



Upper Columbia Basin Network Osprey Monitoring Protocol

Standard Operating Procedures Version 1.0

Natural Resource Report NPS/UCBN/NRR—2010//270



ON THE COVER

Osprey (*Pandion haliaetus*) at Lake Roosevelt

Photograph from Lake Roosevelt National Recreation Area, courtesy of Jeffrey Joh (SCA Intern)

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Standard Operating Procedures Version 1.0



Natural Resource Report NPS/PWR/UCBN/NRR—2010/270

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Change History

1. Version numbers increase incrementally by tenths (e.g., version 1.1, version 1.2, ...etc) 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, identify paragraphs and pages where changes are made, and the reason for making the changes along with the new version number.
2. Notify the UCBN Data Manager of any changes to the Protocol Narrative or SOPs so that the new version number can be incorporated in the Metadata of the project database.
3. Post new versions on the Internet and forward copies to all individuals with a previous version of the Protocol Narrative or SOPs. A list will be maintained in an appendix at the end of this document.

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1.0				

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Osprey Monitoring Protocol

Standard Operating Procedure (SOP) 1: Preparation for the Field Season

Version 1.0, March 2010

Change History

Version #	Date	Revised By	Changes	Justification

Note: This SOP describes the step-by-step procedures for preparing for field work and for preparing and organizing field equipment prior to the initiation of personnel training and entry into the field. Field time is expensive, both in time and money. Adequate field and equipment preparation is crucial to a successful monitoring program.

Suggested Reading

Standardized Inventory Methodologies For Components of British Columbia's Biodiversity: Raptors. 1997. Version 1.1. Resources Inventory Committee, Victoria, BC.

Annual Review

Key network and park staff should conduct an annual review of the protocol and SOPs prior to spring preparations. This is a central element to season close-out procedures. Review should include training and field procedures, recruitment of participating field technicians, data management, analysis, and reporting, and fundamental design issues. Most importantly, careful consideration should be made of the resulting analyses and the overall confidence in results. The adequacy of sampling effort must be evaluated. Any necessary changes should be made to the protocol and SOPs with enough time to circulate updated material to key staff.

Scheduling and Organizing Field Work

The Upper Columbia Basin Network (UCBN) and Lake Roosevelt National Recreation Area (LARO) are unable to maintain a large field staff for financial and logistical reasons. This, combined with the remote and widely dispersed nature of the network, and the demands from other vital signs monitoring efforts requires that the field portion of the osprey monitoring program be sustained with temporary student employees and/or student conservation association interns. The field work should be scheduled in early spring, and scheduling efforts should begin no later than the previous January/February. The Project Leader will coordinate this planning with LARO park resource and interpretive staff. A team of 2 people working for 2 weeks each sampling season must be available in order to complete the field data collection. The field crew will be provided with the following information:

- Paper maps for the occupied nest sites included in the years data collection efforts.
- List of Easting and Northing coordinates for each nest site from previous year's data.
- GPS units and/or PDAs loaded with the nest site coordinates.
- Field data collection sheets (see Appendix 1 and 2)

Equipment List and Preparation

The following equipment should be assembled each spring, and sufficient time allowance must be made to order replacement equipment. The amounts of individual items required are not included here, as they may change according to the number of field participants and teams available.

Navigation and Recording Equipment

- GPS unit with pre-loaded nest site location waypoints (UCBN supplied, or comparable unit)
- PDA with field forms (if used by this team) + cradle and AC/DC converter for charging batteries
- Weatherized field data entry forms (Appendix 1-2 for ground-based surveys, SOP #9, Tables 7-11 for aerial surveys)
- Maps of nest site locations from previous year
- Backup copies of data entry forms
- Mechanical pencils and clip boards
- Rangefinder, clinometer, and DBH tape (to record nest site characteristics for new nest sites)
- Hard copies of SOPs

Observation Equipment

- Digital camera (supplied with a case, spare battery, and digital storage card)
- Identification sheet for the identification of ospreys (provided in SOP #2 and #10)
- Binoculars (2 pair of image stabilization binoculars for helicopter surveys)

Safety Equipment

- 2-way radios
- First aid kit
- Boat safety equipment (will be included onboard with LARO-maintained boats)

Preparation of Navigation and Observation Equipment:

- 1) Charge all GPS units, PDAs, digital cameras, and backup batteries, prior to departure for the field. Bring extra AA batteries during field work.
- 2) Paper data sheets should be prepared and printed on Rite-in-the-Rain paper if rain is likely to occur. A copy of field data sheets are provided in Appendix 1-2.
- 3) Analysis and reporting of previous year's data are necessary before starting a new field effort. This is covered in SOP # 6, data management, and SOP # 7, data summary and analysis.
- 4) Prepare a realistic schedule of events in advance of group arrival, and circulate to team leaders and organizers ahead of time to manage expectations and ensure timely arrival.
- 5) Apply for a research permit (<http://science.nature.nps.gov/research/ac/ResearchIndex>) well ahead of the field season, as early as February/March.
- 6) Arrange with the staff at LARO for your arrival and stay during field season. Housing is generally not provided by LARO so UCBN crews should make arrangements with area motels. Arrange with LARO staff if a boat survey is planned. Any boat operator must be current with their National Park Service (NPS) Motorboat Operator Certification Course (MOCC). Project Leaders on the osprey protocol should always be current on their certification, but it is not necessary with temporary employees or students who will always be accompanied by a MOCC graduate.
- 7) Safety is an important, but easily overlooked consideration. The safety plan (SOP # 8) should be reviewed before the field team heads into the park. Make sure all team leaders know where vehicle keys are to be stored during field operations, the location of the nearest pay phone and/or cellular phone coverage opportunity, and emergency contact and operation procedures for LARO staff.
- 8) After the field season, clean and organize all non-electronic equipment and store in labeled plastic bins in the UCBN office in Moscow, Idaho. Remove batteries from GPS units requiring long-term winter storage. PDAs are typically stored by the UCBN under the direction of the data manager in the central office.

9) Identification of osprey is relatively straightforward, however, during training of interns and student workers identification will be explained. An identification guide for identifying ospreys is part of the required equipment. An identification sheet is provided in SOP #2 and #10.

10) Hard copies of all field-relevant SOPs and nest site location maps should be prepared and made available to the field team for the duration of the survey period.

Osprey Monitoring Protocol

Standard Operating Procedure (SOP) 2 Training Observers and Osprey Identification

Version 1.0, March 2010

Change History

Version #	Date	Revised By	Changes	Justification

Note: This SOP describes the step-by-step procedures for organizing and training field personnel. Note that none of these SOPs are meant to be stand-alone training manuals replacing the thorough documentation available for GPS and PDA hardware and software. Training personnel should refer to these SOPs as a guide, and seek out additional information in the suggested references and through hands-on training courses provided by NPS and outside vendors.

Suggested Reading

Garmin. 2005. GPSMAP 76CSx owner's manual. Garmin International, Olathe, KS. Available online at <http://www.garmin.com/products/manual.jsp?product=010-00469-00>.

Raptor Research and Management Techniques. 2007. Edited by David M. Bird and Keith L. Bildstein. Hancock House Publishers Ltd., Surrey, British Columbia, Canada and Hancock House Publishers, Blaine, WA.

Standardized Inventory Methodologies For Components of British Columbia's Biodiversity: Raptors. 1997. Version 1.1. Resources Inventory Committee, Victoria, BC.

Introduction

This SOP describes the training of the field crew prior to field sampling including overview of field data collection, data recording, and the importance of correct identification of osprey at Lake Roosevelt.

Procedures

Team Organization

Once the number of participants is known, teams can be organized. Two persons per team is a minimum, 3-4 is acceptable. Larger team sizes are inefficient. Provide each team member with a complete set of observation equipment. Also provide each team with a hard copy of each of the relevant field SOPs for reference during training and field operations. Each team should also be provided with a hard copy map of the park and a larger scale map indicating the team's individual nest site locations and their nest ID labels. These hard copy maps are crucial for field efficiency and to minimize errors associated with misidentified nest sites. Once the team is established, it should be maintained throughout the duration of training and sampling in order to maintain consistency.

Equipment Operation

Operation of GPS units is outlined in SOP # 3.

Field Operations

- 1) Designate a lead trainer. This will typically be the Project Leader, if present, or a designated biotech. This person should be available to troubleshoot and reassign new equipment as needed.
- 2) Definitions for key field terms are presented in Table 1 and should be reviewed during training.

Table 1. Important field definitions for monitoring osprey in the UCBN.

Term	Definition
Occupied Nest	An occupied nest is a nest with evidence of actual pairs. Occupancy is best determined during the incubation period.
Fledge	Fledge is the stage in a young bird's life when the feathers and wing muscles are sufficiently developed for flight. It also describes the act of raising chicks to a fully grown state by the chick's parents. A young bird that has recently fledged but is still dependent upon parental care and feeding is called a fledgling.

- 3) Personnel should already have basic GPS navigation and data entry skills, but additional training on those topics can be provided in the field.

4) On-site training can be accomplished in half a day. The team should be assembled at the beginning for a review of concepts and techniques. Basic osprey identification should be reviewed.

5) Following group introductory material, team members should practice locating existing nest sites with GPS and maps. The team should practice making observations and performing data entry. To facilitate this, extra field data entry sheets should be made available. **Emphasize clear communication practices between team members during data entry.** Once this portion of training is complete, reassemble into the full group and review questions and concerns. Each team leader must be comfortable and confident in the methods.



Figure 1. Photo of an adult osprey (*Pandion haliaetus*). Photo courtesy of NASA.

Osprey Identification

<http://www.mbr-pwrc.usgs.gov/id/framlst/i3640id.html>

- Length: 22 inches; wingspan: 54 inches
- Large, narrow-winged hawk
- Flies on flat wings with distinct kink at elbow
- Wings taper to a rounded tip
- Short hooked beak
- White cap
- Dark brown eyeline broadening behind eye
- Dark brown nape, back, and upperwings
- Wings from below: flight feathers white barred with dark brown, undersecondary coverts white and underprimary coverts dark brown producing rectangular dark brown mark at wrist
- White chin, throat, breast, and belly
- Brown tail has a number of white bands
- Hovers and then plunges into water after fish

Adult male:

- Underparts entirely white
- Yellow eyes

Adult female:

- Dark necklace of brown streaks on throat
- Yellow eyes

Immature:

- White tips to dark back feathers
- Reddish eyes

Similar species:

Unmarked white belly, wing shape, and flight style make the Osprey instantly recognizable even at a distance. However, many inexperienced observers often mistake the osprey for a bald eagle.

Length and wingspan from: Robbins, C.S., Bruun, B., Zim, H.S., (1966). Birds of North America. New York: Western Publishing Company, Inc.

Osprey Monitoring Protocol

Standard Operating Procedure (SOP) 3

Finding GPS Waypoints

Version 1.0, March 2010

Change History

Version #	Date	Revised By	Changes	Justification

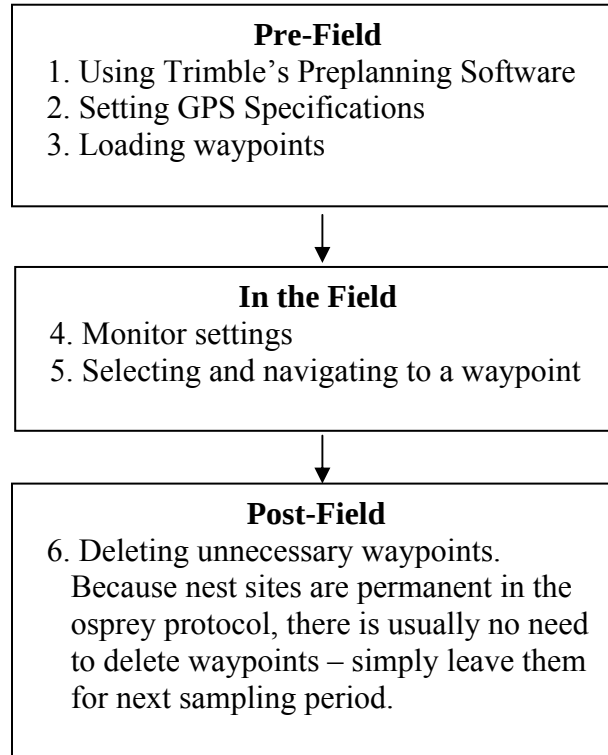
Suggested Reading

Garmin. 2005. GPSMAP 76CSx owner's manual. Garmin International, Olathe, KS. Available online at <http://www.garmin.com/products/manual.jsp?product=010-00469-00>.

Introduction

The purpose of this SOP is to describe the procedures necessary to navigate to waypoints using GPS units, particularly Garmin Map 76CSx. Information on GPS specifications and settings are also included. This is not intended as a substitute user's guide for GPS units. Please consult the appropriate user's guide for more detailed information on unit functionality.

The following flowchart provides a general overview of steps addressed in this SOP:



Before the Field

Preparation is key to successful field work, particularly when that field work relies on GPS data collection or navigation. The baseline GPS constellation consists of 24 satellites that orbit the earth approximately every 12 hours. The position and time signals transmitted by these satellites are used by GPS receivers to triangulate a location on Earth. While this process is subject to various sources of error, pre-planning can minimize the impacts.

Using Trimble's Preplanning Software

Trimble offers a free stand-alone program that determines visibility for GPS, GLONASS, and WAAS satellites. The software can be downloaded from <http://www.trimble.com/planningsoftware.html>. Make sure to also download the Ephemeris file (current.ssf).

1) Use the Station Editor to select the location, date, and time of data collection (Figure 2).

2) Import current .ssf file and check the satellite information. Select those satellites of interest. Default is all.

3) Create graphs.

The Station Editor dialog box is shown with the following fields and buttons:

- Station Name: Walla_Walla, WA
- Position:
 - Latitude: N 46° 4'
 - Longitude: W 118° 20'
 - Height: 0 [m]
 - Elevation Cutoff: 10
- Time:
 - Start Date: 2/1/2005
 - Start Time: 8:00
 - Duration: 12 [h]
 - Interval: 10 [min]
- Time Zone: Pacific Standard Time, DST, Difference GMT: -7.0 [h]
- Buttons: OK, Cancel, Apply, Delete, Obstacles..., Map..., City..., Today, Time Zone...

Figure 2. Station Editor in Trimble's preplanning software highlighting position and time.

As long as it doesn't compromise the best times to determine productivity, look for the time of day when the most satellites are available and the PDOP (Position Dilution of Precision) is lowest. PDOP is the measurement of error introduced by satellite orientation or geometry and can be easily minimized through the timing of field data collection.

Setting GPS Specifications

Verify Time: Time synchronization of the GPS receiver and GPS satellites is critical for the most accurate data collection and navigation. With Garmin MAP76CSx, use the Time Setup Menu to set the time format, zone, and to conform to Daylight Savings Time.

Verify Projection and Datum: All GPS positioning information is referenced to the North American Datum (NAD83). In the case of UCBN osprey sampling, select UTM Zone 11 NAD83 for Lake Roosevelt National Recreation Area. With Garmin MAP76CSx, use the Units Setup Menu to select the position format and map datum.

Enable WAAS: Enabling WAAS (Wide Area Augmentation System) allows for real-time correction of GPS coordinates as long as the WAAS satellites are in view. Due to the fixed position of these satellites over the equator, signal reception is best in open areas with a clear view of the southern sky, and at times, sampling under a heavy conifer canopy can be problematic. With Garmin MAP76CSx, use the System Setup Menu to enable WAAS.

Calibrate the Compass: The internal compass in the Garmin MAP76CSx should be calibrated prior to each use for increased accuracy in navigation. Use the Calibration Setup Menu to calibrate the compass. Follow the directions on screen.

Batteries: Fully charge the batteries and remember to take spares! The Garmin Map76 units tend to fail on battery power quickly and without warning.

Loading Waypoints: Following SOP # 1 in this monitoring protocol, random sample points are generated using ArcGIS 9.2 and exported to a shape or dBase file. Uploading these locations to the Garmin Map76CSx as waypoints is simplified by using DNRGarmin, a freeware program developed and maintained by the Minnesota Department of Natural Resources. The program can be downloaded from

<http://www.dnr.state.mn.us/mis/gis/tools/arcview/extensions/DNRGarmin/DNRGarmin.html>.

The site has information on the application, including installation guidelines and documentation.

To upload waypoints to the Garmin Map76CSx, connect the GPS unit to the PC and open DNRGarmin. DNRGarmin should display your GPS unit and say connect. If it does not, go to GPS and open port.

Use the File Menu to set the correct projection (i.e., Zone 11 for LARO with the datum as NAD83) (Figure 3, left). Next go to load data in the File Menu and select your shapefile or dBase file of interest. You can delete and or edit points, add comments, etc., if necessary (Figure 3, right). Use the GPS Menu to open the port to the GPS unit. Then, use the Waypoint Menu to upload the points to the GPS unit.

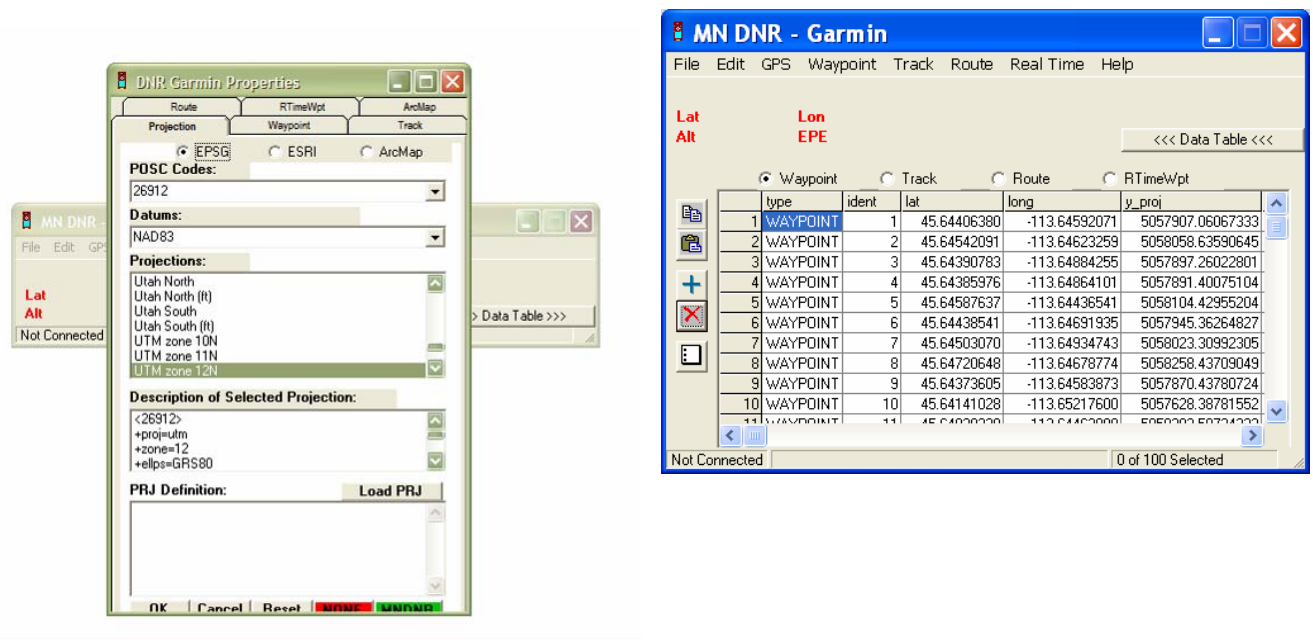


Figure 3. Screenshot from DNRGarmin used to set the correct map projection (left). Screenshot from DNRGarmin used to view and upload selected waypoints (right).

In the Field

Monitor Location Error

Ideally, you would be able to set thresholds for the maximum PDOP allowed and the minimum number of satellites. While you cannot set these values in the Garmin MAP76CSx, you can monitor the satellite strength and relative location error on the Satellite Main Page.

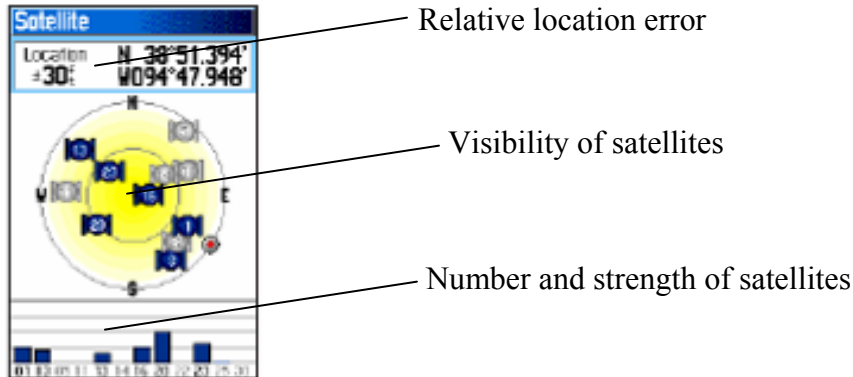


Figure 4. Satellite Main Page of Garmin unit.

