

Standard Operating Procedure #1: Preparing for the Field Season

Version 1.3

In GLKN Amphibian Monitoring Protocol

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Revision History Log

The following table lists all edits and amendments to this document since the original publication date. Information entered in the log must be complete and concise. Users of this standard operating procedure will promptly notify the program manager and/or the Great Lakes Network (GLKN) data manager about recommended and required changes. The program manager must review and incorporate all changes, complete the revision history log, and change the date and version number on the title page and in the header of the document file. For complete instructions, please refer to Revising the Protocol, SOP #10.

Previous Version #	Revision Date	Author (with title and affiliation)	Location in Document and Concise Description of Revision	Reason for Change	New Version #
1.0	3/1/13	Bill Route, program manager, GLKN	Added section 1.3 for testing and calibrating Song Meters.	This material was originally in an SOP for deploying Meters, but is more appropriate in this pre-field season SOP.	1.1
1.1	9/27/16	Gary Casper, GLES	Added microphone testing sec. 1.4, referenced new Protocol 2.0	Need for equipment upkeep	1.2
1.1.3	7/28/17	Ulf Gafvert, GLKN		Removed all reference to corded temp sensors, changed to HOBO loggers	1.3
Add rows as needed for each change or set of changes tied to an updated version number					

1.0 Introduction

The Great Lakes Inventory and Monitoring Network is implementing long-term monitoring of wetland-breeding amphibians in network parks. This monitoring will consist primarily of call surveys with Automated Recording Systems (ARS) based on the North American Amphibian Monitoring Program (NAAMP) protocol (Weir and Mossman 2005). Many tasks must be completed prior to each field season for call surveys to be successful. Field preparations should begin in January of each calendar year to make certain that there is adequate time to hire seasonal help and order any necessary equipment. This standard operating procedure provides a detailed outline of the steps to be taken before the field season for amphibian call surveys using ARS. Table 1.1 provides a checklist of the steps, and many of the steps are described in detail in the following sections.

Table 1.1. A checklist of steps to be taken before beginning the field season for amphibian call surveys by ARS.

√	Activity
☐	Prepare calendar for field work
☐	Inventory equipment
☐	Clean and test equipment
☐	Calibrate temperature sensors if needed
☐	Order supplies
☐	Update field folders
☐	Update/printout data sheets
☐	Obtain or update required permits
☐	Reserve vehicles for field work
☐	Make travel and lodging reservations
☐	Review protocol and SOPs
☐	Provide supervisor with field schedule

1.1 Read the Entire Protocol

Prior to the field season read through the entire protocol, including all standard operating procedures (SOPs). Be sure to understand the purpose for which the various types of data will be collected and review the SOPs for the types of measurements and samples needed. Be alert for portions of the protocol or SOPs that may be in need of revision, and bring these sections to the attention of your supervisor or the Network program manager. Make certain that the field crew is notified of any changes and that field materials (such as field folders) are updated as well. The procedure for making changes to the protocol and SOPs is found in SOP #10.

1.2 Equipment

An inventory should be conducted to make certain that all equipment is available. A complete list of equipment needed for ARS call surveys can be found in SOP #4. All applicable equipment should be cleaned, tested, and calibrated. The following is needed for this purpose:

1. Ambient and cold water baths for calibrating temperature meters
2. ARS units with microphones, SD cards, batteries and sample recordings
3. Map software for GPS units

Any or all of the above items may need to be ordered prior to this step. Obsolete or damaged equipment may need to be replaced. A calibration log should be started for each applicable piece of equipment during this first equipment check, and it should be updated with each additional calibration.

Field folders and data sheets may need to be updated. Field folders should contain the following:

1. Updated maps of sampling sites
2. Directions to and descriptions of sampling sites
3. Instructions for deploying ARS units; see SOP #4
4. Emergency phone numbers and radio contacts
5. Copies of all applicable permits

Updates to the data sheets may include adding or removing fields, changing dates, and adding basic instructions.

1.3 Temperature Logger Calibration Testing

The song meters have internal thermistors to record air temperature, but these are prone to significant bias due to sunlight warming the dark housing of the unit. The program also uses independent temperature loggers, currently Onset HOBO Pendant temperature/light data loggers. These should be calibrated initially, before being deployed.

