

**Field Protocol For Migration Monitoring**  
**Rocky Point Bird Observatory**



Ver. 2.4  
December, 2024

## Protocol Version History

This section records all significant revisions made to the Rocky Point Bird Observatory (RPBO) monitoring protocol. All significant changes must be noted in this section and the version number on the title page and within the footer must be revised to reflect the new version number. The RPBO Migration Project Coordinator will provide the latest revised protocol.

<b>Version</b>	<b>Date of Revision</b>	<b>Major Changes</b>
1.0	November, 1999	Initial review draft prepared by Daniel Derbyshire
1.1	20 February, 2000	Grammar, organization. Electronic data entry section added. Priority species revised to reflect most recent CMMN agreement.
1.2	1 August, 2000	Procedural revisions and grammar by Daniel Derbyshire
1.3	December, 2000	Procedural revisions by Daniel Derbyshire
1.4	April, 2003	Clarification and procedural revisions by the RPBO Board
1.41	October, 2004	Revision of Census Time
1.42	August, 2005	Revision of Census Time
2.0	March, 2008	Update of safety procedures, data forms and maps, elaboration of details in text, reorganization of subsections and text, addition of appendices
2.1	November, 2011	Update of text, data sheets and appendices. Reorganization and creation of subsections and sections.
2.2	January, 2022	Major revisions to organization, text and maps. Addition of procedural changes (no effect on data). Incorporation of information for Pedder Bay site. Section 9 was added to address specific history details which could affect data analysis.
2.3	March, 2024	Changes made as per request from CMMN. Primarily formatting and standardization among member stations. No significant changes to procedures.

### Questions










Questions regarding the BC Migration Monitoring Program should be directed to Wendy Easton (landbird biologist) at the Canadian Wildlife Service's Pacific Wildlife Research Centre at (604) 940-4673. Please contact the Rocky Point Bird Observatory Board regarding questions on this protocol ([rpbo@rpbo.org](mailto:rpbo@rpbo.org)).

**The Bander's Code of Ethics**  
**Banding is a privilege, not a right.**


1. Ensure the respect, safety, and welfare of birds and their populations, people, and the environment.
  - Handle each bird carefully, gently, quietly, and in minimum time; capture and process only as many birds as you can safely handle given your ability and the environmental conditions
  - Follow safety procedures as outlined in NABC materials and constantly innovate ways to conduct operations more safely
  - Follow the NABC Code of Conduct to help guide professional behavior
2. Design or use appropriate studies, methods, and analyses to advance a valid scientific purpose.
  - Collect accurate data and submit to an appropriate data repository
  - Collaborate to maximize data collection and to avoid duplicating effort
  - Promote and contribute to projects using standardized protocols when appropriate
3. Be accountable and strive for high standards.
  - Engage in self-assessment and invite assessments from others to ensure that your work is beyond reproach
  - Share knowledge and offer honest and constructive feedback to others to improve skills and banding practices
4. Obtain all necessary permits and permissions; understand and adhere to the conditions, responsibilities, and limitations thereof.

North American Banding Council, March 2021

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## 1. Authority for Rocky Point Bird Observatory Conduct

Rocky Point Bird Observatory operates under permit 10781 issued by the Canadian Wildlife Service of Environment and Climate Change Canada (ECCC). In addition, a permit under the BC *Wildlife Act* is obtained for species regulated by the province (number changes at each issuance) and a Scientific Education Permit (number changes each year) is obtained from ECCC to cover RPBO's specimen collection. (see Appendix 1)

## 2. Introduction and history

Rocky Point Bird Observatory (thereafter, RPBO) has been operating the Rocky Point migration monitoring station (48.32060N 123.54778W) at the Department of National Defense's Rocky Point Ammunition Depot on the traditional lands of the SC'IA/NEW people in Metchosin BC since 1994, and with a standardized protocol since 2000. The protocol has been developed and updated with guidance from the Canadian Migration Monitoring Network and sources such as *Recommended Methods for Monitoring Bird Populations by Counting and Capture of Migrants. Report for the Intensive Sites Technical Committee of the Migration Monitoring Council* (Hussell and Ralph 1998).

RPBO maintains a website at [rpbo.org](http://rpbo.org) and can be reached through [rpbo@rpbo.org](mailto:rpbo@rpbo.org) or direct mail at Rocky Point Bird Observatory, 170 1581H Hillside Ave, Victoria, BC, V8T 2C1.

The station was established in 1994 by the Canadian Wildlife Service (CWS) in partnership with the Victoria Natural History Society. RPBO is one of four such stations in British Columbia. It is currently the oldest station located on the Pacific coast of Canada and as such provides important longitudinal information on western and coastal migrant birds in Canada.

In the fall of 1998, CWS launched an effort to standardize procedures and effort at RPBO. Funding was secured to hire a full-time bander to run fall operations on a daily basis, as prior to this banding had been done as personnel were available. Following that season, a formal, expanded protocol was developed outlining details such that data from subsequent years of monitoring would be collected in a manner that would allow strong trend analysis between years. Fall migration monitoring has occurred continuously since 1994 at Rocky Point, **except for 2007 when operations were temporarily suspended**. Spring migration monitoring was conducted in 1995, 1996, 1997 and 2006, but has not been established as a standardized program.

A board of directors was formed in 2000 to oversee and guide the future of RPBO. The observatory was registered as a legal society (Rocky Point Bird Observatory Society) in British Columbia and as a Charitable Organization (869770123RR0001) with Revenue Canada in 2000. In 2001, RPBO formally became a member of the Canadian Migration Monitoring Network (CMMN), although data collected earlier was also submitted to the CMMN database and may be accessed through <http://naturecounts.ca>.


In 2002/03, two new monitoring programs were introduced at RPBO: Nocturnal Owl Monitoring Program (focused on Northern Saw-whet Owls) in the fall of 2002 and Monitoring Avian Productivity and Survivorship (MAPS) in the spring of 2003. RPBO followed the guidelines proposed by Project OwlNet ([www.projectowl.net](http://www.projectowl.net)) in developing their owl protocol. MAPS was conducted at the Rocky Point site from 2003 – 2010 (except 2007), at Royal Roads

University from 2003 – 2008 (except 2007), and at Madrona Farms from 2011-2019. MAPS is currently conducted at Witty's Lagoon (2009 - present) and Power To Be (2021 – present). MAPS is governed by the protocol established by the Institute for Bird Populations (IPB) (De Sante et al. 2004).

In 2009, RPBO was approached by Cam Finlay, the bander responsible for the Hummingbird Project of BC, to take on this program. RPBO agreed to manage the operations as a Special Project. This was subsequently added to RPBO's core programs, and due to expansion to other provinces, has been renamed the RPBO Hummingbird Project.

In 2011, due to a two-week access closure because of military activity at the peak of migration, RPBO conducted an exploratory operation at nearby Pedder Bay (48 35194, 123.57778W). The test was sufficiently successful that the RPBO board approached Pedder Bay Marina management the following year to establish a second fall migration monitoring station at that location. Since 2012, the site at Pedder Bay has mirrored passerine monitoring activity at Rocky Point. In 2014, standardized Northern Saw-whet Owl banding also began at Pedder Bay.

RPBO is primarily a volunteer organization, with seasonal banders hired for the monitoring programs. As such, there is a fair amount of field personnel change, although many of the volunteers have been working with RPBO for more than 10 years. A standardized protocol helps ensure that methods are consistent from year to year, despite changes in paid and volunteer personnel.

This protocol is intended to outline field procedures for migration monitoring at Rocky Point Bird Observatory's sites required to ensure that field procedures at RPBO are understood and adhered to in a consistent and standardized fashion by volunteers and staff. Standardized protocols are essential to ensuring that data are collected in a manner that allows them to be directly comparable from one year to the next. Any deviations in protocol may result in the data being incomparable. Any changes to this protocol that could affect data analysis must be fully recorded (see Section 9) so any effects can be considered at analysis stages. A calendar icon  will appear next to the heading of sections with significant changes that could affect analysis of the data.

All volunteers and staff should review this document at least annually to become informed or reminded of the current requirements and responsibilities at the sites.

In addition, banders and any staff or volunteers aspiring to become banders should review the Bird Banding Office (BBO)'s memos to banders found here: [Memo to Banders / Bulletin des bagueurs - Google Drive](#) .

### **3. Statement of purpose**

The primary goal of the bird migration monitoring projects at Rocky Point and Pedder Bay is to contribute to the efforts of the Canadian Migration Monitoring Network (CMMN) including monitoring changes in the populations of migratory bird species that are not being adequately monitored by other programs.

The objective of this protocol is to generate standard migration counts that represent a consistent and unbiased sample of the birds migrating through Rocky Point and Pedder Bay each day during fall migration. Through adherence to this protocol, we will:

- produce annual indices of populations of migrant birds using and passing through southern Vancouver Island annually, through participation in the CMMN. These indices may include numbers, demographics, species composition and timing, and morphometrics and will be used both to monitor bird populations for adverse and positive trends, and to advise on conservation issues facing these species.
- develop a better understanding of migration and stopover ecology of migratory birds using our monitoring sites and use this information to advise on conservation measures at this and nearby sites.
- contribute to scientific research through partnerships with academic, government and research organizations, such as Monitoring Avian Productivity and Survivorship (MAPS) with the Institute of Bird Populations, DNA Barcoding, West Nile Virus research and others projects compatible with the operations of Rocky Point Bird Observatory. (See Appendix 3)
- develop relationships within the community by providing training to volunteers and students interested in learning field techniques and increasing awareness of conservation issues within the community, military and other groups.

We achieve these goals by working to:

- identify and count individuals (observed and captured) of each species or subspecies, new and recaptured, daily during the monitoring period,
- determine the age and sex composition of captured birds and collect other morphometric data.
- produce annual reports summarizing the season, containing numbers and composition of captures and recaptures, comments on habitat changes, weather conditions and other factors that may have affected the capture of birds locally.
- reduce, where possible, biases in sampling by improving survey protocols and skills of observers, maintaining local vegetation structure and composition and supporting consistency of the surrounding landscape.
- follow a standard protocol that meets the scientific requirements of the Canadian Wildlife Service and the Canadian Migration Monitoring Network. In return, CWS will support annual trend analyses and produce regular analyses and interpretation of data, placing observations in the context of local and regional landscapes, regional weather conditions, population surveys and studies and other environmental factors.

The ultimate purpose of RPBO is to collect field data of excellent quality that can be used for future research or monitoring analyses, both as part of the CMMN and for independent research.

Quality data are collected by establishing and following a set protocol that controls for potential variables.

There is the potential to observe and enjoy rare birds during monitoring, but while it is good to be able to document their occurrence for submission to records committees, the completion of regular operations takes priority. Likewise, although it is exciting to break records (e.g., season banding total), the integrity of the data should not be compromised by deviating from standard protocol (e.g., by raising nets, pishing birds into nets) for the purpose of doing so. Such records are less meaningful than a record-breaking season achieved through strict adherence to protocol standards.

#### 4. Site descriptions

RPBO operates fall migration monitoring programs at two sites (Figure 1): Rocky Point (RP) and Pedder Bay (PB), both in Metchosin, BC.

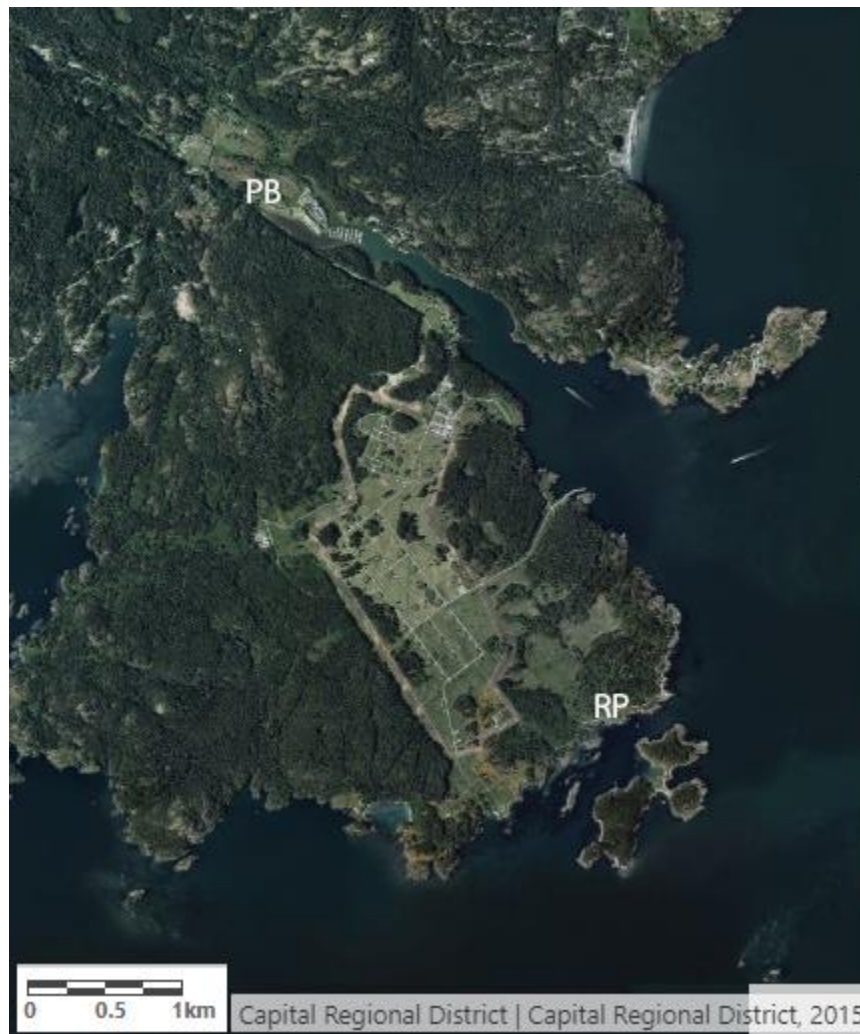


Figure 1. Relative locations of the Rocky Point and Pedder Bay sites.

#### 4.1 General information – Study Areas

Both Rocky Point and Pedder Bay are located within the Coastal Douglas-fir (CDF) biogeoclimatic region (BCR 5) and have very similar geomorphology. A significant difference between the two sites is that Rocky Point also contains a large area of marine and glaciomarine geography including marine sediments such as clay silt deposits and intertidal deposits of sand and gravel.

##### 4.1.1 Rocky Point (RPBO)

The habitat at the site consists of old growth Douglas-fir (*Pseudotsuga menziesii*) and Grand fir (*Abies grandis*) stands, tidal flats, endangered Garry Oak (*Quercus garryana*) forests, open meadow and riparian habitats. Lying at the extreme southern tip of Vancouver Island, Rocky Point concentrates migrant passerines, raptors and seabirds. The most common passerines banded during fall migration include Ruby-crowned Kinglet (*Corthylio calendula*), Pacific-slope Flycatcher (*Empidonax difficilis*), Wilson’s Warbler (*Cardellina pusilla*), Orange-crowned Warbler (*Leiothlypis celata*), Pacific Wren (*Troglodytes pacificus*), Lincoln’s Sparrow (*Melospiza lincolnii*), and Yellow Warbler (*Setophaga petechia*). More than 300 bird species have been observed, 87 of which are confirmed or suspected breeders at the site. The potential for bird studies here is considerable. Rocky Point is particularly suited for migration monitoring since human disturbance is minimal.

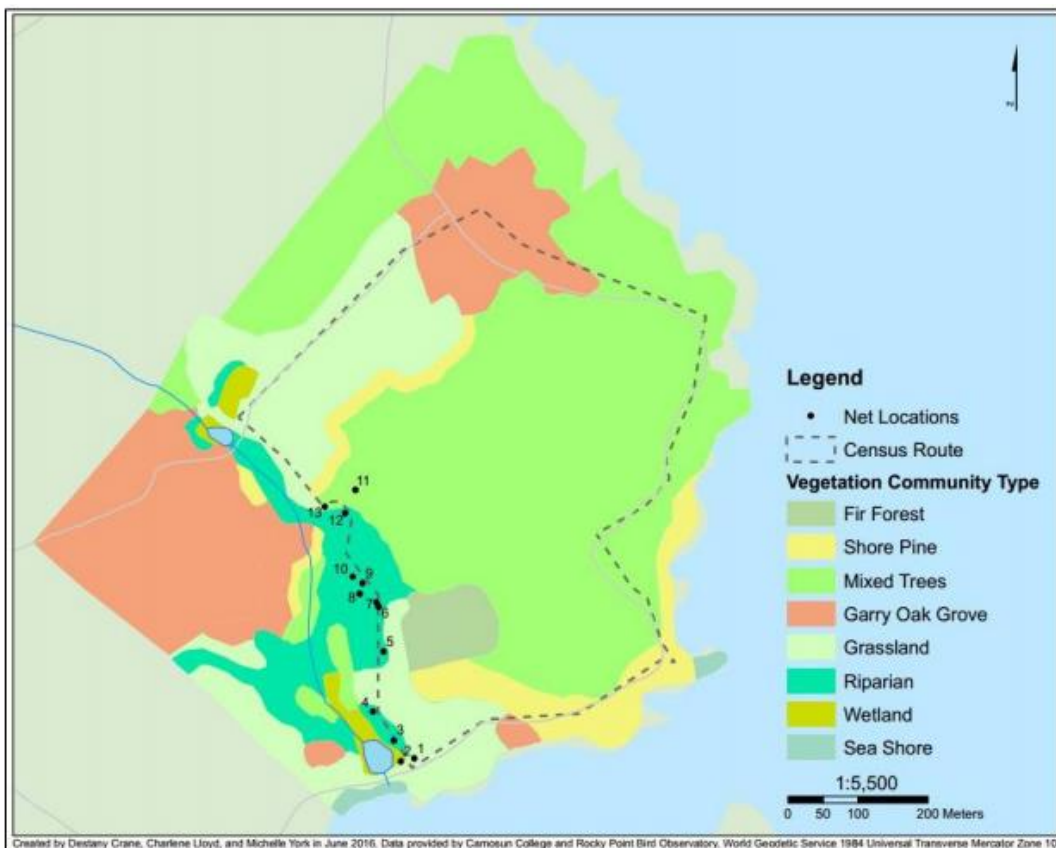


Figure 2. Rocky Point Current Count Area, Census Route and Net Locations.