These values should all be monitored frequently during data collection and navigation. The maximum relative location error allowed should be set prior to beginning field work. For the osprey monitoring protocol, the maximum location error allowed is 10 m (30 ft). If a GPS unit is used that allows for user-defined PDOP thresholds, the maximum should be set at 6.

Selecting and Navigating to Waypoints

With Garmin Map76CSx, use the Find Menu to search for a waypoint of interest. Select 'Find by Name' and scroll to the point ID of interest. Conversely, you can select the waypoints icon and scroll to the Point ID of interest. Paper maps will also be provided to aid in locating plots.

Once selected, the items information page for the waypoint opens, allowing you to show the item on the map (by selecting Map) or create a route to the point (select GoTo). Select GoTo to navigate to the point. You can use the 'Page' button to switch through various pages, select the Compass page and, holding the GPS level, walk in the direction indicated by the compass until the 'Dist to Dest' window reads zero.



Figure 5. Compass page of Garmin unit.

After the Field

Delete Waypoints (if desired)

In the case of osprey monitoring it is not necessary to delete waypoints that are stored on the GPS unit because nest site locations are permanent and will be re-visited during the next sampling season. If you need to delete temporary waypoints from the GPS unit, go to the Find Waypoints page, select Menu – Delete – All waypoints. Remove batteries from units before any long-term winter storage to prevent corrosion and leakage.

Osprey Monitoring Protocol

Standard Operating Procedure (SOP) 4 Nest Site Observations and Characteristics

Version 1.0, March 2010

Change History

Version #	Date	Revised By	Changes	Justification

Note: This SOP describes the step-by-step procedures for locating and collecting nest site data on occupancy, productivity, and nest site characteristics for purposes of long-term monitoring of osprey at LARO.

Suggested Reading

Edwards, T. C. and M. W. Collopy. 1988. Nest tree preference of osprey in Northcentral Florida. J. Wildl. Manage. 52(1):109-107.

Forestry Suppliers. Unpublished. How to use a clinometer. Technical Bulletin M-0003. available online at: http://www.forestry-suppliers.com/t01_pages/pdfs/M0003.pdf.

Steenhof K., and I. Newton. 2007. Assessing nesting success and productivity. Pages 181-192 in Bird, D. M. and K. L. Bildstein. Raptor research and management techniques. Hancock House Publishers. Blaine, WA.

Introduction

This SOP provides detailed directions for how to find LARO and the nest site locations from Spokane, Washington. It also suggests daily routes that you might use for observing nest sites and gives step-by-step directions on how to collect nest site observation and characteristics data.

Driving Directions

From Coulee Dam, Lake Roosevelt stretches 130 miles north to Onion Creek. Bordered by 312 miles of publicly owned shoreline, there are 22 NPS boat launches from which you can access the lake and 28 campgrounds.

- To **Kettle Falls** in the northern district from Spokane: 90 miles northwest on Highway 395; from Grand Forks, B.C. 49 miles southeast on Highway 395; from Rossland, B.C. 49 miles southwest on State Road 25.
- To **Coulee Dam** in the southern district from Spokane: 90 miles west on Highway 2.
- State Road 25 follows along the eastern lakeshore connecting the north district to the south via **Fort Spokane** and Porcupine Bay.



Figure 6. Location of Lake Roosevelt National Recreation Area in the NE corner of Washington State.

The field crew should check in with the resource manager at the park headquarters in Coulee Dam, Washington, upon arrival. The crew will be given keys to the resource boat, gas pump, and any other necessary access keys.

The majority of nest site locations at LARO are most easily accessed by boat. Some nests in lower Lake Roosevelt and all nests in upper Lake Roosevelt (Nests G-01, G-02 and K-01, K-09) can be reasonably accessed by foot (less than 600 m hike).

The following nests are not visible from the water:

K-07 and K-08 are located directly on the gated service road at the USBR China Bar Debris Facility.

C-07 is located on the west side of State Hwy 21.

K-03 is located near Kettle Falls Historical Center.

C-01 is located near the Grand Coulee Dam Tour Office.

Suggested Itinerary:

Day 1: Drive to nest C-01, which is near the Grand Coulee Dam Tour office. Drive to nests C-05, C-06, and C-07, which are within a 10 mile stretch of Hwy 21 between Keller and Keller Ferry. Drive to nests G-01 and G-02, which are near Inchelium and Gifford, respectively.

Day 2: Drive to nests K-07, K-08, and K-09, which are at the China Bar/China Bend area. Drive to nests K-03 and K-04, which are near the Kettle Falls Historical Center.

Day 3: Boat from Keller Ferry to Porcupine Bay and check nests C-02, C-03, C-05, C-06, C-08 through C-14, and C-16.

Day 4: Boat around Kettle Falls and check nests K-01 thru K-06.

Procedures for Locating Nest Sites

1) Prior to entry into the field, pre-determined nest site location points should be organized into routes for the field team. Follow SOP # 3 “Finding GPS Waypoints” for instructions on pre-loading sampling point coordinates for field navigation.

2) To locate a nest site, go through the steps outlined in SOP #3 “Finding GPS Waypoints” to initiate navigation to a waypoint. Ensure that you are navigating to the correct point, according to the Nest ID. You should use the nest site photo to assist you in locating the nest site.

3) Perform the data collection associated with the osprey observation form (Appendix 1-2).

4) Move to the next nest site on the daily route, navigating with the GPS unit. Continue to record nest site observations.

Procedures for Locating New Nest Sites

An effort to locate new nests will be completed as a part of our spring activity survey work in mid-May each year. All nests from the previous year will be visited and new nests will be added to the database when encountered during the boat, auto, or foot surveys. Aerial surveys will be conducted every 3 years. Observers will scan the shoreline for evidence of any osprey activity around nests not already in the database. We will also rely on park staff to add new nests to the database, through our Osprey NestWatch Program.

Park staff will be recruited through the Osprey NestWatch Program in early April each year to watch for nesting activity in mid-May. Park staff and seasonal employees will be asked to report

any nest sites, including those sites not already in the database, they observe to the UCBN volunteer coordinator. This information will then be forwarded to the Project Leader for follow-up data collection efforts that will obtain nest site characteristics and annual productivity data.

Data Entry Procedures

Activity Survey

1) **Annual timing of activity survey:** An activity survey will be completed in mid-May each year. This survey is to determine the location of occupied nests and to add any new nest sites to the database. All nest locations from the previous year should be checked for evidence of occupation by an osprey pair and the study area should be surveyed for new nest sites. The data form to be used for this survey is located in Appendix 1.

2) **Daily survey schedule:** Surveys should begin no earlier than 0700 PST and end no later than 1700 PST to avoid low light and excessive shadows.

3) **Weather conditions:** Do not conduct surveys during periods of high turbulence, when winds exceed > 20 mph, snow storms, or rain storms. These factors can reduce visibility and accuracy of survey results.

4) **Ground observations:** Once each nest site has been located, team members will position themselves for efficiency, comfort, and the ability to observe the nest. If the nest site has been visited in previous years, the GPS coordinates may already be entered on the field sheet. GPS coordinates will be recorded for each new nest site added to the database. Nest site visits can normally be accomplished within 15 minutes. Use binoculars to determine if the nest is occupied and the species occupying the nest (most likely eagle or osprey). One crew-member should record the data while the other crew member observes the nest. Record the number of adults, weather conditions, and behavior of the birds. If this nest site is not already in the database, record the GPS coordinates, nest site characteristics, and take a photo of the nest site. The number of the photo taken should be recorded on the datasheet to later match up the photo with the Nest_ID assigned to the new nest.

5) **Avoid observer fatigue:** This protocol requires that there is one recorder while all crew members make observations (jobs can change between nest sites). As is outlined in the training SOP # 2, clear communication between the data recorder and other team members is essential. It is recommended that results are announced out loud to the recorder, and that the recorder repeats the announced result, confirming successful transmission of information.

6) **Completing the survey:** Check data entry at the conclusion including nest site ID, before moving on to the next nest site. Repeat osprey nest site observations as outlined in step 4 until all nest sites in the database are visited and data recorded in the field data sheet or PDA if used.

Nest Site Characteristics

Nest site characteristics, following methods from Edwards and Collopy 1988, for all occupied nests encountered during the spring activity survey will be recorded on the activity survey monitoring data form (Appendix 1).

1) **Nest structure** - Record the type of nest structure in which the nest is located. The structure will most commonly be identified as a dead tree, live tree, power pole, bridge, or platform on a power pole. If the observer encounters a different type of structure they will write in a name for the structure.

2) **Tree species** - Record the tree species in which the nest site is located.

3) **Tree height (m) and Nest height (m)** - Tree height is measured using the principle of triangulation with a clinometer (Forestry Suppliers unpublished). Assuming that the tree grows at a right angle to the ground (even on a slope), we use the clinometer at 1 chain (66 feet or 19.8 meters) away from the tree using the following steps: a) With both eyes open, aim the black crosshair of the clinometer level with the base of the tree at the soil. Using the right-hand scale (the left scale is for measuring percentage of slope) you will read a negative number if the tree is on level ground or down slope. You will read a positive number if the tree is up slope. b) With both eyes open, aim the black crosshair of the clinometer to the top of the tree. This is a tricky measurement because your view may be obscured by leaves or nearby tree branches. If the top of the tree were an open umbrella, you would want to be aiming at the point on the top of the umbrella. c) Add or subtract the numbers: If your eye is at a level between the base of the tree and the top, the two numbers are added together to determine total height. If your eye is below the level of the base of the tree or the tree is upslope from you, the base reading must be subtracted from the top reading to determine total height.

4) **Tree dbh (cm)** - The diameter at breast height (dbh) is measured at 4.5 feet or 1.37 m above the ground. Use a “diameter tape” to measure dbh by attaching its end at the proper breast-height, then stretching the tape around the trunk at breast height. You read diameter from the point that the tape overlaps zero on the tape. A common mistake is using the wrong side of the tape. Remember, one side measures distance, just like any other tape. Don't use that side! Use the other side, which reads diameter when the tape is wrapped around a circular trunk.

5) **Distance to water (m)** - The distance to water will be measured with a laser rangefinder. To measure the distance to the water, stand at the base of the tree and point the rangefinder at the closest point near the water's edge and press the release button on the rangefinder once. Once the button is released the target mark remains illuminated for around another 4 seconds. While it is illuminated, lock onto the object and carry out the distance metering by pressing the release button again. The measured value is then displayed. If you are in a boat, you can reverse this process by measuring the distance from the water's edge to the base of the tree.

6) **Broken top** – Indicate “yes” or “no” on the data form whether the top of the nest tree is broken or not.

7) **Diameter of 4 nearest trees** that reach heights of at least the lower canopy height of the nest tree. Lowest canopy height of the nest tree is at the live branch closest to the ground (lowest live branch) or at the first visible branch or broken stub on a dead snag. Nests that occur on pilings or other human-made structures will have no canopy and typically are not surrounded by any other trees within an influential distance, and therefore will have no measurements taken for this category.

8) **Height of 4 nearest trees** that reach heights of at least the lower canopy height of the nest tree.

Productivity Survey

1) **Annual timing of productivity survey:** Conduct the productivity survey after most nestlings reach 80% of their fledging age but before many actually leave the nest (fledge). This survey is best conducted in mid-July each year.

2) **Daily survey schedule:** Surveys should begin no earlier than 0700 PST and end no later than 1700 PST to avoid low light and excessive shadows.

3) **Weather conditions:** Do not conduct surveys during periods of high turbulence, when winds exceed > 20 mph, snow storms, or rain storms. These factors can reduce visibility and accuracy of survey results.

4) **Ground observations:** Once each nest site has been located, team members will position themselves for efficiency, comfort, and the ability to observe the nest. The productivity survey is conducted using two observers. Observers will use binoculars to determine the number of young in or near the nest. The main requirement is that the observers make their observations independently of one another. To ensure observer independence, no conversation is allowed between the observers during the actual surveys and observers may not compare notes until after the survey is completed. Using this approach, the observers will not announce the sighting of fledglings or the number of fledglings present, when they are first observed. Rather, both observers will wait until both observers have made their observations. Once the observations are complete, the observers will discuss their observations and verify the presence and number of nestlings. The Project Leader will then fill in the data sheet appropriately. Once the initial evaluation has been made, both observers look at the nest and jointly decide on the number of fledglings and their age and then record this information on the data form.

Observers will record the number of adults present, number of young, approximate age of nestling based on feathers, behavior observed, and weather conditions. If you do not observe nestlings and the nest appears abandoned (no fresh white wash), define this nest as “occupied, breeding-failed, continue on to the next occupied nest.

5) **Avoid observer fatigue:** This protocol requires that there is one recorder while all crew members make observations (jobs can change between nest sites). As is outlined in the training SOP # 2, clear communication between the data recorder and other team members is essential. It is recommended that results are announced out loud to the recorder, and that the recorder repeats the announced result, confirming successful transmission of information.

6) **Completing the survey:** Check data entry at the conclusion including nest site ID, before moving on to the next nest site. Repeat osprey nest site observations as outlined in step 4 until all nest sites in the database are visited and data recorded in the field data sheet or PDA if used.

Osprey Monitoring Protocol

Standard Operating Procedure (SOP) 5

Data Management

Version 1.0, March 2010

Change History

Version #	Date	Revised By	Changes	Justification

Note: This SOP provides documentation for the osprey monitoring project database UCBN_Osprey.mdb and provides instructions for the development, maintenance, archiving, and distribution of the database or datasets.

Suggested Reading

- Dicus, G. H., and L. K. Garrett. 2007. Upper Columbia Basin Network data management plan. Version 1.0, Natural Resource Report NPS/UCBN/NRR—2007-020. National Park Service, Moscow, ID
- Garrett, L. K., T. J. Rodhouse, G. H. Dicus, C. C. Caudill, and M. R. Shardlow. 2007. Upper Columbia Basin Network vital signs monitoring plan. Natural Resource Report NPS/UCBN/NRR—2007/002. National Park Service, Fort Collins, CO.
- National Park Service. 2006. Natural resource database template. Version 3.1 documentation. Natural Resource Program Center, Office of Inventory, Monitoring, and Evaluation, Fort Collins, CO.

Database Model

The UCBN Osprey database has been developed within Microsoft Access. The database structure conforms to the standards of version 3.2 of the Natural Resource Database Template (NRDT), and consists of a user interface front-end (holding user forms for data entry, review, and export) that is linked to a back-end database file (holding the core osprey protocol data tables), an integrated UCBN data dictionary database file (holding various lookup tables shared across all UCBN protocols), and an integrated UCBN species database file (holding UCBN species data, from the NPSpecies database, also shared across all UCBN protocols). The general data management strategy will employ both a “working copy” of the database (used to enter the current season’s data, then conduct error-checking and validation) and a “master version” of the database (used to store all validated data, to facilitate multi-year analyses, and to provide specific data report and export formats). A physical data model for the osprey monitoring protocol shows the relationships among the core data tables, lookup tables, and cross reference tables (Figure 7).

The primary core tables in the UCBN Osprey database are the tbl_Sites, tbl_Locations and tbl_Events tables plus a nest observation data table (tbl_EvData_NestObs). The nest observation data table is supported by a lookup table holding osprey behavior codes and descriptions. The sites table stores basic information about the site (e. g., Park unit) where osprey monitoring takes place. The locations table stores the unique physical location information for each nest site. Two tables (tbl_LocDetail_Images and tbl_LocDetail_NestTreeInfo) are linked to the locations table for the purpose of storing details on nest site photos and nest tree measurements. The events table, storing information about each visit to a given nest site, links to all involved field observers (via the xref_Events_Contacts table) and to the nest observation data. The protocol version in use at the time of data collection is linked to tbl_Events through use of a tlu_Protocol_Ver lookup table, and revisions to the osprey monitoring database will be captured in 2 metadata tables, tbl_Db_Meta and tbl_Db_Revisions.

The UCBN employs generic lookup tables that can be incorporated across all monitoring protocols. The osprey database makes use of tlu_Parks_UCBN, tlu_UCBN_Contacts, and tlu_LocalSppList_UCBN as generic lookup tables. These generic lookup tables are managed in 1 or more separate MS Access files that are linked to protocol-specific databases, allowing for updates to generic lookup tables without disruption to the functionality and use of protocol-specific database applications.

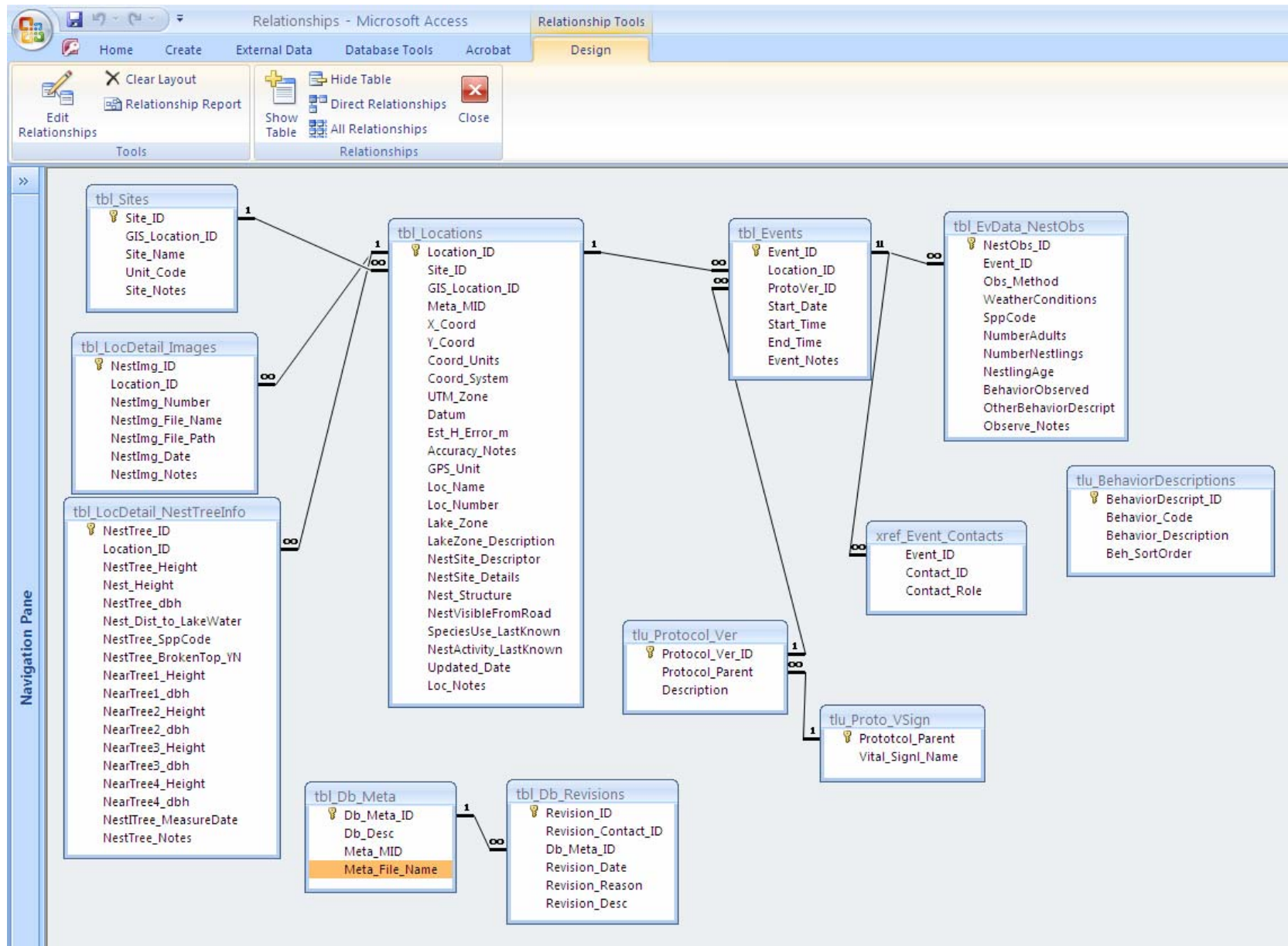


Figure 7. The UCBN osprey monitoring protocol database model.