The following is needed for this purpose:

1. Two small coolers for warm and cold water baths
2. One 5-pound bag of ice cubes
3. Two professional grade lab thermometers, NIST certified

Use the following calibration check procedure:

- 1) Use the Hoboware and the Onset shuttle to start the loggers. If doing a batch test, using the scheduled start program will allow synchronous testing as well as test this capability for the logger. Allow adequate time to setup the equipment if using a scheduled start.
- 2) Place the loggers in the warm water bath. The units will float in water, so attach a weight sufficient to fully submerge the units.
- 3) Place one NIST reference thermometer to record air temperature, and place the second NIST thermometer in the warm water bath so that it reads a common temperature with the HOBO loggers. Stir the bath constantly to maintain a homogeneous water temperature. Allow 15 minutes for loggers and thermometers to reach the bath temperature.
- 4) Beginning at the time programmed in the loggers, record the time and temperature of both NIST reference thermometers—air and water bath. Repeat for 10 minutes, recording 10 readings for air and 10 for water from the NIST reference thermometers.
- 5) Fill the other cooler with cold water and crushed ice, so as to maintain a constant temperature of 0°C. Transfer all the loggers to the cold water bath and let soak for 20 minutes. Keep the bath stirred to ensure a well-mixed (non-stratified) water bath.
- 6) After the soak time has lapsed repeat *steps 3 and 4*.
- 7) Upon completion of the two water bath tests, download the data from each logger to a computer using Hoboware. Bring all the logger readings and the readings from the thermometers into a spreadsheet, and line up readings so that times match as close as possible.
- 8) For each temperature logger, calculate the difference between NIST thermometers and the corresponding one-minute readings for the loggers in warm water and cold water baths. Calculate the mean difference for each temp logger/NIST thermometer to check accuracy. If

the mean temperatures differ from the NIST-certified thermometers by $\geq 0.5^{\circ}\text{C}$, contact the Network program manager to report the failed test and take appropriate steps for further testing, calibration, or equipment replacement (see below).

- 9) Save the temperature calibration measurements and analysis in the Excel spreadsheet. Use the following naming convention: PARK_SMtest_yy-mm-dd. For example a test of loggers done at Indiana Dunes in March 2013 would be INDU_SMtest_13-03-15. Send the Test log to the network amphibian program manager.

If the average temperature difference for the temperature logger is greater than the manufacturer's stated accuracy, then a second check should be performed to ensure there wasn't a problem with the calibration method. If the second result is still greater than the manufacturer accuracy, then the temperature logger should not be used. If the temperature logger is off by a degree or more, a decision should be made whether or not to utilize the data from the thermistor for analyses.

1.4 Microphone Testing

The Song Meters should be tested each year both before and after deployment to ensure they function properly and will collect accurate data. Microphones have limited life spans as membranes degrade with age and weather. They may appear undamaged but no longer function properly. To test the mics using the SM2 (or 2+) Song Meter, attach two mics to the unit, turn it on, go to the Utilities tab, then Calibrate Mics (scroll down to 4th option). Start to record and speak at the SM unit while observing the decibel readout. The display (Figures 1 and 2) will show readings at two frequency levels for both the left and right mics. Left is your left as you face the front of the SM. A good mic will register -10 to 30 db under the 1 kHz column; a bad mic will stay around -50 to 60 db. This test should only take a minute or so per pair of mics. Mics can be swapped out of testing on a 'hot' Song Meter, so you don't have to turn it off or exit from the Calibrate Mics utility to cycle through any other mics for testing.

We have also found a few mics that work, but have reduced sensitivity. Depending on your voice and talking distance, a good mic might drop to -20 dB during testing, whereas a compromised mic might only drop 5 to 10 dB from the starting ambient reading (-50 to -65 dB). Microphones with reduced sensitivity should be discarded. These mics are omni-directional, but still pick up sound straight out to the side of the SM better than from the front of the SM. Before determining a mic to be bad, give a second audio test straight in front of the suspect mic. When bad mics are found, replace with new mics and notify the network of the number of mics discarded. If new mics are not available, consult with the network for replacement.

Another optional test is to create a sound file (.wav), using ambient noise or conversation, and download the generated WAV file and listen to tone quality, indications of line or mic noise (static or hissing sounds), or other sound problems. This should only need to be done if the prior year's sound files had consistent noise or other faulty recordings.

