Standard Operating Procedure (SOP) 7: Data Management

Protocol for Monitoring American Peregrine Falcons

Central Alaska (CAKN) Inventory and Monitoring Network

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May 2018

U.S. Department of the Interior
National Park Service
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Please cite this Standard Operating Procedure as:

Ambrose, S., N. Guldager, S. Daw, M. Beer, M.J. Flamme, M. MacCluskie. J. H. Schmidt, S. D. Miller. 2018. Standard Operating Procedure (SOP) 7: Data Management. Protocol for Monitoring American Peregrine Falcons in Central Alaska (CAKN) Inventory and Monitoring Networks. National Park Service, Fairbanks, Alaska. Available online at: https://irma.nps.gov/DataStore/Reference/Profile/2218300.

The main Narrative for the Protocol for Monitoring Peregrine Falcon in Central Alaska (CAKN) Inventory and Monitoring Network is available from the NPS Inventory and Monitoring Central Alaska Network website (http://science.nature.nps.gov/im/units/CAKN/) and the Natural Resource Publications Management website (http://www.nature.nps.gov/publications/nrpm/).

SOP 7 – Data Management

Standard Operating Procedure #7
Version 1.0 (May 2018)

Revision History Log:

Previous Version #	Revision Date	Author	Changes Made	Reason for Change	New Version #
Add rows as needed for each change or set of changes associated with each version.					

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SOP 7.0 – Introduction

This Standard Operating Procedure describes data management procedures for all data derived from monitoring Peregrine Falcons in Yukon-Charley Rivers National Preserve (YUCH), CAKN. This SOP applies to data from all years monitored, regardless of whether the year was selected for sampling in the USFWS Plan (2003). The USFWS Plan (2003) states that all Peregrine Falcon monitoring data will be useful in their analysis of population trends; therefore, data from all territories will be made available to the agency contacts listed below.

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This SOP and Microsoft Access database (*CAKN_PEFA.accdb)* were written and created by the CAKN assistant data manager, Nick Bywater. This protocol provides instructions for data entry and validation, and the development, maintenance and distribution of monitoring data associated with the CAKN American Peregrine Falcon Monitoring Protocol. Procedures for data handling and quality assurance/quality control for all monitoring protocols implemented by the Central Alaska Network are detailed in the network's Data Management Plan posted at:
http://science.nature.nps.gov/im/units/CAKN/DataMgt

SOP 7.1 – Data Model

Microsoft Access XP is the primary software environment for managing tabular data. ESRI ArcGIS serves as a tool for the validation of spatial data residing in Access. All data files must reside on a secure server or hard drive with regular backup routines and off-site storage rotation.

The database consists of two files in a front-end, back-end configuration that can be linked using a utility included with the database. The file *CAKN_PEFA.accdb* contains the forms, queries, and VBA code for the application itself, including the user interface; the back-end file, *CAKN_PEFA_be_.accdb* contains the data tables. The front-end, back-end configuration allows

continual improvements to the database user interface without altering the data structure or records. The database file name will change according to the database version number, which will be identical to the Data Management SOP version.

Figure 7-1 shows the relationships among the primary tables in the database. Data related to the area surveyed, which can be an existing territory or potential habitat, are entered into tbl_survey_location. Multiple survey events can be associated with one survey location. If birds are observed during the survey, details are recorded on their activity in tbl_survey_event. Data are also recorded if no birds are observed so that negative survey results are tracked. If a nest is observed, details are collected on the nest location, age and number of birds, and nest habitat in tbl_nest_location, tbl_nest_details, and tbl_nest_habitat. Each survey event is linked to tbl_master_version_table that defines the narrative and suite of SOP versions in effect at the time of the survey.

Location data as x,y coordinates are collected only if a nest site is observed, and two methods are used. The first method is to determine geographic coordinates (via GPS) of a reference position in the field from which bearing and distance to the nest site are recorded. This information helps subsequent observers relocate a position from which the nest can be observed. Upon returning from the field, a second set of coordinates that corresponds to the nest site location is derived by digitizing the nest location from a 1:63,360-scale (or larger-scale) topographic map.