Data Dictionary

The following data dictionary provides a table description for every table contained in the UCBN Osprey database back-end file, and, for each table, provides each field name, the field type, the field size, and the field description.

Table: *tbl_Sites*

Description: Table stores descriptive data for Sites. Sites are Park units in which osprey nest monitoring occurs. Linked 1:Many to *tbl_Locations*.

Field Name	Field Type	Size	Field Description
Site_ID	ReplicationID	16	Primary key, uniquely identifying each <i>tbl_Sites</i> record
GIS_Location_ID	ReplicationID	16	Link to GIS feature, if applicable
Site_Name	Text	50	Unique name for a site (Park Unit name)
Unit_Code	Text	12	Park unit code (Park or Park sub-unit)
Site_Notes	Text	255	General notes on the site, if applicable

Table: *tbl_Locations*

Description: Table stores sampling Location data. Locations are nest sites. Nest observation data are collected at Locations. Linked 1:Many to *tbl_Events*, and 1:Many to *tbl_LocDetail_Images* and *tbl_LocDetail_NestTreeInfo*.

Field Name	Field Type	Size	Field Description
Location_ID	ReplicationID	16	Primary key, uniquely identifying each <i>tbl_Locations</i> record
Site_ID	ReplicationID	16	Link to <i>tbl_Sites</i> (foreign key)
GIS_Location_ID	ReplicationID	16	Link to GIS feature, if applicable
Meta_MID	ReplicationID	16	Link to Metadata record
X_Coord	Double	8	X coordinate of Nest Tree
Y_Coord	Double	8	Y coordinate of Nest Tree
Coord_Units	Text	10	Coordinate distance units (e.g., meters)
Coord_System	Text	50	Coordinate system
UTM_Zone	Text	50	UTM Zone
Datum	Text	50	Datum of mapping ellipsoid
Est_H_Error_m	Single	8	Estimated horizontal accuracy in meters
Accuracy_Notes	Text	255	Positional accuracy notes, if applicable
GPS_Unit	Text	80	GPS unit used to collect Location coordinates, if applic
Loc_Name	Text	80	Name of Location (NestSite ID -- e.g., Nest_C_07). [Note: C = Coulee Dam section; G = Gifford section; K = Kettle Falls section.]
Loc_Number	Long Integer	4	Location (Nest) number
Lake_Zone	Text	30	Lake Zone (South, Middle, or North) in which the Location (Nest) occurs
LakeZone_Descript	Text	50	Description of Lake Zone (Coulee Dam section for South; Gifford section for Middle; and Kettle Falls section for North)
NestSite_Descript	Text	255	Description of Nest Site

NestSite_Details	Text	255	Additional details about Nest Site
Nest_Structure	Text	50	Description of Nest Structure (Dead Tree, Live Tree, Platform on Pole, Powerline Pole, Other)
NestVisible FromRoad	Text	20	Indication of whether Nest is visible from a road (Yes, No, or Unknown)
SpeciesUse_ LastKnown	Text	50	Species using Nest, based on latest Nest Observation data (Osprey, Bald Eagle, or Unknown)
NestActivity_ LastKnown	Text	50	Year of last known Nest Activity, based on latest Nest Observation data (either the year, or Unknown)
Updated_Date	Date/Time	10	Date of entry or last change
Loc_Notes	Text	255	General notes on the location, if applicable

Table: tbl_LocDetail_Images

Description: Table stores data for photos of Locations (nest sites). Linked Many:1 to tbl_Locations.

Field Name	Field Type	Size	Field Description
NestImg_ID	ReplicationID	16	Primary key, uniquely identifying each tbl_LocDetail_Images record
Location_ID	ReplicationID	16	Link to tbl_Locations (foreign key)
NestImg_Number	Text	150	Nest Photo Number, if applicable
NestImg_File_Name	Text	255	Name of Nest Photo file. Park_NestID_Date (where Date in yyyyymmdd format).
NestImg_File_Path	Text	255	File location Path of Nest Photo file
NestImg_Date	Date/Time	10	Date on which Nest Photo taken
NestImg_Notes	Text	255	Notes regarding Nest Photo, if applicable

Table: tbl_LocDetail_NestTreeInfo

Description: Table stores nest tree measurement data for Locations (nest sites). Linked Many:1 to tbl_Locations.

Field Name	Field Type	Size	Field Description
NestTree_ID	ReplicationID	16	Primary key, uniquely identifying each tbl_LocDetail_NestTreeInfo record
Location_ID	ReplicationID	16	Link to tbl_Locations (foreign key)
NestTree_Height	Long Integer	4	Height of Nest Tree (meters), if applicable
Nest_Height	Long Integer	4	Height of Nest above ground (meters)
NestTree_dbh	Long Integer	4	Diameter-at-Breast-Height of Nest Tree (centimeters), if applicable
Nest_Dist_ to_LakeWater	Long Integer	4	Distance of Nest from nearest area of lake water (meters)
NestTree_SppCode	Text	50	Species code (from xref_Spp_Protocol table in linked UCBN_NPSpp_Module backend file) of the Nest Tree, if applicable
NestTree_ BrokenTop_YN	Text	10	Does nest tree have a broken top (Yes/No), if applicable

NearTree1_Height	Long Integer	4	Height of Near Tree #1 (meters), if applicable
NearTree1_dbh	Long Integer	4	Diameter-at-Breast-Height of Near Tree #1 (centimeters), if applicable
NearTree2_Height	Long Integer	4	Height of Near Tree #2 (meters), if applicable
NearTree2_dbh	Long Integer	4	Diameter-at-Breast-Height of Near Tree #2 (centimeters), if applicable
NearTree3_Height	Long Integer	4	Height of Near Tree #3 (meters), if applicable
NearTree3_dbh	Long Integer	4	Diameter-at-Breast-Height of Near Tree #3 (centimeters), if applicable
NearTree4_Height	Long Integer	4	Height of Near Tree #4 (meters), if applicable
NearTree4_dbh	Long Integer	4	Diameter-at-Breast-Height of Near Tree #4 (centimeters), if applicable
NestTree_MeasureDate	Date/Time	10	Date on which Nest Tree measurements taken
NestTree_Notes	Text	255	Notes regarding Nest Tree measurements, if applicable

Table: tbl_Events

Description: Table stores sampling Event data. Linked Many:1 to tbl_Locations, and linked to the field data table (tbl_EvData_NestObs).

Field Name	Field Type	Size	Field Description
Event_ID	ReplicationID	16	Primary key, uniquely identifying each tbl_Events record
Location_ID	ReplicationID	16	Link to tbl_Locations (foreign key)
ProtoVer_ID	Text	10	Link to tlu_Protocol_Ver (indicates the Protocol version in use at time of Event)
Start_Date	Date/Time	10	Date of sampling Event
Start_Time	Date/Time	6	Start time (24 hour format) of sampling Event
End_Time	Date/Time	6	End time (24 hour format) of sampling Event
Event_Notes	Text	255	Event notes (Plot-specific notes recorded during Event)

Table: xref_Event_Contacts

Description: Cross-reference table between tbl_Events and tlu_Contacts (stored in UCBN_Data_Dictionary backend file), allowing 1 or more contact persons to be associated with a given sampling Event.

Field Name	Field Type	Size	Field Description
Event_ID	ReplicationID	16	Link to tbl_Events
Contact_ID	ReplicationID	16	Link to tlu_Contacts (in UCBN Data Dictionary file)
Contact_Role	Text	50	The contact's role in collection of field data

Table: tbl_EvData_NestObs

Description: Table stores nest observation data. Uses species codes from UCBN_NPSpp_Module linked back-end file, and behavior codes from tlu_BehaviorDescriptions. Linked Many:1 to tbl_Events.

Field Name	Field Type	Size	Field Description
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NestObs_ID	ReplicationID	16	Primary key, uniquely identifying each tbl_EvData_NestObs record
Event_ID	ReplicationID	16	Link to tbl_Events (foreign key)
Obs_Method	Text	50	Observation Method for Nest survey (ground/vehicle or boat)
Weather Conditions	Text	20	Weather Conditions at time of Observation (Clear, Cloudy, Foggy, Rain, or Snow)
SppCode	Text	50	Tree species code (from xref_Spp_Protocol table in linked UCBN_NPSpp_Module backend file) for species observed at Nest Site
NumberAdults	Text	10	Number of Adults observed at Nest (0, 1, 2, 3, or 4+)
NumberNestlings	Text	10	Number of Nestlings observed at Nest (0, 1, 2, 3, or 4+)
NestlingAge	Text	50	Age of Nestlings observed at Nest (Downy Nestling, or Feathered Nestling)
Behavior Observed	Text	150	Behavior observed during Nest survey (most applicable choice from tlu_BehaviorDescriptions)
OtherBehavior Description	Text	255	Description of Observed Behavior (only if BehaviorObserved = Other)
Observe_Notes	Text	255	Comments regarding the nest observation

Table: tlu_BehaviorDescriptions

Description: Lookup table storing behavior codes and descriptions for characterizing behavior observed at nest sites.

Field Name	Field Type	Size	Field Description
Behavior Descript_ID	ReplicationID	16	Primary key, uniquely identifying each tlu_BehaviorDescriptions record
Behavior_Code	Text	15	Code used for Behavior Description
Behavior_Descript	Text	255	Description of Behavior
Beh_SortOrder	Long Integer	4	Sort Order for controlling the sort order in databsae forms

Table: tlu_Proto_VSign

Description: Lookup table of Vital Sign and Protocol. Linked 1:Many to tlu_Protocol_Ver.

Field Name	Field Type	Size	Field Description
Prototcol_Parent	Text	10	Primary key. Four letter code to identify each vital sign protocol (i.e., OSPY for Osprey Vital Sign).
Vital_Signl_Name	Text	150	Full Name of associated Vital Sign

Table: tlu_Protocol_Ver

Description: Lookup table of Protocol versions, linked to tbl_Events in order to associate a Protocol version with each individual sampling Event.

Field Name	Field Type	Size	Field Description
Protocol_Ver_ID	Text	10	Primary key. Four letter Protocol Parent code plus version (e.g., OSPY_1_0, ASPN_2_3, etc.).
Prototcol_Parent	Text	10	Link to tlu_Proto_VSign (foreign key). Protocol four

			letter abbreviation (e.g., OSPY for Osprey protocol).
Description	Memo	NA	Description of this Protocol Version

Table: tbl_DB_Meta

Description: Database description and links to I&M metadata tools.

Field Name	Field Type	Size	Field Description
DB_Meta_ID	ReplicationID	16	Local primary key
Db_Desc	Memo	NA	Description of database purpose
Meta_MID	ReplicationID	16	Link to Metadata record
Meta_File_Name	Text	255	Filename of Metadata record

Table: tbl_DB_Revisions

Description: Database revision history data.

Field Nam	Field Type	Size	Field Description
Revision_ID	Text	50	Database revision (version) number or code
Revision_Contact_ID	ReplicationID	16	Link to tlu_Contacts
DB_Meta_ID	ReplicationID	16	Link to tbl_DB_Meta
Revision_Date	Date/Time	8	Database revision date
Revision_Reason	Memo	NA	Reason for the database revision
Revision_Desc	Memo	NA	Revision description

Data Entry

Field data collection will be accomplished using paper datasheets. Following concentrated data collection by UCBN staff and/or cooperators, data will be transferred from paper datasheets into the UCBN Osprey database as soon after data collection as is practical. Data entry forms in the Osprey database are patterned after the structure of the paper datasheet, and the database has built-in quality assurance components such as pick lists and validation rules to test for missing data or illogical combinations. Data entry will be viewed as an important step in the overall QA/QC process, and care will be taken to review all nest observation data while the observers are in the field.

Additional nest observation data will be collected by volunteers and park staff involved in the “Lake Roosevelt Osprey NestWatch Program.” Volunteers and/or park staff will visit their chosen nest site(s) from May until August until ospreys migrate from their nest sites in late summer. A web-based database application will facilitate online data entry by these volunteers and/or park staff. These online data entry forms will be linked from the UCBN osprey vital sign webpage (<http://science.nature.nps.gov/im/units/ucbn/monitor/osprey/osprey.cfm>), and will input data into a simple MS Access database stored on the web server. At the end of the field season, the UCBN Data Manager will perform quality control checks on the records in that Access database, then migrate valid records into the current UCBN Osprey working database application. The NestWatch Program will provide useful nest activity data to augment the UCBN nest surveys conducted during nest initiation/incubation and during the fledging period.

Assigning Nest Site ID

Nest site identifications are assigned based on three general geographic locations: the lower third of the lake (Coulee Dam section), the middle third of the lake (Gifford section), and the upper third of the lake (Kettle Falls section). Each nest site is assigned a four-character code or Nest ID. The first character indicates the lake section (C, G, or K), and the nest number is represented as a 2-digit number (e.g., 01, 02, 03, etc.) separated from the lake section character by an underscore. Following this nest site identification strategy, nest sites located between Coulee Dam and the upper reaches of the Spokane River arm are named C_01, C_02, C_03, etc. Nest sites located along the middle section (river mile 50 to river mile 95 [Bradbury Beach]) are named G_01, G_02, etc. and nest sites located between river mile 95 and the NPS boundary at Onion Creek are named K_01, K_02, etc. Nest site identification will not change if a nest falls completely apart and a new nest is built within the same tree several years later. Keeping the same Nest ID over time will enable us to track long-term history of use at individual nest trees.

Quality Review

After the data have been entered and processed, they will be reviewed by the Project Leader for quality, completeness, and logical consistency. The working database application will facilitate this process by showing the results of pre-built queries that check for data integrity, data outliers and missing values, and illogical values. The user may then fix these problems and document the fixes. Not all errors and inconsistencies can be fixed, in which case the resulting errors are then documented and included in the metadata and certification report.

Metadata Procedures

Data documentation is a critical step toward ensuring that data sets are useable for their intended purposes well into the future. This involves the development of metadata, which can be defined as structured information about the content, quality, and condition of data. Additionally, metadata provide the means to catalog data sets within intranet and internet systems, making data available to a broad range of potential users. Metadata for all UCBN monitoring data will conform to Federal Geographic Data Committee (FGDC) and NPS guidelines and will contain all components of supporting information such that the data may be confidently manipulated, analyzed, and synthesized. For long-term projects such as this one, metadata creation is most time consuming the first time it is developed – after which most information remains static from one year to the next. Metadata records in subsequent years then only need to be updated to reflect current publications, references, taxonomic conventions, contact information, data disposition and quality, and to describe any changes in collection methods, analysis approaches or quality assurance for the project.

Specific procedures for metadata development and posting are outlined in the UCBN Data Management Plan. In general, the Project Leader and the Data Manager (or Data Technician) will work together to create and update an FGDC- and NPS-compliant metadata record in XML format. The Project Leader will update the metadata content as changes to the protocol are made, and each year as additional data are accumulated. Edits within the document will be tracked so that any changes are obvious to those who will use it to update the XML metadata file. At the conclusion of the field season, the Project Leader will be responsible for providing a completed, up-to-date metadata questionnaire form to the Data Manager. The Data Manager will facilitate metadata development by creating and parsing metadata records, and by posting such records to national clearinghouses as described below (see Data Archiving section).

Sensitive Information

Part of metadata development includes determining whether or not the data include any sensitive information, which includes specific locations of rare, threatened, or endangered species. Prior to completing metadata, the Project Leader and Park Resource Manager will work together to identify any sensitive information in the data. Their findings will be documented and communicated to the Data Manager. We do not anticipate that sensitive information will be present in the osprey monitoring program at this time.

Data Certification and Delivery

Data certification is a benchmark in the project information management process that indicates 1) the data are complete for the period of record; 2) they have undergone and passed the quality assurance checks; and 3) they are appropriately documented and in a condition for archiving, posting, and distribution. Certification is not intended to imply that the data are completely free of errors or inconsistencies, which may not have been detected during quality assurance reviews.

To ensure that only data of the highest possible quality are included in reports and other project deliverables, the data certification step is an annual requirement for all tabular and spatial data. The Project Leader is primarily responsible for completing certification. The completed form, certified data, and updated metadata should be delivered to the Data Manager as outlined in the following steps and in Table 2.

Data certification steps

To package the certification materials for delivery, the Project Leader should follow these steps:

- 1) After the quality review has been completed, open the back-end working database file and compact it (in Microsoft Access, Tools > Database Utilities > Compact and Repair Database). This will make the file size much smaller.
- 2) Create a compressed file (using WinZip® or similar software) and add the back-end database file to that file. Note: The front-end application does not contain project data and as such should not be included in the delivery file.
- 3) Add the completed metadata to the compressed file.
- 4) Add the completed certification report to the compressed file.
- 5) Add any geospatial data files that aren't already in the possession of the Data Manager.
- 6) All file names – except for image files and geospatial data files – should include the assigned UCBN project code, in addition to the year or span of years for the data being certified. For example: OSPY_2009_certified.mdb, OSPY_2009_cert_report.doc.
- 7) The compressed file may then be delivered to the UCBN Data Manager (typically via FTP site or CD/DVD disk).

Upon receiving the certification materials, the Data Manager will check them in, store them in the central UCBN directory structure, upload the certified data to the master project database, and update the project GIS data sets with any geospatial data that are submitted. Upon notification that the year's data have been uploaded and processed successfully, the Project Leader may then proceed with data summarization, analysis, and reporting.

Data Archiving

Paper data sheets will be archived for 3 years, which allow ample time to complete QA/QC and certification steps for digital data. The UCBN will maintain the master database as the official record of protocol data, following procedures established in the UCBN Data Management Plan (Dicus and Garrett 2007) to ensure the master database is properly archived and remains compatible with applicable software.

Once the annual data certification has been completed, the UCBN Osprey database and related UCBN reports will be archived on the UCBN server, posted to the UCBN website, and posted to the national web-accessible secure Natural Resource Information Portal (NRInfo) application hosted by the NPS Washington Areas Support Office (WASO) or National I&M program. The NRInfo application incorporates functionality previously handled by separate databases into a single web interface that comprises:

- The master database for natural resource bibliographic references
- The master database for biodiversity information including species occurrences and physical or written evidence for the occurrence (i.e., references, vouchers, and observations)
- A centralized data repository with a graphical search interface.

A review of archive and expendable data products will be undertaken by the Project Lead and Data Manager during season close-out each year. An example of an expendable data product is an intermediate draft of an annual report that was saved during report preparation.

Directory Structure

The following directory structure will be used to store and archive all information related to the osprey monitoring project on the UCBN file server. This is a generic structure that should provide a foundation and a minimum standard of organization and consistency. The goal is to organize all project materials in an efficient hierarchical structure that reflects the life cycle and workflow of the project. Toward this goal, all subfolders are organized into 4 primary project folders that reflect life cycle stages (initiate, plan, implement, and close). Additional subfolders may be added as needed, but a strong emphasis must be placed on keeping the structure as simple and logical as possible. The 4 primary project folders and their standard subfolders are presented below.

\Initiate – Store information about the initiation of the project here, including proposals, contract agreements, relevant e-mails, etc.

\Agreements_Contracts

\Meetings_Correspondence

\Proposals

\Plan – Store information about the planning phase of the project here, including monitoring objectives, protocol development summaries, conceptual models, protocol and SOP drafts, study plans, and research permits.

\Conceptual_Models

\Data_Mng_Models

\Equipment

- \Meetings_Correspondence**
- \Monitoring_Objectives**
- \Protocol_Develop_Summary**
- \Protocol_SOP_Drafts**
- \Research_Permits**
- \Study_Plans**

\Implement – Store information about the implementation phase of the project here, including data management documents and draft products, data analysis documents and draft products, project photos, and relevant correspondence.

- \Data_Analysis**
- \Data_Management**
 - \Data_Dictionary**
 - \PDA_Forms**
 - \Database_Working**
 - \Download_Files**
 - \GPS_Files**
 - \Datalogger_Files**
 - \GIS_Data_Working**
 - \Map_Products**
 - \Templates**
 - \Features**
 - \Geodatabases**

- \Meetings_Coorepondence**
- \Photos**
 - \Final**
 - \Originals**
 - \Working**

\Close – Store finalized documents and products from the close-out phase of the project (on either an annual basis or a final project close-out basis) here, including final reports, certified data and GIS products, and presentations.

- \Certified_Data_GIS_Metadata**
- \Final_Reports**
 - \Annual_Reports**
 - \Investigator_Annual_Reports**
 - \Protocol_SOP_Final**
- \Other_Final_Deliverables**
- \Presentations**

Schedule of Data Management Tasks

Table 2. The yearly osprey monitoring data management task list. This table identifies tasks by project stage, indicates who is responsible for the task, and establishes the timing for its execution.