#### 4.1.2 Pedder Bay (PEBA)

Located 4 km NNW of the Rocky Point site, the Pedder Bay site is on the property of the Pedder Bay RV Resort and Marina. While there is a great deal of overlap between the vegetation found at both sites, the Pedder Bay site lacks significant older growth forests and has much more habitat with extensive introduced and invasive species. Although Garry Oak is present at both sites, at Pedder Bay, the trees are found in shallow soils on bedrock rather than in deeper soil meadows. The most common passerines banded during fall migration include Fox Sparrow (*Passerella iliaca*), White-crowned Sparrow (*Zonotrichia leucophrys*), Ruby-crowned Kinglet, Golden-crowned Sparrow (*Zonotrichia atricapilla*), Swainson's Thrush (*Catharus ustulatus*), Dark-eyed Junco (*Junco hyemalis*), and Wilson's Warbler. As a site with public access, the Pedder Bay site provides great opportunities for public education and outreach, as well as serving as a training site for volunteers.



Figure 3. Pedder Bay Count Area, Census Route and Net Locations.

## 4.2 Count Areas

The count area refers to the area in which birds may be counted and included in the daily totals. Birds are considered countable if the observer is inside this count zone, regardless of the location of the bird.

### 4.2.1 Rocky Point

The current boundaries extend to the meadows adjacent to the upper ponds and the full extent of the census route, although those areas at greater distances from the banding station are not visited as frequently as the areas west to the restricted area fence, east to Edge Point and north to the upper ponds. See Figure 2.

### 4.2.2 Pedder Bay

The count area for the Pedder Bay site is contained by the census boundary. However, the portion of the count area beyond the creek is typically not visited outside of the census. The ridge above the banding station provides visibility over most of the count area. See Figure 3.

## 5. Operations Overview

During the season, operations consist of collecting data by three overlapping processes:

- Daily timed census along an established route
- Bird capture and banding
- General observations

Bird banding data are submitted to the Canadian Wildlife Service/Environment and Climate Change Canada and the Bird Banding Laboratory/US Geological Survey through the Bandit software, and to the Province of BC under the terms of the Wildlife Act Permit. A copy is also archived with Birds Canada's Canadian Migration Monitoring Network (CMMN).

Census and general observation data are submitted to CMMN through the Daily Estimated Totals (DET) spreadsheets provided for this purpose.

### 5.1 Coverage

Monitoring occurs from July 21 to October 18. Unavoidable deviations in start or end dates of up to a week have occurred at Rocky Point (usually due to military activity) but have been too infrequent to affect overall data quality. Exceptions to the standard start and end date must be highlighted in the season-end report.

### 5.2 Count Period

The standard count period begins 30 minutes before sunrise and runs for 7 hours (6.5 hours after sunrise). The purpose of this count period is to have a standard timeframe over which all surveys and observations can be compared from one year to the next. A breakdown of the components within the standard count period is provided in Table 1.

RPBO uses the 24 hour clock and Pacific Time.

**Table 1. Daily monitoring schedule example for October 8.**

<b>Event</b>	<b>Start Time</b>	<b>Finish Time</b>	<b>Duration</b>
Standard Banding Period	half hour before sunrise 06:50	12:50	6 hours
Census	1 hour after sunrise 08:20	09:50	90 minutes
General observations	half hour before sunrise 06:50	Completion of DETs	Up to 7 hours

### 5.3 Observer Codes

Observer codes categorize the observer’s ability to identify birds by sight and/or sound without the need to consult reference material or use apps such as Merlin.

**Table 2. Observer classification codes.**

<b>Observer Class</b>	<b>Description</b>
1	Can correctly identify at least 75% of birds encountered.
2	Can correctly identify 50%-75% of birds encountered.
3	Can correctly identify <50% of birds encountered.

### 5.4 Coverage Code

RPBO, as at many other stations, operates with a coding system based on observer classification, number of observers, observer effort, banding effort, census and Estimated Totals (ET). Observer class and observation hours are significant for the calculation of coverage codes, as both have substantial impact on the quality of observations made during the count period. Definitions of each coverage code are provided in Table 3.

The coverage code is intended to give a general indication of the level of coverage achieved. The target is to obtain adequate to good coverage on at least 75% of all days during the coverage window and good coverage on as many days as possible. Coverage code is recorded on the daily log. A daily coverage code serves the purpose of evaluating the quality of the migration monitoring on a given day and therefore accounting for variability in trend analysis. Note that the coverage codes only apply to the standard count period.

**Table 3. Daily coverage codes.**

Code	Criteria
0	No coverage
1	No census or ET. Some observations or non-standard banding.
2	Census. Possibly some observations or non-standard banding
3	Census and ET. At least one Class 1 observer present for 7 hours and some banding (<50% of 6-hour banding period)
4	Census, ETs, at least two Class 1 observers + 50-100% of standard banding effort. One Class 1 observer must be present for 7 hours.
5	Census, ETs, at least three Class 1 observers +100% of standard banding effort. Two Class 1 observers must be present for 7 hours.

## 5.5 Standard Equipment

### 5.5.1 Nets

The standard net array consists of small-mesh mist nets in fixed locations. (See Appendix 16). Each net has a unique identifier code that is used to track net opening and closing times and track where each bird was caught. They are 12 m long, 30 mesh nets made of 110 denier, 2 ply black nylon thread. Nets are 2.5 m high with 4-shelves with generous amounts of bag. Avinet nets are used at the Pedder Bay site; Spidertech nets are used at the Rocky Point site.

Nets are set on 2.5m (10') poles (3/4" electrical conduit) with the bottom shelf string set at approximately knee height (minimum 40 cm ground clearance at all points). Even though some birds will end up going under the net, this minimum clearance is essential to prevent predation of birds in the bottom panel and to prevent birds being injured by contact with the ground. Net lanes that are on uneven ground may have a short section of conduit added to one pole to achieve the minimum ground clearance.

Nets are opened using a pulley system and set so that the top shelf loop is 1"- 2" from the top of the net pole and the top three shelves are a standard distance. The lowest two shelves must be adjusted manually. Additional adjustments may be required depending on topography. The net pole is 3.3m in length.

These rules are in place to standardize the capture "window" of a net from one year to the next and are designed to maximize the diversity of birds captured while simultaneously ensuring the safety of birds in the nets. For instance, lower net panels may capture more ground foragers such as sparrows, higher panels may capture more mid-height foragers such as warblers, so adjusting height or alignment may bias capture composition. Changes to net set up, such as moving or permanently raising or lowering net height, should be avoided except in cases of landscape changes, such as flooding, fire, fallen trees, or major removal of vegetation. Nets must be properly furled and tied when closed.

Old, destroyed or faded nets should be replaced with identical new nets to minimize capture bias due to net specifications. Longer nets will naturally catch more birds because they have a larger capture "window", as will nets by manufacturers that build them with deeper pockets. Denier will affect the visibility of the net to birds and how much of the bird will get caught in the netting.

Mesh size will affect which bird species are most effectively captured. Any changes in net specifications (for instance, if the manufacturer goes out of business or discontinues certain net models) must be documented and replacement nets should match the old specifications as closely as possible to reduce any potential variation in capture.

### **5.5.2 Banding equipment**

RPBO provides essential banding equipment to each site. These include bands, banding pliers, band removal pliers, wing and tail rules, scales, and bird bags. Equipment must be kept in good repair by proper cleaning and storage. If equipment is missing or damaged, staff must immediately notify the Project Coordinator. Spare equipment may be available in RPBO's storage container outside the Rocky Point gate.

Bands are ordered before the beginning of the season, based on previous RPBO history. If there is an unusual influx of birds, the supply could be insufficient. Bands may be moved between Rocky Point and Pedder Bay as needed. The BIC is responsible to monitor the band inventory and advise the station permit holder well in advance of needing more bands. It can take up to two weeks to receive additional bands.

Bird bags are washed after each use. Site personnel are to turn used bags inside out before storage. Typically, volunteers will launder and return the bags, but staff may be asked to do this from time to time. Volunteers also make the bird bags used by RPBO. The instructions are posted on the RPBO website. Any bags in poor condition should be discarded.

### **5.5.3 Electronic equipment**

Electronic equipment includes station computers, radios, headlamps, and solar and battery systems. Staff is responsible to ensure that rechargeable equipment is plugged in daily and backup batteries are fully charged. If equipment is missing, damaged or no longer functioning properly, staff must immediately notify the Project Coordinator.

### **5.5.4 Optical equipment**

Staff and volunteers are to provide their own binoculars. RPBO has a supply of older and/or small binoculars that can be used as backup, if necessary. RPBO will provide a scope and tripod to each site. These are valuable and delicate items and must be treated with the appropriate care. In particular, if the scopes are on standard tripods and are not actively being used, they should be placed where they cannot be blown over by a gust of wind (e.g., stored or placed on the ground). They must be stored securely at the end of each day. If equipment is missing or damaged, staff must immediately notify the Project Coordinator.

### **5.5.5 Supplies and consumables**

Each station will be provided with stationery items, batteries, cleaning supplies, etc. at the beginning of each season. Backup supplies are available in RPBO's storage container outside the Rocky Point gate. It is staff's responsibility to ensure that supplies are moved from the container to the site as necessary throughout the season. If supplies are running low, staff must notify the Project Coordinator.

### **5.5.6 Maintenance and fire safety equipment**

Each site is provided with tools for expected maintenance and fire safety. Additional tools (grass trimmer, drill, etc.) are available in RPBO's container outside the Rocky Point gate. If equipment is missing or damaged, staff must immediately notify the Project Coordinator.

## **6. Daily operations**

Daily migration monitoring at each site is to be conducted by at least three experienced people. A licensed and experienced bander with excellent bird identification skills (Class 1 observer; see Table 2), who serves as the bander-in-charge. The BIC is ultimately responsible for ensuring that all aspects of fieldwork are completed in a manner which conforms with this document.

A second individual with strong bird identification skills (Class 1 observer required, but preferably someone who can identify >90% of birds commonly encountered on southern Vancouver Island). This person will normally conduct the timed census (see Section 6.1) and may or may not be involved in other aspects of monitoring (i.e., banding, extraction of birds from mist nets, scribing, observations).

A third individual to assist with bird extraction and/or bird banding (good identification skills are not required for extraction but are a must for banding). This person may also be required to assume scribe responsibilities, or if qualified, conduct the census.

Typically, up to three additional personnel will be present to assist with the daily operations.

Additional personnel may attend to serve as extractor, scribe, observer or general helper. All volunteers must be willing to perform any support role for which they are qualified requested by the BIC.

On occasions when there is a lack of qualified personnel available, the daily program must be scaled down as necessary. Conducting the daily census is the top priority, while banding and general observations are 2nd and 3rd priorities, respectively.

### **6.1 Census Procedure**

The census is the highest priority element of the passerine migration monitoring program. Census is conducted by a skilled individual during each day of operations, barring extreme weather conditions or site closures. The daily census must begin one hour after sunrise. The “window” for census is significant as suitable light levels and high bird activity generally occur at this time. The routes are illustrated in Appendices 8 (Rocky Point) and 9 (Pedder Bay). Special conditions for which census may be altered, delayed or aborted include electrical storm, heavy rain, extremely high winds, safety concerns or site closures. If a second person is required to accompany the census person for safety reasons, the second person must remain behind the census person (so that birds aren't flushed or view blocked) and may not assist in the observation or identification of birds. There should be no communication between the two, except as it relates to safety. Notes must be made on the daily log when census timing or details are altered.

The census person must be a Class 1 observer (Table 1) but in practice, many censusers can identify >90% of the birds commonly encountered at the sites. The CMMN recommends that personnel who are skilled enough to do the census should rotate this task. Having a number of

censusers reduces the observer-skill bias that can occur when a single person is conducting a task. Observer classification is intended to account for variation in skill level of personnel for analysis purposes. The identification percentage refers to all birds encountered, either visually or audibly. New volunteers can assign themselves a code based on the criteria detailed below. Personnel are encouraged to be honest and accurate in assessments of abilities, as inaccurate representation may lead to compromised data quality. While Class 2 and Class 3 observers cannot do the census, their observations are still valuable.

If a censuser is unable to identify a bird to species but can determine its family or species group, it can be recorded as such in the daily log. For instance, a sandpiper that is too far to see field marks for, but is obviously a *Calidris* species, can be recorded as “unidentified *Calidris*”. Similarly, a group of blackbirds that flies overhead but cannot be specifically identified can be recorded as “unidentified blackbirds”. These birds are recorded in the log in parentheses to acknowledge that they should not be counted as a full species. For instance, if Red-winged Blackbirds were also identified during the day, the flyovers may or may not also have been Red-wings (as their identity is uncertain), so they should be counted as one species, not two. However, if no other *Calidris* sandpipers were observed during the day, an unidentified *Calidris* does count as a separate species and would not receive parentheses.

Censusers must record start time and census duration as well as the total number of individuals of each species observed on the census route. All birds seen or heard can be counted, regardless of distance from the observer, provided that the observer is positioned on the census path. The observer is allowed to stray off the main path to a maximum distance of 10 metres for the purpose of confirming identification. The census must not be stopped or delayed to focus on a rare bird. Collecting data of excellent quality is the first priority of RPBO and the chance to observe rarities is a side benefit.

The censuser must use binoculars and record observations promptly so that data are accurate and complete. Use of spotting scopes is not allowed during census. "Pishing" may be used, except when near the mist nets (i.e., <10m) where there is the potential to draw birds into the nets, but censusers are encouraged to keep its use to a minimum when possible.

Effort must be made to avoid double-counting birds, so the censuser should make careful observations of bird locations and movements during the census. For example, 3 Evening Grosbeaks observed flying over Upper Ponds and 3 observed flying over Cape Calver are likely the same birds and therefore should be counted only once. By the same token, the birds found caught in the mist nets are not counted during the census, as they will be included in the day's data under banding captures.

As a member station of the CMMN, RPBO's main focus is migrant passerines and near-passerines. Waterbirds and shorebirds, while important to record, should be given less priority when there is the need to divide one's attention, as incidental observations can account for these species. Brief scans of water birds can be made during the census. Ocean viewing positions at Cape Calver, Edye Point and Building 143 (the boathouse) are good locations for this.

Training for census people will normally take place outside of the census itself. Personnel familiar with the route can take the new censuser along the route, pointing out typical locations for certain species or individuals. Any birds noted during this training can be included in the day's general observations.

### **6.1.1 Rocky Point**

The census route must be completed within 90 minutes. The following time intervals are provided to assist in keeping the timing of progress along the route consistent: Start at the large Garry oak (48.320254N, 123.546679W) by banding shelter at 0 minutes, Upper Ponds (48.323202N, 123.550087W) at 20-25 minutes, the T-junction (48.326012N, 123.545638W) with Perimeter Road at 35 minutes, Cape Calver(48.324668N, 123.541083W) at 45-50 minutes, Edye Point (48.320158N, 123.541481W) at 60-65 minutes, Glover Pond (48.318782N, 123.547000W) at 80-85 minutes and banding shelter at 90 minutes. Census takers are encouraged to keep moving and not dwell in any one area for too long, so that the whole route receives even coverage. This is true even if the censuser must leave a flock of birds partially unidentified due to time constraints (unidentified birds can be recorded as “unidentified warbler”, etc., if species group is known). If the observer feels they cannot complete the census in the time allotted, they should abstain. The censuser can also alert the BIC about large flocks and it may be possible to send another observer to spend more time going through the birds.

A standardized census route has been established at each site within the current count area. The purpose of this route is to create a standardized set of observations that can be used for year-to-year data analysis.

This route should only be changed in cases of long-term landscape (e.g., erosion of current route, impassable fallen trees) or DND operational changes in order to maintain the integrity of the long-term data set by removing potential variables.

Current version can be found on Google Drive in folder: Migration>Forms>Station Binder

Rocky Point Census Route (Sample eBird Track)



*Figure 4. Rocky Point Census Route*

Instructions: 90 minutes maximum, with brief stops at key areas. Starting at the large Garry oak east of the banding shelter at 0 minutes, Upper Ponds at 20-25 minutes, the T-junction with Perimeter Road at 35 minutes, Cape Calver at 45-50 minutes, Edge Point at 60-65 minutes, Glover Pond at 80-85 minutes and banding shelter at 90 minutes. Census takers are encouraged to keep moving and not dwell in any one area for too long, so that the whole route receives even coverage. This is true even if the censuser must leave a flock of birds partially unidentified due to time constraints (unidentified birds can be recorded as “unidentified warbler”, etc., if species group is known). If the observer feels that they cannot complete the census in the time allotted, then they should abstain. Recording seabirds is useful, but the priority is landbirds, so time should be allocated accordingly. Times noted are approximate. Times may be adjusted according to the presence or absence of birds.

### **6.1.2 Pedder Bay**

The census route must be completed within 75 minutes. Start at the second speed bump (48.348861N, 123.576111W) and follow the shoreline to the parking lot at 0 minutes. Cross before the marina, up the stairs (48.347856N, 123.572584W) and turn right to the lookout (48.347919N, -123.571972W). You should be going through the RV Park within 20 minutes of starting. Walk through the campground to the fire road (48.349416N, 123.574829W) and turn

left. Take the right turn (48.350783N, 123.575693W) to the Galloping Goose Trail. Cross the creek and turn left. Follow the trail along the creek and up a hill into the soccer field (48.352099N, 123.575776W) at 30-40 minutes. There is a path on the opposite side of the field. Turn right at the main path (48.351958N, 123.574909W) then across the creek again and up to the fire road (48.350792N, 123.575988W). Turn right on the fire road at about 50 minutes and follow it out almost to Rocky Point Rd. Watch for the cut path and flags and turn left into the brush (48.352490N, 123.580936W) approximately 30 m from the road. The route ends approximately 100 m down Pedder Bay road near the electrical service box(48.350944N, 123.581918W) at about 65 minutes, leaving 10 minutes to survey this area. Times are provided as guidelines. Current version can be found on Google Drive in folder: Migration>Forms>Station Binder

Pedder Bay Census Route (sample eBird track)



*Figure 5 Pedder Bay Census Route*

Maximum 75 minutes – Slow walk, no long stops. Be sure to leave time to bird the road near the end of the route. It is often very birdy!