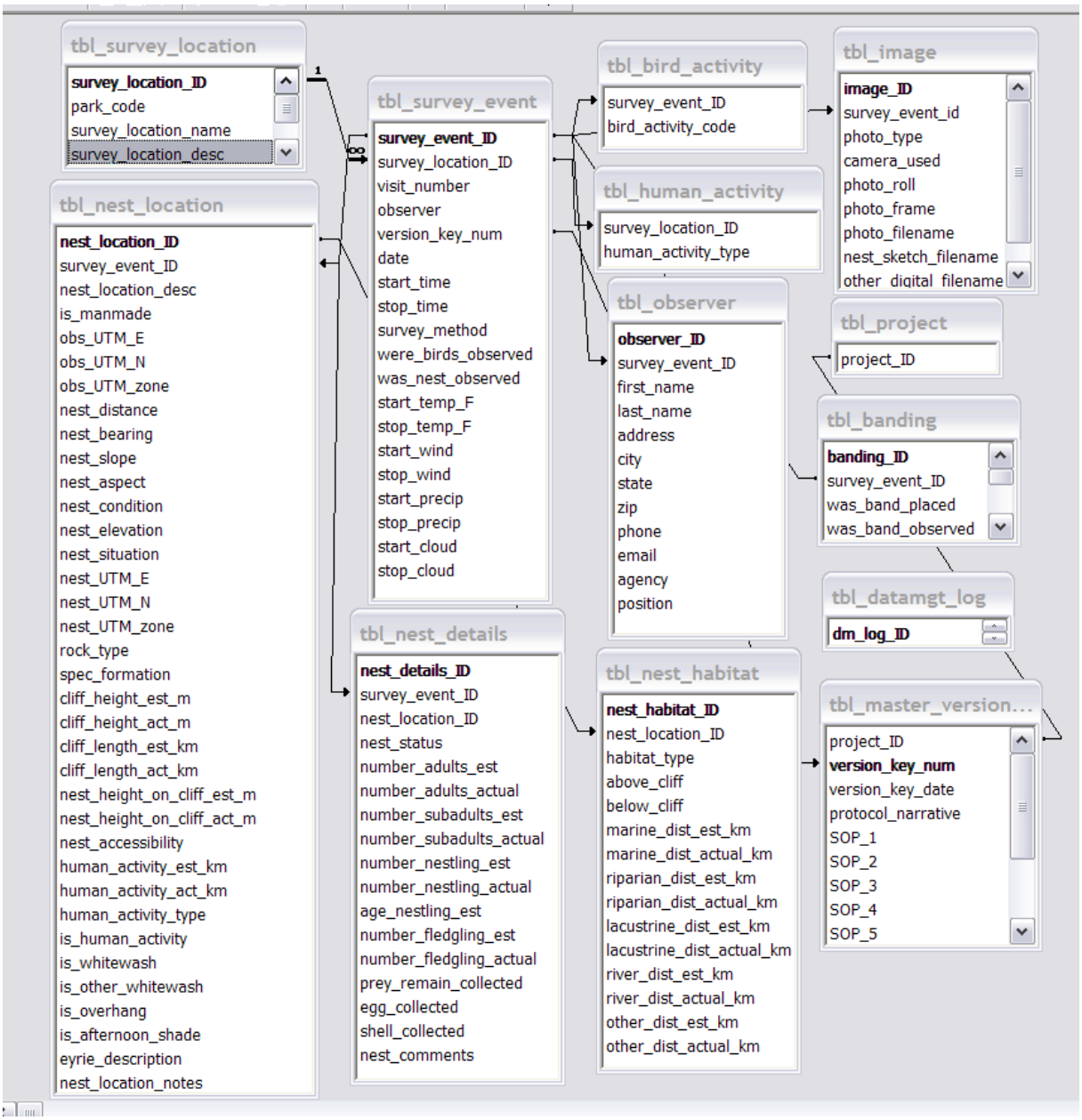


Figure 7-1. Data model for Peregrine Falcon monitoring. All look-up tables are not shown.

Table: **tbl_banding**
Description: Information regarding banding or banded peregrines.

FIELD NAME	FIELD DESCRIPTION	FIELD TYPE	FIELD WIDTH
banding_ID	Unique record identifier	dbLong	4
survey_event_ID	foreign key; link to tbl_survey_event	dbLong	4
was_band_placed	Was a peregrine banded?	dbBoolean	1
was_band_observed	Was a previously-banded peregrine observed?	dbBoolean	1
bird_age	Age class of banded bird. BBL abbreviations: U=unknown, L=local, HY=hatching year, AHY=after hatching year, SY=second year, ASY=after second year, TY=third year, and ATY=after third year	dbText	3
bird_sex	Sex of banded bird. BBL abbreviations: U=unknown, F=female, M=male	dbText	1
status	BBL code for status (see http://www.pwrc.usgs.gov/bbl/manual/status.htm)	dbText	50
band_number	Bird band number (including prefix)	dbText	50
band_color	Color of band	dbText	50
band_leg	Which leg is banded, right or left?	dbText	50
band_notes	Comments regarding banded bird observation	dbText	50

Table: **tbl_bird_activity**
Description: Peregrine activity/behavior descriptions.

FIELD NAME	FIELD DESCRIPTION	FIELD TYPE	FIELD WIDTH
survey_event_ID	Unique record identifier	dbLong	4
bird_activity_code	Activity or behavior of bird (from tlu_bird_activity)	dbText	50

Table: **tbl_datamgt_log**
Description: Table containing a log of data set manipulations or database object alterations.

FIELD NAME	FIELD DESCRIPTION	FIELD TYPE	FIELD WIDTH
dm_log_ID	Unique record identifier	dbLong	4
item_description	What was done with the data set? Include changes to data and changes to database objects or structures.	dbMemo	0

Table: **tbl_human_activity**
Description: Human activity detected in survey area.

FIELD NAME	FIELD DESCRIPTION	FIELD TYPE	FIELD WIDTH
survey_location_ID	foreign key; link to tbl_survey_location	dbLong	4
human_activity_type	type of human activity at survey location (use tlu_human_activity)	dbText	50

Table: **tbl_image**
Description: Photo and other digital image related information.

