

# Lake Papakeeche Sustainability Initiative (LaPSI)

## Mission, Vision, Activities – 2023



### Who We Are

The Lake Papakeeche Sustainability Initiative (LaPSI), founded in 2012, is a group of Lake Papakeeche residents interested in learning about the lake and the watershed in which it resides. We are a science-driven lake management group. LaPSI is incorporated in the state of Indiana, and has 501(c)(3) non-profit tax status. LaPSI's activities are supported by: (1) an annual donation of \$2–3K from a lake resident; (2) occasional summer grants from the University of Notre Dame; (3) occasional Notre Dame undergraduate student interns; and (4) private donations.

### Mission

LaPSI serves all residents of Lake Papakeeche as a lake management resource to promote a healthy, vibrant, beautiful, and sustainable ecosystem at Lake Papakeeche and its environs through the use of modern scientific tools and methods.

### Vision

- To engage with local, state, and national individuals, groups and organizations on lake management
- To enable continuous improvement in the quality of life in, on and around Lake Papakeeche for the current and future generations
- To serve as a technical information resource and advisory group to the Papakeeche Protective Association (PPA) and its Board on the health of the Lake Papakeeche ecosystem, as assessed by modern scientific methods
- To respond to, and manage, events of nature (e.g., climate change) in a manner that secures a viable long-term future for the lake and its diverse ecosystems

### Activities

To fulfill its mission and vision, LaPSI uses multiple approaches and methods to:

- collect, analyze, archive and communicate scientific data on water quality, and on other biological parameters related to lake health
- develop state-of-the-art lake management, control and conservation plans
- monitor and assessment aquatic and non-aquatic plants and animals
- support and encourage sustainable behaviors and activities by lake residents to preserve the lake as a natural resource and source of pleasure and recreation
- ensure and promote the private character of the lake

### Water Testing and Other Work

LaPSI has developed reliable methods, some in collaboration with other groups, to evaluate water quality and other lake properties. This testing includes:

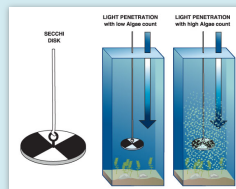
- (1) **Secchi disc** – used to evaluate water turbidity
- (2) **Dissolved oxygen and temperature** – diagnostic of overall lake health
- (3) **Coliform** – microbiological concentrations in lake water; affected by septic system failure and waterfowl excrement
- (4) **Phosphorus** – a nutrient that can cause excessive algal growth; partly comes from the use of lawn fertilizers
- (5) **Fluridone** – a systemic herbicide used to control opportunistic and invasive plant growth.
- (6) **Microcystins** – natural products released by some algae that can endanger living systems
- (7) **Chlorophyll a** – natural product whose concentration in water is related to lake health
- (8) **Bathymetric mapping** – essential to understanding lake topology, water volume, and how both evolve over time (also done by external contractors)

These tests are conducted at specific sites on the lake annually from May–October as indicated on the following map. The sites are identified by their unique GPS coordinates to ensure reproducibility.

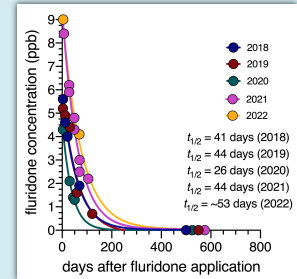
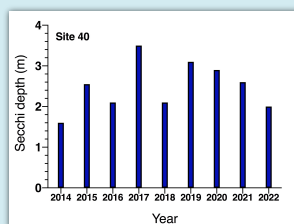


### Some Results

A Secchi apparatus is shown below. The disc is slowly lowered into the water until a depth is reached at which the user can no longer observe the black/white pattern on the disc. This depth is defined as the Secchi depth.



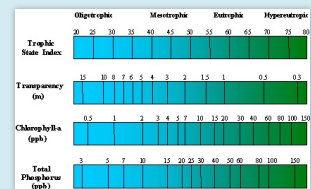
An example of Secchi data collected on Lake Papakeeche at **Site 40** during the month of July in 2014–2022 is shown below. Secchi depths ranged from 5.2 feet (1.6 meters) to 11.5 feet (3.5 meters) over this eight-year period, giving an average value of 2.5 ± 0.6 meters (8.2 ± 2.0 feet).



Shown above are **fluridone decay curves** on Lake Papakeeche for 2018–2022 at **Site 9**. **Half-lives averaged 42 ± 10 days**; the large standard deviation is caused by the uniquely short half-life in 2020. Data were fit to a single exponential decay function in order to calculate the half-lives.

### SUMMARY

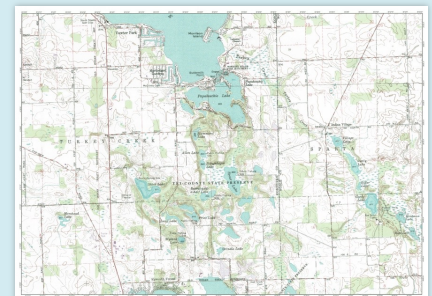
Based on turbidity (Secchi), total phosphorus and chlorophyll a data collected by LaPSI and other groups since 2012, the **TSI (Trophic State Index)** for Lake Papakeeche is **46–55**, indicating a **mid-mesotrophic state** (see chart below).



Systematic monitoring of total phosphorus in the lake and in several proximal water bodies (some in the Tri-County Fish and Wildlife Preserve) has revealed higher-than-acceptable levels of phosphorus in the surrounding waters, while levels in Lake Papakeeche are, in general, low. There is cause for concern about water flow from Redhead Pond adding phosphorus to the lake, which in addition to phosphorus contributed by plant matter decomposition on the lake shoreline (from plant harvesting) could raise phosphorus levels significantly and accelerate **eutrophication** over the long term. *E. coli* levels on Lake Papakeeche appear to be low; the bacterium has been detected at some locations, but at levels below the thresholds considered unsafe. Invasive plant populations on the lake are also low, except for curly leaf pondweed.

LaPSI has established working relationships with other regional lake organizations such as the WACF, the Tippecanoe Watershed Foundation, Indiana Clean Lakes, and the Indiana Watershed Leadership Academy. Some LaPSI members have also participated in lake management training.

**WE NEED YOUR KNOWLEDGE AND HELP ON LaPSI. BECOME A MEMBER.** If you want to make new friends and help maintain the quality of life on Lake Papakeeche, please join our group of citizen scientists.



For more information, contact Diane Tulloh at [dtulloh@gmail.com](mailto:dtulloh@gmail.com), Anthony Seriani at [aseriann@nd.edu](mailto:aseriann@nd.edu), or see our web site:

[www.nd.edu/~aseriann/LAPSI.html](http://www.nd.edu/~aseriann/LAPSI.html)