Project Stage	Task Description	Responsibility	Timing
Preparation	Notify Data Manager of needs (field maps, GPS support, training)	Project Leader	by Feb 1
	Ensure that project workspace is ready for use and GPS download software is loaded	Data Manager	by April 15
	Prepare and print field maps and data sheets	Project Leader /Data Manager	by April 15
	Update and load data dictionary and target coordinates into GPS units	Project Leader/Data Manager	by May 1
	Provide database/GPS training as needed	Data Manager/Project Leader/Field Leader	April
	Train field crew in nest observation protocols	Project Leader and/or Field Leader	May 15
	Examination and certification of field observer qualifications	Project Leader and/or Field Leader	May 1
Data acquisition	Collect field observations and position data during field trips	Technicians/ Volunteers	May-Aug
	Review data sheets after each day	Field Leader	daily
Data entry & processing	Enter data into working copy of the database	Technicians	after each day
	Verification of accurate transcription as data are entered	Technicians	after each day
	Periodic review of database entries for completeness and accuracy	Field Leader	As needed
	Upload processed and verified data to archive master database copy	Data Manager and/or Technician	Aug-Sept
Product development	Complete field season report	Project Leader / Field Leader	Oct
Season close-out	Meet to discuss the recent field season, and document any needed changes to field sampling protocols or the working database	Project Leader, Park Resource Manager and Data Manager	Nov-Dec
	Discuss and document needed changes to analysis and reporting procedures	Project Leader, Park Resource Manager and Data Manager	Nov-Dec
Product delivery	Send field season report to Data Manager	Project Leader / Field Leader	by Nov 15
Quality review	Quality review and data validation using database tools	Project Leader/Data Manager	Oct
	Prepare coordinate summaries and/or GIS layers and data sets as needed for spatial data review and reports	Data Manager	Oct
Metadata	Identify any sensitive information contained in the data set	Project Leader and Park Resource Manager	Nov-Dec
	Update project metadata records	Project Leader	Nov-Dec

Table 2 (continued). The yearly osprey monitoring data management task list. This table identifies tasks by project stage, indicates who is responsible for the task, and establishes the timing for its execution.

Project Stage	Task Description	Responsibility	Timing
Data certification	Certify the season's data and complete the certification report	Project Leader	Nov-Dec
Data delivery	Deliver certification report, certified data, and updated metadata to Data Manager	Project Leader	by Oct 31
	Upload certified data into master project database, store data files in UCBN Digital Library ¹	Data Manager	Nov 30
	Notify Project Leader of uploaded data ready for analysis and reporting	Data Manager	Nov
	Update project GIS data sets, layers and associated metadata records	Data Manager	Nov
	Finalize and parse metadata records, store in UCBN Digital Library ¹	Data Manager	Nov
Data analysis	Power analyses and sample site selection for upcoming season	Project Leader/Data Analyst	Nov-Dec
	Status and Trend Analyses	Project Leader/Data Analyst	Nov-Dec
Product development	Export automated summary queries and reports from database	Data Analyst	Nov-Dec
	Produce park-wide map output for archives	Data Manager / Data Analyst	Nov-Dec
	Generate report-quality map output for reports	Data Manager / Data Analyst	Nov-Dec
	Acquire the proper report template from the NPS website, create annual report	Data Analyst and Project Leader	Nov-Dec
	Screen all reports and data products for sensitive information	Project Leader and Park Resource Manager	Nov-Dec
Product delivery	Submit draft report to Network Coordinator for review	Project Leader	by Dec 15
	Review report for formatting and completeness, notify Project Leader of approval or need for changes	Network Coordinator	by Dec 31
	Upload completed report to UCBN Digital Library ¹ submissions folder, notify Data Manager	Project Leader	by Dec 31
	Deliver other products according to the delivery schedule and instructions	Project Leader	upon completion
	Product check-in	Data Manager	upon receipt
Posting & distribution (Section 4k)	Submit metadata to NRInfo ²	Data Manager	by Dec 31
	Create NRInfo ³ record(s), and link digital reports	Data Manager	upon receipt
	Update NRInfo ⁴ species records according to data observations	Data Manager	Dec
	Submit certified data and GIS data sets to NRInfo ²	Data Manager	Dec

Table 2 (continued). The yearly osprey monitoring data management task list. This table identifies tasks by project stage, indicates who is responsible for the task, and establishes the timing for its execution.

Project Stage	Task Description	Responsibility	Timing
Archival & records management	Store finished products in UCBN Digital Library ¹	Data Manager	upon receipt
	Review, clean-up, and store and/or dispose of project files according to UCBN Data Management Plan guidelines	Project Leader	Dec

¹ The UCBN Digital Library is a hierarchical digital filing system stored on the UCBN file server. Network users have read-only access to these files, except where information sensitivity may preclude general access.

² Natural Resource Information Portal (NRInfo) is a clearinghouse for natural resource data and metadata (<http://nrinfo.nps.gov>). Only non-sensitive information will be publically viewable. Refer to the protocol section on sensitive information for details.

³ Bibliographic citations are managed within the national Natural Resource Information Portal (NRInfo) application, which facilitates user citation searches on author, title, keywords, etc. (<http://nrinfo.nps.gov>). Only non-sensitive information will be publically viewable.

⁴ Park-specific species lists and observation data are managed within the national Natural Resource Information Portal (NRInfo) application

Osprey Monitoring Protocol

Standard Operating Procedure (SOP) 6 Data Summary, Analysis, and Reporting

Version 1.0, March 2010

Change History

Version #	Date	Revised By	Changes	Justification

Note: This SOP describes details of the recommended analytical approaches and reporting guidelines for the UCBN osprey monitoring program.

Suggested Reading

- Agresti, A. 2007. An introduction to categorical data analysis. 2nd Edition. John Wiley and Sons, New York.
- Crawley, M. J. 2005. Statistics: an introduction using R. John Wiley and Sons, Ltd. West Sussex, England.
- Garrett, L. K., T. J. Rodhouse, L. K. Svancara, and C. C. Caudill. 2006. Vital signs monitoring plan, Upper Columbia Basin Network. Natural Resource Report NPS/PWR/UCBN/NRR—2006/001. National Park Service, Seattle, WA.
- Gerrodette, T. 1987. A power analysis for detecting trends. Ecology 68:1364-1372.
- Helsel, D. R., and R. M. Hirsch. 1991. Statistical methods in water resources: Techniques of water-resources investigations of the United States. Geological Survey Book 4: Hydrologic analysis and interpretation Chapter A3, Reston, VA.
- Higgins, J. J. 2004. Introduction to modern nonparametric statistics. Brooks/Cole-Thomson Learning, Pacific Grove, CA.
- Maindonald, J., and W. J. Braun. 2007. Data analysis and graphics using R – an example-based approach. Cambridge University Press, UK.

National Park Service. 2006. Instruction to authors—Natural Resource Report and Natural Resource Technical Report. Natural Resource Report NPS/NRPC/NRR—2006/001. National Park Service, Fort Collins, CO.

Introduction

This SOP describes analytical procedures for developing summary information that will be reported to park managers in annual and 5 year trend reports. The first trend report will be produced in 2015.

Analytical Procedures

The statistical methods outlined below are described for implementation with the statistical freeware R, an open source version of S-Plus. R is a powerful system for statistical computations and graphics, which runs on Windows, Unix, and Mac computers. R is a combination of a statistics package and a programming language. It can be downloaded for free from <http://www.r-project.org/>. The R Wiki provides an online forum <http://wiki.rproject.org/rwiki/doku.php> and documentation. R is one of the analytical environments of choice for the Upper Columbia Basin Network. Computational code for procedures outlined in this SOP written for R statistical language and environment (<http://www.r-project.org/>) are provided on the CD that accompanies this manual or by request from the UCBN. All analytical code is stored on the UCBN file server under Osprey/3_Implement/Data_Analysis/RCode. Direct references to R commands in the text are distinguished by **Courier New Font** rather than Times New Roman, with arguments for the commands noted by closed parentheses ().

Power Analysis

Given the history of osprey population declines world-wide in response to environmental contamination, and the level of contamination and human disturbance present in Lake Roosevelt currently, we have focused our analytical attention on detecting declines rather than increases, although our protocol will support change detection in both directions. Power to detect change is a function of sample size (occupied nests), magnitude of the minimum detectable change, and acceptable error (Type I and Type II error; Gerodette 1987). We have no ability to adjust the sample size and have chosen to accept a higher Type I (false-change) error in order to minimize the Type II (missed-change) error, reducing the “conservationist’s risk” (Irwin 2006; Morrison 2007).

Because we are observing most and potentially all members of the target population (mapped and accessible established nests), there will be little or no uncertainty in status estimates of occupancy or productivity, and therefore no requirement for power analysis or sample size calculations for status. Change detection will be restricted to the absolute increase or decrease in the number of occupied nests observed during the incubation period, and in the ratio of the total number of fledglings produced per year to the total number of occupied nests within the target population. We have taken a simulation approach to estimating power to detect declines for fixed sample sizes (occupied nests), and with Type I error (α or false-change error) fixed at 20%. In our case, year (time) is the variable that influences power, rather than sample size (number of nests) within years. Based on our simulations, power ($1-\beta$) to detect 50% declines in the number of occupied nests over 20 years with non-parametric Mann-Kendall tests will be approximately 95%.

The following code was used to estimate power:

```
*****
#File: UCBN_OspreyPower_MannKendall_20100312.txt
#Purpose: Simulate decline in annual occupied nest count data from a binomial
distribution,
#and estimate power with Mann-Kendall tests
#Contact: Tom Rodhouse, UCBN Ecologist, Tom_Rodhouse@nps.gov
#Date: March 12, 2010

library(Kendall)

#yrs is years
yrs<-20
#Number of nests
n<-20
decline=seq(from=.5,to=.25,length.out=20) #starting p based on pilot data
approximately 50%
#50% decline over 20 yrs ends at p=0.25
#its is number of simulation iterations
its<-10000
#WYear is year index
WYear<-rep(seq(0,(yrs-1),by=1))
#data and temp hold output
data<-numeric(0)
temp<-numeric(0)
#begin loop
for (i in 1:its) {
  for (j in 1:yrs) {
    temp[j]<-rbinom(1,n,decline[j])
    data[i]<-MannKendall(temp)$sl[1]
  }
  power<-sum(data<=0.2)/its
}
power
#data
plot(temp,type="l",xlab="Years",ylab="Nests Occupied",
main="Osprey Occupited Nests - A Simulated Trend")
lm<-glm(temp~WYear,family="poisson")#Poisson regression for counts
lines(WYear,exp(predict(lm)),lty=2)
*****
```

Annual Status Summary

Status results will be summarized after each year of data collection. Standard summary information will be presented for nesting ospreys at LARO with content similar to that shown in Tables 3 and 4, and will include the number of known nest sites, number of occupied nests, percentage of occupied nests, total number of young, and average number of young per occupied nest (productivity).

Table 3. Example of annual summary information for the LARO osprey population.

Results of Annual Osprey Surveys	2009
Number of known nest sites	9
Number of occupied nests	4
Percentage of occupied nests	44%
Total number of young	6
Average number of young per occupied nest (productivity)	0.67

Nest tree characteristics will be summarized and reported annually along with the activity and productivity survey information. Table 4 is an example of summary information that will be reported for characteristics of nest trees at LARO.

Table 4. Example of summary information of nest site characteristics of occupied osprey nests in LARO.

Parameter	Mean or Percent	Range	<i>n</i>
Nest height (m)	22.8	6-33	45
Tree height (m)	23.1	10-33	45
Tree dbh (cm)	58.9	28.2-136.4	45
Distance to water (m)	121	2-1,430	45
Species of tree			
Ponderosa pine	39%		13
Douglas-fir	30%		10
Manmade structures	30%		10
Average height (m) of 4 nearest trees to occupied nest tree	12	6-34	180
Average diameter (dbh in cm) of 4 nearest trees to occupied nest tree	18	1-140	180

Trend Analysis

After 5 years of data collection, evidence of change in the two key metrics, (number of nests occupied) and (number of fledglings per occupied nest) will be evaluated with the non-parametric Mann-Kendall test, which uses a simple rank-based correlation coefficient, Kendall's tau, to determine if nest occupancy is correlated with time (Helsel and Hirsch 1991, Higgins 2004). Simple summaries will be made with the multi-year averages, as shown in Table 5. A table similar to Table 5 will be generated for the LARO 5-year annual status and trend report.

Table 5. Breeding success of Ospreys in the West Kootenay during 2006, compared to the nine-year average and range of values for 1997-2005 (Arndt 2007).

Indicators of Breeding Success	2006	1997-2005 mean (range)
Number of occupied nests	27	34 (21-56)
Number of young	29	44 (15-96)
No. young per occupied nest	1.07	1.23 (0.71 – 1.71)

Graphical tools will also be used to display biologically important changes in osprey numbers and productivity over time. For example, a simple line graph of a time series of occupied nest counts can be effective. Figure 8. displays a simulated 50% decline in osprey nest occupancy over 20 years, with a stochastic component introduced by drawing from a binomial error distribution, provides a realistic illustration of how osprey observation data may be presented over time. The dashed line represents a Poisson regression line (for count data) fitted to the nest counts over time. In this example, the estimated annual rate of decline was 3.4%. The estimated correlation coefficient τ between the number of occupied nests and year was -0.53 ($p=0.002$). This figure was drawn from one iteration of our power analysis simulation described previously, showing how nest counts may vary from year to year, but also show an overall trend. A generalized linear model using a log-linear transformation suitable for counts (i.e., a “Poisson” error structure), $\ln(y_j) = \beta_0 + \beta_1(Year_j)$, was plotted over this time series to illustrate one way of obtaining an overall estimate of mean trend over time. Code for plotting Figure 8 and for estimating the slope coefficient for trend with a Poisson model are included in the power analysis code presented previously.

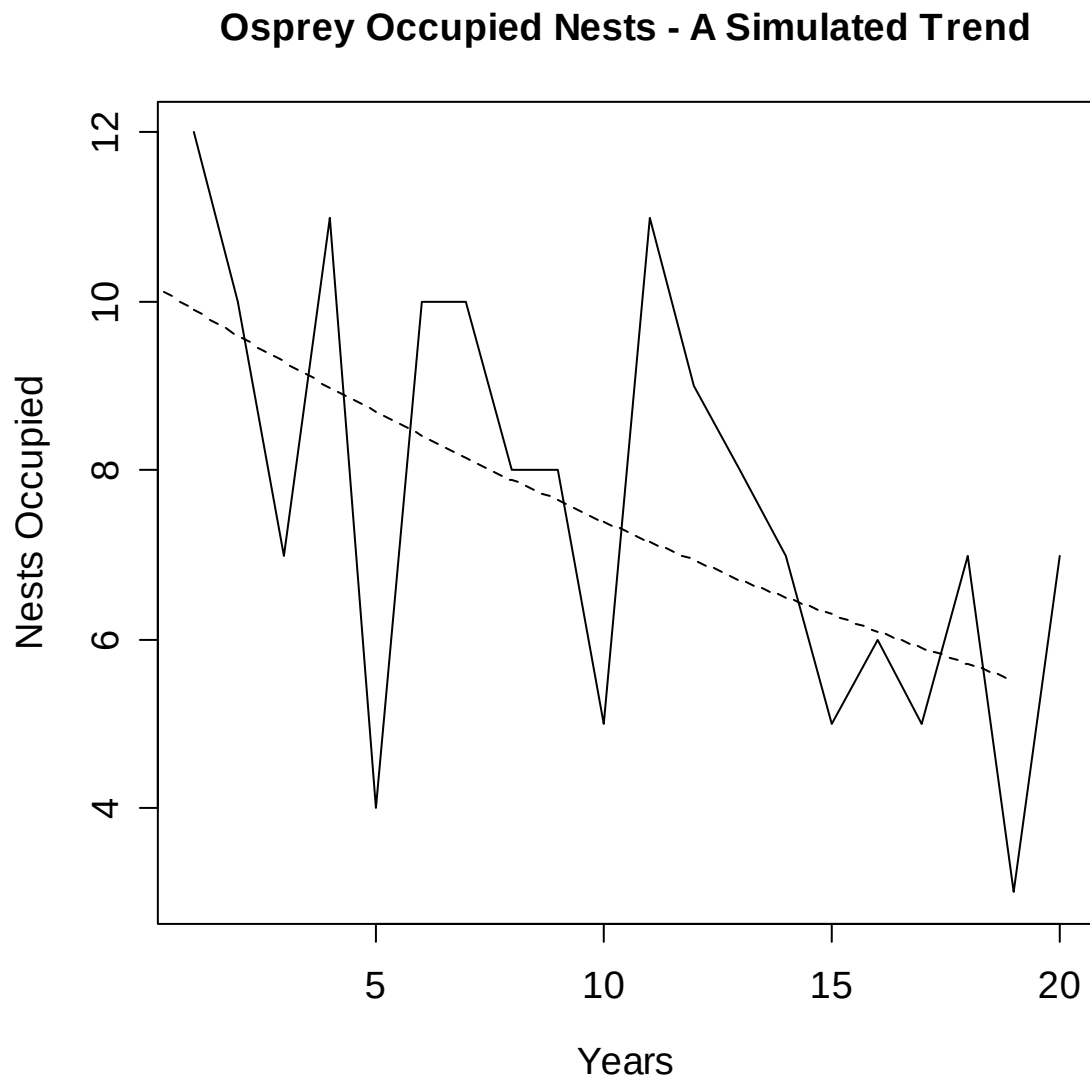


Figure 8. A simulated trend of osprey nest occupancy.

Reporting

A summary will be produced annually, with a more detailed status and trend report produced every 5 years. The annual summary will:

- List project personnel and their roles.
- List nest site locations and observations recorded during the current year.
- Provide a summary history of the number of occupied nests and number of young produced per occupied nest (productivity).
- Provide status and trend (after 2014) estimates for the osprey population at LARO.
- Provide a summary of additional nest tree characteristics, including mean nest height (m), tree height (m), tree DBH, distance to water (m), and species of tree.
- Provide a summary of additional nest platform characteristics, type of structure (power pole, bridge, etc.), height of structure, and distance to water (m).

- Provide map(s) of annual nest site locations.
- Evaluate data quality and identify any data quality concerns and/or deviations from protocols that affect data quality and interpretability.
- Evaluate and identify suggested or required changes to the protocol.

In order to reduce the reporting burden of the I&M program on UCBN staff, the annual summary will be developed for internal Network distribution only. However, a 1-2 page resource brief will be prepared for public consumption, and provided to park interpretive staff for distribution to interested visitors (Figure 9). An NPS template for producing maps with ESRI ArcGIS or ArcView software is available at <http://imgis.nps.gov/templates.html>.

Osprey nest site locations will be reported to the LARO resource managers as early in the nesting season as possible. Reported information will include GPS locations and location maps so that resource managers can direct boat vehicle traffic or visitors away from the nest site, if necessary.

A more in-depth status and trend analysis and report will be produced approximately every five years, or as the importance of emerging information warrants. This report will provide greater analytical and interpretive detail, and will evaluate the relevance of findings to long-term management goals. The report should also evaluate operational aspects of the monitoring program, such as whether the observation period remains appropriate. The timing of the spring arrival of birds at the nest site could conceivably change over time in response to climate change.

The 5-year status and trend report will use the NPS Natural Resource Publications Natural Resource Technical Report (NRTR) template, a pre-formatted Microsoft Word template document based on current NPS formatting standards. This template, guidelines for its use and documentation of the NPS publication standards are available at the following address: <http://www.nature.nps.gov/publications/NRPM/index.cfm>. This osprey protocol is also an excellent example of the NPS Natural Resource Report formatting standard, which is very similar to the NRTR template.

Schedule for Osprey Monitoring Project Deliverables

Table 6. Schedule for osprey monitoring project deliverables.

Deliverable Product	Primary Responsibility	Target Date	Destination(s)
Field season report	Project Leader	December 1 of the same year	UCBN Digital Library ¹
Raw data files	Field Leader	September 15 of the same year	UCBN Digital Library ¹
Photographs (select, quality images for long-term storage)	Project Leader	November 30 of the same year	UCBN Digital Library ¹
Certified working database and geospatial data with draft metadata	Project Leader with Data Manager assistance	delivered by November 30 of the same year, not posted to public sites until June of the second year	master project database and GIS data sets, copy to UCBN Digital Library ¹ , and post to NRInfo ²
Data certification report	Project Leader	November 30 of the same year	UCBN Digital Library ¹
Full metadata (parsed XML)	Data Manager	March 15 of the following year	NRInfo ² , UCBN Digital Library ¹
Annual report	Project Leader	April 30 of the following year	NRInfo ³ , UCBN Digital Library ¹ , printout to local park collections
5-year analysis report	Project Leader	Every 5 years by April 30	NRInfo ³ , UCBN Digital Library ¹ , printout to local park collections
Other publications	NPS Leader, Project Leader, Data Manager	as completed	NRInfo ³ , UCBN Digital Library ¹ , printout to local park collections
Other records	NPS Leader and Project Leader	review for retention every January	retain according to UCBN Data Management Plan guidelines

¹ The UCBN Digital Library is a hierarchical digital filing system stored on the UCBN file server. Network users have read-only access to these files, except where information sensitivity may preclude general access.