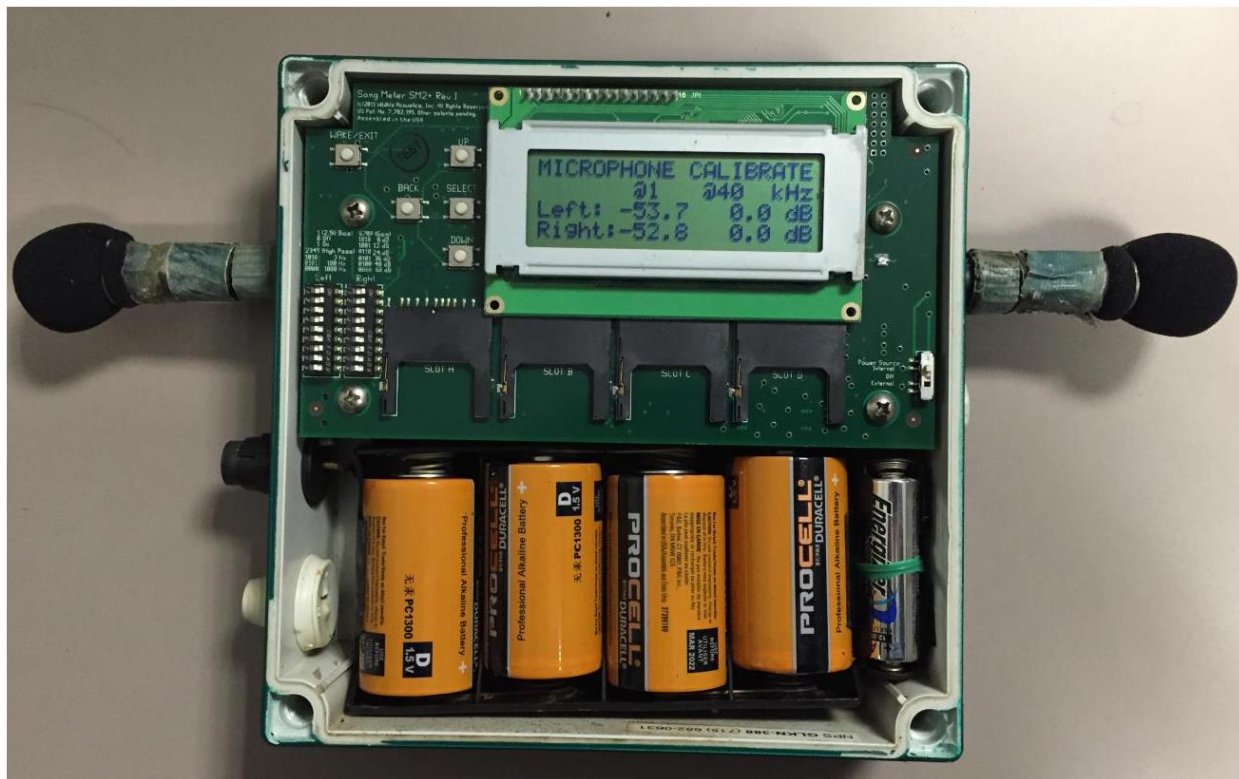


Figure 1.1. The Calibrate Mic readout screen with two mics and moderate background noise.