Start at the second speed bump and follow the shoreline to the parking lot. Cross before the marina, up the stairs and turn right to the lookout. You should be going through the RV Park within 20 minutes of starting. Walk through the campground to the fire road after campsite 10 and turn left. Take the right turn to the Galloping Goose Trail. Cross the creek and turn left. Follow the trail along the creek and up a hill into the soccer field. There is a path on the opposite side of the field. Turn right at the main path then across the creek again and up to the fire road. Turn right on the fire road and follow it out almost to Rocky Point Rd. Watch for the cut path and flags and turn left into the brush approximately 30 m from the road. The route ends approximately 100 m

down Pedder Bay road near the electrical service box. Times are provided as guidelines. Adjust for birdiness.

## 6.2 Standard Banding

A standardized program of mist net captures is the best method available for determining the numbers of some species of migrants present at the site. Many birds are present in the understory that are not easily counted by sightings. Moreover, banding allows identification of those individuals that are residents or stopovers, and provides information on the age, sex and condition of each captured bird. Any birds which were captured but managed to escape, were released without a band or escaped from the net are recorded as general observations.

The goal of Standard Banding is to capture, mark and collect data on a representative sample of the species present at the site on any particular day. Ideally, all nets in the standard array are used for a set period every day, a full set of data are collected for each bird captured, and each bird is banded with a standard numbered band issued by the Canadian Bird Banding Office. However, the welfare of the birds takes priority over maintaining the standard protocol, which could require reducing the number of nets in operation when detrimental conditions arise. The operations must be carried out with minimal stress to the birds being captured while maximizing the value of the data being collected.

As with access to the site, the handling of birds is a privilege not an inherent right. All banding by RPBO follows the Bander's Code of Ethics (see insert preceding Table of Contents). Bird handling, extraction from mist nets and banding are extremely delicate processes that require lengthy training by experienced persons. Therefore, it is necessary for those wanting to get hands-on experience to approach the BIC or Volunteer Coordinator about this.

## 6.3 Net hours

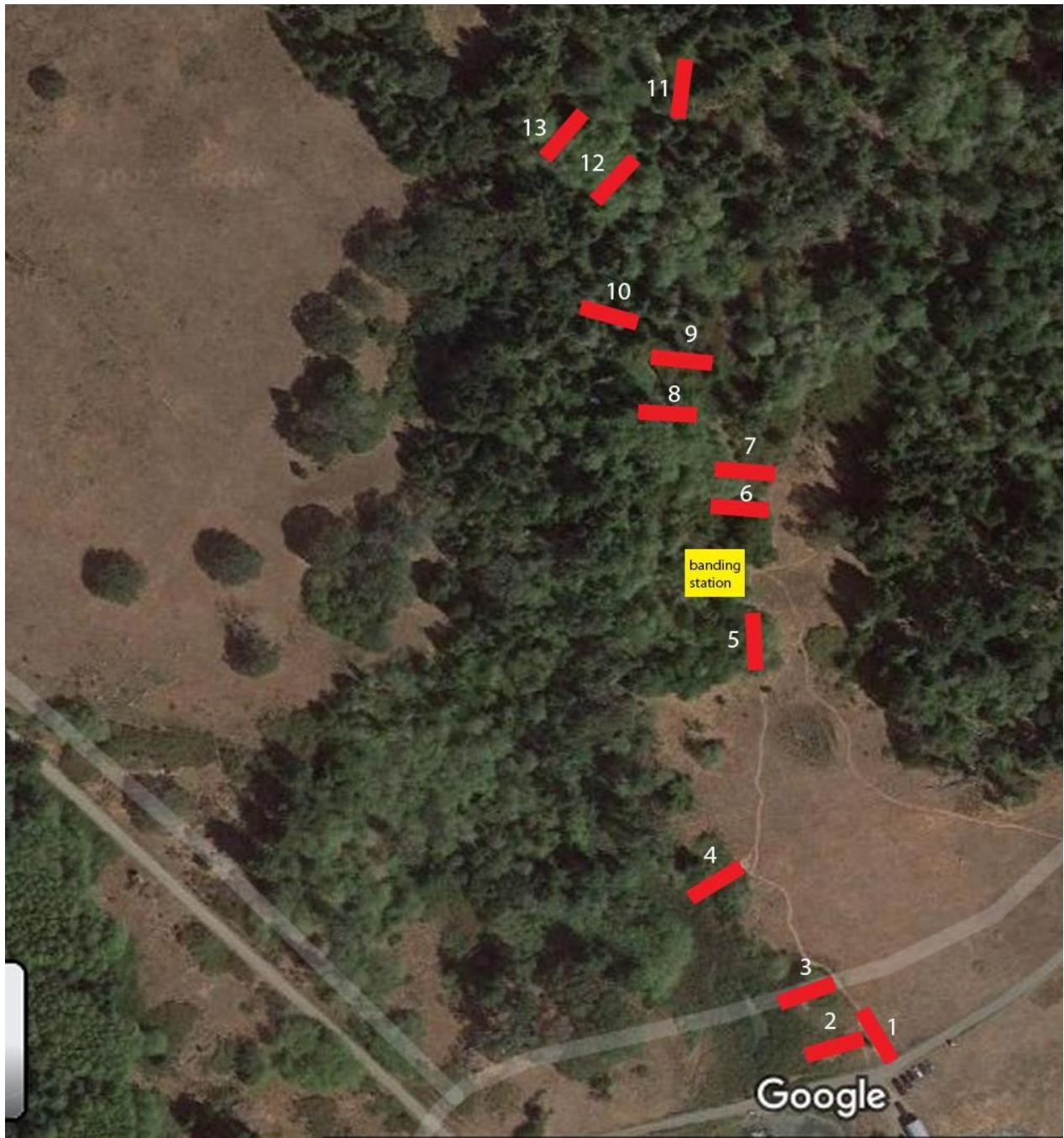
Nets are operated for six hours beginning one-half hour before sunrise on a daily basis during migration, weather and access permitting. A sunrise time chart is available at the banding station and is posted on the RPBO website (<http://rpbo.org/sunrise.html>). Times of net openings and closings are noted on the Daily Log sheets and in the DET program.

## 6.4 Net locations

The locations of these nets have been selected to maximize capture rates while simultaneously sampling a variety of the habitats present at the site. The addition of new nets and/or changing the location of current nets should only be done in cases of long-term landscape (e.g., fire, flooding, erosion, fallen trees, significant removal of vegetation, etc.) or site operational changes.

### 6.4.1 Rocky Point

Standard banding consists of operating 13 mist nets. Net layout and numbering schemes are shown in Figure 6. Nets are numbered sequentially from 1 to 13, beginning with net 1 at the perimeter road and progressing roughly north toward the upper ponds. The banding station is located between nets 5 and 6.



*Figure 6. Net Locations at Rocky Point*

#### 6.4.2 Pedder Bay

Standard banding consists of operating 15 mist nets. Net layout and numbering schemes are shown in Figure 7. Nets are numbered sequentially from 1 to 15, beginning with net 1 at the eastern end of the array, nets 7 and 8 on top of the ridge, 9 through 11 west of the banding station. Nets 12 and 13 are on the estuary on the opposite side of the road; Nets 14 and 15 are in the mixed shrub field farther west and north of the road. The banding station is located between nets 6 and 9.



*Figure 7. Net Locations at Pedder Bay*

## **6.5 Capture Effort**

The standard capture effort includes only mist nets.

For special projects, other nets or traps may be used provided they do not impact the standard netting efforts by attracting birds closer to, or farther from, the standard nets.

## **6.6 Net operations**

Nets may be opened and closed by any personnel after appropriate training.

Nets may not be opened at Rocky Point during DND base closures.

Occasionally nets become damaged due to interactions with deer, vegetation, personnel or predators. Sewing the nets on site is acceptable if time and skill levels permit. The net can be repaired by weaving (preferred) or quickly by sewing the hole shut as a temporary solution. In cases of large holes or tears, the nets are taken down and replaced with less damaged nets. Damaged nets should be clearly labeled as damaged and will be repaired in the off-season.

### **6.6.1 Opening**

Nets are normally to be opened/closed and checked by a minimum of two people starting from the banding station (the middle of the line of nets) and progressing to the ends (Appendices 10 and 11). For example, one person would open nets 6-13 at Rocky Point while the other person would

open nets 5-1. If three people are available, one would go directly to nets 11-13 while the other nets are being opened.

The net layout at Pedder Bay is such that it is best if three people open/close nets. Typically, one person would open nets 1-6, a second open 7-11, and a third open 12-15. RPBO uses a net tag checkout system to ensure that all nets are opened and closed. At net opening, the net opener takes a numbered tag to each net and places it on the guy line or in adjacent shrubbery when the net is opened.

### **6.6.2 Checking and managing nets**

Net checkers (who may also be extractors) must carry a radio on net rounds for communication with the BIC and extractors. Any issues or concerns noted by the extractors or net checkers must immediately notify the BIC by radio. These could include the presence of predators, damaged nets, an abundance of birds near the nets that could result in delays in processing. As bird welfare is paramount, the BIC should not hesitate to either raise or shut down nets if birds are at risk.

Nets are checked at least every 20-30 minutes (20 minutes under normal circumstances). Situations in which birds may be at greater risk of injury, such as with potential presence of predators or threat of rain, require that nets be checked more frequently, if not closed altogether.

Nets must not be operated in overly wet conditions (rain, showers, drizzle or heavy fog) or when the temperature is below 0°C. Frosty nets may need to be warmed by hand or heat packs to open them after a night of below-freezing temperatures. Banders should be aware of unusually hot days in which birds may experience heat stress if left in the nets or hanging in bags for too long.

The sites are also home to feral cats, raccoons, mink, deer, hawks, owls and other predators during migration. Predator sightings should be immediately reported to the BIC. Predators should be hazed, and nets may be raised or closed to reduce the risk of injuries. If these predators appear to pose a threat to captured birds (i.e., they have not left the netting area), nets should be checked more frequently, raised, guarded or closed altogether.

#### Rocky Point

Since the nets are in a line rather than a loop at Rocky Point, the nets should be checked in both directions and any birds caught in the nets should be extracted both outbound from and inbound to the station. If bird capture volume is too high or staff availability too low to maintain a minimum 30 minute net check schedule, some nets should be closed until capture volume decreases or more staff are available. Nets should be closed based on distance from the banding station, with nets 11-13 closed first when a reduction in the number of nets is necessary. Rocky Point nets 1, 2 and 3 (closest to the water) are frequently closed due to high winds and represent the only situation where a subset of nets may be closed out of order. These nets should be closed for the safety of birds when winds are gusting at 45 km/hr or higher (Beaufort 5 or higher) or as the BIC sees fit.

#### Pedder Bay

At Pedder Bay nets 12-15 should be checked in reverse order (i.e., 15-12) as 14 and 15 tend to be the busiest, and other personnel can be most easily sent to nets 12 and 13 if necessary. A net

round normally includes all birds extracted during the round trip. During slow periods, and with permission of the BIC, extractors may remain at the far end of their route and return on the next net round.

If bird capture volume is too high or staff availability too low to maintain a minimum 30 minute net check schedule, some nets should be closed until capture volume decreases or more staff are available. Nets should be closed based on distance from the banding station. Nets 14-15 at Pedder Bay and Pedder Bay nets 7 and 8 (on the ridge), are frequently closed due to high winds and represent the only situation where a subset of nets may be closed out of order. These nets should be closed for the safety of birds when winds are gusting at 45 km/hr or higher (Beaufort 5 or higher) or as the BIC sees fit.

Nets must not be operated in overly wet conditions (rain, showers, drizzle or heavy fog) or when the temperature is below 0°C. Frosty nets may need to be warmed by hand or heat packs to open them after a night of below-freezing temperatures. Banders should be aware of unusually hot days in which birds may experience heat stress if left in the nets or hanging in bags for too long. The sites are also home to feral cats, raccoons, mink, deer, hawks, owls and other predators during migration. If these predators appear to pose a threat to captured birds (i.e., they have not left the netting area), nets should be checked more frequently, raised, guarded or closed altogether.

### **6.6.3 Closing**

Nets are to be closed in the same order they are opened to keep the time the nets are open consistent. When the net is closed, the net closer retrieves the tags and returns them to the station so that the BIC can be confident that all nets are closed.

RPBO uses a two-step process for closing the nets. First, the lower four panels of the nets are brought together and furled into the top panel as it is lowered. Care must be taken to not furl the top trammel (line) of the top panel into the rolled net. Clips can be applied to both ends at this point. The net closer then moves to the middle of the net and, using a bicycling motion with the arms, “twizzles” the net into a tight rope. The net is then tied with a securing rope tied to a stake or tree near the centre of the net and the rope clipped to the rolled net.

### **6.7 Extracting birds from mist nets**

People removing birds from nets must have read the North American Banders’ Study Guide and apprenticed under an experienced person. Extracting may only be done with the approval of the bander-in-charge or trainer.

Extractors must carry a radio on net rounds for communication with the BIC. Expected communications include advising the BIC if the extractor

- encounters a net with more than 4 birds (at which point the BIC will determine if assistance to complete the net round is required (if personnel are available))
- is dealing with a difficult extraction (little progress after 2 minutes of handling, or bird not freed from the mist net within 5 minutes)
- has several birds extracted but still has more nets to check (at which point a volunteer may be sent to retrieve the bagged birds)

- if more bird bags are required
- any other assistance is required (e.g., net pole needs resetting, net is damaged, etc.)

The banding staff and/or experienced volunteers will accompany new volunteers on net rounds to give the new volunteer learning opportunities and provide information on handling of different species. Helping new volunteers learn in a safe, respectful and enjoyable manner is a priority during the daily operation of the station.

A clean bird bag should always be used and only one bird should be placed in each bag. Extractors should carry enough clean bags with them to accommodate the birds on the net round. Emergency supplies of bags are kept at the most distant nets. If more bags are needed, the extractor should radio the station and request more bags. Extractors should not double up or carry birds back to the station without bags.

High risk or stressed birds should be removed from the nets first. These include birds caught by one leg or the tongue, birds hanging in vegetation or on the ground. Large or aggressive birds or those at risk of escape may need to be removed before others in the net.

Extractors must notify the bander when they return to the station with very young birds, birds in extreme molt, hummingbirds, injured or stressed birds or any others designated by the BIC so these can be processed in order of priority. Use red clips on the bags to indicate high priority birds.

Birds waiting in bags must be safely hung up as directed by the BIC and not left on the ground at any time. Numbered clothes pegs are available at each net and are to be attached to bird bags as an easy way to note which nets the birds were extracted from.

While birds being held in bags in the banding lab are at little risk of harm, they are nonetheless not able to feed or migrate and should be processed and released as soon as possible. Birds should not be held for more than one hour from time of extraction. Whenever it appears that more birds are being caught than can be safely processed within 60 minutes of capture, then the standard processing procedures must be adjusted by dropping some measurements (e.g., fat, skull, wing length, and those taken for interest, such as length of crown on Wilson's Warbler, etc.) Age and sex could be recorded as "U" if determining such for each bird would be too time-consuming. A second option at the BIC's discretion would be to release birds of species which have already been captured in significant numbers to make time for fully processing less commonly captured birds. Counts of birds that have been released unbanded, by species, should be recorded in the data file.

### **6.8 Processing unbanded birds**

Stressed birds are to be processed first, followed by hummingbirds, local young, species at risk, priority species, then the remaining new birds. The BIC may designate other species or situations (e.g., birds in molt) for priority handling (see Table 4).

**Table 4. Priority handling.**

Priority species or situation	Details
Stressed or injured birds	Birds can be stressed by heat, cold and handling. Be aware of what birds are more susceptible to stress and know how to deal with them (North American Banding Council. 2001a).
Hummingbirds	Cold, wet or windy days in July-August mean that nets should be checked more frequently as hummingbirds are very sensitive to these conditions while in the nets. Any hummingbird showing signs of torpor may be resuscitated with sugar water (located in the bird first aid kits at each station), by blowing warm air on the bird, or warming in the hospital bin. Birds in torpor may take several hours to waken. Do not dispose of an apparently dead hummingbird or store it in an inescapable container until you are absolutely certain the bird is dead.
Local young	For any local young with pin feathers, ensure they are released in the area where they were captured. Release the young birds with their accompanying adult if they are caught together.
Species at Risk	Species at risk should be banded ahead of any birds uninjured or extremely sensitive birds. The precise ordering will be determined by the bander based on the birds at hand. In any case, any bird on Canada's Species at Risk list should be banded, measured, photographed and released as quickly as possible.
Priority species	Several species of birds appear to stress more easily than others and the BIC should be alerted when these species are brought to the station. These include Bushtits, Kinglets, American Robins and juvenile Brown Creepers.

Only individuals of known species can be banded. Use Pyle et al. (1997) to identify species and sub-species, as well as for aging and sexing passerines. Other helpful guides used for identification of warblers (Curson et al. 1994; Dunn and Garrett 1997), sparrows (Byers et al. 1995; Rising and Beadle 1996), waders (Prater et al. 1987) and difficult species (Kaufmann

1990). Sibley (2000), Kaufmann (2000) and National Geographic Society (2002) are useful guides for all birds.

Ageing and sexing at RPBO is primarily based on Peter Pyle's *An Identification Guide to North American Birds. Ageing North American Landbirds by Molt Limits and Plumage Criteria: A Photographic Companion to the Identification Guide to North American Birds, Part 1* (Froelich 2003) is another useful publication.

