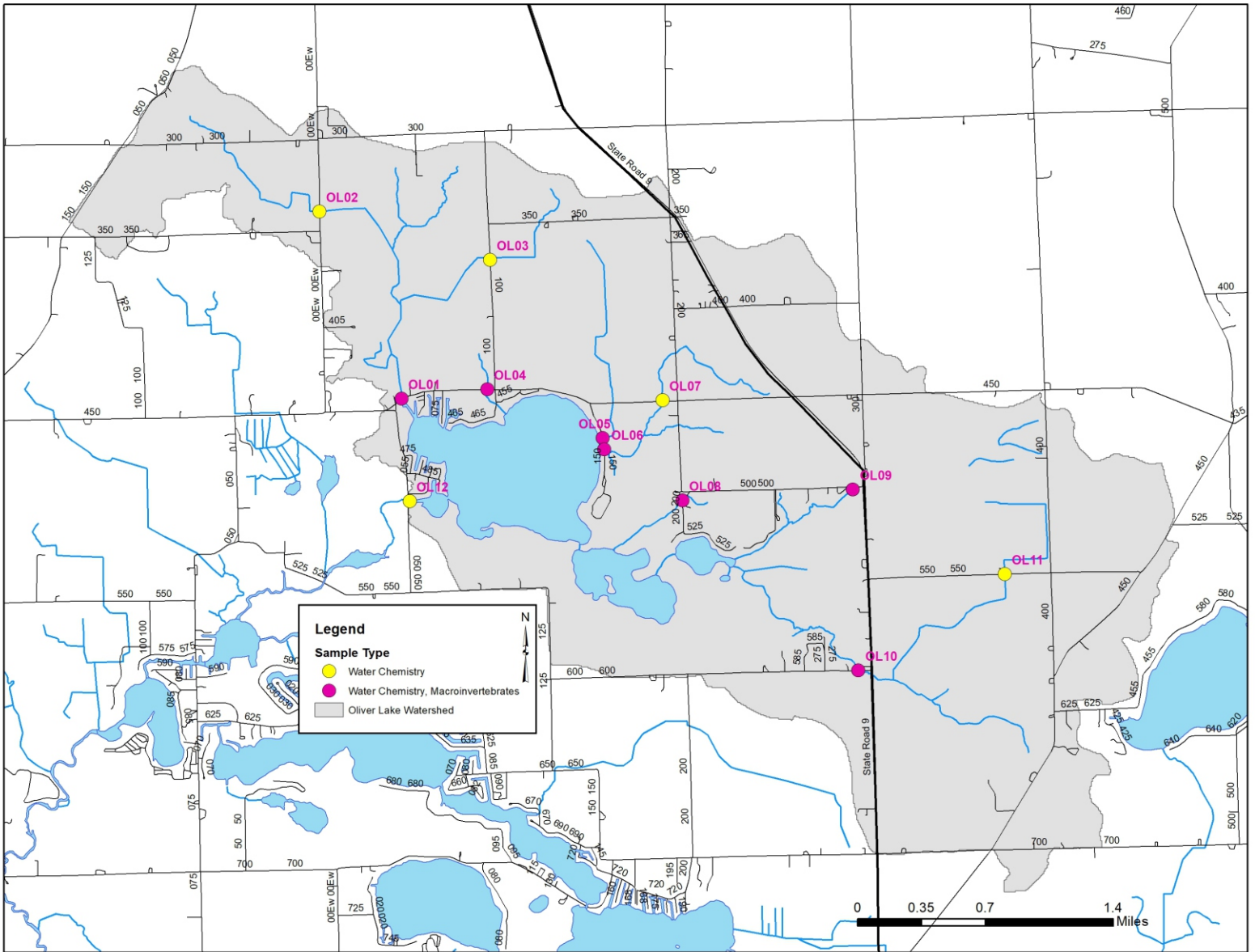


# Testing Sites Map



## Appendix A: Scope of Services

### 1. Summarize historical information on trends in land use and water quality:

Arion Consultants, Inc. (Arion Consultants) will record the 12-digit Hydrologic Unit Code (HUC) for the Oliver Lake Watershed. Arion Consultants will compile an annotated bibliography of all previous studies pertinent to land use and water quality changes, including volunteer monitoring data, within the Oliver Lake Watershed. Arion Consultants will summarize pertinent information on climate, geologic history, topography, trends in land development, unique recreational resources related to waterbodies in the Oliver Lake Watershed, and water quality. All water quality data, impaired waterbody (303(d) list) listings, and historic maps, including aerial photographs, if available, will be included.

