

Standard Operating Procedure #5: Data Management

Version 1.2

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 #
Add rows as needed for each change or set of changes tied to an updated version number					

5.0 Introduction

This data management plan provides an overview of data management within the Great Lakes Network Inventory and Monitoring Program specific to the amphibian monitoring program. For more in-depth discussion on data management across the network program, see the Data management plan: Great Lakes Inventory and Monitoring Network, by Hart and Gafvert. This document covers pertinent data management components, including data collection, metadata, database design, data entry and verification procedures, analysis and reporting, and archival of data products.

5.1 Data Stewardship Roles and Responsibilities

The purpose of data stewardship is to share the responsibility for managing data and information resources that are organized, useful, compliant, available, and safe. The demand for detailed, high quality data and information about amphibian occupancy requires a group of people working together to ensure that data are collected using appropriate methods, and that resulting datasets, reports, maps, and other derived products are well managed.

The program manager will supervise data collection, provide project oversight, direct on-the-ground data collections, and provide cohesive links among data collection, synthesis, interpretation, and reporting. While the program manager must act as the steward for amphibian monitoring data for the Network, other project and GLKN personnel are also accountable for specific data management tasks. Table 5.1 lists stewardship responsibilities of personnel involved in the management of amphibian data. To ensure that all project data are managed properly, individuals must understand their responsibilities, communicate with one another, and assist one another as needed. These roles will be shared by GLKN, parks and contractors, in a manner to be determined.

5.2 Metadata Procedures

The network's overall strategy for the generation, management, and distribution of metadata is described in chapter 8, Data Documentation, of the GLKN Data Management Plan (Hart and Gafvert 2006) and the appendices of that document.

Executive Order 12906 mandates that federal agencies document all new geospatial data they collect or produce, either directly or indirectly using the Federal Geographic Data Committee (FGDC) Content Standard for Digital Geospatial Metadata (CSDGM; www.fgdc.gov/metadata/contstan.html). In addition, EO 12906 directs agencies to plan for legacy data documentation and provide metadata and data to the public. GLKN will also generate FGDC-style metadata for non-spatial datasets that meets this standard, absent only the geospatial-specific elements.

Table 5.1. Data stewardship responsibilities of amphibian monitoring personnel.

Personnel Role	Data management responsibilities related to amphibian monitoring
Field Crew Member	Crew members collect and manage data with direction and guidance from the crew leader and/or program manager. Data collection includes calibrating and operating sampling equipment and recording measurements and observations. Crew members are responsible for quality control by following data collection and recording instructions and by promptly verifying recorded data. Crew members also perform data entry and verification.
Field Crew Leader	The crew leader normally performs the same duties as the other crew members and ensures adherence to data collection protocols, including data verification and documentation. The crew leader also works with the program manager and data manager on amphibian data management in the office.
Program Manager	The program manager is responsible for all project operations and results, and may also participate in field operations. The program manager ensures that data management activities are conducted according to established procedures and is responsible for data validation: approving the data content, quality, and documentation, as well as making decisions about data sensitivity and distribution. The program manager is responsible for evaluating project data at specified intervals, analyzing data for trends, and following reporting requirements.
Network Data Manager	The network data manager ensures that amphibian monitoring data are organized, useful, compliant, available, and safe. The network data manager provides the most current version of the amphibian monitoring database. The network data manager oversees activities related to training, user support, quality assurance, documentation, backups, archiving, and data maintenance and distribution.

The FGDC Biological Data Profile (www.fgdc.gov/standards/status/sub5_2.html) contains all the elements of the CSDGM and includes additional elements for describing biological data sets. Metadata created in compliance with the Biological Data Profile can be added to the National Biological Information Infrastructure (NBII, www.nbii.gov/datainfo/metadata) Clearinghouse. Although not a requirement, completion of the Biological Data Profile for appropriate data sets is recommended.

All GIS data layers must be documented with applicable FGDC and NPS metadata standards. The NPS GIS Committee requires all GIS data layers be described with FGDC standards and the NPS Metadata Profile (nrddata.nps.gov/profiles/NPS_Profile.xml). The GLKN will use ESRI ArcCatalog with appropriate NPS metadata tools and profiles and/or the standalone NPS Metadata Tools to generate FGDC and NPS compliant metadata.