Birds are typically weighed before removal from the bird bag. The bird in the bag is placed in a container on the scale, and the scale is tared. Once the bird is removed, the bag is returned to the container, and the scale will show the inverse of the bird's weight. The mass should then be provided to the scribe. See Table 5 for details of data normally recorded during banding.

**Table 5. Data collected during the banding process (normally in this order).**

Data collected (Required except where noted)	Explanation
Bander	Bander's initials (three preferred)
Species	Species 4-letter code (recognizable forms should be identified as such) (Appendix 7)
Band size	Alphanumeric band size; Hummingbird band size includes length (e.g., X6.2)
Band number	9 digit, with hyphen after prefix
Net	Net number
Capture time	Time of net round start
Body mass	To 0.1g
Age/how aged	Alpha codes using Bandit codes (Appendix 8). Code of CC requires comment (e.g., PL, SK)
WRP code	Molt stage using Wolf-Ryder-Pyle codes (Appendix 9)
Sex/how sexed	Alpha codes using Bandit codes (Appendix 7). Code of CC requires comment (e.g., PL, BP)
Skull	Optional: Ossification using Bandit Codes (Appendix 10)
Wing chord	To nearest millimetre, except to nearest 0.1mm for hummingbirds
Fat score	1-7 according to chart in Appendix 11
Tail	Optional: To nearest millimetre. Generally collected for species where TL can be used for sexing

Data collected (Required except where noted)	Explanation
Bird Status	Birds with injuries, disease, and deformities must receive a code of 500, whether or not the condition is related to capture and/or banding. As per Bandit; all birds with a status other than 300 require a comment describing the injury, disease or defect. In addition, a bird injury caused by RPBO activities must be noted on the Injury/Mortality page of the data worksheet.
Capture date	Autocalculated; mm/dd/yyyy (Correct if necessary)
Station	Four letter code (e.g., RPBO, PEBA)
Comments	Additional measures, CC explanation, or other information (e.g., large leg requiring a larger than normal band size, band used out of sequence, disease, injury, or deformity, etc.). All comments are submitted to the Bird Banding Office so should be relevant, clear, and professional.
Time weighed	Optional: Autocalculated

Additional information, such as skull ossification, breeding condition, etc., should be recorded when it is checked or observed. For reasons of bird welfare, RPBO does not allow "wet skulling" if the temperature is at 4°C or below. Any deformities or old injuries should also be recorded with the band record. Unusual injuries or deformities should also be photographed.

Birds are to be released by holding the bird in a bander's grip and placing their feet on the bander's opposite hand before releasing the wings. They should be released a short height above the ground or a surface to avoid injury if the bird is unable to fly. A dipnet should be stationed nearby in case an injured bird has to be recaptured. Birds should not be released directly into the vegetation.

When time permits, banders should attempt to identify birds to sub-species. Prior banding experience at the site has demonstrated that several forms of a given species (e.g., Song Sparrow) can be encountered (sometimes on the same day). Banders lacking experience with the different subspecies may use the descriptions in Pyle as an indicator. Recording subspecies provides a greater amount of information on the populations of birds migrating through RPBO sites.

## 6.9 Processing recaptured birds

Normally, recaptured birds banded or recaptured earlier on the same day are to be released without being processed. If the extractor knows from the band number that a bird was banded that day, they may release it at the net. This can be ascertained by radio if time permits.

Special projects may require that certain data (such as mass) be collected from same day recaptures.

Recapture data must be entered onto the Recapture Worksheet in the station's data file. Recaptured birds are processed with the same information as newly banded birds.

It is essential that banders and scribes pay close attention to the reading and recording of the band number, as this number is the most important piece of information from the recapture record. An incorrectly read number renders the entire recapture record useless. The scribe should read back the number to the bander to ensure accuracy. The scribe must also verify that critical data such as species, age and sex match those of the original capture. (These data will autofill on the recapture worksheet when the band number is entered.) If there are any discrepancies, the scribe must notify the bander while the bird is still in hand.

If the band is not immediately determined to be from the RPBO inventory, the band and the bird must be photographed as a potential foreign recapture. Either the BIC or the Project Coordinator may report the foreign recapture to the Bird Banding Lab (<http://reportband.gov>). While the bander's name will be used as the finder (and appear on the Certificate of Appreciation), the email and physical address used must be RPBO's. The bander's email and address can be provided as an additional contact.

Returns (i.e., birds banded in previous seasons) and foreign recaptures are of special interest and should be noted in the narrative of the Daily Log

### **6.10 Data Entry**

Banding data are entered in an Excel worksheet on the station computer during banding, and later exported to the BBL portal. See Appendix 12 for a screen shot of the data entry worksheet.

The bander and the scribe work as a team. While the bander collects and relays the data, the scribe enters the information into the computer. The scribe must focus on the actions of the bander and must not hesitate to ask the bander for clarification. The scribe has a very important job in recording the data accurately and consistently. Knowing the Bandit 4 letter code facilitates scribing. Once the bird species has been identified, the scribe confirms the band size and band number to be used with the bander. The scribe is encouraged to notify the bander of any missing data elements or any values that seem out of the normal range while the bird is still in hand.

The process is the same for recaptured birds, except that the original banding record must be compared to the data being provided while the bird is in hand. The scribe must notify the bander if there is a discrepancy between the recapture data and the original banding record displayed on the worksheet.

### **6.11 Injured birds/casualties**

It is inevitable in any project that actively handles wild animals that some injuries or deaths will occur. However, every effort must be made to minimize these events and in no situation should data or personal objectives be placed ahead of the welfare of the birds. Birds that are obviously stressed from cold or handling should be released, even if unbanded, as extended periods of stress can often lead to death. Birds that are cold, damp, stressed, or unable to fly immediately after release can be put into the 'hospital box', a suitably sized container with a heated pad, for warmth and observation. Birds that have broken bones or wing strain can be taken to the SPCA

WildARC, an animal rehabilitation centre located on Malloch Rd in Metchosin, BC. In extreme cases, the BIC may be called upon to euthanize an injured bird.

To reduce the likelihood of injuries, nets should be closed if large volumes of birds are being captured and personnel are unable to extract and process birds in a safe and timely manner. In a net round where an unmanageable number of individuals are extracted, some of the most frequently captured species can be released unbanded and the count recorded in the daily log.

Whenever an injury or mortality occurs, personnel at the station should review the processes that led to the event with a view of improving procedures to reduce them in the future. It is essential that any casualties and/or injuries encountered at RPBO be recorded on the “Casualty/Injury” worksheet on the data file.

### **6.12 Non-Standard Banding**

Non-Standard Banding refers to either:

- a) nets or traps which are run outside of the standard count period or
- b) nets and traps run during the standard count period, but which are not part of the standard net array.

Such banding is strongly discouraged unless associated with specific research, or educational or similar events. Birds banded during non-standard banding cannot be included during standard data analysis and generally provide little information of value on their own. Furthermore, these non-standard bands complicate analysis of capture volume and recaptures (as the bird may have been captured the next day during standard banding operations but is now counted as a recapture rather than a new band). Non-standard banding should be conducted with a specific research question or objective. If non-standard banding is occurring, a map showing the location of the net(s) should be drawn, the net UTM coordinates taken, and a photo record should be made.

Personnel should avoid attempting to flush or "pish" birds into the nets. Likewise, personnel should resist the temptation to try to capture rare or unusual birds that show up on site simply for the excitement of banding a rare species. Such non-standard situations of capture are recorded on the banding sheets with NSB (Non-Standard Band) in the comments. Both the daily log and ET sheets have sections where these banded birds can be recorded.

### **6.13 General Observations**

General observations refer to birds encountered during the standard count period that do not fall under census or banding, including unbanded captures. The general observations are an important component for generating estimated totals (ETs). Scopes are permitted for general observations. Personnel must pay careful attention to this data and are encouraged to record the numbers of birds observed throughout the morning. There is a shared observation board at each site where all observers record their data. Observers are encouraged to discuss their sightings with others to attempt to eliminate any overlap in observations during the ET tallying process.

General observations begin at net opening and continue for the duration of the standard count period. The extended observation period (one hour after net closure) is designed to accommodate further general observations and data recording after the 6-hour banding period has finished (e.g.,

while closing nets or completing ETs). General observations for the standard count period are factored into the ETs.

General observations are treated as a separate tally from both banding and census. Personnel are encouraged to note details on their observations such that potential overlap with census or banding data can be eliminated during the ET process (i.e., if a rare bird was both observed during the morning and later a bird of the same species, presumably the same individual, was caught, it is recorded under both categories, but only one individual is tallied under ET).

Volunteers and staff are strongly encouraged to make as many observations as possible throughout the standard count period, providing it does not compromise the ability to complete other standard activities. To account for day-to-day variation in the amount of time that observers spend performing incidental observations, each observer must record total time spent making these observations, and this will be reported in the daily log. This will ensure that the daily variation in effort does not affect the validity of the data.

Throughout the day, observations are to be added to the observation board at the station. This increases the likelihood that all observations will be noted and decreases the likelihood that observations will be counted more than once. Staff and volunteers leaving before ETs are calculated must record their observations on paper with reference to species and their total number, location, time and movements of birds (e.g., 1 MGWA @0900 in the Upper Ponds), or by another means approved by the BIC, so that they can be accurately incorporated into the ET's.

## **7. Data Management**

### **7.1 Completing the Daily Log**

At the beginning of each day, time-critical weather information (temperature, wind, cloud cover, etc.) is entered into the RPBO log sheet (example in Appendix 13). At the end of each field day, the RPBO Daily Log sheet must be completed by the BIC in consultation with station personnel. Ancillary information (such as effort, weather, distractions, etc.) may be necessary for analysis of banding and observation data. Therefore, it is recommended that the BIC and any volunteers entering data into the Daily Log pay close attention to the following items to be included:

- Date (all pages)
- List of personnel present for that day, their observer class, volunteer hours and observer hours (in total)
- Censuser, census start and end time
- Weather information at net opening and closing
- Net opening and closing times, total hours of operation and total net hours
- Coverage codes
- Daily total # of birds per species banded, recaptured, censused and observed.  
Autocalculated ET values from the CMMN Daily Estimated Totals worksheet are to be adjusted to avoid duplication
- Unusual species
- Season banding total and species totals
- Narrative entry - The narrative located on the log may include some or all of the following, as appropriate:
  - A description of bird movements and their relative density.

- Unusual species.
- Military or other increased activity (construction, traffic, etc.).
- Observational information on volunteers (training procedures etc.).
- Notes about injuries or casualties.
- Personnel changes.
- Unusual or noteworthy bird behaviour.
- First arrival dates for migrants
- Observations made outside of the count area zone.
- Description of other floral and faunal species observations (Orca, Humpback Whales, Wolves, invasive species removal, etc.).
- Anecdotal information deemed worthy of record (e.g., stories about personnel).
- Site maintenance.
- Any protocol deviations or changes.

Weather is recorded at net opening and closing. The following information is to be measured: temperature, wind direction, Beaufort wind strength (Table 6), visibility, cloud cover, and precipitation as well as any other pertinent weather observations.

**Table 6. Beaufort wind scales.**

Scale	Km/H	Wind Speed Indicators
0	<1	Smoke rises vertically
1	1-5	Wind direction shown by smoke drift
2	6-11	Wind felt on face; leaves rustle
3	12-19	Leaves and twigs in constant motion
4	20-28	Wind raises dust; small branches moving
5	29-38	Small trees in leaf begin to sway
6	39-49	Large Branches in motion
7	50-61	Whole trees in motion

Precipitation is measured based upon the three simple, descriptive gradients indicating intensity: drizzle, showers or rain. Temperature is recorded in Celsius from temperature gauges at the banding station. Cloud Cover is measured as a percentage of cloud vs. clear sky from an open viewing position.

## **7.2 Banding Data**

Normally, banding data are entered into the RPBO Banding Records form provided on the station laptop as birds are processed throughout the day. It is the responsibility of the BIC to ensure that the data are being entered accurately.

To avoid possible data loss, a backup USB drive must be inserted into the computer before data are entered. In a situation where the USB is missing or is malfunctioning, data must be entered on

paper datasheets as well as in electronic form to ensure that there is a backup of the electronically entered data.

If direct digital data entry is impractical, or if the backup drive is not working or is unavailable, standardized RPBO data forms (Appendix 14) must be used. Thorough completion of the data sheets and the subsequent electronic entry of all data are considered of equal importance. Manually entered data should be entered onto the electronic forms as soon as possible to ensure that daily statistics are accurate.

### **7.3 Daily Estimated Totals**

At the end of the count period or soon thereafter, all available staff and volunteers are summoned, and someone is selected to take the lead in completing the Daily Log. One person will be designated to enter the data into the CMMN DET worksheet (Appendix 15) on the computer and another to enter the data on the Daily Log sheet.

The BIC, or delegate, checks that all observation data are available, including any records left by observers who left earlier, and then proceeds to work through the list of species on the data sheet.

For each species, the banded, recaptured, census, and observation sheet totals for the species are read aloud.

Discussion should follow to eliminate probable double counting between observers. Numbers of birds that were detected but not counted carefully, such as flocks moving by, can be estimated -- but estimates should never include birds that 'likely were there' when no one actually detected them.

Finally, the adjusted observation totals are added to the census and capture totals and recorded in the 'ET' (Estimated Total) column on the computer and Daily Log sheet.

### **7.4 Data review and submission**

At the end of each banding day, the BIC or delegate must review the day's banding records, and Daily Estimated Totals, proofread them for apparent errors and correct the data file as appropriate. A digital copy of both the data and DET files must be sent to [data\\_manager@rpbo.org](mailto:data_manager@rpbo.org) to ensure safekeeping of the data in case of catastrophic failure or loss of any of the devices (laptops, USB drives, etc.) in use at the stations.

The data are reviewed again by the BIC and the Station Permit Holder during preparation for submission to the Bird Banding Office.

Banding data are sent to the Bird Banding Office using methods required by them, at least once per year after the season is complete. More frequent submissions are recommended.

As part of RPBO's agreement with the Canadian Migration Monitoring Network, data collected and summarized in the CMMN Daily Estimated Totals form are submitted annually to Birds Canada. Banding data may be sent as well for permanent archiving. Data provided to Birds

Canada may be made available to researchers and others through the NatureCounts website (<https://www.birdscanada.org/naturecounts/>).

## **8. Habitat assessment and management**

Although the sites experience relatively little human disturbance, habitat is naturally unstable and changes to site composition are inevitable. Any major vegetation changes should be well documented (e.g., through aerial photos, photographic records of net lines, census route, observation area). The net lanes and trails have endured some changes (blow down) from winter storms and high winds.

Maintenance of the habitat is the purview of the respective land managers and from time to time, changes may be made (such as invasive species removal or removal of hazard trees) which may affect the habitat structure of the area. Changes should be documented in writing and with photographs in the end-of-season report.

Keeping annual written and photographic records of the standard count area, especially the netting area, can monitor such changes. Aerial photos are available through Google Earth and the Capital Regional District (CRD) Regional Map. The CRD map provides detail at a much finer scale (up to 1:500) if needed. Aerial and net lane photographs can be found on the RPBO Google Drive in the Migration>Policies and Procedures>Protocol folder

## 8.2 Habitat Assessment

As requested by the CMMN a fulsome habitat assessment was done in 2023. Assessors followed the general instructions used by the Institute for Bird Populations MAPS programs, quantifying the coverage of vegetation and other features of the understory, midstory, and upper story of the sites.

