Lake Erie Baseline Assessment Framework: Information and Program User Guide (A Supplemental Guidance to LEBAF SOP)

Background: LEVSN and LEBAF

Our Water Quality is Threatened
The Lake Erie Basin is more significantly impacted by human activity than that of any other Great Lake. These impacts are fueled by longstanding challenges like harmful algal blooms and heavy metal pollution as well as emerging contaminants such as microplastics and PFAS. At the same time, State and Provincial monitoring programs are challenged by limited staffing and budgets that curtail the scope and granularity of water quality data collected across the Basin.

People are Ready to Help
Lake Erie residents feel a powerful sense of connection to their water resources. Local orgs have been harnessing this energy to power "Citizen" or "Volunteer" science groups that monitor water quality across the Basin for years. These groups are essential contributors to our understanding of the Basin, but their data are often challenging to access and use across watershed, state, or national boundaries. As a result, decision makers and communities struggle to fully leverage volunteer science data to address their most pressing water governance, management, research and advocacy needs.

We Have Organized into a Movement for Collective Impact
To address these challenges, the Lake Erie Volunteer Science Network (LEVSN), a collaboration of local water quality monitoring programs convened by Cleveland Water Alliance (CWA), created the Lake Erie Baseline Assessment Framework (LEBAF) SOP. **The LEBAF SOP is a comprehensive reference guide for participating Local Hubs that details the process for** standardizing data collection, analysis and communication of **LEVSN monitoring data.** LEBAF is a process that empowers local groups to elevate the credibility of their data and tell a regional story about the health of Lake Erie watersheds. This standardization makes volunteer science data easier to collect, access and use, increasing individual and collective impact toward our common goal of clean and accessible water for all Lake Erie Basin communities. All relevant program resources can be found in the LEVSN Google Drive.

Consider Getting Engaged!
Organizing a volunteer science group has a host of benefits for your community ranging from resident engagement to production of actionable environmental information. If you are currently, or hope to become, engaged in this critical work, you should consider participating in the Lake Erie Volunteer Science Network and implementing LEBAF as a "Local Hub." As a Local Hub, you gain access to:

- Data management and visualization services through pre-paid access to Water Reporter (WR).
- LEBAF SOP that standardizes all study design elements to serve common monitoring objectives.
- Data Manager's Manual (DMM): A user guide for data and metadata management in WR.
- Technical support through Fondriest (for YSI water meters) and The Commons (for WR)
- General program support through CWA and the Lake Erie Volunteer Science Network (LEVSN)
- Validated data, analyses, messaging, and outreach products shared across the network.
- Annual program evaluation and evolution process to facilitate and grow greater collective impact

How can you find out if participating as a Local Hub is a good fit for you? This User Guide summarizes key elements of the LEBAF program and lists steps for watershed groups to consider before joining LEVSN and implementing LEBAF protocols. Just follow the steps below.

Step One: Understand LEBAF's Purpose, Use, and Users

The first output of LEBAF is a set of Standard Operating Procedures (SOP or "Standards") document which outlines procedures for collecting, analyzing, and communicating volunteer monitoring data as well as describes core data elements for the LEBAF program. These elements are:

Monitoring Purpose: Describe a common set of water quality indicators that support assessment of the baseline conditions and trends in the health of Lake Erie watersheds at various scales.

Intended Data Use: Data collected using the LEBAF SOP is intended to be used primarily as a water quality screening tool that drives 1) benchmarking of watershed health, 2) interoperability of results across watersheds, 3) education and engagement of local communities. It is secondarily intended for use in resource prioritization and decision making (e.g. use support, advocacy, policy, resource management, and adaptive management).

Target Data Users: Data collected using the LEBAF SOP is primarily intended for use by LEVSN and its partners. Use by Federal, State and local decision makers is a priority, but secondary to the needs of the volunteer science groups implementing LEBAF.

Expected Outcomes and Impacts: The implementation of LEBAF will 1) Provide a regional condition assessment of Lake Erie streams over time. 2) Identify potential problem areas to be investigated for impairment identification. 3) Establish a shared lexicon to communicate program elements, shared goals, and watershed status to volunteers and the public. 4) Demonstrate the capacity of regional volunteer science collaboration. 5) Create an iterative process for expanding the scope of shared standardizations and collaborations over time. LEBAF is not trying to serve all purposes, uses and information needs. It is important to remember this context as you consider your organization's alignment with our strategy for creating collective impact.