Metadata allows potential data users to evaluate the quality and usefulness of the data based on an understanding of the complete process under which it was collected and maintained. In this respect, all of the protocol documentation, including SOPs, are part of a dataset's metadata. A reference to the appropriate version of these documents is part of the metadata for any particular element of a dataset.

The relationship between a data element and the appropriate versions of documented procedures is based on the date and time the procedures are performed. Thus the documentation must have accurate records on each version indicating the start and end date it was in effect, an indication of which version it replaced and, if applicable, the version which replaced it – both a forward and reverse documentation trail. Although perhaps obvious, all data must have an associated value for the date and time it was collected.

Most of the remaining metadata will be recorded directly in the protocol specific database and tables. The GLKN database has fields and tables which incorporate the metadata elements specified by NPS standards. During collection of field data, these metadata elements are entered by selecting an existing profile of metadata, or by entering specific elements in data fields using pre-determined lookup values selected from dropdown menus.

5.3 Data Collection

Data values are measured, observed, or estimated according the GLKN Amphibian Monitoring Protocol at various monitoring locations (sample sites) and recorded on data sheets and as digital audio files (see SOP #4). Crew members are responsible for legible, accurate entries on data sheets and calibration logs. As a first step to verify data, crew members will check and double-check the recorded values at the time of data collection. GPS coordinates of sites are stored as waypoints if using a recreational GPS unit, and recorded in a MS Excel file for future reference, and as a shapefile. When possible, formal site locations should be collected using mapping grade GPS receivers (e.g, Trimble) and differentially corrected to provide higher accuracy coordinate information.

5.4 Amphibian Monitoring Database

At the national level, the networks in the NPS Inventory and Monitoring Program are cooperatively developing a Microsoft Access template tool for developing monitoring databases called the NPS Natural Resource Database Template (NRDT). GLKN will implement most protocol specific monitoring databases by developing MS Access and/or ESRI personal geodatabases from the NRDT model.

The network may develop a database that can be used on a field computer. If the field equipment is Windows OS compatible, the field database will be a replica, versioned copy, of the MS Access master database for the protocol. This amphibian monitoring protocol will typically use recreation-level GPS receivers so that all GPS locations will be recorded as simple fixes (waypoints) and higher level GIS features (lines and polygons) will be created as needed from the fixes when the data are transferred to the master database with an ESRI shapefile or geodatabase. See SOP #6 for further details on GPS use.

5.4.1 Overview of the Database Design

At the national level, the networks in the NPS Inventory and Monitoring Program have cooperatively developed a Microsoft Access template tool for developing monitoring databases called the NPS Natural Resource Database Template (NRDT). The GLKN master database for amphibian monitoring data uses the Site – Event data model that is found in the NRDT.

The network office will maintain one master copy of the amphibian protocol-specific MS Access database on a central server. This is the only copy that can be used to export data to other locations. Additional copies (replicas) of the database can be used as a conduit for data entry and importation of data to GLKN's master version of the database. For analysis, researchers will access data from the master copy of the MS Access database.

In summary, the data flow for amphibian monitoring data involves entering survey data from the field sheets into an Access database, importing spreadsheets with automated and manual detections, and backup and storing of digital audio files for archive and analysis. At the end of each field season the data will receive formal quality assurance/quality control (QA/QC).

5.5 Data Entry

Data entry will involve entering information from printed field forms.

For any field data that is collected on printed data forms, and later transcribed into a database, there are digital data entry forms in the Access database that mimic the printed data forms, to facilitate data entry with a minimum of transcription errors.

In addition to field data, both automated and manual call recognition data will need to be entered into the Access database. These type of data do not get manually entered, but are imported from spreadsheet file formats (CSV, Excel, etc.). The database has the capability to import files that match a specified format (SOP#???) During import, call identification data is assigned to the correct fields in relevant tables, and undergoes quality check procedures that reduce the likelihood of incorrect values in the imported data sets.

Data verification starts with the QA/QC steps that are outlined in SOP #8. As data are entered into the amphibian protocol database forms there is a suite of QA/QC procedures that compare the entered data with expected formats and accepted data value ranges or domains. If the entered data do not pass a form-based QA/QC test the database prompts the user to make corrections and re-enter the data. For most of the form-based tests the database will not accept out-of-bound data, and correction is mandatory; for some range tests, out-of-bounds data are accepted after a user prompt, but are flagged as “suspect.” QA/QC procedures on imported data (such as environmental sensor loggers) perform similar tests, but exceptions which do not pass QA/QC are presented to the user and must be reconciled before the record or dataset can be accepted by the database.