FIELD NAME	FIELD DESCRIPTION	FIELD TYPE	FIELD WIDTH
image_ID	Unique image record identifier	dbLong	4
survey_event_id	foreign key; link to tbl_survey_event	dbLong	4
photo_type	Type of image - e.g., slide, photograph, digital image	dbText	15
camera_used	Type of camera used (e.g., Nikon Coolpix 4500)	dbText	50
photo_roll	Photo roll ID	dbText	50
photo_frame	Photo frame ID	dbText	50
photo_filename	Unique image filename	dbText	50
nest_sketch_filename	Unique nest sketch digital filename	dbText	50
other_digital_filename	Unique filename for other digital image file	dbText	50

Table: **tbl_master_version_table**
Description: Reference of all protocol versions that are in effect at a given time.

FIELD NAME	FIELD DESCRIPTION	FIELD TYPE	FIELD WIDTH
project_ID	Unique identifier for project	dbLong	4
version_key_num	Protocol version key number (maintained in SOP #10)	dbLong	4

version_key_date	Date of protocol version key number	dbDate	8
protocol_narrative	Version of protocol narrative	dbText	50
SOP_1	Version of SOP #1	dbDecimal	16
SOP_2	Version of SOP #2	dbDecimal	16
SOP_3	Version of SOP #3	dbDecimal	16
SOP_4	Version of SOP #4	dbDecimal	16
SOP_5	Version of SOP #5	dbDecimal	16
SOP_6	Version of SOP #6	dbDecimal	16
SOP_7	Version of SOP #7	dbDecimal	16
SOP_8	Version of SOP #8	dbDecimal	16
SOP_9	Version of SOP #9	dbDecimal	16
SOP_10	Version of SOP #10	dbDecimal	16

Table: **tbl_nest_details**
Description: Description of peregrines at the nest and related nest activities.

FIELD NAME	FIELD DESCRIPTION	FIELD TYPE	FIELD WIDTH
nest_details_ID	Unique record identifier	dbLong	4
survey_event_ID	foreign key; link to tbl_survey_event	dbLong	4
nest_location_ID	foreign key; link to tbl_nest_location	dbLong	4
nest_status	Status of nest (from tlu_nest_status_)	dbText	50
number_adults_est	Estimated number of adults at nest site	dbLong	4
number_adults_actual	Actual number of adults at nest site	dbLong	4
number_subadults_est	Estimated number of subadults at nest site	dbLong	4
number_subadults_actual	Actual number of subadults at nest site	dbLong	4
number_nestling_est	Estimated number of nestlings in nest	dbLong	4
number_nestling_actual	Actual number of nestlings in nest	dbLong	4

age_nestling_est	Estimated age of nestlings in nest (in days)	dbLong	4
number_fledgling_est	Estimated number of fledglings (reached 80% of fledgling age) at nest site	dbLong	4
number_fledgling_actual	Actual number of fledglings (reached 80% of fledgling age) at nest site	dbLong	4
prey_remain_collected	Did observers collect prey remains from nest site?	dbBoolean	1
egg_collected	Number of eggs observers collected from nest	dbInteger	2
shell_collected	Did observer collect egg shells from the nest site?	dbBoolean	1
nest_comments	Comments regarding nest details	dbText	50

Table: **tbl_nest_habitat**
Description: Description of nest habitat types and distance from various water source types.

FIELD NAME	FIELD DESCRIPTION	FIELD TYPE	FIELD WIDTH
nest_habitat_ID	Unique record identifier	dbLong	4
nest_location_ID	foreign key; link to tbl_nest_location	dbLong	4
habitat_type	Habitat type (from tlu_habitat_type)	dbText	50
above_cliff	Habitat type above nesting cliff area (choose from Dominant Habitat Types on Raptor Nest/Eyrie Record Card)	dbText	50
below_cliff	Habitat type below nesting cliff area (choose from Dominant Habitat Types on Raptor Nest/Eyrie Record Card)	dbText	50
marine_dist_est_km	Estimated distance, in kilometers, from nest to marine habitat	dbLong	4
marine_dist_actual_km	Actual distance, in kilometers, from nest to riparian habitat	dbLong	4
riparian_dist_est_km	Estimated distance, in kilometers, from nest to riparian habitat	dbLong	4
riparian_dist_actual_km	Actual distance, in kilometers, from nest to riparian habitat	dbLong	4
lacustrine_dist_est_km	Estimated distance, in kilometers, from nest to lake	dbLong	4
lacustrine_dist_actual_km	Actual distance, in kilometers, from nest to lake	dbLong	4

FIELD NAME	FIELD DESCRIPTION	FIELD TYPE	FIELD WIDTH
river_dist_est_km	Estimated distance, in kilometers, from nest to river/stream	dbLong	4
river_dist_actual_km	Actual distance, in kilometers, from nest to river/stream	dbLong	4
other_dist_est_km	Estimated distance, in kilometers, from nest to other perrenial water	dbLong	4
other_dist_actual_km	Actual distance, in kilometers, from nest to other perrenial water	dbLong	4

Table: **tbl_nest_location**
Description: Established peregrine nest description and location information.

