theoretical or practical [research problem](https://www.scribbr.com/dissertation-writing-roadmap/problem-statement/) that you want to address. What is already known about the problem? What is missing from current knowledge?

## **Research Questions**

State the specific [question(s)](https://www.scribbr.com/dissertation-writing-roadmap/research-questions/) that you aim to answer.

## **Relevance and Importance of the Research**

Make it clear what new insights you will contribute, who they are relevant to, and why the research is worth doing.

# **Literature review**

The [literature review](https://www.scribbr.com/dissertation/literature-review/) summarizes, compares and critiques the most relevant scholarly sources on the topic. There are many different ways to structure a literature review, but it should explore:

## **Key Concepts, Theories and Studies**

Compare, contrast, and establish the theories and concepts that will be most important for your project.

## **Key Debates and Controversies**

Identify points of conflict and situate your own position.

## **Gaps in Existing Knowledge**

Show what is missing and how your project will fit in.

# **Research design and methods**

Here you should explain your approach to the research and describe exactly what steps you will take to answer your questions.

## **Research design**

Explain how you will design the research. [Qualitative or quantitative](https://www.scribbr.com/methodology/qualitative-quantitative-research/)? Original data collection or [primary/secondary sources](https://www.scribbr.com/citing-sources/primary-and-secondary-sources/)? Descriptive, correlational or experimental?

## **Methods and Sources**

Describe the tools, procedures, participants and sources of the research. When, where and how will you collect, select and analyze data?

## **Practical Considerations**

Address any potential obstacles, limitations and ethical or practical issues. How will you plan for and deal with problems?

# **Implications and contributions to knowledge**

Finish the proposal by emphasizing why your proposed project is important and what it will contribute to practice or theory.

## **Practical Implications**

Will your findings help improve a process, inform policy, or make a case for concrete change?

## **Theoretical Implications**

Will your work help strengthen a theory or model, challenge current assumptions, or create a basis for further research?

# **References**

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# **Research schedule**

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| **Research phase** | **Objectives** | **Deadline** |
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