² Natural Resource Information Portal (NRInfo) is a clearinghouse for natural resource data and metadata (<http://nrinfo.nps.gov>). Only non-sensitive information will be publically viewable. Refer to the protocol section on sensitive information for details.

³ Bibliographic citations are managed within the national Natural Resource Information Portal (NRInfo) application, which facilitates user citation searches on author, title, keywords, etc. (<http://nrinfo.nps.gov>). Only non-sensitive information will be publically viewable.



Osprey Monitoring at Lake Roosevelt National Recreation Area (LARO)

Importance

Osprey (*Pandion haliaetus*) is a high priority vital sign for LARO. Raptors occupy most ecosystems, cover large home ranges, are often migratory, and are top predators in complex food webs. Because of these characteristics, as well as their sensitivity to human disturbances, they can be extremely useful indicators of environmental change.

The osprey is a common breeding resident in LARO and is at risk from environmental contamination. North American osprey populations began declining in the early 1950's due to pollutants such as Dieldrin, DDE, and PCB. Although restrictions enacted in the 1980's have allowed populations to rebound, the presence of contaminants still remains a concern in many areas, including LARO. Contaminants, such as heavy metals, dioxins, and furans, are released into the Upper Columbia River by mining operations, pulp and paper production, sewage treatment plants, and other industrial activities. Since fish constitute 99% of osprey diets, pollutants accumulate rapidly in osprey tissue and cause decreased egg viability.

Increased recreational activity is an additional stressor on osprey populations. While reservoirs and man-made nesting structures such as telephone poles and artificial platforms benefit osprey, high levels of human activity in the vicinity of active nests may be adversely affecting successful reproduction. Recreational activity at LARO has been steadily increasing over time, attracting over 1 million visitors in 2005. Most visitors are summertime watercraft users, and because osprey typically nest on or near the lakeshore and forage exclusively over open water, an inherent conflict exists.

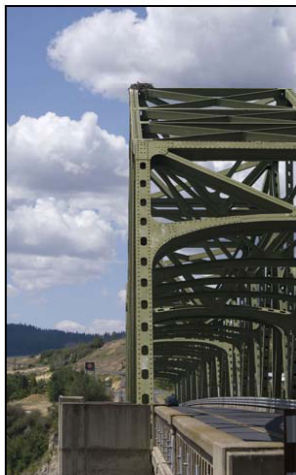


Preliminary Results

Twenty-eight known nest sites were surveyed in mid-July, 2009. Of the nine that were occupied by osprey, four contained at least one fledgling. The remaining nests were either occupied by bald eagles or unoccupied at time of survey. The occupied nests were concentrated in the south end of Lake Roosevelt, between Porcupine Bay and Coulee Dam.

Objectives

- Determine status and trend of nest occupancy for osprey at LARO.
- Determine status and trend of productivity (expressed as the number of young per nest) for osprey at LARO.



Osprey nest atop Fort Spokane Bridge

Management Applications

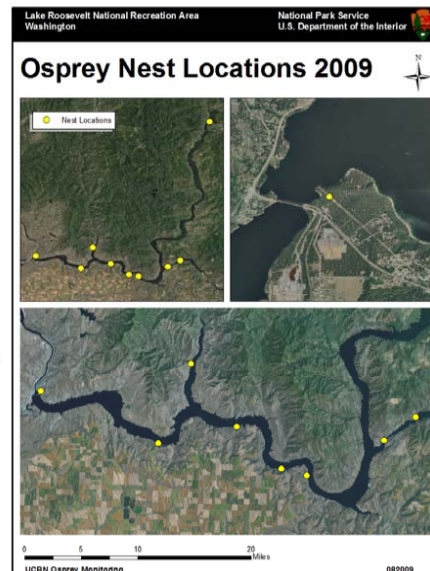
- Provide information to park managers and the public about osprey distribution and nest success in the park.
- Update park managers knowledge about osprey health, and identify areas for increased protection.
- Support park resource planning and reporting efforts.

Future Plans

Two surveys will be conducted each year. Nests will be visited in the spring to identify nest initiation and incubation. Occupied nests will be revisited late summer to determine the number of fledglings. A new website will be available in 2010 for NPS staff and the public to assist researchers with nest site observations.

Contact Information

Lisa Garrett, Lisa_Garrett@nps.gov



Network website: <http://science.nature.nps.gov/im/units/ucbn/>

Resource website: <http://science.nature.nps.gov/im/units/ucbn/monitor/osprey/osprey.cfm>

August 2009

Figure 9. Osprey monitoring 2009 resource brief.

Osprey Monitoring Protocol

Standard Operating Procedure (SOP) 7

Protocol Revision

Version 1.0, March 2010

Change History

Version #	Date	Revised By	Changes	Justification

Note: This SOP describes the recommended protocol revision practices and provides a history and documentation of the protocol development and revision process.

Procedures

This monitoring protocol is an actively evaluated and updated document that reflects the latest procedures of the monitoring program. Revisions are expected, and can involve only minor changes with little overall impact or occasional major revisions and course corrections.

Evaluation and revision of the protocol is directed by the Project Leader on an annual basis in association with season close-out. The narrative and SOP has a revision history log whereby changes can be recorded. Older versions of the narrative and SOPs should be archived to ensure proper legacy of past work is maintained. Each revision will require the updating of the version number. Minor changes are recorded as decimal numbers (e.g., 1.0, 1.1, 1.2, etc...). Major changes are recorded as a change in the primary number of the protocol version (e.g., 1.0, 2.0, 3.0, etc...). In some cases, major revisions to the protocol may prompt the need for additional peer review. The Project Leader and Network Coordinator will coordinate this with the Regional I&M Program Coordinator.

Development and Revision History Log

The development, reporting and revisions will be recorded as part of the osprey monitoring. Table 7 summarizes the major events in protocol development and reporting up to this date.

Table 7. Protocol development and revision history log. This table summarizes the major events leading to the development and revision of the UCBN osprey monitoring protocol (version 1.0, draft).

Date	Development Step	Documentation
August 2007	Pilot data collection from a fixed wing airplane with UCBN staff	Excel Spreadsheet
August – September 2008	LARO and SCAs collect data on 31 nest sites at LARO.	Excel Spreadsheet
July 2009	UCBN Project Leader and SCAs collect data on 31 nest sites at LARO. A resource brief is developed and the protocol development summary is updated.	Access Database, Project Development Summary, Resource Brief
September 2009	A complete draft of the osprey monitoring protocol narrative and SOPs are submitted to UCBN for internal and external review.	Draft Osprey Monitoring Protocol Narrative and SOPs
March 2010	Revised version 1.0 of the osprey protocol narrative and SOPs submitted for final approval	Revise Osprey Monitoring Protocol Narrative and SOPs

Upper Columbia Basin Network Osprey Protocol Development Summary

(March 2010)



Protocol: Osprey

Parks Where Protocol will be Implemented: LARO

Justification/Issues being addressed:

Indicator species help researchers and resource managers by providing information on the overall condition of an ecosystem. For several reasons raptors can be extremely useful indicators of environmental change. Raptors occupy most ecosystems, cover large home ranges, and are often migratory, top predators in complex food webs, and sensitive to environmental contaminants and other human disturbances (Bildstein 2001). The osprey is an excellent example of one of these potential indicator species.

North American osprey populations began to drastically decline in the early 1950s and declines continued through the early 1970s (Reese 1972; Poole 1989). Environmental pollutants such as Dieldrin, DDE, and PCB, have been listed as the primary cause of declines. These pollutants bioaccumulate in the aquatic flora and fauna and, because fish constitute 99% of an osprey's diet, pollutants accumulate rapidly in osprey tissue. At high levels, these contaminants cause eggshell thinning and decreased egg viability (Ames 1966; Wiemeyer et al. 1978; Steidl et al. 1991). With restrictions and bans on many of these pollutants in the 1980s, osprey numbers appear to have rebounded and are flourishing in many areas (Titus and Fuller 1990). However, the presence of contaminants still remains a concern in many areas, including LARO.

The osprey is a common breeding resident in LARO, but is at risk of environmental contamination. Contaminants found in the sediments of the Upper Columbia River consist of heavy metals such as antimony, arsenic, cadmium, copper, lead, mercury, and zinc, as well as organic contaminants such as polychlorinated dibenzo-p-dioxins (dioxins), polychlorinated dibenzofurans (furans) and PCBs (EPA 2006). Known and potential sources of contaminants in LARO include mining and milling operations, smelting operations, pulp and paper production, sewage treatment plants, and other industrial activities (EPA 2006). One of the largest sources of contamination in LARO is the TechCominco Smelter, located along the Columbia River approximately 16 km (10 mi) north of the US border. This smelter has been discharging pollutants for over 100 years, making it the single largest source of heavy metal contaminants in the Upper Columbia River (EPA 2006).

Increased human recreational activity is an additional stressor on osprey populations in LARO. While reservoirs and man-made nesting structures, such as telephone poles and artificial platforms benefit osprey, high levels of human activity in the vicinity of active nests may be adversely affecting successful reproduction (D'Eon and Watt 1994). The effect of human disturbance on osprey is dependent on several factors including the timing, frequency, and intensity of disturbance and the degree of osprey habituation. Recreational activity at LARO has

been steadily increasing over time, and in 2005, LARO attracted over 1 million visitors. Most of these are summertime watercraft users, and because ospreys typically nest on or near the lakeshore and forage exclusively over open water, an inherent conflict exists.

Monitoring of osprey is a critical element in the suite of information needed by LARO managers to adequately understand and manage park ecological condition. Though there have been several studies over recent years examining the presence of contaminants within LARO, little information is available regarding osprey in the area, and few studies (if any) have researched the potential impacts of these contaminants on osprey and other avian wildlife (Henny 2005).

The UCBN I&M Program seeks to support LARO staff by developing a simple and effective long-term monitoring protocol that will provide timely information on osprey nest occupancy and productivity. We will assist LARO in the identification of desired target values for occupancy and productivity, and conservative thresholds that, if crossed, might trigger management action. Because of the complexity of land ownership and management responsibilities in the Lake Roosevelt area, NPS management options are limited. However, osprey declines exceeding established thresholds may be used to garner support among other area stakeholders to support additional research or alternative management strategies.

The overarching goal of the UCBN osprey vital signs monitoring program is to inform park resource managers about the status and trend of osprey populations at LARO. The primary objective of current osprey population management at LARO is to prevent a decline in current density levels. Knowledge of nest site characteristics and determining patterns in nesting area occupancy and reproductive success is important in the conservation and preservation of osprey populations.

Given the lack of available ecological data on osprey nesting ecology in LARO, the following fundamental questions continue to drive much of the UCBN's inquiry into osprey population ecology:

- What is the number of nests occupied in LARO? What is the trend in nest occupancy?
- What is the trend in productivity as measured by the number of young produced per occupied nest in LARO?
- What are the habitat characteristics of osprey nest sites at LARO?
- What volunteer programs can park managers implement to engage park staff and visitors in a greater appreciation for natural resources within LARO?

In light of these questions and the broader goals outlined above, this protocol will address the following specific measurable monitoring objectives:

1) Determine status and trend in the number of occupied osprey nests within 1500 m of Lake Roosevelt that are accessible to surveyors. **Justification:** *Currently little information is available concerning osprey nesting activity in LARO. Osprey nests are relatively easy to locate and observe from the ground. Locating nests will provide information regarding nest structure and it will also help to identify critical areas for increased protection.*

2) Determine status and trend in productivity (expressed as the number of young per occupied nest) for monitored osprey nests at LARO. **Justification:** *Productivity is essential to maintaining a healthy population. Contaminants and human disturbance at LARO may be affecting osprey productivity. Knowing the level of productivity of this area will help managers better understand population condition and proceed to address issues of management concern.*

3) Determine status and trend in osprey nest site characteristics including nest tree metrics and habitat characteristics to evaluate changes in nesting habitat association for monitored osprey nests at LARO. **Justification:** *Currently little information is available concerning habitat characteristics of osprey nest sites in LARO. Collecting data on nest site characteristics will provide information regarding nest trees and use of artificial nest structures at LARO.*

4) Increase appreciation and understanding of osprey breeding biology and nest site requirements at LARO through the recruitment of park staff, local birdwatchers, and school groups in collecting and reporting osprey nest site data. **Justification:** *Currently one of the long-term goals of the resource staff is to increase public appreciation and understanding for the natural resources at LARO. The challenge is to help visitors understand that the national recreation area offers more than just fishing and boating opportunities. With a well-planned and well-delivered volunteer monitoring program for observation of osprey nests, visitors can collect and report data on osprey nest sites that will provide a means to increase public understanding and appreciation of osprey breeding biology.*

Basic Approach:

Knowledge of nest site characteristics and nest success of ospreys is important in the conservation and preservation of these populations. We will annually locate occupied osprey nests by foot, car, and boat along the Lake Roosevelt study area. Classification of occupied (pair present) versus active nests (eggs laid or young present) will follow the criteria of Postupalsky (1974). Nests will be visited a minimum of 2 times during the breeding season to determine success (number of feathered advanced-age young of 40-45 days at each nest).

Our terminology and data summary methods are based on Postupalsky (1974, 1983), who recommended standard terminology for describing status of nests and standard criteria for calculating reproductive success. Postupalsky (1983) recommended counting young when adults are no longer brooding consistently, and young are large and dark (partly feathered to feathered). Our goal is to determine the number of feathered nestlings, but occasionally downy nestlings may be present during the second visit to a site. When this happens, an additional visit will be made to the nest site several days later to determine if the chicks develop into fledglings.

Information collected on nest site characteristics will assist park managers in determining the location and type of structure that osprey are using for their nests along the shoreline of LARO. Nest site covariates that are recorded at occupied nest sites include: nest height (m), tree height (m), tree dbh (cm), distance to water (m), species of tree, type of nesting structure (power pole, bridge, etc.) and relationship of nest tree to surrounding trees. This comparison will be a height comparison, or if the trees are of a similar height then a comparison of dbh (larger, similar, and smaller).

The focus of this protocol is the monitoring of osprey nests but we recognize that the importance of eagle nesting success is also of concern to park management. Information on occupied eagle nest sites encountered during field work will also be recorded and reported to park management as time allows.

Principle Investigators and NPS Leader:

NPS Leader: Lisa Garrett, Lisa_Garrett@nps.gov.

Development Schedule, Budget, and Expected Interim Products:

A draft protocol was revised and submitted for final approval in March 2010.

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Osprey Monitoring Protocol

Standard Operating Procedure (SOP) 8 Field Safety and Job Hazard Analysis

Version 1.0, March 2010

Change History

Version #	Date	Revised By	Changes	Justification

Note: This SOP describes recommended safety practices, emergency contact information, and a job hazard analysis for the osprey protocol. All motorboat operators must adhere to the Department of Interior Manual Chapter 22: Watercraft Safety included in this SOP.

Field Safety Procedures

Weather and Field Gear

Field work in northeast Washington can bring with it challenging weather extremes. In spring and early summer cold rainy weather is common with possible frost at night. Later in summer the weather can be very hot approaching, 100° F. It is essential to the success of the program that all volunteers and staff are well prepared for weather extremes. Good rain gear, warm clothes, sunhats, sunscreen, plenty of water, and mosquito repellant are essential. Lightweight, long-sleeve clothing worn as protection from insects and sun is recommended. It is also important to always wear boots during field sampling; lighter shoes are acceptable in camp.

Safety Precautions

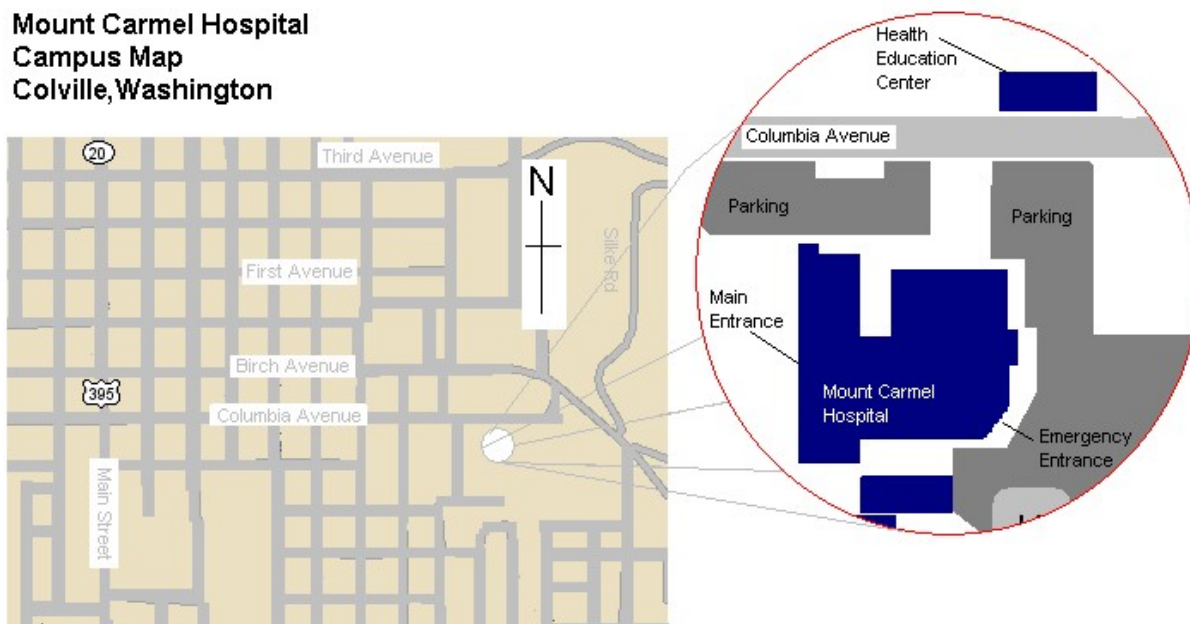
The terrain around the nest sites at Lake Roosevelt National Recreation Area is varied with many nests located on relatively steep hillslopes and large elevation gains between the water and the nest. Osprey nest sites are also in rather remote locations and travel time to transport injured or sick personnel is considerable. Conservative decision-making is imperative. An injury, even a minor one, could cause a substantial interruption in field schedules and overall monitoring program progress. Cell phone coverage at both park sites is intermittent and should not be relied upon in case of an emergency. **Use of two-way radios is strongly encouraged! First aid kits should be available in vehicles or boats during field work!**

Emergency Contact Information

North District – Kettle Falls

If you need an Officer, **contact** Stevens County Dispatch @ (509) 684-2555. If you have an **emergency**, please call 911. The closest hospital is located at 982 E Columbia, Colville, WA 99114, (509) 684-2561

**Mount Carmel Hospital
Campus Map
Colville, Washington**



Headquarters – Coulee Dam

Coulee Medical Center

411 Fortuyn Blvd. - Grand Coulee, WA 99133

Coulee Medical Center: 509.633.1753

Coulee Family Medicine Clinic: 509.633.1911

Coulee Medical Clinic: 509.632.5701

FIRST RESPONDERS

BE PREPARED TO STATE YOUR EXACT LOCATION

EMERGENCIES - 911

MARINE BAND NUMBER

Marine 16

STEVENS COUNTY SHERIFF'S OFFICE

(509) 684-2555

LINCOLN COUNTY SHERIFF'S OFFICE

(509) 725-3501

FERRY COUNTY SHERIFF'S OFFICE

(509) 775-3132

COLVILLE TRIBAL POLICE

(800) 551-5800

SPOKANE INDIAN TRIBAL PARK RANGERS

(509) 722-4445

Department of the Interior

Departmental Manual

Effective Date: 3/12/99

Series: Safety Management

Part 485: Safety and Occupational Health Program

Chapter 22: Watercraft Safety

Originating Office: Office of Managing Risk and Public Safety

485 DM 22

22.1 Purpose. To establish minimum requirements for the safe operation of Department of the Interior watercraft and other non-motorized boats, and for the training and certification of Departmental watercraft operators.