FIELD NAME	FIELD DESCRIPTION	FIELD TYPE	FIELD WIDTH
nest_location_ID	unique record identifier	dbLong	4
survey_event_ID	foreign key; link to tbl_survey_event	dbLong	4
nest_location_desc	Description of nest location	dbText	50
is_manmade	Is the nest manmade?	dbBoolean	1
obs_latitude	geographic coordinate at observation point (Latitude, decimal degrees)	dbLong	4
obs_longitude	geographic coordinate at observation point (Longitude, decimal degrees)	dbLong	4
nest_distance	Distance from observation point to nest (meters)	dbLong	4
nest_bearing	Bearing from observation point to nest (degrees); set declination for true north	dbInteger	2
nest_slope	Slope aspect of nest cliff (degrees)	dbInteger	2
nest_aspect	Slope aspect of nest (degrees)	dbInteger	2
nest_condition	Condition of nest (good, fair, poor/remnant)	dbText	4
nest_elevation	Nest elevation above sea level (feet)	dbLong	4
nest_situation	Nest situation (cliff ledge, cliff sticknest, cliff cavity, open hillside, level ground, other)	dbText	15
nest_latitude	geographic coordinate of nest– digitized from map	dbLong	4

FIELD NAME	FIELD DESCRIPTION	FIELD TYPE	FIELD WIDTH
nest_longitude	geographic coordinate of nest– digitized from map	dbLong	4
rock_type	Cliff rock type (Sedimentary, Igneous, Metamorphic)	dbText	15
spec_formation	Rock formation, if known (e.g., Morrison, Entrada)	dbText	15
cliff_height_est_m	Estimated distance from bottom to top of cliff (meters)	dbLong	4
cliff_height_act_m	Actual distance from bottom to top of cliff (meters)	dbLong	4
cliff_length_est_km	Estimated length of cliff (kilometers - to nearest tenth)	dbLong	4
cliff_length_act_km	Actual length of cliff (kilometers - to nearest tenth)	dbLong	4
nest_height_on_cliff_est_m	Estimated height from bottom of cliff to nest (meters)	dbLong	4
nest_height_on_cliff_act_m	Actual height from bottom of cliff to nest (meters)	dbLong	4
nest_accessibility	Nest accessibility to ground predators (Easy, Moderately Difficult, Very Difficult)	dbText	20
human_activity_est_km	Estimated nearest human activity to nest (kilometers - to nearest tenth)	dbLong	4
human_activity_act_km	Actual nearest human activity to nest (kilometers - to nearest tenth)	dbLong	4
human_activity_type	Closest and most prominent type(s) of human activity (trail, road, boating, aircraft, building, agriculture, construction, research, mining, oil/gas, logging, etc.)	dbText	50
is_human_activity	Is there human activity visible from the nest?	dbBoolean	1
is_whitewash	Is there whitewash at the nest?	dbBoolean	1
is_other_whitewash	Is there other whitewash on the cliff area?	dbBoolean	1
is_overhang	Is there an overhang (sheltered from most elements except for extreme conditions) over the eyrie?	dbBoolean	1
is_afternoon_shade	Is the nest shaded in the afternoon?	dbBoolean	1
eyrie_description	Describe the eyrie	dbText	50

FIELD NAME	FIELD DESCRIPTION	FIELD TYPE	FIELD WIDTH
nest_location_notes	Additional notes on nest location	dbText	50

Table: **tbl_obs_location**
Description: Location information for potential habitat surveyed.

FIELD NAME	FIELD DESCRIPTION	FIELD TYPE	FIELD WIDTH
obs_location_ID	Unique record identifier	dbLong	4
park_code	Standard 4-letter Park code	dbText	4
latitude	geographic coordinate of observation point	dbLong	4
longitude	geographic coordinate of observation point	dbLong	4
datum	Datum of coordinates	dbText	50
USGS_quad	Full official name(s) printed on each 1:63,360 USGS quadrangle that covers the site location. If more than one quad, separate the quad names with a comma and a space.	dbText	50

Table: **tbl_observer**
Description: Name and contact information for observers.

FIELD NAME	FIELD DESCRIPTION	FIELD TYPE	FIELD WIDTH
observer_ID	unique record identifier	dbLong	4
survey_event_ID	foreign key; link to tbl_survey_event	dbLong	4
first_name	First name of observer	dbText	50
last_name	Last name of observer	dbText	50
address	Street address of observer	dbText	50
city	City location of observer	dbText	50
state	2-Letter state abbreviation of observer	dbText	2
zip	Zip Code location of observer	dbLong	4
phone	Phone number of observer (including area code)	dbText	50

email	email address of observer	dbText	50
agency	Agency to which observer is affiliated	dbText	50
position	Position title of observer	dbText	50

Table: **tbl_project**
Description: Contains identifier for project; enables link to master_version_table.mdb.

FIELD NAME	FIELD DESCRIPTION	FIELD TYPE	FIELD WIDTH
project_ID	Unique identifier for project	dbLong	4

Table: **tbl_survey_event**
Description: Event-specific information for survey.