### 8.2.1 Rocky Point

CMMN Habitat Zones Map: Station: RPBO – Rocky Point 4 September 2023

Legend:

Black line: Count Area

Dashed line: Census Route

Short black lines: Net Lanes

Blue blobs: Ponds

1 square = c 75m

Indicate North  
with arrow



North

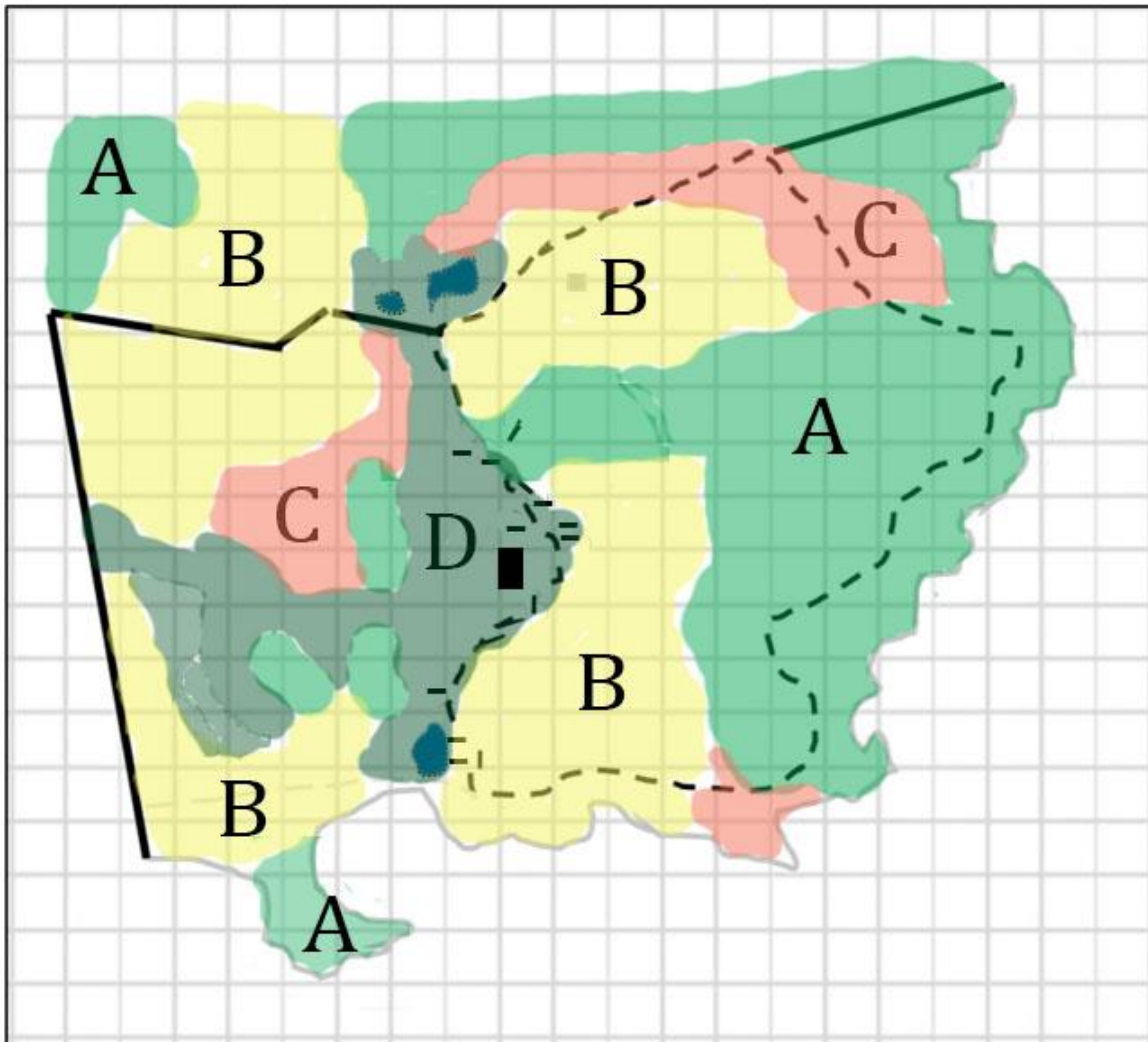


Figure 8. Habitat Zones at Rocky Point

**Table 7. Zone descriptions of habitats at Rocky Point.**

A	Fir-dominant forests	Dominated by tall second-growth conifers, primarily Douglas-fir, Grand fir, Shore pine and Western Red-cedar. Deciduous trees include Big leaf maple, Garry oak, Red alder, Elderberry, and Trembling aspen. This zone typically has a lush understory of mosses, ferns, and shrubs such as Salmonberry, Scotch broom, Oregon grape, Red osier dogwood, Black hawthorn, Daphne laurel, Salal, Oceanspray, Indian plum, Nootka rose and others. There is also considerable fallen wooden debris left in place proving food and habitat for many species of birds.
B	Open grass/shrubland	Contains few trees but rather open former agricultural fields dominated by non-native grasses, weeds and shrubs including Scotch broom, Gorse, Canadian thistle, Tansy ragwort, Himalayan blackberry, Black hawthorn, Daphne laurel, Oxeye daisy, Cluster tarweed. Native plants include Nootka rose, Foothill sedge (listed species), Scoular’s willow, and Common snowberry. Mostly dry during the banding season, but floods during the winter. Has been subjected to prescribed burns on an irregular schedule, becoming more regular in recent years.
C	Garry oak grove	Dominated by Garry oak. Was beginning to become crowded with Douglas-fir but DND has been carrying out a thinning program since around 2015. Other trees that occur in this zone include Arbutus, Scoular’s Willow, and Shore pine. Understory is primarily non-native grasses and weeds as noted in the B zone above. Native plants include ferns, Oregon grape, Salmonberry, Trailing blackberry, and Common snowberry.
D	Riparian	Dominated by deciduous trees such as Red Alder, Big-Leaf Maple, Red Elderberry and Scoular’s Willow, but with some conifers (Grand Fir, Douglas-fir, ). Understory is very shrubby, often impenetrable, providing excellent habitat with a mix of native and non-native shrubs including Nootka Rose, Salmonberry, Common snowberry, blackberries, Scotch broom, Oceanspray, English holly, Hardhack, Common snowberry, and Stinging nettle.

**Table 8. Vegetative and water coverage of zones at Rocky Point**

Site	Rocky Point			
Survey year	2023			
Survey date (month, day)	4-Sep			
Name(s) of surveyor(s)	Ann Nightingale, Kim Beardmore			
Zone label (as on HSA map for station)	A	B	C	D
% of Count Area taken up by this zone	40	35	13	12
% of zone covered by upperstory (>15 m high)	30	0	0	20
% of zone covered by midstory (5-15 m high)	60	0	80	75
% of zone covered by understory (0.5-5 m high)	30	100	80	60
% of zone covered by running water	3	0	0	5
% of zone covered by standing water	5	2	0	5
Average height trees within zone (m)	12		12	10
Average height shrubs within zone (m)	2.5	2	0	2
Average height herbaceous vegetation within zone (m)	1	1	1	<1
Enter 'X' if mean width of running water <2 m	X		X	X
Enter 'X' if mean width of running water = 2-5 m				
Enter 'X' if mean width of running water >5 m				
Enter 'X' if area of standing water <50m <sup>2</sup>		X	X	
Enter 'X' if area of standing water = 50m <sup>2</sup> - 50m <sup>2</sup>				
Enter 'X' if area of standing water >50m <sup>2</sup>	X			X

### 8.2.3 Pedder Bay

Legend:

Black line: Count Area

Dashed line: Census Route

Short black lines: Net Lanes

Gray line: Road

Gray block: Station

1 square = c 40m

Indicate North  
with arrow

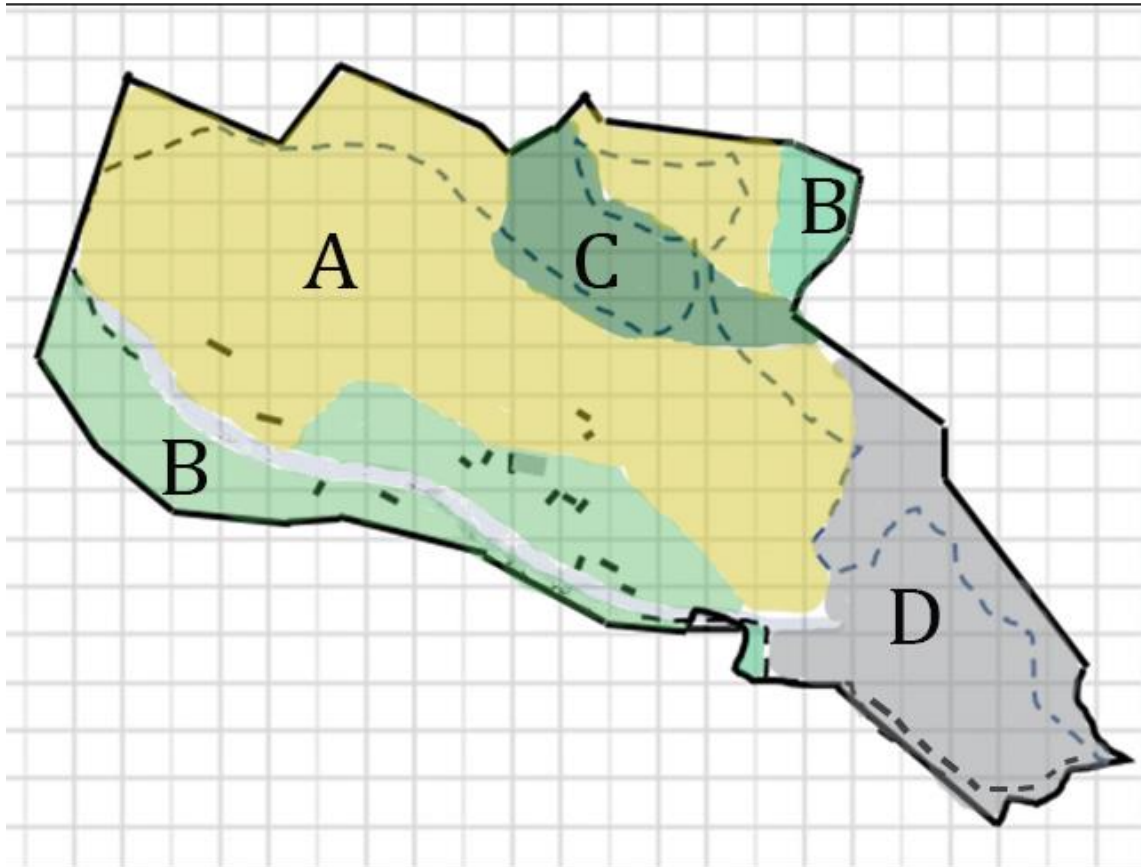


Figure 9. Habitat Zones at Pedder Bay

Table 9. Zone descriptions of habitats at Pedder Bay.

A	Open grass/shrubland	Contains sparse trees (Garry Oak, Scouler's Willow, cultivated fruit trees) in otherwise open former agricultural fields and a significant rocky ridge dominated by non-native grasses, weeds and shrubs including Scotch broom, Gorse, Canadian thistle, Tansy ragwort, Himalayan blackberry, Black hawthorn, Daphne laurel, and Oxeye daisy. Native plants include Nootka Rose, and Common Snowberry. Mostly dry during the banding season, but low-lying areas become saturated and muddy during the winter.
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B	Riparian	Dominated by deciduous trees such as Red Alder, Big-Leaf Maple, and Scouler's Willow, but with some conifers (Grand Fir, Douglas-fir). The shoreline includes an estuary which floods with brackish water in the winter. Understory is mostly open with a mix of native and non-native plants including Sword and Bracken ferns. Nootka Rose, Salmonberry, Common snowberry, blackberries, Scotch broom, Oceanspray, English holly, Common snowberry, and Stinging nettle.
C	Mixed forest	Dominated by tall second-growth conifers, primarily Douglas-fir and Grand fir. Deciduous trees include Big leaf maple, Garry oak, Scouler's willow and Red alder. The understory is largely open with patches of ferns, and shrubs such as Salmonberry, Scotch broom, Oregon grape, Black hawthorn, Daphne laurel, Salal, Oceanspray, Indian plum, Nootka rose and others. There is also considerable fallen wooden debris left in place proving food and habitat for many species of birds.
D	Paved/cultivated	This area primarily consists of paved areas with planted borders between campsites and around its perimeter. Open areas are largely mown, but planted trees and shrubs, along with a small amount of natural vegetation provide habitat for a fair variety of bird species. Trees include Black cottonwood, Douglas-fir, Arbutus, Red alder, Birch, and Cedar hedging. There are native and invasive shrubs along the shoreline including Scotch broom, Himalayan blackberry, English holly, English ivy, and Nootka rose.

**Table 10. Vegetative and water coverage of zones at Pedder Bay**

Site	Pedder Bay			
Survey year	2023			
Survey date (month, day)	4-Sep			
Name(s) of surveyor(s)	Ann Nightingale, Kim Beardmore			
Zone label (as on HSA map for station)	A	B	C	D
% of Count Area taken up by this zone	53	22	8	17
% of zone covered by upperstory (>15 m high)	0	15	50	1
% of zone covered by midstory (5-15 m high)	<1	80	70	2
% of zone covered by understory (0.5-5 m high)	60	80	70	5
% of zone covered by running water	0	1	5	0
% of zone covered by standing water	0	0	<1	0
Average height trees within zone (m)	10	10	15	0.5
Average height shrubs within zone (m)	2.5	2	2	3
Average height herbaceous vegetation within zone (m)	0.5	0.5	0.5	0
Enter 'X' if mean width of running water <2 m		X	X	
Enter 'X' if mean width of running water = 2-5 m				
Enter 'X' if mean width of running water >5 m				
Enter 'X' if area of standing water <50m <sup>2</sup>			X	
Enter 'X' if area of standing water = 50m <sup>2</sup> - 50m <sup>2</sup>				
Enter 'X' if area of standing water >50m <sup>2</sup>				

### 8.3 Habitat Management

Ongoing habitat maintenance should be carried out to maintain safe and stable conditions for the mist-netting operation during fall migration monitoring season, including trimming of overhanging branches and shrubs, clearing of fallen branches and trees and mowing of trails.

The net lanes and connecting paths are trimmed regularly in mid-June to mid-July, prior to the start of the monitoring season, and as needed throughout the season. Vegetation should be trimmed back approximately two or three feet from the nets (approximately a full arm-span across the net lane), to the height of the nets (just over 2.6 m). In strong winds, the nets should be able to billow straight out without catching on any twigs, branches, or leaves.

When trimming net lanes and census paths, it should be stressed that net lanes and walking paths should be well hidden. Although it is more convenient for personnel to have more room to maneuver in the field, it is more important to minimize the impact of people on the vegetation. Therefore, net lanes and census paths should be trimmed back only enough to allow individuals to extract birds comfortably and ensure that vegetation blowing in the wind will not damage nets.

#### 8.3.1 Rocky Point

Major invasive plant removal programs have taken place during RPBO's tenure on the site, and in the last few years, prescribed burns have been conducted during the banding season. The pond at the south of the banding area has almost completely filled in with cattails. Recognizing that

RPBO does not manage the property, and decisions regarding invasive plants and prescribed burns will be made solely by DND, vegetation should be kept at a consistent stage of growth relative to net height as much as possible. All major changes should be documented in the end-of-season reports.

The mist-netting area south of the banding station hosts the Foothill Sedge (COSEWIC 2008), listed as endangered under the federal Species at Risk Act. Each season, before footpaths are cut, the DND species-at-risk biologist should be invited to the site to help set out the path for the upcoming season.

### 8.3.2 Pedder Bay

Habitat management decisions will be made by the Oak Bay Marine Group and/or staff at the Pedder Bay RV Resort and Marina. There may, however, be more room for discussion and negotiation on purposeful changes to the monitoring area. While there have been minor natural and human-directed changes since banding began at the site in 2012, there have been no major landscape changes up to and including 2023.

## 9. Changes or interruptions in standardized data collection

Important interruptions to operations should be recorded here, such as flooding or lack of personnel that reduced effort for periods of a week or more. Also to be recorded are any permanent changes to data collection methods. Although operational changes are sometimes necessary (as when a netting location is destroyed), changes in data collection are not to be made unless absolutely necessary, and must first be discussed with CMMN advisors.

### 9.1 Instructions for record keeping

If any standardized operational change or interruption occurs, enter details into the table below, underneath any previous entries. Refer to parts of the text that were changed (e.g. section number, altered locations on a map, new GPS points). Revise the ‘latest version’ date on page 1 of this protocol. If changes have been made to the protocol other than adding to the table below, submit a copy of the entire revised protocol to Birds Canada along with year-end data submission; otherwise, send only a copy of the changes below.

<b>Date</b>	<b>ROCKY POINT: Description of change and justification (if applicable); main effect on trend results</b>
1994-97	Experimental start-up period included variation in net number, location and daily hours of operation. Extensive non-standard activity, including seawatch and raptor watch
1998	Nets 1-10 established in standard locations
2000-2001	Census and length of daily count period standardized. New nets 11-13 operated every other day to allow testing of effect on numbers banded.

Fall 2001	Standard Count Area reduced in size to area where nets located. Daily Estimated Totals from earlier years could be inflated relative to later years
2002	Nets 11-13 incorporated into standard array for daily netting. First year of wholly standardized operation.
2003 and 2004	Nets (formerly from Avinet) replaced with Spidertech nets. No formal testing of possible effects.
2007	RP - No data collection (no access to site)
2008	RP - Site access restricted to standard count period (previously all day). No effect on Daily Estimated Totals.
2011	Site access denied for c. 2 weeks in late Sept-early October, a normally busy time, possibly causing decline in annual abundance indices for some species.
2023-2024	RP - Spidertech nets replaced with Avinet's, alternated daily in experimental design that will allow analysis if desired to compare capture rates.
2025	RP – Avinet nets now standard

Date	<b>PEDDER BAY: Description of change and justification (if applicable); main effect on trend results</b>
2011	Trial year at a location that was not continued.
2012	Station established. Some adjustment of net lanes in first year.
2013-2015	A double-height net (#101) used in these years only. Other than this net, all net locations standard from 2013 on
2013	Time allowed for census increased from 60 to 75 min

### 9.1.1 Count Period

At Rocky Point, prior to 2007, RPBO members were allowed continuous access to the site during the banding season. The bander-in-charge was housed on the site and long-term volunteers often stayed on site. This provided opportunities for additional observations. The non-standard count period began after the standard count period ended (that is, 6.5 hours after sunrise) and covered all hours not contained within the standard count period. Observations during the late afternoon, evening or overnight would be included in the non-standard count period. No RPBO activities occurred during 2007 but resumed in 2008. However, access was limited to the duration of the banding schedule, effectively eliminating seawatch, raptor watch, and non-standard observations.

In addition to the information in Table 1 in Section 5.2, prior to 2007 when personnel were on site 24 hours per day, the following activities were recorded as non-standard observations.

The following two rows and related comment were removed from Table 1.

General Observations*	After Standard Count Period Ends 13:50	Next day start 06:50	17 hours	Non-Standard
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Seawatch*	Any time after Standard Count Period Ends 16:00	16:30- 18:00	0.5-2 hours	Count Period 12:50-06:50
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\* Note that activities during the non-standard count period were not mandatory. General Observations did not have to be continuous for the entire non-standard count period.

### 9.1.2 Count area

#### Rocky Point

Prior to 2001, given the large size of the count area, there were substantial areas of habitat rarely visited during regular operations. It was therefore determined following the 2000 fall season that the area should be scaled back to an area bounded by the forest edge of the east meadow, the fence line west of the west meadow, the fire road and upper pond area north of the banding station and the shoreline only as far east as Edeye point.

To reduce the effects of these changes, the smaller count area was designed to include specific areas that are visited most often and that are of significance for concentrations of migrants. Essentially, the new count area was a smaller "loop" around the area where the nets are deployed. The smaller count area was employed starting in fall 2001 for the standard count period only. Anything outside of these new boundaries is considered non-standard and applicable only to the non-standard count period for the daily records. Separation of records for the standard count area, non-standard sightings and seawatch were appropriate while banders were housed on site prior to 2007. However, after 2007, access to the site was restricted to the banding period, and all observations from the site were subsequently combined into one comprehensive Daily Estimated Total. Over time, the recruitment of skilled volunteers and staff keen on conducting observations has led to greater coverage of the area which now extends to the meadows adjacent to the upper ponds and the full extent of the census route.