Additional comparison tests will be run on data in the master version of the MS Access database to flag records that are outside the expected range for a parameter based on previous records. These suspect data points are reviewed by an expert user and can be corrected, flagged or excluded from the dataset.

Each individual record in the amphibian monitoring dataset always has one, and only one, status flag indicating its data processing level as raw, provisional or accepted. Only after the record has passed all QA/QC steps will it be flagged as having final status. Finalized data can still be edited and changed if errors are discovered after review in reporting and analysis.

A data enterer's identification is recorded for each aspect of data handling, from collection through to the final steps of QA/QC. The identity of the data collector(s) is recorded on data sheets and is transcribed into the appropriate data entry forms. Additionally, the MS Access database records the user name (login) for every table entry or modification. Only qualified users who have been trained and given edit permissions are allowed to edit data in the master amphibian database. These procedures protect the integrity of the data and allow the history of each data record to be traced.

5.5.1 Data Verification, and Documentation

On a regular schedule approved by the program manager and data manager, the crew leader gathers the data sheets and verifies the completeness, accuracy, and legibility of each form. Following each round of sampling, the crew leader will photocopy each field form and ensure it is legible; one copy will be sent to the program manager and the original will be archived in the GLKN office. Upon receiving the copy, the program manager will proofread the datasheets, making sure that they have been filled out completely.

Once data sheets have been approved by the project leader, the field crew will transcribe the verified field data from data sheets into the amphibian monitoring database. At the end of each season the field crew leader will perform or coordinate a 100% check of hand-entered data of the characteristic values entered in the database that season. The field crew leader will resolve errors according to established procedures (see SOP #9 for additional details).

Upon completion of the field season, the field crew will perform a check of all data entered into the database in that year. This will consist of a visual check of each record by one crew member, while another crew member simultaneously reads through the corresponding data sheet. Transcription errors that have not set off automated QA/QC procedures can be identified using this process.

5.5.2 Data Validation

Prior to distributing the data for any type of use, the program manager validates the amphibian monitoring database content in the master amphibian data file according to procedures in SOP #6. The integrity of each master data file must be preserved during the validation process in cases where the person performing data validation does not have direct access to the master amphibian data file. Validation is performed once each year after data collection and entry are complete. If this annual validation does not meet scheduled reporting requirements of the Network, then the program manager may coordinate other validation to meet needs, or reports can include a statement explaining

that results are based on data that have not been validated. The statement should include an explanation of what significance this has for using preliminary data.

5.5.3 Data Folder and File Organization

All data from the amphibian monitoring protocol should be stored, at the earliest possibility, on the GLKN central server. This includes field data and digital audio data. Files should be named in accordance with the file-naming standards in the GLKN Data Management plan (see Hart and Gafvert 2006). Files have a 'GLKN' prefix, a descriptive element, and finish with a date element. For example, GLKN_SLBE_Field_Data_20070605.doc contains field data from Sleeping Bear Dunes National Lakeshore on June 5, 2007. Do not use spaces in file names.

5.5.4 Data Archival and Distribution Procedures

Data archiving serves two primary functions: it provides a source to retrieve a copy of any dataset when the primary dataset is lost or destroyed, and it provides a data record that is an essential part of the QA/QC process. Original data will be archived at the Network office. Original data for printed forms are either the physical datasheets or exact and complete digital copies of the forms that capture all entries and notations. The unedited sound files (.wav) are the original data for digital data.

All digital data have a duplicate file created at the earliest opportunity. Digital field data that are entered directly into a field computer or collected from a data logger must be backed up to a second medium at the earliest possibility. The data files on field computers must not be erased until the integrity of these data files are verified on the duplicate storage medium. The removal of original data files from a field computer must be a balance of keeping memory available for new data collection and a need to keep data in their most original form for as long as possible. Field files should only be deleted when memory space is needed for new data collection.

GLKN's master version of the amphibian monitoring Access database is maintained on a central server in the Ashland Office that is backed up daily, and backed up off-site weekly. Complete details of the GLKN Server archiving procedure are found the Infrastructure chapter of GLKN's Data Management Plan (Hart and Gafvert 2006); the general strategy for data archiving is also described in this plan and its appendices.