22.2 References.

- A. 33 CFR, Navigation and Navigable Waters, Subchapter S, Boating Safety.
- B. 46 CFR 2, Shipping, U.S. Coast Guard, Department of Transportation, Requirements.
- C. 410 DM, Department of the Interior Property Management Regulations.

22.3 Definitions.

- A. Motorboat. Any watercraft 65 feet or less in length, that does not require a U.S. Coast Guard license or certification to operate.
- B. Operator. The individual in physical control of the watercraft.
- C. Motorboat Classifications:
 - (1) Class A. Motorboat less than 16 feet in length.
 - (2) Class 1. Motorboat 16 feet to less than 26 feet in length.
 - (3) Class 2. Motorboat 26 feet to less than 40 feet in length.
 - (4) Class 3. Motorboat 40 feet to 65 feet in length.

D. Watercraft. Boats and ships, collectively, including air boats, sailboats, and every description of watercraft, except seaplanes, which are used or capable of being used, as a means of transportation on water; and are propelled by machinery whether or not such machinery is the principle source of propulsion.

22.4 Requirements. Bureaus engaged in watercraft operations will establish a watercraft safety program that includes the following minimum requirements:

A. Safe Watercraft Operation.

(1) Departmental watercraft will be operated in a safe and prudent manner and in accordance with recognized Federal, State, and local laws and standards, in addition to the requirements of this Chapter.

(2) Departmental watercraft will meet or exceed applicable U.S. Coast Guard design/equipment requirements.

(3) In addition to basic safety devices required by local, State, or Federal regulations, Departmental watercraft will be outfitted, based on expected conditions, with other equipment necessary for safe operation. This may include communications gear, navigation aids, and Satnav. Special consideration should be given for the use of emergency location devices such as Emergency Position Indicator Radio Beacon or personal locator beacons. Use of these devices is highly recommended where situations may warrant.

(4) Operators of Departmental watercraft shall be adequately trained, properly tested and certified, prior to official operation of any Departmental watercraft. Certification will be in accordance with Section 22.5 of this Chapter. Prior to certification, employees may practice motorboat operation under the supervision of a certified operator aboard the watercraft. Motorboat operation by non-certified employees will only be used to gain experience prior to completing the necessary training requirements and being certified.

(5) On Class A or Class 1 vessels, all persons must wear a U.S. Coast Guard-approved personal flotation device (PFD) at all times while on board. On Class 2 or Class 3 vessels, all persons must wear U.S. Coast Guard approved PFDs at all times when on an open space such as the deck, and at the discretion of the vessel operator at other locations on the vessel.

(6) PFDs will be international orange in color and equipped with retro reflective tape in accordance with 46 CFR 25.25-15. (See Appendix 3 of this Chapter.)

(7) Deviation from the requirements of Section 22.4A(6) of this Chapter may be permitted if special mission requirements, such as may be involved in special law enforcement operations, cannot be otherwise satisfied. Deviations must be authorized in writing by the supervisor of the organizational unit conducting the operation prior to the conduct of the activity. The written authorization will identify alternate safety measures to be taken. Deviations will be authorized on a case-by-case basis except where they have the concurrence of a regional (or equivalent) safety

manager. In those cases, the deviation may be authorized for a period not to exceed one year. Deviation from other requirements of this Chapter is not permitted.

(8) Cold water protective equipment, such as exposure suits and/or immersion suits, will be provided where cold water conditions pose a hazard during watercraft operations. All personnel on board will be trained in the use of this equipment.

(9) Periodic inspection and maintenance programs will be established for all Departmental watercraft, as required by reference identified in Section 22.2C of this Chapter. Records of inspections and maintenance will also be kept in accordance with Section 22.2C.

(10) Departmental employees operating watercraft subject to U.S. Coast Guard licensing regulations will be licensed in accordance with the requirements of reference identified in Section 22.2B of this Chapter, notwithstanding the general exemption of Federal titled watercraft under that reference. Departmental watercraft will meet the applicable U.S. Coast Guard inspection and certification requirements.

B. Operator Training and Certification.

(1) Operators of Departmental watercraft will be trained in safe watercraft operation in accordance with the requirements of this Chapter.

(a) Operators of all motorboats, other than those requiring U.S. Coast Guard licensed operators (see reference identified by Section 22.4B(1)(b) of this Chapter), will successfully complete the Motorboat Operator Certification Course (MOCC) training requirements specified in Section 22.5C and Appendix 2 of this Chapter. All current operators will be trained and certified in accordance with these requirements.

(b) Operators of watercraft covered by U.S. Coast Guard requirements identified in Section 22.2A will complete all training and certification requisites for operation of those vessels.

(2) Motorboat operator certification will be valid for a period of five years, except that operators certified before October 1, 1995, will remain certified until October 1, 1999. Prior to recertification, operators will complete an 8-hour refresher course that addresses the minimum subject areas described in Section 2.4 of Appendix 2 of this Chapter.

(3) Operators of non-motorized boats are exempted from the requirements of Section 22.5 below. However, they must receive alternate appropriate training necessary for the safe operation of these boats, as determined by the bureau safety manager.

22.5 Training and Certification.

A. The Office of Managing Risk and Public Safety, in coordination with the bureaus, will develop and maintain standards for the Motorboat Operator Instructor Certification Course (MOICC), the MOCC, and the 8-hour refresher training.

B. Appendix 1 outlines the MOICC standards. Employees successfully completing the MOICC will be authorized to present the MOCC and to certify individuals to operate Departmental watercraft. Completion of the MOICC satisfies the requirements of Section 22.4B(1)(a) of this Chapter.

C. Appendix 2 outlines the authorized local MOCC standards. Appendix 2 details minimum requirements only; bureaus should add additional modules meeting specific bureau and local needs. Individuals successfully completing the MOCC will be certified for operation of Departmental watercraft. This course is to be instructed by persons trained in the MOICC as described in Appendix 1 of this Chapter. Training materials will be developed by the Department and distributed to bureaus as necessary for reproduction and use.

D. Other watercraft training programs may be substituted for the Departmental MOCC. Requests for substitution must be submitted to the bureau safety manager or, at his or her discretion, the bureau designated responsible person identified in Section 22.5E. Substituted training must demonstrate that it will meet the MOCC objectives, including on-water proficiency. (See Appendix 2.) Examples of acceptable training are the U.S. Army Corps of Engineers Boat Operators Training Course and the Federal Law Enforcement Training Center (FLETC) Marine Law Enforcement Training Program.

E. (1) Each bureau with watercraft operations will designate an individual as the responsible person for all watercraft training and certification activities within the organization. This individual will help coordinate watercraft safety activities and operator certification functions, and serve as a program point of contact with other bureaus and the Department. That individual must have successfully completed the Departmental approved 40-hour MOICC as outlined in Appendix 1. For implementation of this Chapter, this individual must complete the training prior to October 1, 1996. Additional instructors will be designated, as necessary to assist in motorboat operator certification training. All instructors must complete the Departmental MOICC.

(2) Watercraft Safety Work Group. A Departmental standing Watercraft Safety Working Group will be established to serve as a forum for peer group discussion of watercraft safety issues, and to provide policy and program recommendations and other input to the Department of the Interior Safety and Occupational Health Council. The work group membership will consist of the bureau coordinators identified in Section 22.5E(1) above, in addition to other designated individuals. The work group will meet as necessary, but generally at least once annually.

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APPENDIX 1

MOTORBOAT OPERATOR INSTRUCTOR CERTIFICATION COURSE (MOICC)

STANDARDS

1.1 Course Description. The MOICC is a course targeted toward experienced motorboat operators. It stresses the learning of specific motorboat handling techniques and knowledge through extensive hands-on practical exercises and instruction, with a minimum of classroom presentation. Because 1 objective of this course is to qualify individuals to present MOCC training to other Departmental personnel, there is additional training in instructional techniques and presentation.

1.2 Course Objectives. The MOICC objectives are to:

- A. Provide attendees with specific skills and knowledge needed to safely operate watercraft.
- B. Familiarize attendees with state-of-the-art watercraft safety equipment and other gear, through demonstration and actual use.
- C. Train and qualify personnel to serve as instructors of the MOCC.

1.3 Course Length. The MOICC will include at least 36 instructional hours. Course instructional hours may be increased to address specific bureau operational needs.

1.4 Minimum Subject Areas. The following mandatory subject areas will be presented in the MOICC:

- A. Bureau Watercraft Policies.
- B. Required Safety Equipment.
- C. Motorboats and Motorboat Maintenance.
- D. Trailers and Trailer Maintenance.
- E. Navigation Aids/Rules of the Road.
- F. Emergency Operations.
- G. Fire Suppression.
- H. Motorboat Orientation/Marlinspike.
- I. Motorboat At-Speed and Low-Speed Maneuvering.
- J. Alongside Maneuvering.
- K. Trailing
- L. Towing.

M. Instructional Techniques.

1.5 **Other Standards.** A maximum student/instructor ratio of 3:1 will be maintained.

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APPENDIX 2

MOTORBOAT OPERATOR CERTIFICATION COURSE (MOCC)

STANDARDS

2.1 **Course Description.** The MOCC is a course targeted toward individuals whose jobs require them to operate watercraft for the Department. It stresses the learning of specific motorboat handling techniques and knowledge through extensive hands-on practical exercises and instruction, with a minimum of classroom presentation.

2.2 **Course Objectives.** The MOCC objectives are to:

- A. Provide attendees with specific skills and knowledge needed to safely operate watercraft.
- B. Familiarize attendees with state-of-the-art watercraft safety equipment and other gear, through demonstration and actual use,
- C. Allow attendees to demonstrate, through written examination and physical demonstration, that they have adequate grasp of motorboat handling techniques and knowledge to safely operate a motorboat.

2.3 **Course Length.** The MOCC will include at least 24 instructional hours. Course instructional hours may be increased to address specific bureau operational needs.

2.4 **Minimum Subject Areas.** The following mandatory subject areas will be presented in the MOCC:

- A. Agency Watercraft Policies.
- B. Required Safety Equipment.
- C. Motorboats and Motorboat Maintenance.
- D. Trailers and Trailer Maintenance.
- E. Navigation Aids/Rules of the Road.

- F. Emergency Operations.
- G. Fire Suppression.
- H. Motorboat Orientation/Marlinspike.
- I. Motorboat At-Speed and Low-Speed Maneuvering.
- J. Alongside Maneuvering.
- K. Trailing.
- L. Towing.

2.5 Other Standards.

- A. A maximum student/instructor ratio of 3:1 should be maintained to ensure that attendees obtain necessary operating techniques and knowledge.
- B. MOCC instructors will have successfully completed the MOICC. Instructors will participate in MOCC presentations at least once over any three year period to maintain proficiency.

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APPENDIX 3

RETRO REFLECTIVE MATERIAL FOR PERSONAL FLOTATION DEVICES

(REFERENCE 46 CFR 25.25-15)

"(a) Each life preserver, each marine buoyant device intended to be worn, and each buoyant vest carried on a vessel must have Type I retro reflective material that is approved under Subpart 164.018 of this chapter.

(b) Each item required to have retro reflective material must have at least 200 sq. cm. (31 sq. in.) of material attached to its front side, at least 200 sq. cm. of material on its back side, and, if the item is reversible, at least 200 sq. cm. of material on each of its reversible sides. The material attached on each side of the item must be divided equally between the upper quadrants of the side, and the material in each quadrant must be attached as closely as possible to the shoulder area of the item."

3/12/99 #3252

Replaces 11/20/95 #485A-4

Job Hazard Analysis

Each field crew member is required to have a signed job hazard analysis on file with the Project Leader before beginning any fieldwork.

JOB HAZARD ANALYSIS		Date:	New: X Revised:
Park Unit: Lake Roosevelt National Recreation Area	Division:	Branch:	Location: Coulee Dam ____ Gifford____ Kettle Falls ____
Job Title: Osprey Nest Monitor		JHA Number:	Page _1_ of _1_
Job Performed By:	Analysis By:	Supervisor: Paulina Starkey / Mary Jay	Approved By:
Required Standards and General Notes	Drive, boat and hike carefully. Bring all necessary equipment to the field.		
Required Personnel Protective Equipment	Hiking boots, sun hat, sunscreen, insect repellent, personal water bottles, life vest (if in a boat), first aid kit.		
Tools and Equipment	Binoculars, field data sheets, clipboard, topographic maps of Lake Roosevelt NRA, GPS unit (if available).		
Sequence of Job Steps	Potential Hazards	Safe Action or Procedure	
Accessing the nest site			
1. Access by car	1a. Car accidents	1a. WEAR SEATBELTS AT ALL TIMES WHEN VEHICLE IS MOVING. Drive only on established roads; follow all driving laws; park in a location that will not obstruct traffic.	
	1b. Narrow roads with bumpy or "washboard" surfaces	1b. Maintain a safe speed (this is often below the legal speed limit) for the road conditions; stay clear to the right, especially on curves, drive with headlights on at all times; when turning around on mountain roads always "face the danger" (versus backing toward the cliff edge); the passenger should get out and spot for driver when backing up.	
	1c. Driving with limited visibility	1c. Maintain windshield cleaner fluid level and clean both sides of windows regularly (remember back window); slow down; if blinded by sun or dust, proceed slowly or pull over and wait for hazard to pass; keep to the right hand side of the road and drive with your lights on.	
	1d. Sharp rocks on edge or in middle of road	1d. Get out and move sharp rocks out of the way, reduce speed substantially in places with large amounts of rockfall; make sure tires are properly inflated and check tread and walls regularly for damage; make sure tire jack fits the vehicle and all parts are in the vehicle.	

	1e. Large animals crossing or standing in roads	1e. Slow down where animals might be present to allow for reaction time; do not swerve abruptly to avoid hitting an animal, if necessary it's better to ride out the impact.
	1f. Fatigue	1f. Be aware of signs of fatigue- pull over and rest! Take a short nap, eat a snack or have a partner drive; do not take chances by continuing to drive; communicate with your field partner.
	1g. Storm conditions	1g. Avoid visiting nests during adverse weather. Extreme heat, cold and rainy days can be stressful situations for birds. Keep informed on the current weather - check www.weather.com or www.wrh.noaa.gov .
	1h. Fallen trees on road	1h. For small trees, try and remove tree; for large trees, notify support crew to remove tree.
	1i. Others driving on the road	1i. Drive slow and keep right!; if you encounter an unusual situation, contact your partner to inform and notify a park ranger. Avoid confrontational situations with other people- let the proper authorities handle it!
2. Access by boat	2a. Boating accidents	2a. WEAR PROPER PROTECTIVE/FLOATATION GEAR (LIFE VESTS) AT ALL TIMES. Follow safe boating procedures; work in pairs; stand up securely in your boat where you will not fall. It is advisable for those conducting aquatic work to be able to swim; if swept away, point feet downstream (to avoid rocks and other debris), swim towards the bank.
Once on site, the volunteer will monitor the nest		
3. Hiking to access site	3a. Steep, rugged, and slippery terrain can cause falling, slipping, tripping	3a. Assess terrain conditions to find safe route. Proper footwear is VERY important- wear boots with slip-resistant soles with tops well above the ankle. Preferably no tennis shoes. Walk on established trails only. If unavailable, avoid thick vegetation and bank edges. Cross fences safely.
4. Encountering noxious plants, animals, and people	4a. Poison ivy	4a. Make sure you can identify poison ivy; wear long sleeves; avoid sitting with arms resting on knees; use Tecnu lotion (or similar) to prevent exposure; wash with soap immediately after returning from the field. If possible, bring an extra set of clothes and shoes to change into after coming out of field; wash field clothes separately from other laundry.

	4b. Bees/Wasps/Hornets	4b. Determine if you are allergic to bee stings. If so; ensure that you carry prescribed medication to prevent anaphylactic shock; carry a bee sting kit or Benadryl or other antihistamine; be aware of the ground where you step- some hornets build nests in the ground at the base of trees or shrubs, or in rotten logs- watch for bees buzzing in and out of holes or around ground level.
	4c. Ticks	4c. If bitten by a tick, remove it (grasp tick with tweezers at head and pull straight out); fill out an accident report in the event that symptoms of Lyme disease appear eventually.
	4d. Mosquitoes	4d. Wear bug repellent and long sleeve shirt to prevent bites; be aware of West Nile Virus symptoms.
	4e. Rattlesnakes	4e. Avoid rattlesnakes by inspecting the ground near logs before stepping over them; avoid placing hands on rock ledges or other natural hoists without visually inspecting them first; in the unlikely event you're bitten by a rattlesnake, stay calm, sit still, and call and wait for help.
	4f. Moose	4f. If you encounter moose, keep your distance and change directions. Avoid going to monitor nests with your dog, as they can disturb the birds and other wildlife.
	4g. Encounters with strangers	4g. Report uncomfortable encounters with strangers in the park to a supervisor/park ranger as soon as possible; report apparent illegal activity to a park ranger, do not get into a confrontation with other people in the park. If a nest is located on private property and you wish to monitor it, obtain permission from the landowner first.
5. Exposure to environmental variables	5a. Sunburn	5a. Monitoring nests takes place in full sunlight, To prevent sunburn, use 30+ or greater SFP sunscreen and lip balm; and wear a hat, sunglasses, and shirt.
	5b. Hyperthermia	5b. Hyperthermia may occur during high temperatures, monitor for dehydration, heat exhaustion, heat cramps, and heat stroke; symptoms include nausea, headache, and flushed, red skin. Bring and drink plenty of water (even when you are not thirsty); as heat increases, take frequent breaks in cool locations; wear a light shirt.

Leaving the site																	
6. Returning by car	6a. Car accidents	6a. WEAR SEATBELTS AT ALL TIMES WHEN VEHICLE IS MOVING. Drive only on established roads; follow all driving laws; park in a location that will not obstruct traffic.															
7. Returning by boat	7a. Boating accidents	7a. WEAR PROPER PROTECTIVE/FLOATATION GEAR (LIFE VESTS) AT ALL TIMES. Follow safe boating procedures; work in pairs; stand up securely in your boat where you will not fall. It is advisable for those conducting aquatic work to be able to swim; if swept away, point feet downstream (to avoid rocks and other debris), swim towards the bank.															
<u>JHA Instructions</u> The JHA shall identify the location of the work project or activity, the name of Volunteer(s) involved in the process, the date(s) of acknowledgment, and the name of the appropriate supervisor approving the JHA. The supervisor acknowledges that volunteers have read and understand the contents, have received the required training, and are qualified to perform the work project or activity. Identify all tasks and procedures associated with the work project or activity that have potential to cause injury or illness to personnel and damage to property or material. Include emergency evacuation procedures (EEP). Identify all known or suspect hazards associated with each respective task/procedure listed. For example: a. Research past accidents/incidents. b. Research the Health and Safety Code, or other appropriate literature. c. Discuss the work project/activity with participants. d. Observe the work project/activity. e. A combination of the above. <u>Emergency Evacuation Instructions</u> Work supervisors and volunteers are responsible for developing and discussing field emergency evacuation procedures (EEP) and alternatives in the event a volunteer(s) becomes seriously ill or injured at the worksite. Be prepared to provide the following information: a. Nature of the accident or injury (avoid using victim's name). b. Type of assistance needed, if any (ground, air, or water evacuation). c. Location of accident or injury, best access route into the worksite (road name/number), identifiable ground/air landmarks.		d. Radio frequencies. e. Contact person. f. Local hazards to ground vehicles or aviation. g. Weather conditions (wind speed & direction, visibility, temperature). h. Topography. i. Number of individuals to be transported. j. Estimated weight of individuals for air/water evacuation. The items listed above serve only as guidelines for the development of emergency evacuation procedures. <u>JHA and Emergency Evacuation Procedures Acknowledgment</u> I, the undersigned volunteer, acknowledge participation in the development of this JHA (as applicable) and accompanying emergency evacuation procedures. I have read them thoroughly and understand the provisions of these documents: <table border="0"> <thead> <tr> <th align="center">PRINT NAME</th> <th align="center">SIGNATURE</th> <th align="center">DATE</th> </tr> </thead> <tbody> <tr> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> <td>_____</td> </tr> <tr> <td>_____</td> <td>_____</td> <td>_____</td> </tr> </tbody> </table>	PRINT NAME	SIGNATURE	DATE	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____	_____
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Osprey Monitoring Protocol

Standard Operating Procedure (SOP) 9 Helicopter Surveys

Version 1.0, March 2010

Change History

Version #	Date	Revised By	Changes	Justification

Note: This SOP describes recommended procedures and safety practices for scheduling and conducting helicopter survey flights for determining osprey nesting occupancy and productivity.