### 9.1.3 Net changes

#### Rocky Point

Prior to 2000, ten net lanes were operated at Rocky Point in the habitat between Perimeter Road and the area around the banding shelter. In July of 2000, 3 additional nets were set-up in the "tunnel" area northwest of the existing net array. It was determined that these nets had the potential to catch large numbers of birds as well as species not commonly encountered by the standard 10 net set-up already in use. These nets, numbered 11, 12 and 13, were operated on alternating days in 2000 and 2001. This alternate day pattern is intended to account for data fluctuations caused by the introduction of more nets. Any birds caught from these nets in the interim were not recorded as non-standard banding, but rather were included with the rest of the captures on the banding and ET forms. Starting in 2002, nets 11-13 were run every day with nets 1-10.

Between 1994 and 2002, 70 denier/2-ply, 12 x 2.6 meters Avinet mist nets, made of nylon, with 30 mm mesh and 4 shelves, were used at RPBO. In 2003, damaged nets were replaced by Spidertech nets with similar specifications (110 denier/2ply, 12 x 3 meters, 30 mm mesh) and from 2004 to 2006, the Spidertech nets were used for all 13 standard banding nets and will continue to be used from 2008 forward. Although the nets were nominally similar, the Spidertech nets had deeper pockets and tended to stretch more than the Avinet nets. Several of the nets

purchased in 2006 later faded to brown during the course of one banding season. These nets were subsequently dyed black during the pre-season preparations. While the quality of the Spidertech nets is inconsistent, there have been no issues with fading since 2012. Four-panel Spidertech nets were used consistently until August 2023.

In 2023, due to discontinuation of the four-panel Spidertech nets, after consultation with Erica Dunn of the CMMN, a move to transition back to Avinet nets (such as those used at Pedder Bay and between 1994 and 2002 at Rocky Point) was initiated. All odd numbered nets were replaced with Avinets in August 2023. In 2024, even nets will be Avinet and odd nets will be Spidertech. In 2005, all nets will be Avinets. This transition will allow analysis of captures between years to determine what, if any, effect the net choice has on capture rates.

#### Pedder Bay

Although standardized banding did not begin at Pedder Bay until 2012, a trial was run in 2011 in a different location from the current site. Data from 2011 should be excluded from any analysis.

Net lane adjustments took place during the first year of operation and between 2012 and 2013 and all the nets were renumbered sequentially. The Bandit data from 2012 has been adjusted to align the net numbers to the current placement of the nets. Nets numbered higher than 15 do not coincide with any standardized nets in place from 2013 on. A double-height net was added to net 11 (and numbered net 101) from 2013-2015. Other than this temporary net, all net placements have remained the same since 2013 with minor adjustments due to landscape changes (e.g., fallen trees).

### **9.1.4 Census**

#### Rocky Point

Census at Rocky Point was initially established to be between 60 and 90 minutes, with expert birders taking 60 and less experienced birders (who may have needed to see birds to confirm identifications) taking 90 minutes. This was designed to level the playing field between excellent by-ear birders and those still developing their skills. This proved difficult to regulate, though, and over time, all census personnel now take close to 90 minutes to complete the circuit at Rocky Point.

#### Pedder Bay

In the first year of operation at Pedder Bay, censusers were asked to complete the circuit in 60 minutes, but they were rarely able to do so. In 2013, the census duration was officially increased to 75 minutes.

### **9.1.5 Standard Banding**

In our original protocol, the bander-in-charge was empowered to delay closing time in the period up to eight hours after sunrise to make up time lost earlier in the morning due to poor weather. While this did occur on occasion in the early years, this strategy has not been implemented in many years and was removed in the 2021 update.

Prior to 2006, banding data was recorded on paper data sheets, then at the end of the season, all data was entered into Excel and imported into BandManager. This was a time-consuming and

tedious effort as all entered data also needed to be proofread and corrected. Beginning in 2006, all banding data was entered directly into the computer. Timed backups occurred every 2, 10 and 15 minutes, to either a portable storage device or to a separate section of the computer hard drive to minimize any risk of data loss. At the end of each day the data was either printed out or emailed offsite to serve as an additional backup. Paper datasheets are also available in case of computer or power failure.

In 2012, CWS mandated a switch to Bandit software for collection and submission of banding data. Direct entry into Bandit was attempted for the first season but was cumbersome both for data entry and error checking. Subsequently, data was entered into Excel, and later imported into Bandit for submission to CWS. In 2023, Bandit was discontinued and data is now directly exported from Excel to the Bird Banders' Portal on the USGS website.

#### **9.1.6 Processing recaptured birds**

Recaptures were recorded at RPBO using the "retrap card" system used by Long Point Bird Observatory (LPBO) until 2006. In this system each recaptured bird had its own corresponding card, which detailed a recapture history. While this method allowed for a quick one-look view of the bird's recapture history at the site and also allowed a double-check to ensure the band number was correct, it was time-consuming and cumbersome when dealing with large numbers of birds. The card system was developed early in Long Point Bird Observatory (LPBO)'s history, before computers were commonplace. LPBO also had a dry enclosed banding area which could be used to store filing cabinets with the retrap cards. RPBO's banding stations are open to the elements and did not have capacity to store a large number of cards. Fortunately, BandManager displayed the entire recapture history of the bird when the band number was entered. Bandit, which came into use in 2012, also recorded recapture information. However, as noted above, direct entry was cumbersome. Beginning in 2013, banding data was entered into Excel and later imported into Bandit. RPBO has developed a verification process for recaptured birds where original data are displayed, but subsequent recaptures are not as readily accessed as they were in BandManager.

#### **9.1.7 Recording unbanded Captures**

Unbanded birds that were handled by extractors or banders were recorded separately on the DET worksheets as "captures unbanded" until 2006. The number of unbanded captures was very small, and after 2006 such birds were simply added to "observed" birds in the DETs.

#### **9.1.8 General Observations**

##### Rocky Point

Prior to 2007, general observations could occur either during the standard count period or outside the standard count period. General observations for the standard count period are factored into the DET, while observations outside of this period (i.e., during the non-standard count period) are recorded separately and were added to the Daily Species Total (DST). Once RPBO was no longer able to have personnel on site after the standard count period, there was no opportunity for non-standard counts. After 2007, only the DETs were calculated.

#### **9.1.9 Seawatch**

##### Rocky Point

Prior to 2007, seawatch at Rocky Point was a non-standard sampling method that attempted to account for water bird density, diversity and movements. Although seabirds were not a priority for migration monitoring at Rocky Point, the potential for future projects on seabirds was noted. Seawatch was only conducted when circumstances were fitting and at the discretion of RPBO personnel on site.

Seawatch was conducted for a minimum of a half hour and up to a maximum of 2 hours from either of two standard observation points: Edye Point and Cape Calver. The watch could begin at any time after the standard count period ended with all visible or audible water birds counted.

Any unidentifiable birds were recorded as unidentified gull species or jaeger species, for example. Such birds identifiable only to family were recorded on the ET data sheets. These tallies were marked in parentheses to ensure that they are not counted as full species in the summary tables of the log. However, as with general observations and census, a “jaeger species” observed on seawatch counts as a species when no jaegers were identified to species on that day. Seawatch was effectively discontinued as of 2008 when access to the site outside of the standard banding period was severely restricted.

A new year-round seawatch program was started in 2016, with observers stationed at Beechey Head in East Sooke Park, but these numbers are not included in the totals compiled for migration monitoring.

#### **9.1.10 Raptor Count**

##### Rocky Point

The raptor count was similar to seawatch in that it was a non-standard sampling method that attempted to measure overhead raptor migration at RPBO. Like seawatch, it took place outside of the standard count period, near the banding shelter or at Building 100 (renamed 143 in 2011). The count was conducted for a minimum of half an hour up to a maximum of 2 hours. As with other observations, unidentifiable birds (e.g., “unidentified buteo”) are recorded in the data but only counted as a separate species when no others of that species group are observed.

Raptor count was discontinued at the end of 2006 when regular access to the site outside of the standard banding period terminated.

Changes in the protocol which may affect data analysis are noted here. Descriptive or procedural changes which do not affect data collection or analysis are not noted.

## **10. Acknowledgements**

Rocky Point Bird Observatory acknowledges with respect the Scia’new and T’Sou-ke First Nations on whose territory we work, as well as the many other Lekwungen and WSÁNEĆ peoples of the region.

Access to the Rocky Point site is provided by the Department of National Defense, including the staff at Formation Safety & Environment, the Range Control staff and the ever-helpful Commissionaires at the gate. RPBO gratefully acknowledges the assistance of all those involved to ensure continued operation of this long-term project. Access to the property at Pedder Bay is

provided by the Oak Bay Marine Group and Pedder Bay RV Resort & Marina, and to them we are once again extremely grateful.

Michael Shepard and Rhonda Millikin created a preliminary protocol for migration monitoring at Rocky Point in 1994. Under the primary authorship of Daniel Darbyshire, several people provided invaluable assistance in the development of RPBO's 2000 version of the current protocol document, including David Allinson, Graeme Gibson, Bev Glover, Claudia Riveros, Mike Setterington, Michael Shepard, Rick Toochn and Rod Mitchell.

Seabrooke Leckie reorganized and updated the document in March 2008. The report was updated by Emily Barnewall and Ann Nightingale in November of 2011 and has been updated once again by Ann Nightingale to meet the requirements of the Canadian Migration Monitoring Network in 2022-2024.

RPBO acknowledges the work of staff and volunteers over our years of operation in refining techniques, improving procedures and developing standards that all result in better monitoring of the birds of southern Vancouver Island.

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## Appendix 1. Important registration numbers.

BC Societies Act Registration Record, accessed 12 Dec 2021

### ROCKY POINT BIRD OBSERVATORY SOCIETY

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**Registration** [BC Corporate Registry](#)

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<b>Registration Type</b>	<b>Registration Status</b>
Society	Active
<b>Registration ID</b>	<b>Registration Date</b>
s0041137	Feb 18, 2000
<b>Details</b>	
Credential Effective Date	Feb 18, 2000, 12:00 AM
Name Effective Date	Feb 18, 2000, 12:00 AM
Status Effective Date	Feb 18, 2000, 12:00 AM

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**Credentials** ☰ ☱ 📅

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Registration <b>ROCKY POINT BIRD OBSERVATORY SOCIETY</b> Feb 18, 2000, 12:00 AM
Business Number <b>869770123</b> Feb 18, 2000, 12:00 AM

Today

998 2000 2002 2004 2006 2008 2010 2012 2014 2016 2018 2020 2022 2024

DND Licence Agreement (Expires 30 May 2026)  
0103A-7603-1 (BExec NMU AA/RDIMS1128404)  
RDIMS 1164576

Federal Banding permits (Expire 31 Dec 2022)  
Station Permit 10781  
Sub permits

10781F Ann Nightingale 10781G Colin Jennings (Owls only) 10781H Jessie Fanucchi 10781L Katie McCreesh (Owls only) 10781Q Acacia Spencer-Hills 10781W Siobhan Darlington 10781X Rebecca Golat	10781Y Jannaca Chick 10781Z Emma Radziul 10781AA Mark Byrne (Owls only) 10781AB Robyn Byrne (Owls only) 10781AC Megan Buers
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Wildlife Act Permit (BC) (Expires 3 July 2024)  
NA19-502735

Scientific (Salvage) Permit (Expires 31 Dec 2021 - new permit will be received in Jan 22)  
SC-BC-2021-0029SAL

## **Appendix 2 - Site Access: Regulations, Obligations and Operations**

The migration monitoring program at Rocky Point is made possible with permission from the Department of National Defence. As this site is an ammunition depot with restricted access to the public, it is paramount that all personnel associated with RPBO follow important DND guidelines. There is a renewable written agreement between RPBO and DND, providing specific authority and responsibilities. No actions are permitted by RPBO volunteers or staff that are not explicitly permitted in this document. All banding staff and key volunteers who work at the Rocky Point site must become familiar with and follow this document. The bander-in-charge (BIC) and banding staff are responsible for ensuring that volunteers comply with the terms of the agreement. If any volunteers do not comply, they will be removed from the access list. The future and the quality of work conducted on these grounds hinges upon the understanding among all personnel that access to Rocky Point is a privilege.

The bander-in-charge is responsible for securing access to Rocky Point during the banding season through communication with DND Range Control. Specific procedures will be set at the beginning of each season. Before and after the banding season, access will be secured by RPBO's DND liaison, usually a designated board member.

Likewise, access to the Pedder Bay site is at the discretion of the Oak Bay Marine Group (OBMG) and Pedder Bay RV Resort and Marina. RPBO staff, volunteers, and visitors are guests on their property and OBMG has no obligation to accommodate our project or personal requests. Access to the site will be secured before the banding season by RPBO's designated liaison, usually a board member.

### **1. Personnel**

Shifts will be scheduled by the Project Coordinator, normally in discussion with the bander-in-charge. Specific staff requests (designated days off, leaves, etc.) will be accommodated as much as possible, as long as there is minimal impact to station operations and other personnel.

Volunteers are required to pre-arrange their shifts with the Volunteer Coordinator through the WhenToHelp scheduling web interface.

#### **1.1 Rocky Point**

All permitted volunteers must check in at the main guardhouse individually or as a group. Details will be provided at the beginning of each season or as the requirements change. Carpooling is encouraged to reduce the number of vehicles on the site. Each vehicle will require a fire extinguisher and the group will require a VHF radio provided by DND. Parking is on the gravel pad at Edye Point. A spill kit must be stored at this site.

When leaving the site, all personnel must be signed out. This is typically done by a single person on behalf of the group. As of 2023, the gate will normally be locked when personnel are inside the perimeter. Entry and departure information must be called or texted to Range Control when the site is accessed and when the crew leaves. The person signing out the group should check with the guardhouse regarding locking the gate once all personnel are out. There may still be other non-RPBO people on site. DND procedures change frequently, so ensure that current instructions are followed.

Volunteers and staff approved for Rocky Point access will have their name on the register at the main gate and will be granted access to the site only on the days that each volunteer is scheduled. To maintain a favourable relationship with DND, it is imperative that personnel treat the site with care and respect. Behaviour by RPBO personnel that may damage this relationship is unacceptable.

Basic guidelines expected of RPBO personnel are as follows. Full guidelines for DND properties are provided in Appendix 4.

- Any activity that may cause a fire is to be stopped (e.g., no smoking is permitted on the site).
- All garbage from the banding station must be disposed of off-site at least once per week.
- No food or other animal attractants are to be left at the banding station.
- Each vehicle must carry a fire extinguisher. Several are stored outside the gatehouse for drivers who do not have their own.
- Keep impact on habitat to an absolute minimum.
- Drive slowly (<30 km/hr) down the perimeter road.
- Be amicable to all DND personnel, openly discuss aspects of the project.
- Do not enter or deface any of the DND buildings or materials on site.
- Do not enter restricted areas not explicitly covered by our agreement with DND.
- Do not assume permission for any activity (e.g., specimen collection, photography, audio recording, etc.) that is not in the written agreement.
- Report any suspicious behaviour or items which may concern DND.
- Those individuals who are registered at the gate are obligated to assist in the migration monitoring program. Except for operational purposes, people will not be allowed to enter Rocky Point if they are not on the schedule or to go birding, no matter how rare the observed species. It should be emphasized that this program is a scientific project that depends on the hard work and enthusiasm of its volunteer personnel. Migration monitoring is a national initiative working towards the understanding and conservation of birds.

## **1.2 Pedder Bay**

Pedder Bay personnel will normally report directly to the banding station at Pedder Bay, however personnel from both stations may also be asked to pick up equipment or materials from the RPBO storage container located next to the Rocky Point gatehouse. Parking details will be provided by the Volunteer Coordinator. These may change throughout the season based on marina operations. Normally, parking will be in the grass field adjacent to the main parking area, or in the car stalls (i.e., not in the stalls designated for boat trailers.)

## **2. Visitors**

### **2.1 Rocky Point**

Under normal circumstances, visitors are not permitted at the Rocky Point site. Permission may be granted by DND for visitors for specific events or occasions. Requests for such visits would normally be submitted to the Base Commander's Office and Formation Environment well in advance of the requested date.

## 2.2 Pedder Bay

Visits to the Pedder Bay site may be drop-in, pre-arranged, or scheduled via a service such as Eventbrite depending on the program offering. Details will be made available on the RPBO website.

### 3. Health and safety of personnel

All banding station personnel should be informed about various bird diseases and the potential to pass diseases from bird to bird and/or bird to human. The North American Banding Council Banders' Study Guide (North American Banding Council 2001c) outlines many of the diseases and disorders that can potentially be transferred from birds to humans.

The Public Health Agency of Canada is the best website for information on risk of any disease to human safety (<https://www.canada.ca/en/public-health.html>) including avian influenza. (<https://www.canada.ca/en/public-health/services/diseases/avian-influenza-h5n1.html>, <https://www.canada.ca/en/public-health/services/diseases/avian-influenza-h7n9.html>).

The British Columbia Ministry of Environment has information about the wildlife diseases that are communicable to humans (<https://www2.gov.bc.ca/gov/content/environment/plants-animals-ecosystems/wildlife/wildlife-health/wildlife-diseases>).

CWS works with the Canadian Cooperative Wildlife Health Centre (<http://www.cwhc-rcsf.ca/>) to monitor West Nile virus ([http://www.cwhc-rcsf.ca/west\\_nile\\_virus.php](http://www.cwhc-rcsf.ca/west_nile_virus.php)), avian influenza ([http://www.cwhc-rcsf.ca/avian\\_influenza.php](http://www.cwhc-rcsf.ca/avian_influenza.php)), and salmonellosis ([http://www.cwhc-rcsf.ca/docs/fact\\_sheets/Avian\\_Salmonellosis\\_Fact\\_Sheet.pdf](http://www.cwhc-rcsf.ca/docs/fact_sheets/Avian_Salmonellosis_Fact_Sheet.pdf)).