FIELD NAME	FIELD DESCRIPTION	FIELD TYPE	FIELD WIDTH
survey_event_ID	Unique record identifier	dbLong	4
survey_location_ID	foreign key; link to tbl_survey_location	dbLong	4
visit_number	Visit number for the current sample year	dbInteger	2
observer	Name of observer	dbText	50
version_key_num	Version key number in effect on survey date (see tbl_master_version_table)	dbInteger	2
date	Date of survey	dbDate	8
start_time	Observation start time	dbDate	8
stop_time	Observation stop time	dbDate	8
survey_method	Survey was done by: foot, vehicle, boat, plane, helicopter, incidental obs	dbText	15
were_birds_observed	Were any peregrines observed?	dbBoolean	1
was_nest_observed	Was the peregrine eyrie observed?	dbBoolean	1
start_temp_F	Temperature (Fahrenheit) at start of observation	dbLong	4
stop_temp_F	Temperature (Fahrenheit) at end of observation	dbLong	4
start_wind	Wind speed (kilometers/hour) at start of observation	dbLong	4
stop_wind	Wind speed (kilometers/hour) at end of observation	dbLong	4
start_precip	Describe precipitation, if any, at start of observation; be specific - mist, light rain, moderate rain, heavy rain, light snow, etc.	dbText	20

FIELD NAME	FIELD DESCRIPTION	FIELD TYPE	FIELD WIDTH
stop_precip	Describe precipitation, if any, at end of observation; be specific - mist, light rain, moderate rain, heavy rain, light snow, etc.	dbText	20
start_cloud	Percent cloud cover at start of observation (use 10% increments)	dbLong	4
stop_cloud	Percent cloud cover at end of observation (use 10% increments)	dbLong	4

Table: **tbl_survey_location**
Description: Location and description of established territories or potential habitat.

FIELD NAME	FIELD DESCRIPTION	FIELD TYPE	FIELD WIDTH
survey_location_ID	Unique record identifier	dbLong	4
park_code	Standard 4-letter Park code	dbText	4
survey_location_name	Name of survey location	dbText	50
survey_location_desc	Description of survey location	dbText	50
is_known_territory	Is this an established territory? "No" indicates that this is potential habitat surveyed.	dbBoolean	1
territory_number	Unique number assigned to each individual established territory.	dbLong	4

SOP 7.2 – Data Entry

Data entry should occur as soon as possible after data collection is completed, before the next observation occurs, and 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 records into the computer with 100% accuracy.*

A database users' manual is provided with the database; however, the project leader makes certain that persons performing data entry understand how to enter data and follow the protocols. Data entry technicians are responsible for becoming familiar with the field data forms, the database software, database structure, and any standard codes for data entry.

Before beginning a data-entry session the user must create a backup of the back-end data files. This backup will ensure that the initial data starting point can be recovered should irreversible errors or problems occur during the data entry session. A prompt will appear at the onset of a data entry

session that will ask the person doing data entry if a backup has been made. See the section on version control (below) for naming conventions for backup files.

The person doing data entry will enter his or her initials at the onset of a data entry session which, along with the date, will be stored along with the data record. QA/QC measures for data entry will be built into the database forms to automatically validate data where possible. Data entry forms will maximize the use of auto-filled fields, range limits, pick lists, and spelling checks. Data entry forms also provide controlled access to the database (i.e., forms are set for data entry only), which prevents accidental deletion or alteration of existing data and controls the sequence of data entry (i.e., certain fields require an entry before more information can be entered). Error messages will alert the operator to correct mistakes.

SOP 7.3 – Data Verification and Validation

1. **Data Verification:**

   Data verification immediately follows data entry and involves checking the accuracy of the computerized records against the hard copy field records and identifying and correcting any errors. All records entered will be verified against their original source in the following order:
   a. Visual review at data entry. The person doing data entry verifies each record after input and immediately corrects any errors.
   b. Visual review after data entry. All records entered during a data entry session are printed in a format that closely matches the original data sources. Each data element on the printout is compared with the original values from the hard copy, preferably by second person who did not perform the data entry. Errors are clearly marked and corrected in the database as soon after data entry as possible.
   c. Summary queries and tallies. Queries are run that detect broad errors such as duplicate or omitted records. Once data entry is completed, an Excel file is exported from Access for data exploration and verification by visualizing through sorting and filtering.
   d. Visual review of spatial data. Nest observation and location data are converted to GIS or uploaded to Garmin MapSource and visually inspected for accuracy. This review can take place at the end of a field season.

2. **Data Validation:**
   a. While many errors are prevented by including validation routines that function during data entry, additional review of the data by a project specialist is needed to detect generic and specific errors that fall outside the scope of automated validation.
   b. Invalid data commonly consist of slightly misspelled names, the wrong date, or out-of-range errors in parameters with well-defined limits (e.g., elevation). Other errors consist of unreasonable metrics or associations. Validation queries will be of two types: one type will present tabular data in ways that records can be reviewed for content and context; the other type will perform specific calculations or routines to detect logic or range errors.
   c. Corrections to errors detected during validation require notations in the *original paper field records* and in *copies used for data entry* about how and why the data were changed. Modifications to the field records should be clear and concise while preserving the original data entries or notes. Validation efforts should also include a check for the

completeness of a data set since field sheets or other sources of data could easily be overlooked.

d. A summary of verification and validation that has been completed, along with any comments or notes, is entered into tbl_datamgt_log once the process is complete.

3. **Data Quality Review and Communication:**
   a. The project leader and any personnel involved in data collection or entry will meet several times during the field season to discuss data quality problems and issues. Procedures may need revision if verification and validation processes reveal an unacceptable level of data quality. Quality checks may also reveal the need to modify field or computer forms if data transcription or entry errors are frequent.
   b. The project leader will use data documentation and metadata to notify end users and other project personnel of project data quality.