5.6 Data Analysis and Reporting

As noted above, one program objective is to periodically assess the percent area occupied (PAO) over time to determine if the distribution or number of occupied sites of any monitored species changes significantly and compare these results with results from other national and state programs. The PAO (MacKenzie et al. 2002, MacKenzie et al. 2003) will be the principal metric to quantify occupancy of sites for targeted species across parks, and requires analyzing data for each species independently for each sampling method used. Available measures of environmental conditions should also be used to test whether trends in occupancy are associated with environmental parameters (i.e., as covariates for PAO analyses). These could include precipitation, drought index,

habitat fragmentation, temperature, ice duration, snow cover, frost depth, water chemistry, etc. Descriptive ecological and survey data summaries will be provided as well, with metrics on species detected at each sampling site each year with detection confidence limits, detection probabilities for each species at each site, averaged detection probabilities with standard errors for each species across sites in each park and across all parks, lists of species that are detected at 95% confidence for each park by the survey method, covariate analyses, and PAO trends with confidence intervals. If an information-theoretic approach is used to compare various models of occupancy and detectability, models will be considered exploratory rather than confirmatory (Burnham and Anderson 2002). These in depth trend analyses will be performed every 3-5 years on a per-park basis, and optionally more regional pooled analyses will be performed covering larger geographic areas to increase power (i.e., several parks, and/or non-NPS data, included).

For long-term analyses, a master matrix of species by site, compared through time, will be used to detect any concomitant changes in occupancy patterns across species. Comparison of these matrices through time will allow us to identify apparent turnover in site occupancy (or lack of detection). For example, if a significant proportion of species are consistently not detected at a water body (or collection of water bodies), and these absences are not explained by any weather or related conditions, increased monitoring at the site may be merited. Investigations will also seek to determine which variables most strongly affect detectability (and presence) of each amphibian species. Figures may include trend charts for PAO, maps of sites, annual temperature and precipitation of the current and last 30 years at nearby weather stations, and GIS coverages of any other spatially explicit stressor (e.g., roads). Tables may include parameters of monitoring effort and PAO with confidence intervals and standard errors for each park. Text may also include noteworthy anecdotes or observations.

In long-term analyses, model updating through an information-theoretic approach (Burnham and Anderson 2002) will be performed, given results of subsequent sampling, to see whether occupancy and detectability are changing over time. PAO for each species for each year will be analyzed over the long-term using models designed for this purpose (Mackenzie and Royle 2005) and available in the program PRESENCE. Trends for PAO will be compared with any trends in the numbers of individuals observed per species per site per year, perhaps by incorporating calling indices into PAO (Royle 2004).

Relatively brief annual reports will be provided to each park, including: the total sampling effort (# days, # samples, # sites), descriptions of locations monitored and environmental data collected, lists/tables of species detected, and outlines of any departures from initial sampling strategy imposed by logistical, equipment, or other constraints.

The time required to run a single recording through a Song Scope recognizer file is significantly less than the actual recording time, and files can be batch processed, so that, for example, the researcher could set a process running to recognize spring peepers in 200 files, go home for the night, and have the results in the morning, when he/she reruns the files through the next species recognizer (i.e., American toad). Under this sampling design, each ARS (Song Meter) will annually record 1,274 5-minute samples (106.2 hours, 12.2 GB), and each park with 10 ARS units will produce 12,740

samples per year (1,062 hours, 122 GB). The time required for data management, analysis and reporting is hard to predict, but should be quantifiable after an initial trial period. Analyses do not necessarily have to use all recordings – subsets may be selected. For example, for analysis of any given species, an initial first step is bounding the sampling period by first and last observation to define the period when the species was calling and therefore assumed detectable at each site. Within these bounds, N samples can be analyzed for presence/absence. This subset may be further filtered by time or weather constraints (for example, throw out any samples where ambient temperature was below 50 degrees F, or recording was earlier than 9 PM). The viable filtering procedures will emerge after initial covariate analyses.

See SOP #7 for detailed information on data analysis and reporting.

5.6.1 Data Archival Procedures

GLKN's general strategy for data archiving is described in GLKN's Data Management Plan and appendices (Hart and Gafvert 2006). Guidance specific to this amphibian monitoring protocol is presented here. Data archiving serves two primary functions, it provides a source to retrieve a copy of any data set when the primary dataset is lost or destroyed, and it provides a data record that is an essential part of the QA/QC process (SOP #9).

Original data are always archived. Original data for any printed forms are either the physical datasheets or exact and complete digital copies of the forms that capture all entries and notations. The unedited files are the original data for digital data.