BIRDNET also offers information to banders, including about West Nile virus and avian influenza (<https://birdnet.org/info-for-ornithologists/fact-sheets/west-nile-virus-highly-pathogenic-avian-influenza-h5n1-and-other-zoonotic-diseases-what-ornithologists-and-bird-banders-should-know/>).

Ticks are present at RPBO sites. The majority of the ticks encountered use birds as hosts. Although the risk of otherwise encountering a tick is rare, it is important to check for ticks after visiting the sites. Lyme disease fact sheet: (<https://www.canada.ca/en/public-health/services/diseases/lyme-disease.html>)

Maintaining good hygiene is the best defense against contracting any viral or bacterial diseases from birds.

Always sanitize your hands after handling birds.

Use each bird bag only once, no double bagging and wash bags afterwards.

Keep banding instruments, banding table and lab clean with the antiseptic spray provided.

Please be aware that Rocky Point is on the limits of cell phone range, and you will often need to go to Edye Point to make the connection. More often than not, the cell tower that will receive the call is in Port Angeles and long-distance and roaming charges may be applied. Cell service at Pedder Bay is more reliable but may also have areas where service is unavailable.

There are short-distance radios for individuals to use. Volunteers should carry one of these at all times. Be aware, however, that there are dead zones around the site where radio communication is limited.

There is a first aid kit at each station. Bear spray canisters in belt-carriers are available at the station. Please do not leave food or garbage outside as it will attract scavengers or possibly larger animals such as bears. Garbage must be taken with you when you leave the site.

RPBO's fire safety procedures can be found in Appendix 5.

In addition to the fire and personal safety information in Appendices 4 and 5, handwashing stations and personal protective equipment, including face masks, face shields, hand sanitizer, and respirators are provided by RPBO.

#### **4. Photography**

RPBO follows the guidelines for photography recommended by the North American Banding Council. See Appendix 6 for details. Bird safety is paramount. "Trophy" photos (i.e., people posing for a portrait-style photo with a bird) are strongly discouraged. Instead, photos should show the activities of the operation (e.g., banding, measuring, releasing, or observing birds). Staff are encouraged to take photos of birds, volunteers, RPBO staff, and habitat, and photographers will retain copyright of those photos. RPBO will require a signed partial copyright license which permits use of these photographs for RPBO purposes, including social media and print materials. Staff may be required to submit bird photographs to Piranga (at <http://natureinstructs.org>) or other databases on behalf of RPBO.

Volunteers and visitors may take photos following the NABC guidelines, which are posted at the sites, and are encouraged to ensure that the photos are suitable before posting to social media.

##### **4.1 Rocky Point**

Photography is generally not permitted on DND property. We have obtained an exception to this policy for photography related to the work we conduct. Photographs of birds, volunteers, RPBO staff, and habitat are permitted, provided no DND structures or personnel are photographed. Other wildlife is not to be approached to take photos, although photos taken at a distance during the course of RPBO work may be acceptable. There must be no interaction between personnel and wildlife for photography. All photographs taken on DND property must be made available to DND through RPBO.

##### **4.2 Pedder Bay**

Permission of the BIC, other staff, or the Project Coordinator is required for photography.

## **5. Site Readiness**

The Project Coordinator is responsible for ensuring that both sites are prepared for the start of each banding season. Working with the Volunteer and Operations Coordinators, dates are to be selected, volunteers scheduled, and equipment delivered for net lane clearing and net and station setup. Most station equipment is kept in the storage container outside the Rocky Point gate. Whenever feasible, banders and other staff should be involved in the set up.

At the end of each migration season, all equipment not required by the Nocturnal Owl Monitoring Program is to be removed from the sites. The Project Coordinator will work with the Volunteer and Operations Coordinators to select dates, schedule volunteers, and return equipment to the storage container outside the Rocky Point gate. At the end of the Nocturnal Owl Monitoring program, the Project Coordinator is expected to assist with removal of shared resources.

## **6. Personnel and shift scheduling**

Personnel at each site typically consists of a bander-in-charge, intern/assistant bander/second bander and volunteers. All personnel participating in the fieldwork are expected to read, understand and follow this protocol. Safe and efficient field work is the daily goal and is achieved when skilled individuals are on hand to assist the BIC. All banders must carry appropriate banding permits/sub-permits with appropriate authorizations for passerines, near passerines, hummingbirds, raptors, shorebirds, waterfowl, waterbirds, and species at risk, and use of mist nets and/or traps. There must also be additional authorizations on the banding permits for auxiliary markers and tags in use, including colour bands. Banders may band incidentally captured birds which are not authorized on their permits, provided appropriate bands are available and the bander has information on any special processing requirements. Personnel who do not have current banding permits may only band birds under the supervision of a permitted bander at the site.

All decisions regarding bird handling and banding procedures made by the BIC are final. Persons not willing to cooperate with the BIC or follow procedures outlined in this protocol, or those who act in a manner which may hold RPBO in disfavor with the property managers should not expect to remain on site. Complaints or comments regarding the decisions or conduct of the BIC should be directed to the Project Coordinator.

## **7. Scheduling**

Shifts and positions are assigned using the web application “When to Help”. Each volunteer will be provided with a username, password, and instructions on how to sign up for shifts. The Volunteer Coordinator (or designate) will work with the Program Coordinator and BIC to establish the staffing requirements throughout the season. The Volunteer Coordinator, Program Coordinator and BIC are authorized to alter the shift assignments to ensure optimal coverage at both sites.

The BIC will delegate specific responsibilities and tasks based upon the abilities and experience of all personnel available. Volunteers wishing not to participate with banding or extraction can still be of great help by making observations, conducting the census, scribing and data entry. It is recommended that all volunteers familiarize themselves with the Bandit program’s 4-letter codes (<http://www.birdpop.org/alphacodes.htm>) for all species likely to be encountered, as this makes data recording procedures much more efficient.

Only those individuals authorized by the BIC are allowed to extract birds. Inexperienced personnel must be supervised by the BIC or by a person designated by the BIC at all times during the extraction process.

## **8. Training**

All volunteers and staff will receive training for station opening and closing, scribing, and station maintenance. Individuals who wish to learn skills involving bird handling should approach the BIC or Volunteer Coordinator about training opportunities. Volunteers with little or no familiarity with this process should read the introduction in Pyle's *An Identification Guide to North American Birds*, which includes excellent descriptions of molt processes, measurement techniques and sexing criteria.

The BIC is ultimately responsible for bird welfare and a safe banding operation and is the person who will lead training in these areas of interest. The BIC is not obligated to train all individuals desiring training. Priority will be given to volunteers who have committed to more than 10 shifts during the season. Training will be discontinued for volunteers who do not have the necessary dexterity or eyesight required for the safe extraction and handling of birds, who volunteer infrequently, who are unwilling to follow directions or requests, or who show poor aptitude for the necessary skills. This decision will be made at the BIC's discretion. There are many roles for volunteers with RPBO that do not involve bird handling.

Volunteers can expect to read through this protocol, read the training manual, walk the census route, get familiarized with the count area and assist banders through scribing during their initial introductory period. Training will be made available as time and personnel permit. New volunteers can expect to receive no or little training on busy days, as regular operations take precedence.

Volunteers wanting training should study the following station manuals for basic instruction on banding operations:

- The North American Banders Study Guide (North American Banding Council 2001c)
- The North American Banders Manual for Passerines and Near Passerines (North American Banding Council 2001b)

These can be downloaded at <http://nabanding.net>

Worksheets outlining the skills used at the banding station are available to the volunteers for self-evaluation. Approval to advance is made on a case-by-case basis by the BIC in consultation with other licensed banders.

### **Appendix 3. Partnerships and collaborations.**

2021-present Vancouver Island University/Tatlayoko Lake Bird Observatory. Tracking movement of Northern Saw-whet Owls in Coastal BC (Motus)

2021-present Capilano U College – data analysis

2019-2021 Vancouver Island University – flatfly project

2005 University of British Columbia – West Nile Virus project

2005 CWS/University of Guelph DNA Barcoding project

2003-present Institute for Bird Populations (MAPS)

2002-present Project OwlNet (Nocturnal Owl Monitoring Project)

2000-present Canadian Migration Monitoring Network

2000-2016 Lyme disease tick project

**Appendix 4. CFB Esquimalt Range and Training Area Safety Briefing (modified based on the 2008 document provided by DND).**

**RESPONSIBILITIES**

1. Welcome to CFB Esquimalt, all civilian persons entering the Ranges or Training Areas must receive a safety briefing.
2. The person in charge of a group is responsible for receiving or delegating a person to receive a formal safety briefing from Range Control and they in turn briefing all members of their group.
3. The person in charge of a group is responsible for ensuring compliance with all regulations.
4. The permit holder is responsible for ensuring that only activities stated on their permit are performed.
5. The permit holder is responsible for ensuring that only authorised locations, as stated on their permit, are used.
6. All persons entering the Ranges or Training Areas must comply with all DND policies, such as Range Standing Orders.

**SAFETY**

**1. Hazards:**

- a. UXO, (Unexploded Ordinances) - DO NOT pick up any metallic, unfamiliar or unusual objects that do not belong to you, report it to Range Control, that's our job, not yours;
- b. HAZMAT – All vehicles entering CFB Esquimalt Ranges and Training Areas must be equipped with a spill kit or groups must have a spill kit capable of dealing with all the vehicles in their group;
- c. Wildlife – CFB Esquimalt areas have Bears, Cougars, and Wolves inhabiting them. Be aware of how to act if you encounter them;
- d. Danger Area Templates – All the Ranges and some of the Training Areas have danger area templates within their boundaries. These templates are the safety zones for active ranges, and no one can enter them when that range is in use or active. Locations that have Danger Area Templates are:
  - i. Albert Head – When the Grenade Range is active there is no access to the Albert Head Training Area;
  - ii. Heals Range – The rifle range, is required to have a danger area well beyond the target area in the event of ricochets, therefore there is no access to Heals Range when it is active;
  - iii. Nanaimo Range - The rifle range, is required to have a danger area well beyond the target area in the event of ricochets, therefore there is no access to Nanaimo Range when it is active;
  - iv. Rocky Point – There are three danger areas in Rocky Point:
    - Bentinck Island Demolition Range. There is no Access to Area-B when Bentinck Island is active;

- Whirl Bay Underwater Demolition Range. There is no access East past the sentry point at the Y-Junction in Area-C when Whirl Bay is active; and
  - CFAD Destruction Area. There is no access to Christopher Point when the CFAD Destruction Area is active.
- e. Roads – The posted speed limit within the Rocky Point Training Area is 30 km/hr. Gravel shoulders and potholes on the single roads throughout the training area create a risk to drivers. Blind corners are to be approached with extreme caution. All vehicle accidents and damage caused to roadways, culverts, forest/wildlife are to be reported to Range Control immediately.
- f. Reporting - In the event of a safety emergency, such as a HAZMAT spill or wildlife sightings, contact Range Control ASAP.

## **2. Emergencies:**

- a. Due to the isolation of the areas, persons are entering, all groups must have at least one cellular phone with them as well as a VHS radio issued by the commissionaires at the gate;
- b. When calling 911 from a cellular phone at Rocky Point and some areas of Albert Head, ensure that you tell the operator you are calling from Victoria, as the call usually goes to Port Angeles;
- c. If you are at Rocky Point, contact the commissionaire at the main gate, as they have a hard phone line to call the appropriate emergency groups;
- d. In the event of a fire, regardless of whether it was started by you or not, call 911, or the commissionaire if at Rocky Point (250) 363-5139 or by using the provided radio;
- e. All vehicles entering CFB Esquimalt Ranges and Training Areas must be equipped with a fire extinguisher;
- f. All vehicles entering CFB Esquimalt Ranges and Training Areas must be equipped with a first aid kit, or groups must have a large first aid kit with them; and
- g. All groups must have an emergency plan as follows:
  - i. Persons that are alone must have a check in time with someone who knows: where they are, how long they will be gone for and what they are wearing;
  - ii. Groups must have a set meeting place in the event of an emergency;
  - iii. Groups must have a list of all who are out with them; and
  - iv. Everyone in a group must be aware of what the emergency plan is.

## **RESTRICTIONS**

1. The following restrictions apply:
  - a. A limit may be placed on number of vehicles entering DND property, recommend car pooling to and from site from main gate;
  - b. Smoking is only authorised in non-flammable areas, (on roads, parking lots...) and only during Low and Moderate fire conditions;
  - c. A limit may be placed on number of persons entering DND property;
  - d. Keep out of environmentally sensitive areas marked off with Siebert Stakes, Security restricted areas and areas not listed on permit; and

- e. Parking is only authorised in designated areas, keep all roads and access points clear.
- f. The parking area for the boat shed and launch in Rocky Point Area-B, is restricted to DND vehicles only.

### **ACCESS CONTROL**

1. Access will only be granted based on authorised lists approved by Formation Environment (Cain van Cadsand). RPBO staff and volunteers may be required to complete DND access authorization forms.
2. The Range Control staff at Albert Head is the only approving agency for access:
  - a. Access is only granted through authorised points of entry, (gates).
3. All access dates must be approved by Range Control as follows:
  - a. Contact Range Control a minimum of one day prior and a maximum of one week prior, to ensure the area is safe for access; and
  - b. Provide a date and person specific access list, which will be checked against the permit holders' master list.
4. Keys for all areas must be signed out from Range Control and the following rules apply:
  - a. An appointment to sign for keys shall be arranged during normal working hours, 0800 – 1600 hrs Mon - Fri;
  - b. Lost or stolen keys must be reported immediately, and the responsible party will pay for all new keys and locks if it is a security issue.
  - c. There is a silver drop box on the right side of the Albert Head main gate for after hours key return.
  - d. Range Control holds the keys to:
    - i. Albert Head;
    - ii. Heals Range;
    - iii. Nanaimo Range;
    - iv. Nanoose TX Site; and
    - v. Rocky Point.
5. When entering Rocky Point and Albert Head, sign in and out with the commissionaire at the main gate.
6. All persons entering DND property must have valid picture ID with them.

### **RESPONSIBILITIES AFTER BRIEFING**

1. It is the permit holders' responsibility to pass this information on to all members of their group.
2. The permit holder is responsible for submitting any changes to access lists.
3. The permit holder is responsible for coordinating access to sites, including picking up and returning keys during normal working hours, contact may be done either by phone or e-mail to the Range Control address provided.
4. Failure to comply with all the regulations could result in the revocation of access.

## CONTACT INFORMATION (2021)

### PHONE NUMBERS:

- Range Control Patrol NCOs (250) 391-4184
- Range Control Duty Pager (250) 978-3778
- Formation Environment (Cain van Cadsand) (250) 361-7210
- Rocky Point Commissionaires (250) 363-5139
- Military Police (250) 363-5546

### EMAIL ADDRESS:

- Cain Van Cadsand (Environment Officer) Cain.VanCadsand@forces.gc.ca
- Range Control +RangeControl@forces.gc.ca
- Randy Blowes (Asst Range Control Officer) Randy.Blowes@forces.gc.ca

## **Formation Environment Briefing for Researchers**

### **1. PERMIT OVERVIEW**

Please ensure you take a moment to read your permit in detail. As a permit holder you are obligated to follow and fulfil the requirements outlined in this document. Please make yourself aware of what your responsibilities are. A few key items are as follows:

- a. You shall accept full and complete responsibility for ensuring adherence to the conditions of your Permit.
- b. You may use the Property for the purpose described in the permit, and for no other purposes whatsoever. **The Permit is valid only for specific research and collection activities in the specified areas, for the dates identified on the Permit.**
- c. There will be a site visit, to be arranged, so that the Formation Environment may monitor your permit activities.
- d. All project members must carry picture identification when accessing the Property and must be prepared to show a copy of the Permit on request.
- e. You may not construct any facilities (buildings, structures, sheds or shelters) on the Property without permission.
- f. Procedures and methods must be **minimally disruptive to the natural environment of the area.**
- g. Ensure that **no plants, animals or other material are damaged, destroyed or removed from the Property**, unless it has been authorized in your permit.
- h. You may **not collect or conduct research on any wildlife species listed in the *Species at Risk Act*** unless it has been authorized in your permit. If you are conducting research on any SARA-listed species, a copy of your SARA permit must be provided to the Formation Environment.
- i. Ensure that **no foreign objects, animals or other material are introduced to or deposited on the Property**, unless it has been authorized in your permit.

- j. **No motorized vehicles or equipment are used** on the Property unless authorized. **Parking will occur only in designated areas. Vehicles may NOT be taken off road** or onto closed roads.
- k. All accidents (personal or environmental) must be reported to Range Control.
- l. Any observed environmental impacts must be reported to the Formation Environment.
- m. If you **discover any previously unknown or unrecorded artefacts, historical site or natural or cultural feature** in the course of any research and collection activity that is not specifically covered by the terms and conditions of the Permit, the find must be left intact and undisturbed and reported immediately to the Formation Environment.
- n. A **project report** on your activities for this year is **required to be submitted by December 31** of each year. A report template will be provided, and your report must comply with the requirements set out in the templates. Copies of a selection of digital photographs taken during the research period are also required.
- o. Within 90 days of completion of the entire research project, you must prepare and submit a comprehensive report (a hard copy and an electronic copy) of the research findings to CFB Esquimalt. **If publications or theses are subsequently produced from the research findings, you are required to provide one copy of each document** at no cost to the Formation Environment.
- p. Upon completion of the Project or termination of this Permit, you must ensure **that all equipment, tools, apparatus, gear, machinery, utensils, shelters, or any and all other things brought onto the Property or used by you on the Property are removed and that the Property is left in the same condition as it was at the commencement of the Permit.**

## 2. SEIBERT STAKES

Seibert Stakes (Figure 1) have been installed at Rocky Point – Area B and Albert Head to identify sensitive areas and to establish a perimeter of **No-Go Zones**.

The stakes are approximately 6 feet tall; the white, red and yellow tube is 17 inches long.