SOP 7.4 – Version Control

Version control is the process of managing copies of changing files over the course of a project. Change includes any alteration to the structure or content of the files, which should not be made without the ability to fully recover a data set as it existed before changes were made. Before making any major changes to a file, a copy of the file should be saved with a unique version number. CAKN recommends the following directory structure for database files:

peregrine_falcon\data\current_data
\working_backup
\annual_archive
\version_archive

Peregrine Falcon data files will be named per the following examples:

1. **Current Database file:**
   a. *CAKN_PEF. accdb* and *CAKN_PEFA_be_.accdb*
   b. The current database version number (visible from the database log-in screen) is incorporated into the file name before the mdb file extension. Files with this naming structure are assumed to be the most current, master versions of the database. These files are saved in the 'current_data' directory. Note: use underscores or dashes in database names, not periods or other punctuation.

2. **Working Backup files:**
   a. *PerMon1-00_12Oct04.mdb*
   b. These backups are made of the back-end files before beginning a data entry session (it is not necessary to back up the front-end). An abbreviation of peregrine monitoring, the database version number, and the date the copy was made are incorporated into the filenames of backups. At the end of a project season, the project manager will review these backups and determine which can be deleted. These files are saved in the 'working_backup' directory.

3. **Annual Archive files:**
   a. *PerMon1-00_Year04.mdb*; *PerMon1-01_be_Year04.mdb*

b. When final data entry, verification, and validation have been completed for a field season, a set of annual archive files (front and back ends) is created. An abbreviation of peregrine monitoring, the database version number, and the year the copy was made are incorporated into the filename of annual archives. These files are saved in the 'annual_archive' directory.

4. **Version Archive files:**
   a. *PerMon1-00_Archive.mdb; PerMon1-00_be_Archive.mdb*
   b. Long-term archive files (front and back ends) are created before any database version upgrade occurs. An abbreviation of peregrine monitoring, the database version number, and the term Archive are incorporated into the filename of archives. These files are saved in the 'version_archive' directory, with a subdirectory created for each version.
   c. Example:

\version_1-00\PerMon1-00_be_Archive.mdb
\version_1-20\PerMon1-20_be_Archive.mdb

SOP 7.5 – Archiving

An overview of the processing and disposition of project data is provided in Table 7-1.

1. **Digital Data:**
   a. Any time a revision of protocols requires a revision to the database, a complete copy of the database will be made and stored in an archive directory (see Version Control, above). In addition to this copy in its native database format, all tables will be archived in a comma-delimited ASCII format that is platform-independent by using the Access_to_ascii.mdb utility developed by CAKN, which is provided to parks along with the database. An abbreviation of peregrine monitoring, the database version number, and the term Archive are incorporated into the filename of archives, with .txt as the file extension. These files are saved in the 'version_archive' directory, with a subdirectory created for each version.
   b. Example:

\version_1-00\PerMon1-00_be_Archive.txt
\version_1-20\PerMon1-20_be_Archive.txt

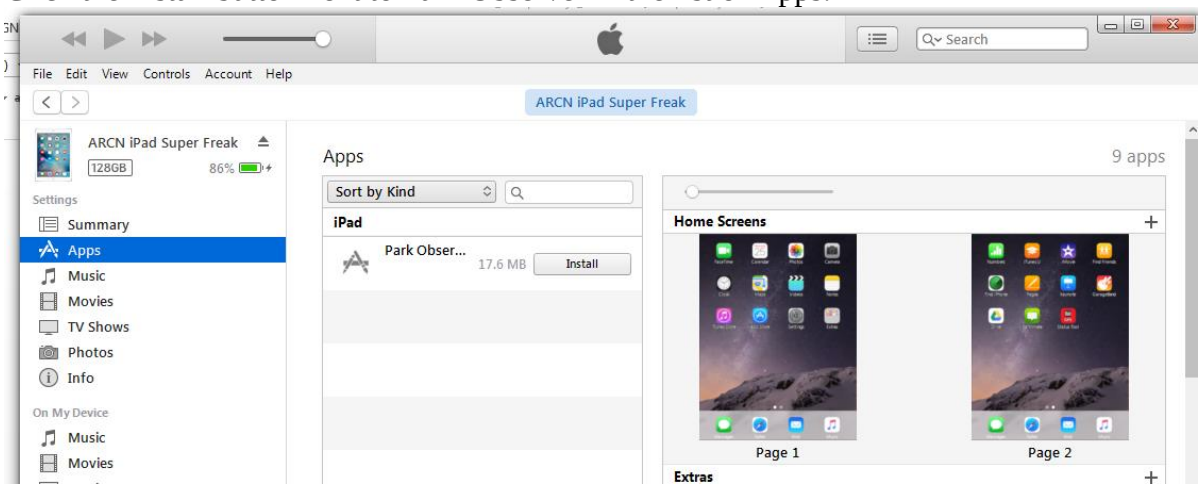
   c. At the end of a field season when all data have been entered, verified and validated, an annual archive copy of the front and back ends will be made (see Version Control, above).
   d. A copy of all archived data sets, both version archives and annual archives, should be sent to CAKN within 2 weeks of their creation.
   e. All archived files should be designated as "read-only." These files must be stored on a server or hard drive that has a regular and secure backup routine that includes off-site storage rotation. CAKN does not recommend using CDs or DVDs for long-term archival storage because of potential media degradation.