Step Two: Understand LEBAF's Annual Program Process

Every year, LEBAF field season will be conducted where data will be collected and reported in Water Reporter. At the end of each field season, during the Information Design, LEVSN will analyze and communicate the outcomes of that year's data collection to participants and the public. Local Hubs and collaborating partners will then convene to evaluate that year's programming. Re-examination of additional parameters and program elements, identification of program priorities, and revisions to the SOP for the following season will be conducted during the Evaluation Design. This annual cycle is intended to guide planned expansion of the SOP, using initial wins as a framework on which to build, over iterations, towards greater collective impact. Any organization that chooses to participate in LEBAF monitoring will be expected to participate in the following design elements for each field season.

- ***Program and Technical Design*** (Field Season, April - October)
  Conduct standardized volunteer science to generate, validate, and manage water monitoring data.
- ***Information Design*** (Data Analysis and Communication - Fall/Winter)
  Transform data into information via analyses and communicate results to stakeholders and decision makers through information products.
- ***Evaluation Design*** (Program Evolution - Winter)
  Evaluate successes and failures of program structure, document needed adjustments and select new elements to standardize in preparation for next field season.

Step Three: Assess Your Capacity to Implement the LEBAF SOP

The LEBAF SOP presents standards for the collection, management and communication of basic water quality indicators that indicate watershed condition. As a Local Hub, you will be expected to adhere to the technical requirements and minimum performance criteria of LEBAF. The specifications described in

LEBAF's Technical User Guide provide guidance on the minimum technical and programmatic elements for participation. For more detail, please reference the complete LEBAF SOP.

Step Four: Join the Network and Prepare for the Field Season

If you feel that LEBAF's purpose, intended use, and target users and Information and Evaluation Process align with your group's priorities and that you have the capacity to Implement the LEBAF SOP then contact CWA (see contact information below) in advance of the next sampling season to join the network. CWA will assess your technical capacity and may offer additional equipment to help you meet standards or enhance your current efforts. You will also need to contact Contact support@waterreporter.org to establish your organization and data source on our data storage platform, Water Reporter. You will then participate in training and planning in preparation for launching a new season of joint field activities and related communications.

LEBAF Workflow Checklists

While the LEBAF SOP is designed to not be overly burdensome, it is worth taking time to think through its implementation. The following lists outline workflows that each Local hub should implement. Review these lists and note any elements that may require consideration for your group. Feel free to print this page for reference.

Pre-field season preparation activities

- **Share Contact Information:** Give CWA basic info for your org and point of contact
- **Technical Evaluation:** Confirm that your probe/sonde specifications meet LEBAF Standards
- **Prep Stakeholders:** Ensure your board, volunteers, etc. are prepared and supportive
- **Sign LEBAF Agreement:** Codify LEBAF expectations and document equipment loaning
- **Setup Water Reporter:** Create your account, logins, monitoring sites, and monitoring kits
- **Technical Preparation:** Acquire new equipment and receive training if needed
- **Training**: Share content on the program, equipment and platform with your staff and volunteers
- **Assign Roles:** Determine who on your team will lead each element of the metrics checklist below

Field Season Metrics for Participants

- **Site Identification**: Did you log data from at least one site in Water Reporter?
- **QA/QC**: Did you log information on all methods used to collect data for LEBAF? Were all methods approved in advance by CWA? Did you calibrate sensors using the manufacturer's recommendations and follow LEBAF guidelines for documenting calibrations and taking appropriate steps for unsuccessful calibrations?
- **Data Collection**: Did you sample all four parameters each month at each of your established stations from AT LEAST April-October (weather permitting)?
- **Data Entry:** Was data entered into Water Reporter monthly with all data uploaded by 11/1?
- **Data Validation**: Did you follow the appropriate data validation steps for your data entry method (automatic vs. manual) as documented in the SOP?
- **Program Engagement**: Did you attend kickoff trainings (at least 2), Monthly Check-ins, end-of-season Information and Evaluation Events (at least 1 in early Nov) and beginning of next season planning event (late Jan/early Feb)?

- **Transparency**: Did you maintain a primary contact and notify CWA of any change in activity status (damage to equipment, name or address change, and station location or frequency changes) and keep a current agreement with CWA?
- **Communications**: Did you coordinate with CWA on any related media engagement and designate a website landing area? Did you communicate LEBAF information products locally?

Contact Max Herzog at Cleveland Water Alliance with any questions: mherzog@clewa.org