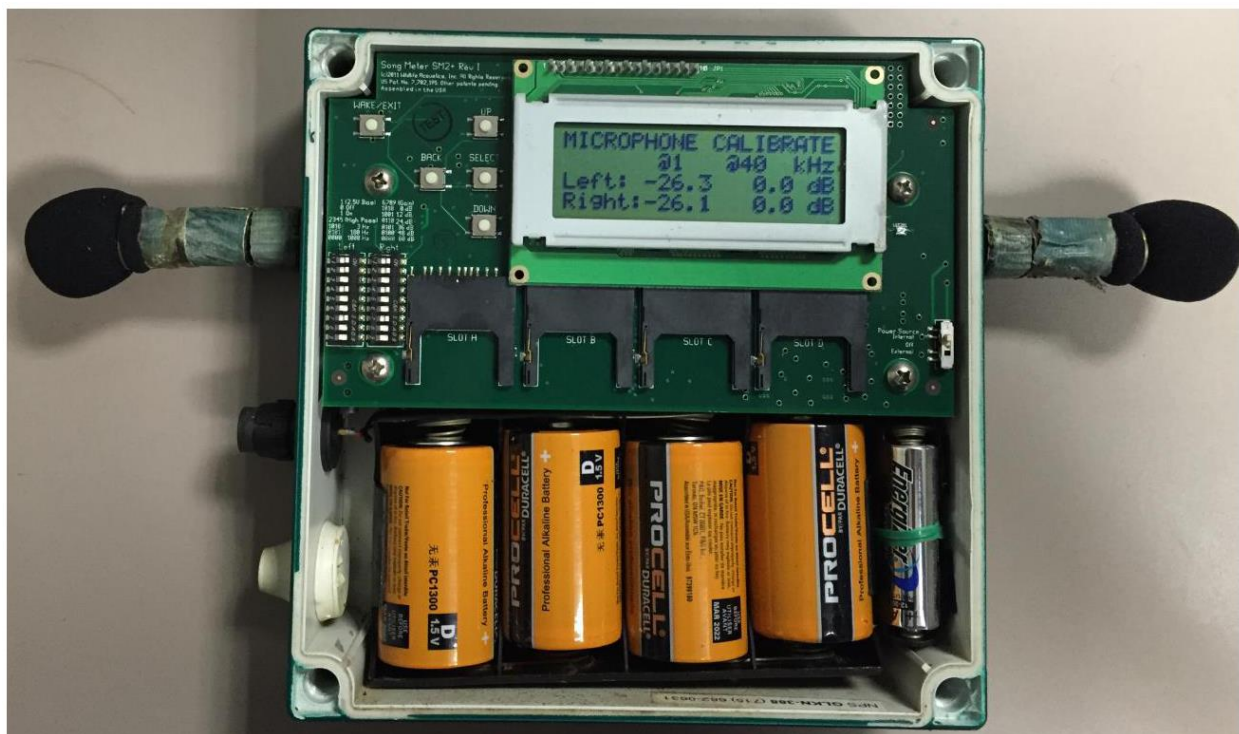


Figure 1.2. The Calibrate Mic readout screen with two mics during speech-level noise.

1.5 Prepare and Share Schedule for Field Work

The calendar for field work should be completed as far ahead of the field season as possible. Doing so will simplify the reservation of vehicles and lodging, provide seasonal staff with an understanding of the sampling schedule, and will serve as a communication tool to alert others about the monitoring activities. The Network's Safety Plan requires that a trip plan be filed with the park when Network staff or contractors are involved in field work. The schedule is an essential part of the trip plan and must be shared with appropriate park staff. The individual in charge of sampling (program manager) should renew contact with park staff, and ask for notification of impending ice-out. Staff or contractors scheduled to perform field work should be notified of the schedule.

Field work will consist of three visits to each sampling site (initially 10 sites at most parks) to:

1. Deploy Equipment: If possible, initial deployment should be made within a week of ice-out, or up to a month prior to ice-out if a delayed start is programmed in.
2. Check Equipment: Equipment should be checked to make sure it is undamaged and operating properly within 3 weeks following initial deployment. Batteries may need to be replaced at this visit.
3. Retrieve Equipment: Equipment should be retrieved at the end of the recording period (14 weeks after deployment). Follow procedures in SOPs #5, 6 and 9 for retrieving, backing up and sending data to the Network office.

Because phenology will vary from year to year, flexibility is built into the schedule. However, park staff and the program manager should ensure that the equipment is deployed within one week of ice-out at the sampling sites, if at all possible.

1.6 Permits

Since fieldwork is being done by park staff, some parks will waive the requirement for a federal permit. Consult with appropriate park staff to determine if a permit is required. Regardless, prior to the field season the program manager should speak with park staff to determine if any areas of the park are closed to surveys or if there are any new restrictions on sampling. Make certain that the names of any new personnel are exchanged.

If a permit is required, an Investigator's Annual Report (IAR) will need to be submitted to the park each year. Go to the following website to apply for a NPS permit, renew an existing permit, or to submit an IAR: <https://irma.nps.gov/rprs/>.

1.7 Vehicles

Ensure that vehicles have sufficient clearance and traction (e.g., 4-wheel drive) to reach sampling sites, or trail heads to sampling sites. This is necessary because of the state of unpaved roads in some park units. Vehicles should have adequate room for storage of gear and the personal possessions of the field crew.

1.8 Travel and Lodging

If lodging is needed, make reservations for park housing, if possible. These reservations should be made as soon as is allowed by the individual parks. Should park housing not be available, reservations may need to be made in local hotels or campgrounds.

Literature Cited

Weir, L. A., and M. J. Mossman. 2005. North American Amphibian Monitoring Program (NAAMP). Pages 307–313 *in* M. J. Lannoo, editor. *Amphibian Declines: The Conservation of United States Species*. University of California Press, Berkeley, California.