2. **Digital Data: Downloading iPad Park Observer Data in iTunes**

Installing without wireless (any office but AKRO)

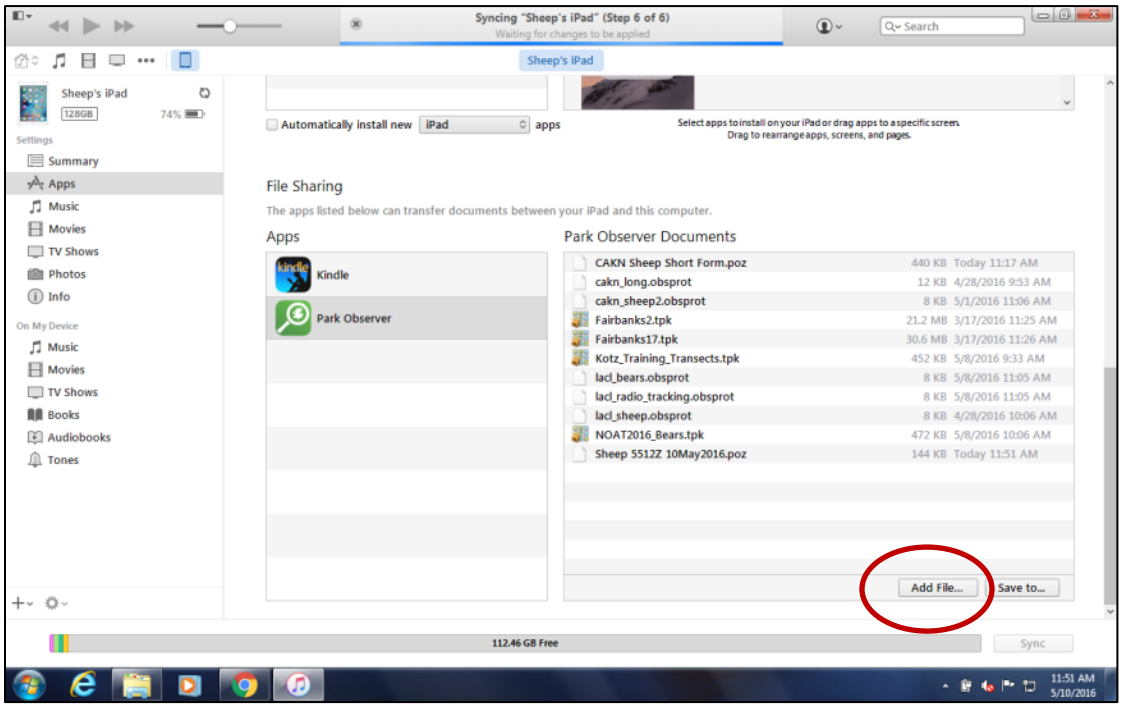
   a. Connect to: http://akrgis.nps.gov/observer/no-wifi.htm (contents shown below).

b. Download the application package (Park_Observer_0.9.8b.ipa and the Park Observer Toolbox [ParkObserver.pyt]) to a PC or Mac with iTunes. The latest is 0.9.8b (as of June 22, 2016).
c. Connect iPads to the computer with a USB cable. iPads sync to only one computer at a time. Use the same computer to sync all iPads.
d. Open iTunes on the computer. Note: A network connection is not required to connect to the iTunes Store. An iTunes or iCloud account is not required to authorize the iPad on the PC.
e. Check to ensure iTunes is logged out of. To check, select the "Account" menu from the main screen and the "Sign in" is shown as an option. If not, select "Sign out". If further problems arise, try logging out of the iTunes account on the iPad by opening the Music app, clicking on the small red user logo (person's head in a circle) and selecting "Sign out".
f. Click "Allow" in iTunes when prompted to allow access to the connected iPad.
g. Click the "Trust" alert on your iPad.
h. Select the iPad icon at the top left of the iTunes window to see the details of the iPad.
i. Click on Apps in the list on the left of the iTunes window.
j. Click the small icon "File" at the very top left and select Add File to Library... (or press Control-O).
k. Browse to and open the file downloaded in the first step or drag the download from step 1 onto the app page in iTunes.
l. Click the Install button next to Park Observer in the list of Apps.



m. Click on the Apply button at the bottom left of the iTunes window.Installation progress will be reported in the banner at the top of the iTunes window (e.g, "Syncing Apps. . . ')
n. When done, click the eject button next to the name of the iPad, but leave the iPad attached to the computer.
o. Tap the Park Observer App icon on the iPad.
p. An "Untrusted Enterprise Developer" alert will appear on the iPad; tap Cancel.
q. Tap on the Settings App icon and navigate (scroll down) to General -> Device Management -> National Park Service and tap on Trust National Park Service.
r. Press the Home button (round actual button at base of iPad).

s. Tap the Park Observer App icon on the iPad.
t. Tap Allow when asked if Park Observer can access your location.
u. Download maps (.tpk)* and protocols (.obsprot – the latest version is Small_Mammals.obsprot) from the server – or get these from the survey project manager. Save these to a file on the computer.
v. Re-attach iPad to the computer. It should appear as a device in iTunes.
w. In iTunes, click on your iPad under Devices in the left sidebar in iTunes.
x. Click on Apps, in the list of options along the left side of the iTunes window and a list of apps on the device appears.
y. Scroll down the list of apps (scroll way down), and select Park Observer.
z. Scroll down further. At the bottom right is a button to add files to Park Observer. Click the Park Observer button on the left and navigate to where your maps (tile caches [.tpk]) and protocols (.obsprot) are and "Add File" the maps and protocols downloaded in the previous step. See screen shot below.
aa. Hit Apply. When it's done syncing, click Done and then eject the iPad from the laptop.