All digital data will have a duplicate file created at the earliest opportunity and there must always be at least two complete copies of the amphibian monitoring dataset. This includes digital replicas (scanned versions) of any hard copy data sheets or maps. Digital field data that are entered directly into a field computer or collected from a data logger must be backed up to a second medium each day. Where possible, data files should be duplicated in the field, with at least one copy being stored in a solid state memory product (for example, CF cards and SD cards), which are less susceptible to damage from physical shocks than is a mechanical hard drive. The data files on field computers and loggers must not be erased until verification of the duplicate storage media. Field files should only be deleted when memory space is needed for new data collection and then only when backup files have been verified on another storage medium (second hard drive).

GLKN's master version of the amphibian monitoring Access database is maintained on a central server in the Ashland office that is backed up daily, and backed up off-site weekly. Complete details of the GLKN Server archiving procedure are found in the Infrastructure chapter of GLKN's Data Management Plan.

Literature Cited

- Casper, G. S., W. Sadinski, E. Beever, and K. D. Bowen. 2012. Amphibian monitoring protocol, version 1.0. Unpublished Natural Resources Technical Report to the Great Lakes Inventory and Monitoring Network, National Park Service, Ashland, Wisconsin.
- Hart, M., and U. Gafvert (editors). 2006. Data management plan: Great Lakes Inventory and Monitoring Network. Great Lakes Inventory and Monitoring Network. Technical Report GLKN/2006/20. National Park Service, Ashland, Wisconsin.

Appendix A. Database Structure.



Figure A1. The GLKN amphibian monitoring database follows the standard structure for I&M Microsoft Access databases—forms, queries, and logic are all in a front-end file, and data are stored in a linked back-end file.

DEPLOYMENT

Site APIS01 Date 5/30/2014 Audio Logger APIS

Site Description Saxine Creek Meyers Beach

Location Saxine Creek XCoord 648518 YCoord 5193904

Name
 ▶ Hart, Mark
 Gafvert, Ulf
 Casper, Gary
 *

Add/Edit Contacts

Deployment Detail Visits/Recovery Equipment Detail Site Detail Observations Detections

Audio Logger APIS Firmware version 3.3.1 Serial Number 003577

Set File APIS01_201405 File Prefix APIS01 Developed By Hart

	Slot A	Slot B	Slot C	Slot D
SD Card number	APIS01 Slot A	APIS01 Slot B		
SD Card size	32GB	32GB		

Date/Time turned on 5/30/2014 Time 9:30

Date/Time of next event 5/30/2014 Time 12:00

Passed LED light test ☒

Description of the Mounting System mounted with a nylon strap around a leaning cedar tree

Height off ground 148 cm Orientation (front is facing) Southwest

Vegetation or obstructions A few tag alders near Sm. No acoustic obstructions

Distance to wet edge 8.9 m Inside wet edge? ☐

Photo info

Temp Sensor/Logger Info

Temp Logger # 10187843 Temp Logger Type Stand-alone

Sensor Placement Float

Distance top of Sensor/Logger to water surface 5 cm Water Depth at Sensor/Logger cm

Distance between Audio Logger and Temp Sensor/Logger 24.5 m

Bottom substrate type Clay

Figure A2. The event action in the amphibian data structure is the deployment of the acoustic recorder.

SITES

Site List

Site Code	Park	Site Description
APIS01	APIS	Saxine Creek Meyers Beach
APIS02	APIS	Little Sand Bay Lagoon
APIS03	APIS	Julian Bay Lagoon Stockton Isl
APIS04	APIS	Stockton Island NW Lagoon
APIS05	APIS	Sand Isl West Beaver Pond
APIS06	APIS	Sand Isl East Bay
APIS07	APIS	Michigan Isl Lagoon
APIS08	APIS	Rocky Isl Sandspit
APIS10	APIS	Basswood Isl Quarry
APIS11	APIS	Outer Isl Lagoon
ISRO01	ISRO	Daisy Farm Trl - Upper Pond
ISRO02	ISRO	South Siskiwit Beaver Pond
ISRO03	ISRO	Malone Bay NE of RS
ISRO04	ISRO	Mt Franklin Trail
ISRO05	ISRO	Huginnin Trail
ISRO06	ISRO	Siskiwit River Pond
ISRO07	ISRO	Windigo Old Radio Tower
ISRO08	ISRO	Lake Ojibway
ISRO09	ISRO	Washington Creek Cmpgrnd
ISRO10	ISRO	Passage Island SW
MISS01	MISS	Coldwater Site
MISS02	MISS	Ravenna Trail & Mwy 68
MISS03	MISS	Grey Cloud Dunes SNA N
MISS04	MISS	Hastings/Ravenna Trail
MISS05	MISS	Macalester Ordwav