### 2. Map and describe current watershed conditions:

Arion Consultants will present maps and describe conditions for the Oliver Lake Watershed and its subwatersheds including the following:

- a. General location maps for the Oliver Lake Watershed, including the watershed outlet, lowest watershed elevation point, watershed boundaries and the associated HUC codes;
- b. Subwatershed boundaries and a table of subwatershed acreages;
- c. Soil type descriptions and maps of Highly Erodible Land (HEL) and hydric soils;
- d. Current and historic extent of wetlands from National Wetland Inventory and potential wetland restoration sites;
- e. Floodplain management areas as identified on FEMA floodplain map and condition of riparian zones indicating any significant locations possessing or requiring unusual bank protection;
- f. Significant natural areas;
- g. General locations of known state and federally listed species;
- h. Priority areas for conservation, restoration, and acquisition;
- i. State-owned land and easements that may be available for resource conservation and public access purposes;
- j. Land use information such as:
  - 1) Land use categories by acreage and percent of watershed area
  - 2) Map of broad land use categories
  - 3) Development trends to document changes in land use over time
  - 4) History of pursuit of public access sites
  - 5) Location of point source dischargers, including permit compliance information such as LUST and NPDES discharge data, which are available from IDEM and MDEQ
  - 6) Location of any hazardous waste or Superfund sites
  - 7) Location of large septic fields or industry
  - 8) "hot spots" of damaging land use practices
  - 9) Number and type of animals in confined animal feeding operations, including CFOs, CAFOs, AFOs and small, undocumented animal operations or hobby farms
  - 10) Tillage transect data/trends in Lagrange County.
- k. Visual assessment of the watershed based on a windshield survey.

Land use information will be reported at a relatively large resolution, not on a "field-by-field" basis. The report will not include information that specifically identifies individual landowners in the text or photographs. All land-use information will be collected and discussed with the Lagrange County SWCD; the local staff of the USDA Natural Resources Conservation Service (NRCS) and ISDA Division of Soil Conservation in the watershed prior to inclusion in draft reports that are circulated for public review.

### 3. Collect and analyze information on water quality, biology, and habitat:

Arion Consultants will conduct water quality sampling at 12 stream site in the Oliver Lake Watershed and at one (1) reference site. All suggested sample sites will be discussed with the GOLC, LARE program staff; the Lagrange County SWCD; IDNR District Fisheries and Nongame Biologists; the ISDA Division of Soil Conservation and the USDA NRCS before final selections are made. Historic sample sites will be reviewed to determine appropriate sampling locations. Final site selection will occur early in 2024 to allow for permission and plans to access. Final sites will be dependent upon receiving permission to access sample sites. At each stream site, Arion Consultants will collect and analyze data on water chemistry, as indicated below.

#### A. Water quality:

##### 1) Tributary sampling:

Arion Consultants will complete tributary sampling at 12 stream sample sites no less than twice, once under base flow and once under storm flow conditions. Samples will be analyzed for physical and chemical water quality, including: pH, temperature, dissolved oxygen, nitrate + nitrite, organic nitrogen (TKN), ammonia nitrogen, total and dissolved phosphorus, turbidity, conductivity, *E. coli* and discharge. Stormflow (more than one inch of rain in any 24-hour period) and baseflow (normal condition) samples will be collected at each tributary site no less than once annually. Site locations will be documented on maps, with photos and GPS coordinates.

##### 2) Lake sampling:

As the Indiana Clean Lakes Program last sample collection occurred in Oliver, Olin and Martin Lakes in 2015, Arion Consultants will collect samples at the deepest point of each lake during July or August 2024 during the peak period of stratification for the purpose of calculating the IDEM Trophic State Index and Carlson' Trophic State Index. Collection of the full suite of parameters will allow for comparison between the three lakes under similar conditions to the lake' historic data collected by the Indiana Clean Lakes Program, and to data collected from other lakes throughout the state.

Samples will be collected from the upper (epilimnion) and lower (hypolimnion) waters within each lake. Samples will be analyzed for conductivity, pH, temperature, dissolved oxygen, nitrate + nitrite, organic nitrogen (TKN), ammonia nitrogen, total and dissolved phosphorus, and turbidity. Secchi disk transparency and light penetration will be measured, a plankton tow from the 1% light level completed, and a chlorophyll *a* sample analyzed from the surface waters. A vertical profile of dissolved oxygen and temperature will be recorded at the same point.

##### 3) Quality assurance:

Water quality analyses will be conducted by the Commonwealth Biomonitoring Laboratory, a state approved laboratory which follows analytical methods described in the most recent edition of the following publications:

(a) *Standard Methods for the Examination of Water and Wastewater*, jointly published by the American Public Health Association (APHA), the American Water Works Association (AWWA), and the Water Environment Federation (WEF)

(b) *Methods for the Chemical Analysis of Water and Wastes*, US EPA, Environmental Monitoring and Support Laboratory.

