Standard Operating Procedure (SOP) #15

Data Entry and Verification

Version 1.01 (March 18, 2022)

Change History

New Version #	Revision Date	Author	Changes Made	Reason for Change	Previous Version #
1.01	3/18/2022	Kelly Kozar, Kim Weisenborn	Updates to general instructions. Updated content to refer to new PACN I&M SharePoint. Updated figures to reflect change. Added database introduction and data entry log sections. Updated order of content.	To accurately reflect the data entry procedures. PACN data is no longer stored on a networked server (I:\ drive) and is now stored on the PACN I&M SharePoint site.	1.0

Only changes in this specific SOP will be logged here. Version numbers increase incrementally by hundredths (e.g., version 1.01, version 1.02) for minor changes. Major revisions should be designated with the next whole number (e.g., version 2.0, 3.0, 4.0). Record the previous version number, date of revision, author of the revision, changes made, and reason for the change along with the new version number.

Purpose

This SOP document describes the general procedures for entry and verification of field data in the working project database for the Pacific Island Inventory and Monitoring Network (PACN I&M) Established Invasive Plant Species (EIPS) Monitoring Protocol. Refer to protocol sections Overview of Database Design (section 4.3 of the protocol narrative), and Data Entry and Processing (4.4) for related guidance and a clarification of the distinction between the working database and the master database.

EIPS Monitoring Database

The EIPS Database is a Microsoft® Access application and is located in the EIPS Monitoring project workspace in the PACN I&M SharePoint site[1]. It employs a front-end/back-end configuration in which the user interface resides in the front-end database file. The front-end database file

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(designated by having "fe" in its filename) and the back-end database file for the sampling year are located in the root of the "Database" folder in SharePoint (Figure SOP 15.1).
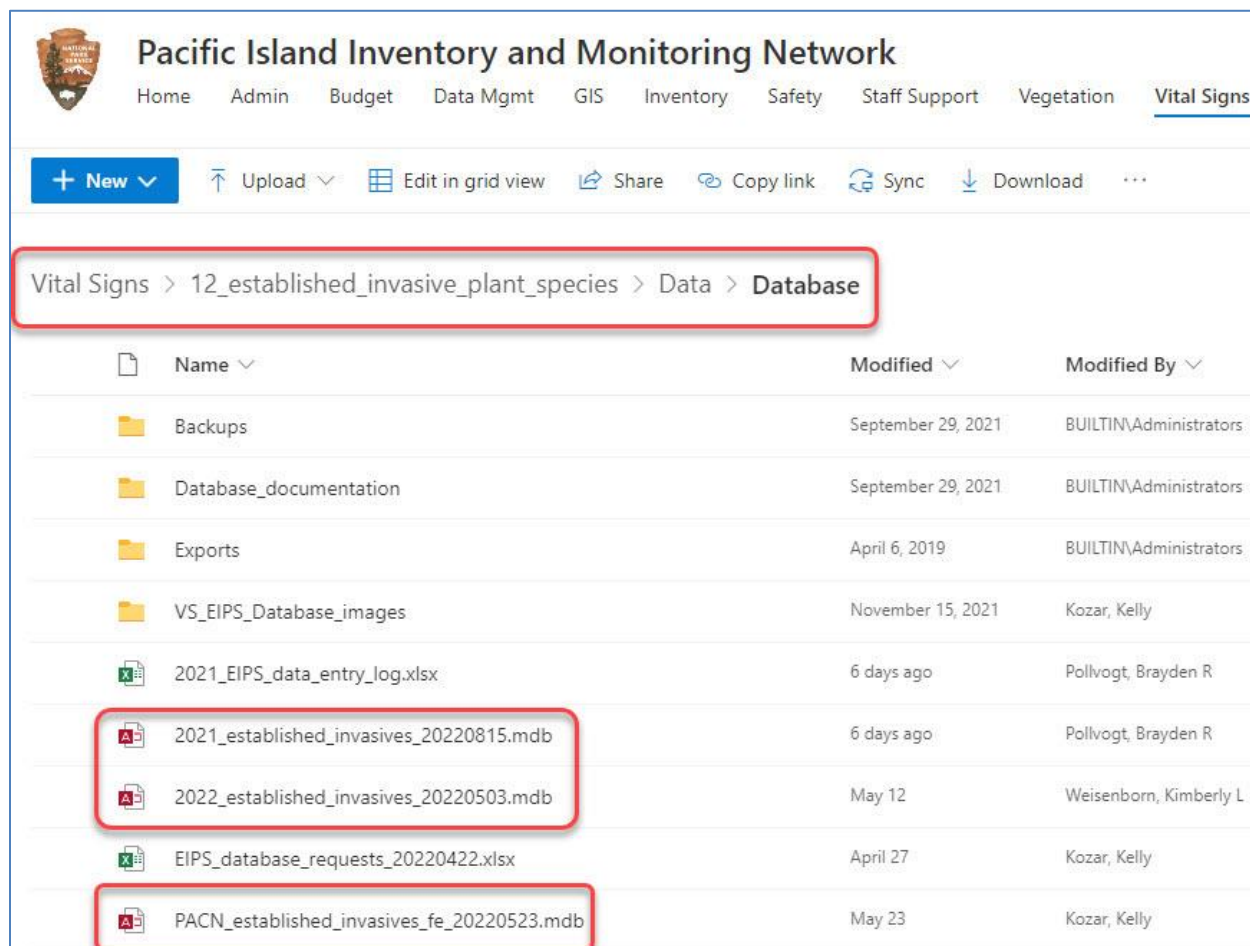