Record: 1 of 50

Site Detail

Site Code: APIS01

Park: APIS

Site Description: Saxine Creek Meyers Beach

Primary access road and/or trail: Meyers Beach Road

Parking location: Meyers Beach Parking Lot

Description of hike to the target wetland:

Site Marker (i.e., wetland edge, witness tree):

Default Location: Saxine Creek 2014

Default Wetland Edge Location:

Wetland type: Permanent Wetland size: 3.35

Associated waterbodies: River

Coarse habitat class: Mixed Other:

Wetland vegetation:

Distance to disturbance: <150m

Dominant overstory: Aspen, white birch, spruce, red maple

Dominant understory: Regen

Height of overstory:

Hydro-period Indicators:

Wetland is Dry/Wet: Wet Estimated Max Depth:

Connected to permanent waters during high water periods? Yes

LOCATIONS

Location Name	UTM Zone	UTM Band	X Coord	Y Coord	Elevation	USGS Quad
Molstrand Wetland	16		546304	5149344		
Mosquito Falls	16		540361	5152064		
Mt Franklin Trail 2015	16		384563	5331493		
North Manitou Lake 2014	16		576469	4996072		
Outer Isl Lagoon 2014	15		692840	5208486		
Outer Isl Lagoon 2015	15		692841	5208450		
Passage Island SW 2015	16		398662	5342137		
Pickerel Lake - St. Paul 2015	15		491090	4974340		
Platte Plains 2014	16		573135	4953874		
Ravenna Trail & Mwy 68 2015	15		520538	4945797		
Rocky Isl Sand Spit 2014	15		676240	5209963		
S. Siskiwit Beaver Pond 2015	16		368089	5316906		
Sand Isl East Bay 2014	15		656954	5205291		
Sand Isl West Bay 2014	15		654559	5204096		
Saxine Creek 2014	15		648518	5193904		
School Lake 2014	16		587776	4973792		
Shell Lake/Pyramid Point 2014	16		585863	4979048		
Siskiwit River Pond 2015	16		365637	5316404		
Stockton Isl Julian Bay 2014	15		686803	5198682		
Stockton Isl NW Lagoon 2014	15		679900	5201436		
Swing Bridge - IGH 2015	15		498900	4966710		
Three Rivers Park 2015	15		475387	4998380		
Tucker Lake 2013	16		582752	4972686		

Record: 22 of 52

Figure A3. The Site and Location forms in the database show the Sites—perennial sampling locations, and the Locations—specific annual deployment locations within a designated Site.

MAINTENANCE FORMS

Click on a list name Close

- Audio Loggers
- Battery Types
- Bottom Substrate Types
- Contacts
- Distance Ranges
- Habitat Classes
- Height Ranges
- Locations
- Observation Types
- Observation Values
- Parks
- Recognizers
- Set Files
- Sites
- Species**
- Temp Logger Types
- Waterbody Types
- Wetland Types

Common Name	Scientific Name	TSN
American bullfrog	Lothobates catesbeianus	
Blanchard's cricket frog	Acris blanchardi	
boreal chorus frog	Pseudacris maculata	
Cope's gray treefrog	Hyla chrysoscelis	
eastern American toad	Anaxyrus americanus americanus	
Fowler's toad	Anaxyrus fowleri	
gray treefrog	Hyla versicolor	
mink frog	Lithobates septentrionalis	
northern green frog	Lithobates clamitans melanota	
northern leopard frog	Lithobates pipiens	
spring peeper	Pseudacris crucifer	
wood frog	Lithobates sylvaticus	

Figure A4. There are list maintenance forms in the database for all lookup categories.