Suggested Reading

Carrier, W. D. and W.E. Melquist. 1976. The use of a rotor-winged aircraft in conducting nesting surveys of ospreys in northern Idaho. Raptor Research 10(3):77-83.

Ewins, P. J. and M. J. Miller. 1995. Measurement error in aerial surveys of osprey productivity. J. Wildl. Manage 59(2):333-338.

Scheduling

The scheduling of all aviation resources for conducting Department of Interior (DOI) work are completed through the National Business Center (NBC) Western region office in Boise, Idaho. The contact information is below:

Richard L. Davis
Flight Coordination Specialist
US Department of the Interior
National Business Center
Aviation Management Directorate
Western Region Office – Boise
Phone: (208) 334-9315
Fax: (208) 334-9303
Richard_Davis@amd.nbc.gov

The process for obtaining a helicopter rental is started by going to the website maintained by the NBC at <http://amd.nbc.gov/>. Click on “On Call Aircraft Contracts and Source List.” Click on “On Call Small Helicopters, May 2010” and download the PDF that contains information on contract aircraft and pricing. The Project Leader will decide on which helicopter is required for the survey based on location, passenger capacity, and pricing. In March 2010, the closest small contract helicopter rental companies to LARO were located in Coeur d’Alene, ID, Clarkston, WA, and Lewiston, ID. Most of these companies rent MD 500 helicopters which have a passenger capacity of 3 and vary in price from \$875.00 – 915.00/hour. The Project Leader will most likely want to choose the company that is closest to the survey area, in this case Panhandle Helicopter in Coeur d’Alene, to save on costs in flight time for getting to the survey area and back.

After the Project Leader has researched the available choices and made a selection he/she should call Richard Davis, Flight Coordination Specialist, and Richard will provide the proper paperwork to secure a rental reservation.

Equipment Preparation

Before the aerial survey, print and review maps printed with the location of each nest from the previous years data and and print and review the field data observation forms. Several days before the helicopter survey, gather all survey equipment including maps, data forms, pencils/pens, binoculars, field note book, GPS units, GPS coordinates of nest sites, and any other necessary equipment so you are prepared on the day of the survey. You will also want to confirm with the helicopter rental company several days before the survey and double-check the time and place you are to meet the helicopter on the day of the survey.

Annual Timing

A helicopter survey will be flown once every 3 years (Table 8). The entire study area will be flown twice during the nesting season. The first survey will be scheduled during the incubation period in mid-May when most pairs have completed their clutches (activity survey). The second survey will be completed in mid-July to determine nesting success and to count nestlings (productivity survey). Flights should begin in mid-morning and end before late afternoon to avoid low light and excessive shadows. Tentative flight plans will be laid out by the Project

Leader before each flight to reduce unnecessary flying but some in-flight adjustments may be necessary owing to refueling stops or unfavorable wind conditions. Surveys should not be conducted during periods of high turbulence, when winds exceed > 20 mph, or rainstorms that can reduce visibility and reduce accuracy of survey results.

Table 8. Osprey survey method schedule from 2011 through 2018.

YEAR	2011	2012	2013	2014	2015	2016	2017	2018
Survey Method	Helicopter	Ground	Ground	Helicopter	Ground	Ground	Helicopter	Ground

Flight lines will be designated for the triennial helicopter survey so that all areas without 1500m of the reservoir are searched for new nest sites. The helicopter pilot will be instructed at the beginning of the survey that it is important to locate new nest sites as well as document nesting activity at nest sites occupied during previous data collection efforts. An effort will be made to detect as many new nest sites as possible by helicopter.

Observation Methods

Helicopters used for osprey surveys will seat a pilot and 2 passengers. Observation of nestlings is easier with the doors off the helicopter. In order to avoid observer fatigue the pilot should plan on landing and taking 15-20 minute breaks every 90 minutes or so during the course of the survey. The Project Leader must be aware of observer fatigue because a tired observer may not make accurate assessments of the occupancy of a nest or the number of young counted.

To facilitate maneuverability and control of the helicopter it is advised to approach nests into the the wind when possible. During the productivity survey, one observer will keep watch on the location of adult birds while the other observer will record nestling numbers. Always approach a nest structure so you remain in full sight of the incubating bird. During all survey flights, approach known nests slowly (≤ 30 kilometers per hour) and maintain at least 300 m between the helicopter and the nest. Avoid hovering directly over the nest to minimize the potential of flushing the osprey from the nest.

Observers should use low-power (less than 7X) binoculars to determine the contents of a nest. Image stabilizing binoculars are not necessary, but are helpful for some observers, to minimize the effects of vibration.

Once an observer has visually located a nest structure, they should instruct the pilot to slowly fly toward the nest until the observer can determine if the nest is occupied. If you observe an incubating adult/subadult on the nest, ask the pilot to slowly turn the helicopter away from the nest and leave the area immediately to minimize disturbance to the incubating osprey. If you do not observe an incubating osprey, look for other signs of occupation including nest building or territorial behavior (undulating, copulating, and vocalizing). Once you determine the status (occupied, unoccupied, etc.) of the nest, proceed with the survey to the next known nesting site or continue to scan the survey route for any new nest sites.

Record all information regarding the nest site on the field data forms (Tables 9-10) or the survey map immediately after making observations. Be sure to complete information on survey times,

landing locations, crew, pilot, aircraft (Table 11) and also record weather information for the day of the survey (Table 12). At the end of the day, summarize your survey results, and develop a strategy if additional helicopter time is needed to survey additional sections of the study area.

The “activity” survey in mid-May is complete after determining the status of all observed nests. The “productivity” is complete in mid-July after determining the number of young per occupied nests, identified from the activity survey.

Table 9. Example helicopter activity survey form for osprey observation data.

Nest ID	Species	Date	Observer	Occupied	Evidence	Comments	UTM X	UTM Y
C_01	Osprey	5/15/2010	LKG	Yes	Incubation	Both adults in air Incubation posture		
C_02	Osprey	5/15/2010	LKG	Yes	Incubation			
C_03	Osprey	5/15/2010	LKG	Yes	Pair			
C_04	Osprey	5/15/2010	LKG	No				
New	Osprey	5/15/2010	LKG	Yes	Evidence		435168	5412115

Table 10. Example helicopter productivity survey form for osprey observation data.

Nest ID	Species	Date	Observer	No. Young	Comments
C_01	Osprey	7/15/2010	LKG	2	Fully feathered
C_02	Osprey	7/15/2010	LKG	2	Adults nearby
C_03	Osprey	7/15/2010	LKG	0	
C_04	Osprey	7/15/2010	LKG	1	

Table 11. Example helicopter survey form for survey data.

Survey Times and Landing Locations

Date	Depart Location	Depart Time	Arrive Time	Arrive Location	Arrive UTM X	Arrive UTM Y
5/15/2010	CDA	0830	0930	Coulee Dam	352846	5313950
5/15/2010	Coulee Dam	1015	1200	Fort Spokane	373026	5314534
5/15/2010	Fort Spokane	1245	1330	Gifford	4145925	5350304
5/15/2010	Gifford	1400	1400	Kettle Falls	431878	5409739
5/15/2010	Kettle Falls	1430	1500	CDA		

Survey Crew, Survey Pilot, Survey Aircraft

Date	Primary Observer	2 nd Observer	Aircraft Type	Aircraft ID #	Aircraft Company	Pilot
5/15/2010	LKG	ES	HU369D	N622PB	Panhandle Helicopter, Coeur d'Alene, ID	R. Swisher
5/16/010	LKG	GD	HU369D	N69PF	Panhandle Helicopter, Coeur d'Alene, ID	R. Swisher
5/17/2010	LKG	ES	HU369D	N622PB	Panhandle Helicopter, Coeur d'Alene, ID	R. Swisher

Table 12. Example helicopter survey form for weather data.

Date	Time	Temp (F)	Wind Speed	Wind Direction	Sky Condition	Precipitation	Comments
5/15/2010	0830	60	1	S	0	0	
5/15/2010	Noon	65	4	S	0	0	
5/15/2010	1400	63	5	S	2	2	

Weather Codes:

Wind Speed		Sky Conditions		Precipitation	
0	Calm	0	< 10% cloud cover	0	None
1	Slight	1	10 - 50 % cloud cover	1	Fog/smoke
2	Wind felt on face	2	50 – 90% cloud cover	2	Drizzle
3	Leaves in constant motion	3	100% cloud cover	3	Showers
4	Raises dust, small branches move			4	Rain
5	Small trees sway			5	Sleet
6	> 15 mph			6	Snow

Osprey Monitoring Protocol

Standard Operating Procedure (SOP) 10: Osprey NestWatch Volunteer Program

Version 1.0, March 2010

Change History

Version #	Date	Revised By	Changes	Justification
Draft 1.0				

Note: This SOP consists of a detailed description of the development of the osprey NestWatch volunteer program. It includes step-by-step procedures to be taken by network staff and volunteers in order to maintain a successful volunteer program.

Suggested reading:

National Park Service Volunteer-In-Parks Program. 2009. How to Succeed with Volunteers-In-Parks Program. Volunteer Program Management Training.

National Park Service. 1998. Director's Order #7: Volunteer in Parks. Available from: <http://www.nps.gov/policy/DOrders/DO-7.htm>. Accessed 5 November 2009.

Cornell Lab of Ornithology. 2008. NestWatch. Available from: <http://www.nestwatch.org/NetCommunity/Page.aspx?pid=577&srcid=265&auth=0>. Accessed 10 November 2009.

Bird Studies Canada. 2010. Project NestWatch. Available from: <http://www.bsc-eoc.org/national/nestwatch.html>. Accessed 10 November 2009.

Introduction

This SOP describes the components of the Osprey NestWatch volunteer program including, program planning, objectives, program materials and resources. The development of the Osprey NestWatch Volunteer Program followed guidelines established by the Volunteers-In-Parks (VIP) Program from the National Park Service. In addition, this program reflects similar initiatives already practiced by other organizations (e.g., Cornell Lab of Ornithology, Bird Studies from Canada), which have successfully included volunteers in their data collection efforts.

Volunteer Program Planning

Starting in 2010, the Upper Columbia Basin Network Inventory and Monitoring Program (UCBN) will incorporate the Osprey NestWatch Volunteer Program as an additional component of the osprey monitoring protocol. Volunteers will conduct osprey nest surveys during the osprey breeding season each year.

Objectives

The main objectives of the Osprey NestWatch Volunteer Program are to:

- *Involve park staff, local birdwatchers and school groups in gathering natural resource data:* This will help increase public understanding of osprey breeding biology and will keep park staff and the public informed about the status and trends of osprey reproduction in Lake Roosevelt National Recreation Area (LARO).
- *Increase cost-effectiveness of osprey monitoring:* Volunteers will help keep track of known nests or discover new nests during the breeding season. Volunteers will supplement data collection efforts by UCBN field crews and will help make osprey monitoring more cost-effective over time.
- *Collect long-term monitoring data on osprey nest and productivity:* Long-term results in monitoring osprey nest success will assist park superintendents and natural resource managers with making informed management decisions at LARO.

Mission statement

The Osprey NestWatch Volunteer Program at Lake Roosevelt is committed to providing volunteers with the opportunity to make a valuable contribution to park science by collecting annual nest site data; thereby, contributing to the overall cost-effectiveness of the monitoring program. The collection of long-term monitoring data will help resource managers better understand the status and trends of osprey nest occupancy and reproductive success and this information will help guide park management decisions.

Volunteer Job Description

Given the technical nature of bird nest site monitoring, this program will primarily target people with bird identification/observational skills. Volunteers who sign up to monitor osprey nests with the UCBN NestWatch Program will only perform the activities detailed in their job description (Appendix 3) and will work for a defined period of time (breeding season) each year. To record monitoring data, volunteers are required to have their own transportation, equipment, internet access, and be able to enter data into an online data entry form.

Park Involvement

The UCBN has continuously communicated the steps taken to develop the Osprey NestWatch Volunteer Program with Lake Roosevelt National Recreation Area (LARO) staff. In December 2009, the UCBN osprey Project Leader and Volunteer Coordinator gave a presentation about Osprey Monitoring and the NestWatch Volunteer Program at the annual LARO staff meeting. An osprey monitoring poster was provided to staff and is being displayed at the LARO visitor center. Additionally, the network's winter newsletter included an article that described the volunteer program and was distributed to all LARO park staff. In the forthcoming years, UCBN staff plans to give a presentation to LARO staff about results obtained after each field season. The UCBN volunteer coordinator and the LARO Volunteer-In-Parks (VIP) coordinator are the primary individuals responsible for working with volunteers. They are in charge of recruiting, contacting and assisting volunteers throughout the duration of the program. Both coordinators have kept continuous communication, and will work closely to provide any assistance to volunteers.

Volunteer recruitment

During the first season of data collection (summer 2010) volunteers will only include interested staff from LARO. In subsequent years, local bird clubs and school groups will be recruited to participate in the NestWatch program. The UCBN wants to start with the dedicated park staff and make sure that all the details are worked out before inviting the public to participate.

Each spring, starting in 2011, the UCBN volunteer coordinator will recruit volunteers from other organizations (e.g., Audubon Society in Spokane, WA) and local high schools. Presentations on Osprey Monitoring and the NestWatch Volunteer Program will be given to interested volunteer organizations, and all interested participants will receive resource briefs summarizing results from the previous year and copies of the volunteer job description.

Policies and procedures for participating in the program

Volunteers

Interested volunteers will need to register with the UCBN volunteer coordinator in order to gain access to the UCBN Osprey NestWatch website, where they will find program information and guidance and be able to enter nest observation records. A registration form will be available from the UCBN website (<http://science.nature.nps.gov/im/units/ucbn/>), allowing volunteers to submit their names, addresses, phone numbers and e-mail addresses to the UCBN volunteer coordinator for approval. This personal information will need to be provided but will be kept private. All personal information will be securely stored in a database on the Network server, where only UCBN staff will be able to access it. The UCBN volunteer coordinator and data manager will review the registration forms and approve selected participants.

1. Once approved, the volunteer will receive a registration confirmation, the volunteer agreement form (Form 301A) and the Job Hazard Analysis (JHA) form via e-mail. Volunteers will need to sign the agreement and JHA forms and return them to the UCBN volunteer coordinator.
2. Instructions on how to record data, a code of conduct, identification guidelines and all necessary information on how to participate in the Osprey NestWatch program will be available on the UCBN Osprey NestWatch website. If there are interested volunteers who

prefer a hard copy of materials, the UCBN volunteer coordinator will send packets of information to volunteers when requested.

3. Volunteers and/or park staff who volunteer to monitor osprey during the breeding season will be asked, at minimum, to visit their adopted nest site(s) during the incubation period in mid-May to determine occupancy, and again in mid-July to count the number of young produced. If volunteers want to make more frequent visits they can certainly do so, as long as they are following the code of conduct and not disturbing the nesting birds. Volunteers will observe their adopted nest(s) activity and record information on the field data sheet when relevant.
4. Volunteers will take pictures only if they can do so without disturbing the birds, and will be asked to send quality pictures to the Osprey NestWatch program volunteer coordinator. Volunteers will be required to follow instructions carefully and follow the NestWatch Program code of conduct (Appendix 4) at all times, so that disturbance of the birds can be avoided.
5. An example of a completed volunteer field data form (Appendix 5) will be available on the Osprey NestWatch website. For every adopted nest, a separate data sheet will be used. In case a new nest is found, volunteers will record the location of the nest, provide a general description of the nest site and include whether or not the nest is visible from a road. If volunteers own a global positioning system (GPS), they will be asked to record the coordinates for that specific nest site.
6. Once data is collected in the field, volunteers will need to enter these data into an on-line data entry form. To access this form, volunteers will need to login to the NestWatch Volunteer Program website using their e-mail address as a Login ID. Instructions for online data entry are detailed in Appendix 6.
7. Once they have finished entering this information, volunteers can save their observations and log out.

UCBN Staff

1. The UCBN volunteer coordinator will maintain contact with volunteers via e-mail when approving registrations, or answering questions.
2. Every month, the UCBN data manager will perform quality control checks with the online nest observation records. Subsequently, he will merge valid records with the information obtained by UCBN survey crews. If volunteers provide records that are difficult to understand, they will be contacted via e-mail or phone to clarify their observations. If a volunteer consistently contributes erroneous or false records, the UCBN data manager will disable his/her Login ID; thus, restricting access to the NestWatch website.
3. Each new nest site added to the database will be assigned a temporary label. This label will be kept until the nest and location are confirmed by UCBN survey crews. Once formally incorporated into the list of nests, all new nests will be assigned a permanent Nest ID.
4. At the end of the field season, the number of hours that volunteers have contributed to this monitoring effort will be reported to the LARO VIP Coordinator and included in their annual reporting to the Regional VIP Coordinator.

Safety

All registered volunteers will receive a Job Hazard Analysis (JHA) form that lists all the potential hazards inherent in field work activities (SOP #8). Volunteers will have to read and sign the JHA and submit this form to the UCBN volunteer coordinator prior to submitting records. All volunteers working for the National Park Service are covered under tort claims and the worker's compensation program. The Osprey NestWatch Program requires volunteers to use their best judgment when conducting field activities due to the inherent risks present in them. If an accident happens, volunteers will need to contact Mary Jay, LARO VIP coordinator, to access Form CA-16 (to ensure medical billing), and to complete form CA-1 online (to ensure receipt of all benefits). If an accident happens to park staff working as volunteers, it will only be covered if the volunteer work is performed outside of official duty hours. Volunteers are fully responsible for any damage to personal vehicles or boats.

It is essential that both volunteer coordinators (UCBN and LARO) ensure all procedures are followed and that adequate volunteer training is provided on safety issues and emergency procedures. If needed, training on data collection and safety issues will be provided to volunteers at the park immediately before data collection starts. Safety practices and emergency contact information are detailed in SOP #8.

Recognition

After volunteers have submitted their first observation, the UCBN volunteer coordinator will send a note thanking them for their participation and encouraging them to continue providing observation records. After volunteers have provided quality data on a regular basis for one monitoring season, they will receive an osprey monitoring coffee mug. For every year of data collection, returning volunteers will receive different forms of recognition (e.g., volunteer patches, t-shirts, vests). The UCBN volunteer coordinator will keep a database including all volunteer names and the types of recognition given to them.

Evaluation

At the end of the data collection period, a survey will be posted on the Osprey NestWatch Volunteer Program website. Volunteers will have the opportunity to share their experiences monitoring ospreys, evaluate the training materials provided, and give their overall input and comments on the volunteer NestWatch program. Annual evaluations from volunteers will be shared with UCBN and LARO staff.

Annual outcomes reports

The UCBN project lead will provide annual results in the form of a resource brief to all volunteers of the NestWatch Program in October each year. This resource brief will be posted on the website and/or mailed to volunteers. Additionally, the UCBN Project Leader will present results obtained during each breeding season to LARO staff at their annual meeting in December.

At the end of the field season, the number of hours that volunteers have contributed to this monitoring effort will be reported to the LARO VIP Coordinator and included in their annual reporting to the Regional VIP Coordinator.

Appendix 1. Activity survey field data form.

Osprey Activity Survey Monitoring Data

Observer Name: Lisa Garrett

Date:

Nest ID: C_03

UTM Coordinates Zone 11 NAD83

UTM X N5313950

UTM Y E352846

UTM Coordinates Zone 11

NAD83

UTM X N

Indicate if this is
a new nest site
and record GPS
coordinates:
YES or NO

Circle Lake Section: Coulee Dam, Gifford, Kettle Falls

Description of Nest Site Location: _____

Indicate if osprey nest is occupied: Yes

Evidence of occupation: Incubating osprey

Please check most appropriate statement:

☐ Eggs present

☐ Two adults are present on or near the nest

☒ One adult on nest in incubation posture

☐ Mating behavior observed near the nest

☐ Other (please describe behavior) _____

Weather Conditions: Clear Cloudy Foggy Rain Snow

Data for New Nest Sites (Please fill in all the data fields above in addition to the nest site characteristics listed below).

Nest Structure _____ (power pole, dead tree, live tree, platform on pole)

Tree Species _____ Relationship of height of nest tree to surrounding trees:

Nest Height (m) _____ Taller or Similar or Shorter

Tree dbh (cm) _____ Relationship of dbh of nest tree to surrounding trees:

Distance to water (m) _____ Larger or similar or smaller

Broken top? YES NO

Additional Comments _____

Was a photo of the nest site taken? ☒ YES ☐ NO Photo Number(s) from camera 01,02

Is this nest site readily visible from a road? ☒ YES ☐ NO

(Label all photos with the Site Name and Nest ID after you return to the office)



Appendix 2. Productivity survey field data form.