Figure SOP 15.1. Folder location for front-end and working back-end database files in SharePoint.

The front-end file (containing the forms, queries, modules, macros, and reports) is linked to the back-end file (containing the data tables). The user interface includes a File Linking Utility that allows the user to control this front-end/back-end file link. This front-end/back-end configuration allows for continual improvements to the user interface (i.e., the various forms and queries for getting data into and out of the database) without requiring duplication or modification of the underlying data tables.

A blank back-end database file for the sampling year will be made available in the "Database" folder in SharePoint at the beginning of the field season to facilitate prompt data entry and edits by the PACN Biological Technicians. Additionally, new versions of the front-end database file may be released as needed throughout the course of the field season. The PACN Data Manager will notify staff when new versions of the database files are ready for use. Users will need to download the front-end and back-end database files onto their local workspace on the user's computer since Microsoft® Access applications cannot be used directly from SharePoint. Instructions to do this can be found in the EIPS Monitoring Database User Guide.

Database Instructions

The first action to be taken is to make sure the local workspace is set up properly on the user's computer since the database application cannot be opened directly from SharePoint and must be downloaded. See SOP #12 Workspace Setup and Project Records Management for more information on how to setup the user's local workspace.

Refer to the EIPS Monitoring Database User Guide to view detailed instructions on how to download the database from SharePoint, as well as utilizing the database application on the user's local workspace.

1. The back-end database file should be first checked out[2] and then downloaded from the "Database" folder in SharePoint to the user's local workspace (e.g., C:\Users\[UserName]\Desktop\EIPS\Data\Database) for use. When finished, the back-end database file should be uploaded back to the "Database" folder in SharePoint and then checked back in.

2. The user's copy of the front-end database should also be stored in the same folder on the user's local workspace (e.g., C:\Users\[UserName]\Desktop\EIPS\Data\Database).

   o New issues of the front-end file may be released as needed through the course of the field season. If this happens, there should be no need to move or alter the back-end file. Instead, the front-end file may be deleted and replaced with the new version on the user's local workspace, which will be named in a manner reflecting the update (e.g., PACN_established_invasives_fe_20220523.mdb)

3. If it doesn't already exist, also create a "Backups" folder in the user's local workspace for storing daily backups of the back-end database file (e.g., C:\Users\[UserName]\Desktop\EIPS\Data\Database\Backups).

   o At the beginning of each data entry session, the user must create a backup of the back-end data file, ensuring that the initial data entry starting point can be recovered should irreversible errors or problems occur during the data entry session. The backup will be done using a database utility, which prompts the user to create the backup at the onset of a data entry session. This will not require a name change or revision change. The backup files will be named by adding the current date and time to the end of the back-end file name (e.g., "2022_established_invasives_2220318_1001_.mdb" for a backup file created at 10:01 AM on March 18, 2022). Back-up copies are used for the current field season only and will not be archived.

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[2] Make sure to check out the back-end database file from SharePoint before downloading it to the local workspace on your local computer. This will notify other user's that the back-end file is in use and ensure that no other user will download the back-end file.