3. Digital Data: Retrieving iPad Park Observer Data from Email

All Park Observer data files collected on different days are emailed from yugaipads2016@gmail.com and to the project manager. Files include "Critter.csv," "TrackLogs.csv," "GpsPoints.csv." Retrieve Park Observer files from the iPad from email. check. Email subject lines include the number date, PEFA territory number and observer initials. For example: "07122017PEAFYUKO254MJF" A up to 21 emails are retrieved, one for each day of the survey.

1. Open gmail and search for "yugaipads2016@gmail.com" to find the Park Observer files for the small mammal survey.
2. Download files in order by earliest date and trap check time (refer to subject line).
3. Each email containing Park Observer data has three files: Critter.csv," "TrackLogs.csv," and "GpsPoints.csv." Click the down arrow to download all three files into one folder.
4. Name this folder using the subject line of the email (e.g. Smammals08122017MJF1pm)
5. Save each folder to the CAKN Network drive and to the IRMA Data Store. J:\Monitoring\PEFA\ _Data\ParkObserver\(Subject Line Title). See more details also in the CAKN Small Mammals SOP 8 (Data Downloading, Proofing and Backup).

4. Hard Copies and Originals:

a. Original data sheets and photographs, if used regularly or stored improperly, will deteriorate over time. Original hard-copies of field data will be used for data entry and data validation, then copied onto acid-free paper. The copies will be stored on-site at the park in project binders and the originals will be accessioned into park or regional archives on an annual or biannual basis. Project leaders should coordinate with their park's curator for specific details on preparing materials for archiving.

b. All original photographs or slides will be placed in archival-quality polypropylene sleeves. Slides will be labeled using indelible pigment ink or using laser-printed archival-quality labels. Photographs should have an archival-quality label attached to the back of photo and should not be written on directly. Label information will include: a unique ID, project name, photographer, photo date, a brief identification of contents (e.g., species name, territory ID), and geographic location. Archival-quality materials can be obtained from Light Impressions (www.lightimpressionsdirect.com).

c. In addition, all slides and photographic prints will be scanned and saved (preferably as 600 dpi TIFF files). The filename of the scanned image should be entered into photo_filename field in tbl_image. Digital images should be used as the primary means of distributing or reproducing the images; slide and prints should be accessioned into park or regional archives for long-term storage under controlled conditions. If data are managed at the park level, copies of digital images will be provided to CAKN on an annual basis. The same procedures apply to sketches of nest sites or birds; file names should be entered in the nest_sketch_filename or other_digital_filename fields in tbl_image.

Table 7-1. Processing and disposition of project data

Data Item	Action	Database	Project Binder	Archive
field notebook	make two copies	enter data	copy	investigator keeps original. Museum keeps one copy

Data Item	Action	Database	Project Binder	Archive
USFWS data form		enter data	copy	museum keeps original
raptor observation record card		enter data	copy	museum keeps original
raptor nest card		enter data	copy	museum keeps original
digital photos of nest sites		enter digital file name in database	hard copy	electronic copy on backed-up server or hard disk
photo prints or slides of nest sites	scan images as TIFF files, 600 dpi minimum	enter digital file name tbl_image	copy	museum keeps originals (note: nest locations are marked on a copy, not on the original photo print)
sketches of nest sites	scan sketches	enter digital file name in tbl_image	copy	museum keeps original
maps			original	museum keeps an annual copy
protocol update		create archive copy (both Access and ASCII) before update		save on backed-up server or hard drive; send copies to NCPN
end-of-season verified/validated database		create archive copy		save on backed-up server or hard drive; send copy to NCPN
metadata	complete or update dataset catalog record		print out copy and place in binder	send updated record to NCPN

SOP 7.6 – Metadata

Each table and field in the Access database will be defined and documented. In addition, the table tbl_datamgt_log provides a location for tracking data manipulations or updates, and for storing ongoing notes on the status of data verification and validation.

Each park will complete a Dataset Catalog record for the project and database, and will update the record contents annually. A copy of the updated record will be provided to CAKN. Any GIS data resulting for the project that is used for distribution or analysis will have an FGDC-compliant metatdata record completed.

The complete protocol for this project (Protocol Narrative and SOP #s 1-10) is an integral component of the project metadata. All narrative and SOP version changes are noted in the Master Version Table (MVT), which is maintained in SOP #10. Any time narrative or SOP versions change, a new Version Key number (VK#) must be created and recorded in the MVT, along with the date of the change and the versions of the narrative and SOPs in effect. The Version Key number is essential for project information to be properly interpreted and analyzed. *The protocol narrative, SOPs, and data should not be distributed independently of this table*.

SOP 7.7 – Reference

U. S. Fish and Wildlife Service [USFWS]. 2003. Monitoring plan for the American peregrine falcon, a species recovered under the Endangered Species Act. U.S. Fish and Wildlife Service, Divisions of Endangered Species and Migratory Birds and State Programs, Pacific Region, Portland, Oregon, USA.