IMPORT

Clear Staging Table Import to Staging Table Run Validations Append to Database

Invalid Recognizer Codes: 0
Invalid Audio Logger Num: 0
Invalid Verified By Names: 0
Invalid Matching Deployment Count: 0

File	Time	Duration	Level	Quality	Score	Recognizer	Verification	Verified By	Comments	Parsed Filename	Parsed Audio Logger	Parsed Park Code	Parsed Date	Parsed Time	Invalid Recognizer	Invalid Validated By	Invalid Audio Logger Num	Matching Deployments
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\02.52.0	6.704	33	22.7	70.01	BUFO1	good				ISRO-GLN421_20120604_230000	GLN-421	ISRO	6/4/2012	230000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\04.32.2	3	29	82.9	52.56	BUFO1					ISRO-GLN421_20120604_230000	GLN-421	ISRO	6/4/2012	230000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\04.57.0	3.048	28	40.5	89.27	BUFO1					ISRO-GLN421_20120604_230000	GLN-421	ISRO	6/4/2012	230000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\00.12.3	4.144	29	83.9	63	BUFO1					ISRO-GLN421_20120605_000000	GLN-421	ISRO	6/5/2012	000000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\00.36.3	1.66	26	23.2	52.62	BUFO1					ISRO-GLN421_20120605_000000	GLN-421	ISRO	6/5/2012	000000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\03.24.0	6.688	33	20.3	87.46	BUFO1					ISRO-GLN421_20120605_000000	GLN-421	ISRO	6/5/2012	000000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\03.59.0	2.048	28	29.4	51.39	BUFO1					ISRO-GLN421_20120605_000000	GLN-421	ISRO	6/5/2012	000000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\04.29.3	3.056	32	44.6	69.51	BUFO1					ISRO-GLN421_20120605_000000	GLN-421	ISRO	6/5/2012	000000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\04.54.3	5.664	30	34.6	63.36	BUFO1					ISRO-GLN421_20120605_000000	GLN-421	ISRO	6/5/2012	000000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\00.33.0	2.104	35	28.2	59.59	BUFO1					ISRO-GLN421_20120605_010000	GLN-421	ISRO	6/5/2012	010000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\00.36.0	3.728	32	55.4	56.7	BUFO1					ISRO-GLN421_20120605_010000	GLN-421	ISRO	6/5/2012	010000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\00.41.1	3.28	28	89.6	58.66	BUFO1					ISRO-GLN421_20120605_010000	GLN-421	ISRO	6/5/2012	010000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\00.52.4	4.584	33	72.4	63.91	BUFO1					ISRO-GLN421_20120605_010000	GLN-421	ISRO	6/5/2012	010000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\01.19.2	4.664	30	83	59.63	BUFO1					ISRO-GLN421_20120605_010000	GLN-421	ISRO	6/5/2012	010000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\02.06.4	6.56	34	24.8	85.75	BUFO1					ISRO-GLN421_20120605_010000	GLN-421	ISRO	6/5/2012	010000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\02.56.0	4.912	31	53.5	63.96	BUFO1					ISRO-GLN421_20120605_010000	GLN-421	ISRO	6/5/2012	010000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\03.17.4	4.4	34	83.1	61.82	BUFO1					ISRO-GLN421_20120605_010000	GLN-421	ISRO	6/5/2012	010000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\04.26.4	6.72	33	25.2	62.26	BUFO1					ISRO-GLN421_20120605_010000	GLN-421	ISRO	6/5/2012	010000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\04.53.4	5.04	31	59.2	70.34	BUFO1					ISRO-GLN421_20120605_010000	GLN-421	ISRO	6/5/2012	010000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\00.56.3	1.696	28	20.7	53.76	BUFO1					ISRO-GLN421_20120605_020000	GLN-421	ISRO	6/5/2012	020000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\01.14.4	3.776	29	86.5	62.19	BUFO1					ISRO-GLN421_20120605_020000	GLN-421	ISRO	6/5/2012	020000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\01.47.2	6.72	29	24.2	65.75	BUFO1					ISRO-GLN421_20120605_020000	GLN-421	ISRO	6/5/2012	020000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\02.11.1	5.2	29	43.3	61.38	BUFO1					ISRO-GLN421_20120605_020000	GLN-421	ISRO	6/5/2012	020000				1
S:\Casper\work\SongScope\GLN\4216-4-7-2Data\02.25.0	2.728	32	31.5	69.43	BUFO1					ISRO-GLN421_20120605_020000	GLN-421	ISRO	6/5/2012	020000				1

Records: 1 of 65

Figure A5. Recognizer data is imported from spreadsheet files using a form, procedures, and queries, then displayed for QC checking following import.



Figure A6. Entity relationship diagram of the amphibian monitoring database.