4. Open the front-end database. The first thing it will do is to ask to update the links to the back-end database file. This will only need to be done once for each new issue of the front-end database.
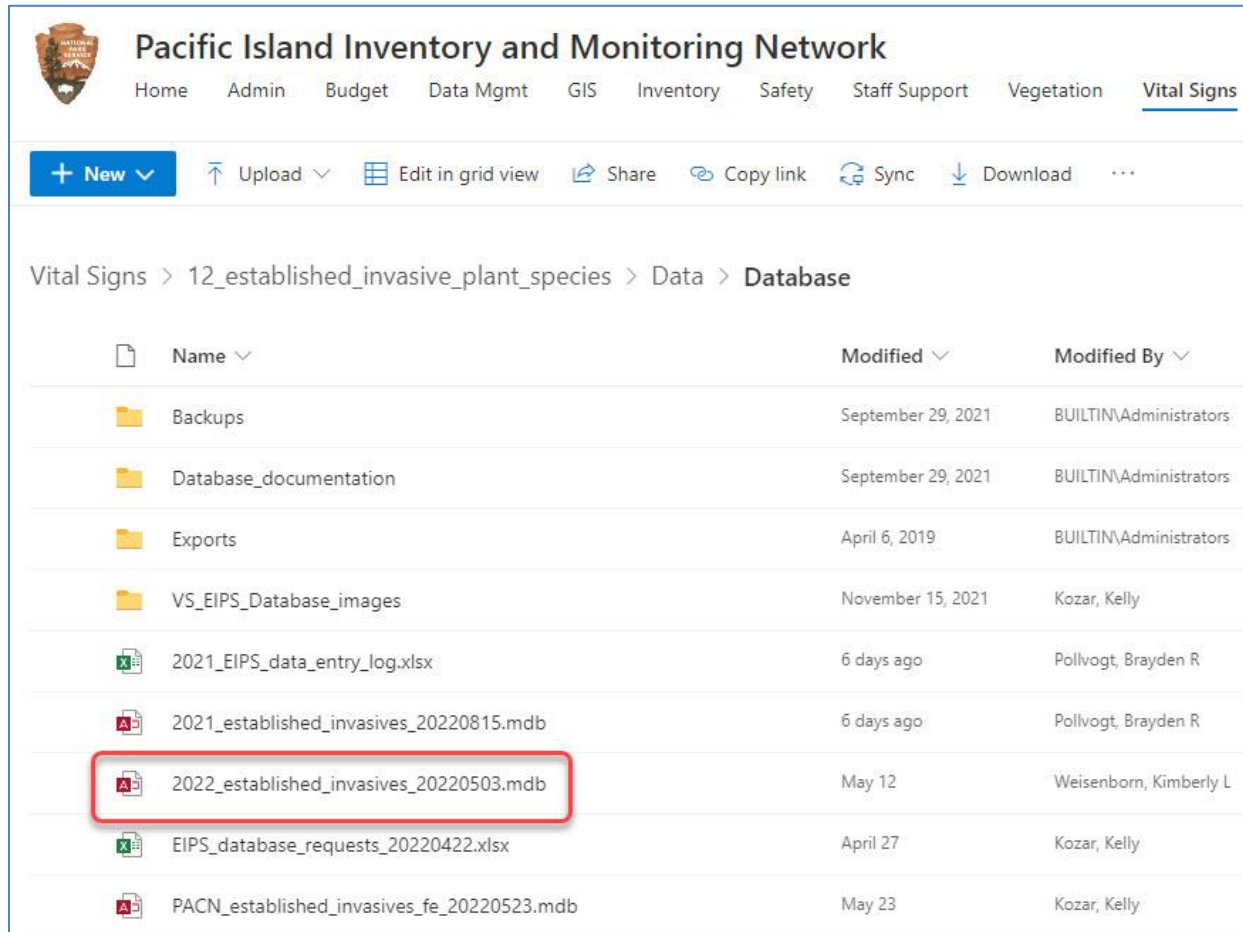
Data Entry

Refer to the EIPS Monitoring Database User Guide for detailed instructions on how to operate the database application, as well as uploading and checking the back-end database file into SharePoint once data entry is complete. The user guide provides step-by-step database instructions accompanied by screen-capture images. Ultimately, it is the PACN Botanist's and PACN Data Manager's shared responsibility to ensure that all data entry staff understand how to enter data and follow all applicable SOPs. Data entry technicians are responsible for becoming familiar with the field datasheets, the database software and structure, import file procedures, and any standard codes for data entry.