Osprey Productivity Survey Monitoring Data

Observer Name: Lisa Garrett

Date:

Nest ID: C_03

UTM Coordinates Zone 11 NAD83

UTM X N5313950

UTM Y E352846

UTM Coordinates Zone 11

NAD83

UTM X N

Indicate if this is a
new nest site and,
if yes, record GPS
coordinates:
YES or NO

Circle Lake Section: Coulee Dam, Gifford, Kettle Falls

Description of Nest Site Location: _____

Observation of Osprey Nest

Please CIRCLE correct choice:

Number of ADULT osprey observed: 0 1 2 3 4+ CHOICE

Number of NESTLING osprey observed: 0 1 2 3 4+

Age of Nestling: Downy nestling Feathered nestling

Weather Conditions: Clear Cloudy Foggy Rain Snow

Behavior Observed: (Please check most appropriate statement)

____ Adult on nest

____ Adults observed in the area, but not at nest site

____ Adult on nest in incubation posture

____ Adult feeding young at nest

____ Adult carrying food

____ Other (please describe behavior) _____

Was a photo of the nest site taken? YES NO Photo Number(s) from camera 01,02

Is this nest site readily visible from a road? YES NO

(Label all photos with the Site Name and Nest ID after you return to the office)



Appendix 3. Volunteer Job Description

Volunteer Job Description

Job Title: Osprey NestWatch nest monitor

Volunteer Name:

Location: Lake Roosevelt National Recreation Area (LARO)

Supervisor: Paulina Starkey (UCBN) – Mary Jay (LARO)

Project Duration: 4-6 months
(May-September)

Visits/Week: Minimum 1 visit
every 2 weeks

Visits/Month: Minimum 2
visits

Description of duties:

The volunteer is responsible for adopting one or more osprey nest(s) that he/she can monitor regularly. The volunteer is required, at minimum, to visit the adopted nest(s) during the incubation period in mid-May to determine occupancy, and again in mid-July to count the number of young produced. If volunteers want to make more frequent visits they can certainly do so, as long as they are following the code of conduct and not disturbing the nesting birds. The osprey nesting cycle usually goes from early April to late September.

All information that the volunteer will need, such as, instructions, code of conduct, field data sheets, safety information, etc., will be available on our website:

(<http://science.nature.nps.gov/im/units/ucbn/monitor/osprey/osprey.cfm>).

The volunteer will be in charge of observing nest activity and recording the number of adults observed, number of nestlings observed and behavior observed (e.g., adult in incubation posture, adult feeding young, adult bringing food to nest, etc.). The volunteer is required to follow instructions carefully and follow the NestWatch Program code of conduct, so that any potential risks to birds can be avoided. In summary, the volunteer will monitor the success of nesting birds. Once data is collected in the field, the volunteer will need to enter these data in an online data entry form.

Benefits to Volunteer:

- Learn about osprey's natural history and breeding biology.
 - Obtain experience collecting natural resource data.
 - Get the opportunity to spend time outdoors.
 - Provide valuable scientific information.
-

Goal/Outcome of Job:

- *Involve park staff, local birdwatchers and school groups in gathering natural resource data:* This will help increase public understanding of osprey breeding biology and will keep park staff and the public informed about the status and trends of osprey reproduction in Lake Roosevelt National Recreation Area.
 - *Increase cost-effectiveness of osprey monitoring:* Volunteers will help keep track of known nests or discover new nests during the summer months. By doing this, volunteers will help make osprey monitoring more cost-effective, as an on-site field crew is not needed to conduct nest surveys for the entire breeding season.
 - *Collect long-term monitoring data on osprey nest and productivity:* Long-term results in monitoring osprey nest success will assist park superintendents and natural resource managers with making informed management decisions at Lake Roosevelt National Recreation Area.
-

Knowledge/Skills/Experience Desired:

- Have an interest in birds. Avid birdwatchers are ideal.
- Have good observational skills. We need an eye for detail!

- Be physically fit.
 - Have the ability to organize data.
 - Know how to use computers.
 - Have the ability to input data to an online website.
-

Special Requirements:

- Minimum age is 18 years.
 - Transportation to and from nest site is the responsibility of the volunteer.
 - Overall safety is the volunteer's own responsibility. Volunteer is covered under Volunteer-In-Parks worker's compensation; however, it is highly recommended that volunteer exercises his/her best judgment when conducting field activities to avoid any injuries.
 - Have a pair of binoculars.
 - Having access to a GPS to record nest site locations is desired, but not required.
 - Have an internet connection to access program website and to enter data into an online data entry form.
-

Appendix 4. Code of Conduct

Osprey NestWatch Code of Conduct

Monitoring nests is a great opportunity to learn more about birds and their nesting cycle. Ospreys are common breeding residents in Lake Roosevelt National Recreation Area (NRA) and their nests are very large and conspicuous, allowing birdwatchers to witness their behavior during the breeding season. Ospreys are fun and easy to watch, but at the same time, nest monitors need to be very careful and follow this code of conduct so that potential risks to ospreys can be avoided.

Plan your visit to monitor nests

Prepare materials in advance. Materials that you should take to the field include: binoculars, field data sheets, a clipboard, a topographic map of Lake Roosevelt National Recreation Area (NRA), and a GPS unit (if available).

Choose an appropriate time to visit your adopted nest(s)

Remember the following general rules:

- Try to visit the nests in the late morning or early afternoon. Avoid early morning and close to dark. If parents leave the nest because they are disturbed, eggs and nestlings can get cold quickly during these times of the day.
- Avoid visiting nests during adverse weather. Extreme heat, cold and rainy days can be stressful situations for birds.
- Avoid visiting nests during the first days of incubation. If you see parents in incubation posture, observe the nest from a distance.
- Do not approach nests when young are ready to fledge. You will know if young are close to fledging if they are fully, or close to fully, feathered. If fledglings feel disturbed, they may leave the nest prematurely.

Approach nests with care:

- Approach nests casually instead of directly walking towards them. Parents may get anxious or disturbed and can accidentally knock eggs or nestlings out of the nest. Additionally, parents may leave the nest and young can become susceptible to predation.
- Hike through a route that disturbs as little vegetation as possible. Avoid noise of breaking branches or removing vegetation.
- Always keep your distance. Avoid getting too close to the nest. The appropriate distance between a nest monitor and a tree (or man-made structure) that has a nest is about 330 ft (100 m).
- Take pictures only if you can do so without disturbing the birds. Choose an appropriate time to take photos.

Respect private land:

If a nest is located on private property and you wish to monitor it, obtain permission from the landowner first. Explain your reason for needing access to the land – many landowners may be interested in what you are doing. Treat the owners and their property with respect and follow any special requests they make.

Appendix 5. Osprey NestWatch Field Data Form

Osprey NestWatch Field Data Form

Print several copies. For field use ONLY – do not return. For complete instructions or to report your data online, go to: <http://science.nature.nps.gov/im/units/ucbn/monitor/osprey/osprey.cfm>

Species:	Osprey _____
Observation Date:	_____/_____/_____
Observation Method:	From a boat _____ From a vehicle _____ By foot _____
Number of Adults:	_____
Number of Nestlings:	_____
Nestlings Age:	Downy _____ Feathered _____
Nest Structure:	Dead tree _____ Live tree _____ Platform on pole _____ Powerline pole _____ Other (explain) _____
Weather Conditions:	Clear _____ Cloudy _____ Foggy _____ Rain _____ Snow _____
Behavior Observed:	Adults in area but not on nest _____ Adults on nest _____ Adult on nest in incubation posture _____ Adult on nest feeding young _____ Adult bringing food to nest _____ Other (explain) _____
Amount of time spent monitoring Osprey:	_____ min.
Observer Notes:	_____ _____ _____

Appendix 6. Instructions for data entry on Osprey NestWatch website

Instructions for Data Entry

Thank you for being an Osprey NestWatch monitor. Below you will find step by step instructions on how to enter your observations into the online data entry form.

1. Registering to Osprey NestWatch

In order to access the Osprey NestWatch website, you will need to register with the UCBN volunteer coordinator. A registration form will be available from the UCBN website. Complete the required information (your full name, address, telephone number, and e-mail address), and send it to the UCBN volunteer coordinator (pstarkey@partner.nps.gov). We need this information to send you pre-data collection materials or to contact you in case we have any questions about your records. We will keep complete confidentiality of your records, and will not provide your personal information to third parties.

The UCBN volunteer coordinator will review the registration form and will approve participants for our NestWatch Program. We will send a confirmation of your registration to the e-mail you provided.

Every time you want to access the website you will simply need to enter your e-mail address as your Login ID. If you have any problems accessing the online data entry form, please contact us.

2. Entering your data

To enter your records, follow these steps:

a. Selecting your nest(s)

Once you are logged in to the website, you will see the list of every nest that is being monitored, and a map of Lake Roosevelt National Recreation Area (NRA) with numbered “Tile” sections. You can select your nest(s) either:

- By clicking the nest label from the list of all nests (Figure 1), or

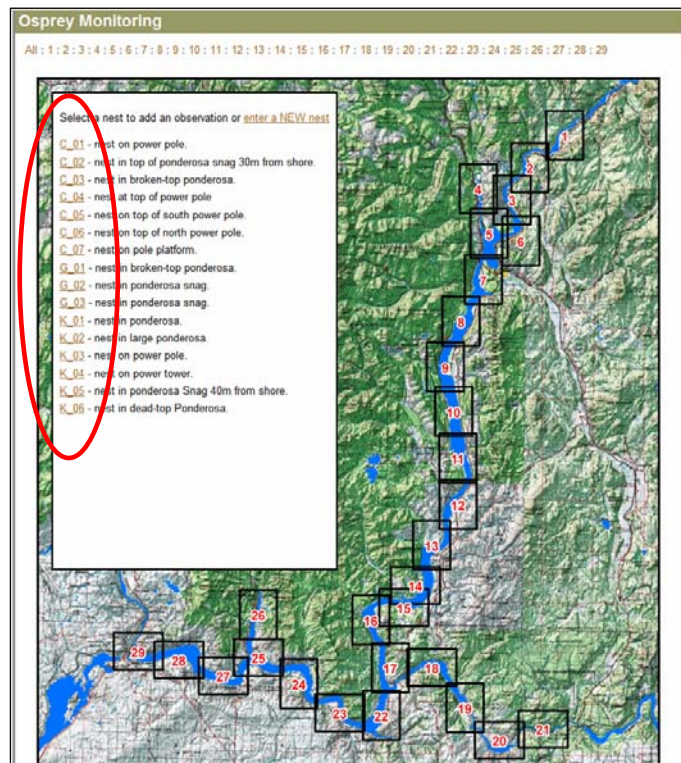


Figure 1. List of all nests being monitored.

- By clicking a numbered Tile section on the Lake Roosevelt NRA map (Figure 2). This will take you to a “zoomed-in” view of that section of the lake, where you’ll then be able to click on the appropriate nest label or nest photo (Figure 3). The legend on each map will inform you about nest types and land management in that specific area.

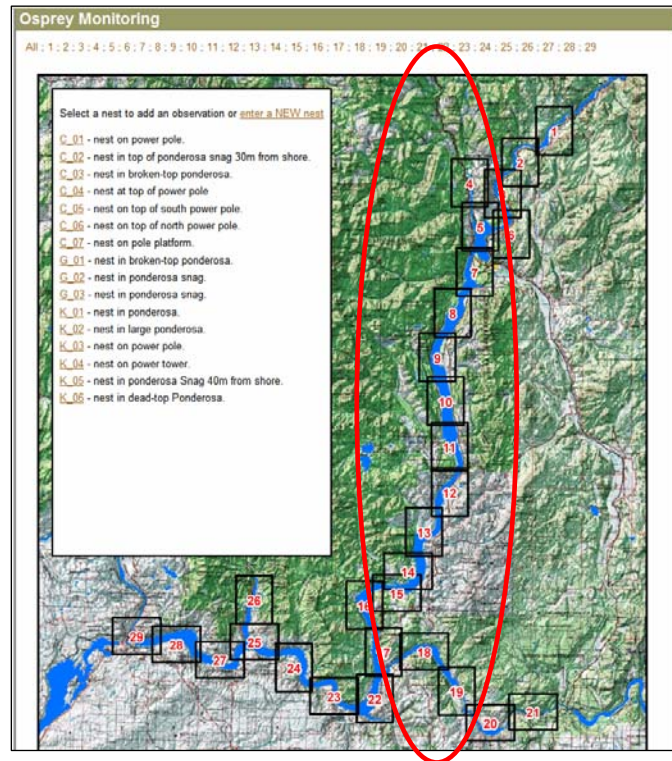


Figure 2: Map of Lake Roosevelt NRA with numbered “Tile” sections that, when clicked, will display a “zoomed-in” map view.

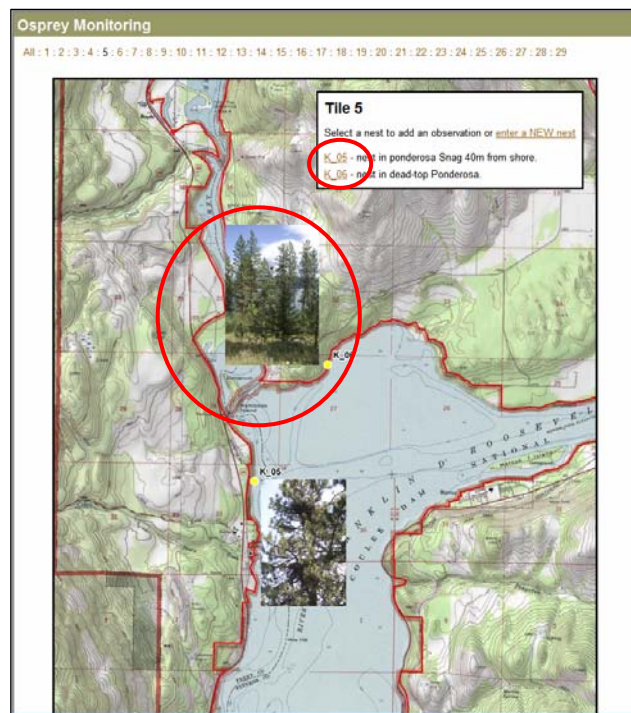


Figure 3. Example of a zoomed-in map showing detailed section of reservoir and nest labels. A photo of each nest tree is also displayed on each “zoomed-in” map.

Nest labels consist of a nest number and a letter designating the stretch of reservoir:

- C for the southern (Coulee dam) stretch,
- G for the middle (Gifford) stretch, and
- K for the northern (Kettle Falls) stretch.

After selecting a nest, you will be able to view past observations of that nest and enter a new observation.

b. Entering data

To enter your new observations, you will need to complete all the fields in the online data entry form (Figure 4).

The screenshot shows a web form titled "Add Observation for Nest C_01". The form contains the following fields and options:

- Species:** A dropdown menu with "Osprey" selected.
- Observer (you):** A section containing three sub-fields: "Name" (with placeholder "Your name"), "Email" (with placeholder "Your email"), and "Phone" (with placeholder "Your phone").
- Minutes of Observation:** A text input field containing the number "30".
- Observation Date:** A date picker showing "06/13/2009" with a "today" button and the format "(MM/DD/YYYY)".
- Observe Method:** A dropdown menu with "foot" selected.
- Number Of Adults:** A dropdown menu with "1" selected.
- Number Nestlings:** A dropdown menu with "2" selected.
- Nestling Age:** A dropdown menu with "Feathered" selected.
- Nest Structure:** A dropdown menu with "Live Tree" selected.
- Weather Conditions:** A dropdown menu with "clear" selected.
- Behavior Observed:** A dropdown menu with "Adult(s) observed feeding young at Nest" selected.
- Observer Notes:** A large text area for additional notes.
- Buttons:** "Save Observation" and "Cancel" buttons at the bottom.

Figure 4: Online data entry form

The information that you need to enter is the following:

1. Select "Osprey" for the species field.
2. The Name, Email, and Phone fields will populate automatically with your contact information. You may update the content in these fields as appropriate.
3. Enter the amount of minutes you spent monitoring the nest.
4. Enter the observation date.
5. Enter the observation method (observed from a boat, from a vehicle, or by foot).

6. Enter the number of adults seen at or near the nest and the number of nestlings (if any) observed in the nest.
 - a. If nestlings are observed, enter the age of those nestlings (downy or feathered).
7. Next, use the set of selection lists to enter the following information:
 - a. Nest structure (dead tree, live tree, platform on pole, powerline pole, or “other”)
 - b. Weather conditions (clear, cloudy, foggy, rain, or snow), and
 - c. Behavior of the osprey (adults in area but not on nest, adults on nest, adult on nest in incubation posture, adult on nest feeding young, adult bringing food to nest, or “other”).
 - i. If you select “other,” then a brief description of behavior can be entered.
8. Finally, you may enter any additional comments about your nest observation.
9. Once all your data is accurately entered, click on “Save observation” and your record will be saved. One thing that you need to remember when entering data online is that your session will time out after one hour (meaning unsaved data will be lost). It is important to click the “Save observation” button so that your observation record is saved. You will be able to return to your observation record in order to make edits, if necessary.
10. To finish, you may click on “Logout” to exit your session.

c. New Nest records

If you find a new nest that is not in the list, click on “enter a new nest” on the page showing the map of Lake Roosevelt NRA (Figure 5).

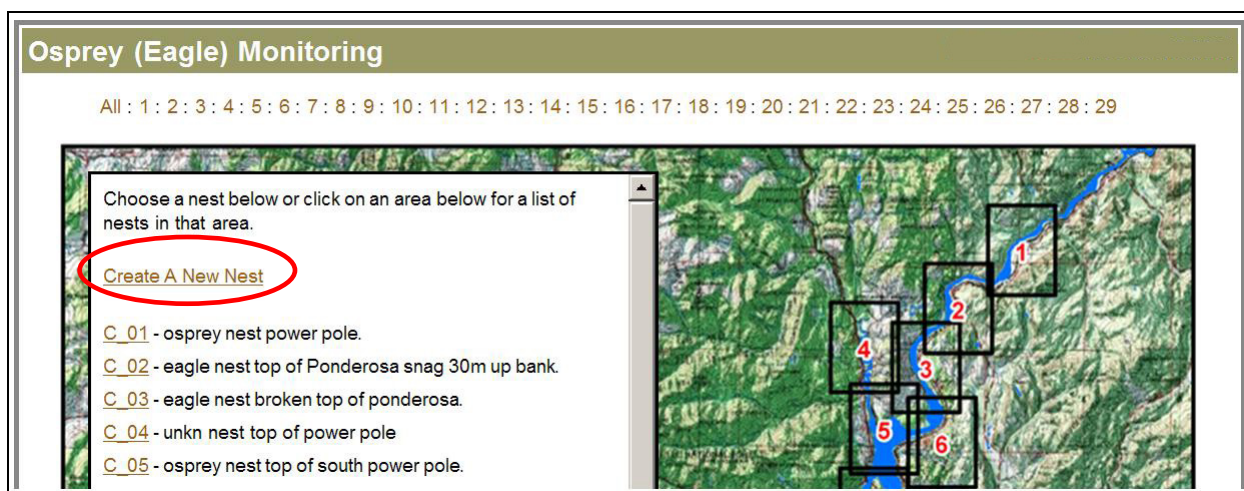


Figure 5. Web page showing where to enter new nest information

You will be directed to a new page (Figure 6) where you will need to complete the required fields.

New Nest Site			
Datum used to collect location coordinates	Lat/Long (DMS) ▼		
	Lat	Degree	Second
	Long	Degree	Second
Nest Description			
Visible From Road?	Yes ▼		
Save Nest Cancel			

Figure 6. New nest entry form

The information that you need to enter is the following:

- *Location of the nest:* If you have a Global Positioning System (GPS) available, you can provide coordinates using UTM or degrees latitude/longitude. (If you don't have GPS coordinates for the nest location, select "none" and please provide a detailed and accurate description of the nest location in the following field).
- *Description of the nest site:* Include a short description of the area where you found the nest. (Note – this is especially important if you cannot provide GPS coordinates.)
- *Nest visibility:* It will help us to know whether or not the nest is visible from a road.

Once you have entered this information, the new nest label will be visible only in the list of nests (it will not appear in the zoomed-in map "Tile" sections until the data is processed at the end of the observation season). This new nest label will have your initials and the date (e.g., NewNest_TW_20100613). Your new nest site will have this temporary label until the nest and location are confirmed by UCBN survey crews. Once formally incorporated into the list of nests, all new nests will be assigned a permanent Nest ID and will appear on the Nest Watch website in both the nest list and on the "zoomed-in" Tile maps.

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National Park Service
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