Water quality analyses must be conducted using detection limits appropriate for the analysis of stream water samples. The following detection limits are suggested for LARE projects:

<u>Parameter</u>	<u>Limits (mg/l)</u>
Total Phosphorus	0.01
Total Orthophosphorus	0.01
Ammonia Nitrogen	0.03
Nitrate Nitrogen	0.10
Total Kjeldahl Nitrogen	0.10
Total Suspended Solids	4

Quality assurance/quality control procedures (QA/QC) will be a part of their sampling and water quality analysis. A copy of the QA/QC plan from the Commonwealth Laboratory is on file with the LARE program office in Indianapolis and is attached with this proposal.

B. Biological community and habitat quality:

- 1) Arion Consultants will conduct an assessment of the benthic macroinvertebrate community at each of the major tributaries to Oliver, Olin and Martin Lakes. Seven macroinvertebrate assessments will occur including the five major outlets of streams entering Olin, Oliver and Martin lakes, the lakes' outlet as well as a reference site. Sampling will occur only if the streams are flowing at the time of sample collection. Sampling will follow methods described in the *LARE Protocol for Macroinvertebrate Sample Collection and Index Calculations*, which follows the *Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers: Periphyton, Benthic Macroinvertebrates, and Fish*, Second Edition. Arion Consultants will calculate the standard metrics for the LARE reports listed in the *LARE Protocol for Macroinvertebrate Sample Collections and Index Calculations*.

Arion Consultants will sample stream sites and one (1) reference site once between July 15 and November 30. Site locations will be documented on maps, with photos and GPS coordinates.

- 2) Arion Consultants will evaluate habitat quality at each site using the Qualitative Habitat Evaluation Index (QHEI) as used by the Indiana Department of Environmental Management at the same time as base water chemistry and macroinvertebrate community assessments.
- 3) Arion Consultants will submit a voucher collection to Department of Entomology, Purdue University prior to the time that Arion Consultants submits the draft report allowing no less than two months for review by IDNR or other specialists. The collection will be forwarded to the Department of Entomology at Purdue University. A voucher for each taxon identified at each site will be curated according to Purdue' protocols for specimen handling.
- 4) Arion Consultants will collect plankton samples within each lake as detailed in 3A1 above following methods specified in the IDEM Indiana Trophic State Index (ITSI). A list of plankton species and abundance will be included based on collections made for calculation of the ITSI. Attention will be paid to the identification and concentration of toxin-producing blue-green algae genera such as *Cylindrospermopsis*.
- 5) Arion Consultants will include reports and brief analyses of surveys, trends, and management recommendations from other biological studies conducted in Oliver Lake and its tributaries. Information on the lakes' fish community will be obtained from IDNR Division of Fish and Wildlife' Fish Management Reports, Assessment Branch in IDEM' Office of Water Quality, previously completed studies, and other sources. Arion Consultants will detail all data, discuss its significance for resource

management, and detail any perceived water quality trends within the waterbodies in the Oliver Lake Watershed.

- C. Arion Consultants will briefly review and analyze aquatic plant survey data and management recommendations from other vegetation studies conducted in the lake and its tributaries. If any trends are identifiable, they will be discussed as part of the study.
- D. Arion Consultants will discuss nuisance wildlife or invasive species concerns with the Oliver Lake Homeowners Association and if determined to be a concern, will develop a survey of the current count or distribution of the species on a representative day.
- E. Analyze trends relating physical, chemical, biological, and habitat factors:  
Arion Consultants will analyze the relationship between water chemistry, habitat and biological community quality data and discuss any correlation. Arion Consultants will indicate potential limiting factors for each parameter and describe trends in water clarity and quality and compare water quality with similar regional lakes.

#### 4. Hydrology and Lake Habitat Quality

Arion Consultants will develop a water budget for each lake and/or update the budget developed during the 2008 diagnostic study, at a minimum. The hydraulic residence time for each lake will be determined. Additionally, Arion Consultants will map the lake shoreline and identify potential areas where protection is needed and/or erosion is occurring including the approximately extent and distribution of various seawall materials. Any water quality or habitat changes which occur along eroding areas will be noted as well. Arion Consultants will conduct a ground survey of eroding streambanks where streams are accessible, or access can be obtained.

#### 5. Model nonpoint source pollution in lakes and subwatersheds:

Arion Consultants will use appropriate models, including STEPL or L-THIA, to describe relative contributions to sediment and nutrient loads from identified or predicted sources of nonpoint pollution. Arion Consultants will calculate the load reductions needed to achieve water quality standards or targets for nutrients, sediment, and/or *E. coli* and indicate any potential benefit derived from any proposed changes in land use practices using either STEPL or the Region 5 Model.