The following are general guidelines to keep in mind:

1. Data entry will be conducted by the PACN Botanist or another trained biological science technician at their duty station.

2. Data entry should occur as soon after data collection as possible so that field crews keep current with data entry tasks and catch any errors or problems as close to the time of data collection as possible.

3. Data entry should be completed by the person who collected the data or someone who is familiar with the project and data. The primary goal of data entry is to transcribe the data from paper and photographic records into the computer with 100% accuracy.

4. If any sensitive data is collected (e.g., endangered plant locations), then make a note of this on the original field datasheet, in the notes of the database data entry form, and let the PACN Data Manager know to flag the data as sensitive.

5. Each data entry form is patterned after the layout of the field datasheet and has built-in quality assurance components such as pick lists and validation rules to test for missing data or illogical combinations. The database allows the users to view only the pre-built forms and does not permit users to view the raw data tables and other database objects as a way of ensuring the maximum level of quality assurance.

6. As data are being entered or imported, the person entering the data should visually review each data entry form to make sure that the data on screen match the field datasheets. This should be done for each record prior to moving to the next form for data entry.

7. At regular intervals and at the end of the field season the PACN Botanist should inspect the data that have been entered to check for completeness and perhaps catch avoidable errors.

8. After each data entry session for a day, the PACN Botanist or designee should upload and check in the back-end database file into the "Database" folder in SharePoint with the date

stamp at the end of the filename replaced with the current date (e.g.,
2022_established_invasives_[YYYYMMDD][3].mdb) (Figure SOP 15.2).

Figure SOP 15.2. Example of file naming structure for back-end database file within the Database folder in SharePoint.

9. Update the EIPS Data Entry Log Microsoft® Excel spreadsheet. Include the date and name of the technician entering data. Use the data log to keep notes on data entry, including suggestions for updates, errors encountered, and who entered or proofread the data.

Data Verification

Quality control of data is a critical step in data management. Verification of data (ensuring data on the field datasheets match data entered into the database) is the responsibility of the PACN Botanist and designees. See recommendations outlined in Chapter 4 of the EIPS Monitoring Protocol. Any modifications to the EIPS Monitoring Database will be described in the edit log and the functionality of the verification routines will be explained in detail in the EIPS Monitoring Database User Guide.

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[3] [YYYYMMDD] = 4-digit year, 2-digit month, 2-digit day representing the date stamp on the database (e.g., 20220503)

Data verification checks that the digitized data match the source data. The following guidelines regarding data verification should be followed:

1. The PACN Botanist is responsible for specifying in the project protocol one or more of the data verification methods available and ensuring proper execution. At the discretion of the PACN Botanist, additional verification methods may be applied.

2. Data verification is carried out by staff thoroughly familiar with data collection and entry.

3. All records (100%) should be verified against original source data using the method below.

    a. Visual review after data entry: Upon completion of data entry, all records are printed and compared with the original values from the hardcopy datasheets. Errors are clearly marked and corrected in the database as soon after data entry as possible. Reliability increases if someone other than the person keying the data performs the review. Alternatively, two technicians (one reading from the original data and one checking the entered data) can perform this review. Questionable data should be flagged in the database.

4. A subset of randomly selected records (10%) should be reviewed after initial verification by the PACN Botanist. If errors are found, the entire dataset should be verified again.

5. A record of the verification process for each dataset, including number of iterations and results, will be prepared by the PACN Data Manager as part of formal metadata generation.

6. Spatial data collected as part of the project will be viewed in GIS and visually inspected for accuracy (e.g., points located outside park boundaries, upland locations occurring in water).

Data Entry Log

The EIPS Data Entry Log is a Microsoft Excel® spreadsheet that is used to keep track of processed EIPS Monitoring data for each plot within a sampling year. It is located in the "Database" folder in the EIPS Monitoring project workspace in SharePoint and should be filled out as data processing occurs (Figure SOP 15.3). Processed data is composed of scanning datasheets, processing images; and entering, verifying, and certifying data. For questions about how to fill in the EIPS Data Entry Log, please contact the PACN Botanist, Jacob Gross (jacob_gross@nps.gov) or PACN Lead Biological Science Technician, Kathryn Akamine (kathryn_akamine@nps.gov).

Figure SOP 15.3. Folder location in SharePoint for the EIPS Data Entry Log Microsoft Excel® spreadsheet for keeping track of data entry and verification.