#### 6. Assess institutional resources:

Arion Consultants will describe the availability of watershed management and leadership resources, both human resources and existence of planning documents or land use management ordinances within the Oliver Lake Watershed. Arion Consultants will identify existing or recommend potential volunteer monitoring groups and establish contacts with producer groups, environmental groups, developers, and land managers at public properties. Where possible, Arion Consultants will include brief summaries of pertinent reports on land use and water quality from these and other land management organizations in the watershed.

#### 7. Prioritize management recommendations:

Arion Consultants will set reasonable goals for improvement of water quality factors in Oliver Lake and its tributaries. Further, Arion Consultants will prioritize subwatersheds and potential watershed improvement projects that will contribute to decreases in degradation from nonpoint source pollution. Arion Consultants will discuss factors related to future success and limitations of recommended projects and describe unusual physical or social characteristics of the subwatersheds or institutions that may support or challenge future watershed projects. Arion Consultants will include general cost estimates, anticipated sediment and nutrient loss reductions

anticipated from each project using the STELP or Region 5 model, and recommended timelines for implementation, as well as briefly list potential sources of funding for projects, including a discussion of eligibility for IDEM 319 funds. Arion Consultants will identify motivating factors that would encourage voluntary participation of land users in future programs and a detailed action plan for implementation.

8. Create a public information handout:

Arion Consultants will create and distribute an information handout that addresses factual issues concerning the state of the Oliver Lake Watershed and costs or benefits predicted from the proposed projects. The handout will be tailored to the specific needs of the GOLC and the Oliver Lake stakeholders. Arion Consultants will recommend methods for keeping the public informed of future watershed management activities.

9. Facilitate meetings:

Arion Consultants will facilitate two public meetings for the purposes of: 1) identifying stakeholders, introducing the study and obtaining public input and concerns; and 2) presenting the final report. Arion Consultants will document meeting dates, attendance, minutes, public comments, and the level of support for recommending particular implementation projects as an appendix to the report. Meetings may be held in a virtual format due to the on-going pandemic. Options will be reviewed with the Oliver Lake Homeowners Association in advance of scheduling meetings.

10. Report project progress:

Arion Consultants will issue monthly progress reports throughout the duration of the project. Copies of progress reports will be submitted to the GOLC and LARE program staff prior to payment of invoices for the work described in the monthly reports. Progress reports will describe completed tasks, any unusual issues, and whether the anticipated timeline needs any modification along with any other information pertinent for LARE staff review.

11. Complete diagnostic study report:

Arion Consultants will complete the Oliver Lake Diagnostic Study report including the following items at a minimum:

- a. Executive Summary
- b. Statement of project purpose
- c. General overall project description
- d. Heading, summary, discussion and recommendations for each project task
- e. Project conclusion
- f. Appendices should include (if applicable) but are not limited to:
  - 1) All pertinent data, including field sheets
  - 2) Water quality and index calculations
  - 3) Computer model input and output
  - 4) Necessary maps, charts, graphs, computations and computational breakdowns
  - 5) Pertinent meeting minutes, attendance lists and public comments

Arion Consultants will provide one printed and one digital copy of the draft and final reports to the local sponsor and pertinent agencies for review. One printed and one digital copy of each report will also be provided to the LARE office. Arion Consultants will meet with the GOLC, Lagrange County SWCD and/or surveyor, LARE and other agency staff to discuss and review comments in conjunction with the final meeting, as needed.

Potential In-Kind Services Items

Potential in-kind service options are listed below. These items represent some options where assistance from the

GOLC and other partners can reduce their overall cost by up to 10%. Additional items will be identified and the final items selected by the GOLC and partners included in the project contract with assigned in-kind service values.

Item 1: Assist with identification of final sample sites and obtain permission to access Oliver Lake Watershed sample sites.

Item 2: Provide a boat and driver for the in-lake monitoring assessments including shoreline assessments.

Item 3: Obtain any available historic water quality data including copies of previously completed IDNR fisheries assessments.

Item 4: Assist with base flow and storm flow sampling including providing local storm totals.

Item 5: Assist with streambank erosion assessment inventory, nuisance wildlife inventory or other data collection.

Item 6: Organize and promote the two public meetings.

Item 7: Assist with prioritization of recommendations.

Item 8: Other items suggested by GOLC as part of final scope determination.

### Timeline

<u>Task:</u>	<u>Timeframe for Completion</u>
1. Summarize historical information for land use and water quality	February - March 2024
2. Map and describe current watershed conditions	February - April 2024
3. Collect and analyze information on water quality, biology, and habitat	April - November 2024
4. Hydrology and Lake Habitat Quality	April - August 2024
5. Model nonpoint source pollution in subwatersheds	August - December 2024
6. Assess institutional resources	August - October 2024
7. Prioritize management recommendations	November - December 2024
8. Create a public information handout	January 2025
9. Facilitate meetings	February 2024 - February 2025
10. Report project progress	Monthly throughout
11. Complete diagnostic study report	Draft December 2024; Final February 2025