*Figure 1. Seibert Stakes.*



Outside No Go Zone – okay

Inside No Go Zone – must exit

When Seibert Stakes are approached the red and yellow sticker will appear with no vertical white stripe visible. However, if you enter a **No-Go Zone**, the Seibert Stakes will have a vertical white stripe through the red and yellow sticker (Figure 1). To transit around a **No-Go Zone**, simply follow the stakes around the perimeter.

If a No-Go Zone is entered:

- a. Stop;
- b. Assess the situation and inspect for damage to the avoidance area;
- c. Exit the location the way you came in; and
- d. Notify Formation Environment ASAP.

### **3. CULTURAL SITES, CULTURALLY MODIFIED TREES (CMT) AND WILDLIFE TREES**

Red flagged areas (Figure 2) mark **Sensitive Zones** at Albert Head and Rocky Point - Area B and are indicated on the Sensitive Area maps. In areas where flags are visible do not physically alter or disturb the immediate landscape including the groundcover, boulders and soil. Report disturbances in these areas to Formation Environment.

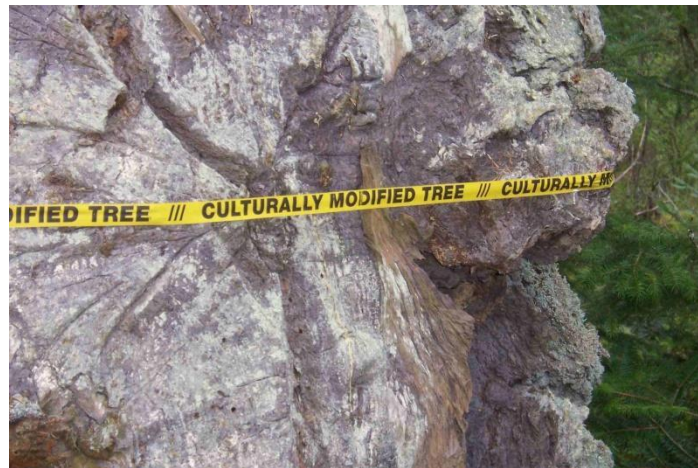
*Figure 2. 30 Inch High Red Flag Indicating Sensitive Zone.*



In the past, artefacts and burial sites with significant First Nations' cultural importance and items with heritage value have been found on DND property. If items or artefacts are discovered that are suspected of having archaeological or heritage value, stop activity in the area immediately and report the location to Formation Environment.

Culturally Modified Trees are marked with (blue or yellow) tape (Figure 3) around the tree and Wildlife Trees are marked with a labelled tag. Do not cut, nail, climb, or damage these trees.

*Figure 3. Culturally Modified Tree.*



#### **4. WETLANDS PRESERVATION**

Wetland areas, including water bodies, streams and the adjacent riparian area are protected under the Fisheries Act. Activities in these areas should avoid damaging vegetation and activities that cause sedimentation in the water. These areas are outlined on the Natural Resources Map Series for DND properties. Any observed environmental impacts or sediment in local waterways must be reported to Formation Environment.

## 5. HAZARD TREES

If you encounter hazard trees, or if trees have fallen across trails that you use in your research, please contact Formation Environment.

A hazard tree is any tree that is leaning, lodged in another tree, rotten, burned or dead, and that has the potential to fall and cause injury to people or damage to infrastructure. Some large limbs on trees may also be hazardous if they are dead, rotten or partially broken.

Permit holders are advised to stay at least a tree-length away from hazard trees and may not move fallen trees. Stay well away from areas with hazard trees during periods of wind. Stay away from all wooded areas during heavy winds.

Identified hazard trees will be assessed and either topped and retained as wildlife trees, or if it is not safe to retain them, they will be felled.

## 6. RESEARCH PLOTS

Researchers are encouraged to label their research installations (i.e., plots, cages, traps, etc.). 'RESEARCH IN PROGRESS' signs (Figure 4) are available from Formation Environment.

Please do not disturb any research plots or installations that do not belong to you.

*Figure 4. RESEARCH IN PROGRESS sign.*



## 7. WILDLIFE

If you encounter dangerous wildlife, please contact Range Control

If you come across sick, abandoned or injured wildlife please contact Formation Environment.

The following is taken from the Ministry of Environment Website and provides direction in the event you encounter wildlife:

## **COUGAR ENCOUNTERS**

The following are guidelines in the event that you do encounter a cougar:

- Stay calm and keep the cougar in view.
- Pick up children immediately - children frighten easily, the noise and movements they make could provoke an attack.
- Back away slowly, ensuring that the animal has a clear avenue of escape.
- Make yourself look as large as possible.
- Keep the cougar in front of you at all times.
- Never run or turn your back on a cougar. Sudden movement may provoke an attack.
- If a cougar shows interest or follows you, respond aggressively. Maintain eye contact with the cougar, show your teeth and make loud noise. Arm yourself with rocks or sticks as weapons. Crouch down as little as possible when bending down to pick up things off the ground.
- If a cougar attacks, fight back. Convince the cougar you are a threat and not prey. Use anything you can as a weapon. Focus your attack on the cougar's face and eyes.

For more information, visit the provincial website at:

[http://www.env.gov.bc.ca/cos/info/wildlife\\_human\\_interaction/docs/cougars.html](http://www.env.gov.bc.ca/cos/info/wildlife_human_interaction/docs/cougars.html)

If you have any questions, do not hesitate to call.

## **BEAR ENCOUNTERS**

Reduce the chance of surprising a bear.

- Always check ahead for bears in the distance. If one is spotted, make a wide detour and leave the area immediately.
- Make warning noises and loud sounds.
- Watch for bear sign: tracks, droppings, overturned rocks, rotten trees torn apart, clawed, bitten or rubbed trees, bear trails, fresh diggings or trampled vegetation.

Stay clear of dead wildlife.

- Take note of signs that may indicate carrion - such as circling crows or ravens, or the smell of rotting meat.
- Carcasses attract bears. Leave the area immediately!
- Report the location of dead wildlife to DND staff.

In general:

- Never approach or feed bears.
- If you have an encounter with a bear, please leave the area immediately and report it to DND staff as soon as possible.

For additional information, visit the provincial website at:

<http://www.env.gov.bc.ca/bcparks/explore/misc/bears/bearsaf.html>

## **WOLF ENCOUNTERS**

It is not normal for wolves to attack or pursue humans, especially adults. Aggressive behavior toward humans by wolves is usually the result of the animal becoming conditioned/comfortable with people as a result of direct or indirect feeding.

If you are concerned about an encounter or about encountering aggressive wolves, keep a deterrent handy. Deterrents could include rocks, sticks, banging pots and pans, tin cans filled with rocks or pepper spray.

If a wolf approaches you:

- make yourself look as large as possible - if sitting, stand for example.
- Wave your arms and throw objects at the wolf.
- Shout at the wolf or coyote in a loud aggressive voice.
- If the wolf or coyote continues to approach, don't run or turn your back. Continue to exaggerate the above gestures and slowly move to safety.

## Appendix 5. RPBO Fire and Emergency Plan.

Current version can be found on Google Drive in folder: Migration>Forms>Station Binder

In the event of fire or emergency at any RPBO banding site it is imperative that the appropriate authorities be informed immediately

- All sites - Call 911 if there is cellular phone coverage.
- at Rocky Point - inform DND by radio
- at Pedder Bay - inform Pedder Bay Marina by the quickest means (runner/radio?)
- Witty's Lagoon - call 911

If evacuation is required, the designated muster point will be the parking area unless otherwise advised.

If the station is informed of fire by DND or Pedder Bay Marina staff, instructions provided by those authorities are to be followed with alacrity.

Anyone discovering a fire at one of our sites is to immediately inform the Senior Bander on shift by the quickest means (normally radio).

The Senior Bander at the station is responsible for seeing that the following priorities are observed:

**The first priority is the safety of personnel and secondly the safety of bird life.** To that end, captured birds should be released immediately and personnel should be directed to an appropriate muster point (to be determined by the Senior Bander based on the prevailing circumstances and/or as directed by local authorities).

Preservation of RPBO equipment is also very important and should be effected unless it compromises safety of people or bird life. Equipment preservation/rescue priority is as follows:

1. Computer
2. Banding Kit & Bands
3. Binder
4. Spare nets
5. Totes
6. etc.

**If time permits and it may be accomplished safely** nets should be closed (or collapsed/cut down if time presses). Any birds caught in the nets should be released or brought out with the net, extracted at the muster point, and released.

At least two vehicles should be used when accessing Rocky Point to ensure rapid evacuation if necessary. **Those with vehicles are to have keys on their person at all times.**

**Banders - ensure all personnel at the station carry a radio at all times!**

## Appendix 6. Photography Guidelines.

Current version can be found on Google Drive in folder: Migration>Forms>Station Binder

North American Banding Council Photographic Guidelines  
Andrea Patterson, Lesley Howes & Anthony Hill

Through the use of blogs, photo galleries, social networking sites, and scientific presentations, banders daily promote bird monitoring and research to a wide audience. In so doing, banders should meet, display and promote high ethical and scientific standards. The Banders' Code of Ethics (<http://www.nabanding.net/banders-code-of-ethics/>) reminds banders that they are “primarily responsible for the safety and welfare of the birds they study so that stress and risks of injury or death are minimized”, and that they are to “handle each bird carefully, gently, quietly, with respect, and in minimum time.” Inappropriate photography during banding may compromise this ethical duty.

The North American Banding Council (NABC) recommends that banders be aware of best practices and how to minimize stress to birds within the context of photography and videography. Banders or stations may wish to develop specific policies around the taking and use of images of birds and the banding process. We offer the following guidelines for consideration.

### A. Recording Images: Photographic Best Practices

The primary uses of photography of birds in the hand are for documentation and education. Standardized documentary poses of the birds clearly demonstrate key features that identify species, age and sex, and they should be used to document rarities, individual markers, specific rare conditions such as indicators of disease, malformations, or injury, and molt.

Photographers should be systematic in the collection of ancillary data such as date, location, band number, species, age and sex. Archiving photographs in a useful format provides an excellent reference library. Banders are encouraged to manage their own photographic collections in a way that adds to the scientific and educational value of the images. Banders are also encouraged to contribute to Piranga (<http://www.natureinstruct.org/piranga/>), an educational website that provides photographic guidelines and a forum for banders to upload, share, discuss and peruse photographs of birds in the hand.

Photographs for personal purposes including images of people holding birds and images for “adoptions” or other fund-raising should be considered low priority and taken only when the bird shows no signs of stress and when time and safety allows.

To minimize time in the hand, photographers should arrange their shots before the bird is posed. As a maximum, we suggest that birds should be held no more than one minute for photographic purposes.

Birds should be held by an experienced bander in a grip that is appropriate to the species and that considers bird and handler safety. For example, passerines with powerful pectoral muscles held in a photographer's grip without additionally securing the wings could risk some injury. We also strongly recommend that species with weak legs such as shorebirds, hummingbirds, and

goatsuckers not be held by the legs. For guidance, consult the NABC's taxon-specific banding manuals or the NABC recommendations for bird grips.

Birds should only be photographed when they show no signs of stress such as closed eyes, gaping, fluffed or ruffled plumage, or continual flapping wings.

In general, it is best to avoid flash photography. If flash must be used, it would be best to ensure that the bird's eyes have time to adjust before it is released.

Banding stations may wish to develop and post in plain view a policy concerning visitor photography. Consider the following points and decide what is appropriate for your situation:

- a) Permission to take photographs must be obtained from the bander-in-charge.
- b) Visitor photography must not interfere with the normal banding process and should only be allowed when banding volume permits.
- c) Photography of birds in mist nets should generally be discouraged.
- d) Photographs of visitors holding birds should be discouraged but consider allowing photographs of visitors helping to release birds.
- e) Some stations have policies explicitly stating that images taken at their stations are the property of the banding organization. As such, those images cannot be posted in public without the prior expressed consent of the host organization.
- f) Examples of station photographic policies can be found on the NABC website (<http://www.nabanding.net/>).

## B. Publishing Images

All photographs published in print or online, or used in presentations, should demonstrate best practices including:

- a) Bird and handler safety and standardized photographic poses that demonstrate the scientific purpose of banding.
- b) Birds in grips that are safe and appropriate to the species.
- c) Consider carefully what images are appropriate to take, and to share. If you are uncertain about the appropriateness of a particular photograph, it is best not to use it.
- d) While any photograph can potentially be misinterpreted, misinterpretation can be minimized by thoughtful commentary. Information associated with posted images and videos should be factual and professional and provide context that enables viewers to appreciate the value of banding.
- e) Cameras often log date and location of photographs. While this can be important for scientific documentation, consider removing these data from photographs before posted online, especially for species at risk.
- f) Video cameras record both images and sound. Ensure that all commentary is appropriate.

## Appendix 7. Species codes and Band Sizes with Pyle Guide Page References.

Current version can be found on Google Drive in folder: Migration>Forms>Station Binder

Species codes and Band Sizes with Pyle Guide Page numbers

Species	Code	Page	Band Size	Species	Code	Page	Band Size	Species	Code	Page	Band Size
<b>WOODPECKERS</b>		163		<b>WRENS</b>		358		<b>SPARROWS, etc.</b>		532	
Downy	DOWO	187	1B	Bewick's	BEWR	363	1	Spotted Towhee	SPTO	536	1A-2
Hairy	HAWO	189	1A-2	House	HOWR	365	0	Chipping	CHSP	550	0
Red-shafted Flicker	RSFL	200	3 – 3B	Pacific	PAWR	366	0A-0	Savannah	SAVS	565	1
Pileated	PIWO	204	4	Marsh	MAWR	369	1	Fox	FOSP	577	1A-1B
Red-br. Sapsucker	RBSA		1A-1B					Song	SOSP	579	1B-1
<b>TYRANT</b>		212		<b>KINGLETS</b>		374		Lincoln's	LISP	584	1-0
<b>FLYCATCHERS</b>				Golden-crowned	GCKI	374	0A	Swamp	SWSP	585	1
W. Wood-pewee	WEWP	215	0	Ruby-crowned	RCKI	375	0A	White-throated	WTSP	587	1B
Willow	WIFL	224	0A-0					White-crowned	WCSP	589	1B
Hammond's	HAFI	230	0-0A	<b>THRUSHES</b>		385		Gambel's			
Pacific Slope	PSFL	235	0A-0	Swainson's	SWTH	397	1B	Puget Sound			
<b>VIREOS</b>		275		Hermit	HETH	399	1-1B	Golden-crowned	GCSP	591	1B-1A
Cassin's	CAVI	281	1	American Robin	AMRO	403	2	Dark-eyed Junco	UDJU	593	0-1
Warbling	WAVI	285	0-0A	Varied	VATH	405	2	Oregon	ORJU		0-1
Hutton's	HUVI		0	European Starling	EUST	421	2-3	State-coloured	SCJU		0-1
Steller's Jay	STJA	295	3-2	Cedar Waxwing	CEDW	437	1B	Red-w. Blackbird	RWBL	626	2-M
<b>SWALLOWS</b>		320		<b>WARBLERS</b>		443		Br-headed Cowbird	BHCO	646	1A-M
Tree	TRES	322	1	Orange-crowned	OCWA	448	0-0A				1B-F
Violet-Green	VGSW	324	1	Yellow	YEWA	459	0-0A	<b>FINCHES</b>		662	
N. Rough-winged	NRWS	325	0	Yellow-rumped	UYRW	469	0-0A	Purple	PUFI	668	1-1B
Barn	BARS	328	0	Audubon's	AUWA			House	HOFI	670	1-1B
Cliff	CLSW	330	1	Myrtle	MYWA			Pine Siskin	PISI	680	0
C-b Chickadee	CBCH	339	0-0A	Bl.-throated Grey	BTYW	472	0A-0	Am. Goldfinch	AMGO	686	0-0A
Bushtit	BUSH	349	0A	Townsend's	TOWA	474	0A-0				
R-b Nuthatch	RBNU	351	0	N. Waterthrush	NOWA	502	1-0				
Brown Creeper	BRCR	356	0A-0	MacGillivray's	MGWA	509	0-1				
				Common Y-throat	COYE	510	0-0A				
				Wilson's	WIWA	515	0A-0				
				Western Tanager	WETA	528	1B				

## Appendix 8. Bandit data entry codes.

Current version can be found on Google Drive in folder: Migration>Forms>Station Binder

### BANDIT CODES - REVISED

Age Alpha Code	Age Description
U	Unknown Age
AHY	After Hatch Year
HY	Hatch Year
L	Local
SY	Second Year
ASY	After Second Year
TY	Third Year
ATY	After Third Year

Sex Alpha Code	Sex Description
U	Unknown Sex
M	Male
F	Female

How Aged Code	How Aged Description
BO	Behavioral observation
BP	Brood patch
CA	Calendar
CC	Combination of characteristics/measurements
CL	Cloaca
EG	Egg in oviduct
EY	Eye color
FB	Fault bar
FF	Flight feathers (remiges), condition or color
IC	Inconclusive, Conflicting
LP	Molt limit present
MB	Mouth/bill
MR	Actively-molting remiges
NA	Not attempted
NF	Nestling recently fledged, incapable of powered flight
NL	No molt limit
OT	Other
PC	Primary covert wear and/or shape
PL	Plumage
SK	Skull
TL	Tail Length
TS	Tail shape or wear

How Sexed Code	How Sexed Description
BO	Behavioral observation
BP	Brood patch
CC	Combination of characteristics/measurements
CL	Cloaca
DN	DNA/chromosome analysis
EG	Egg in oviduct
EY	Eye color
FS	Feather Shape (Primaries or tail)
IC	Inconclusive, Conflicting
LL	Laparotomy/laparoscopy
MB	Mouth/bill
NA	Not attempted
OT	Other
PL	Body Plumage
RC	Sexed upon recapture
TL	Tail length
WL	Wing length

## Appendix 9. Wolfe-Ryder-Pyle (WRP) Codes.

Current version can be found on Google Drive in folder: Migration>Forms>Station Binder

WRP Code	Description	Age
FPJ First Prejuvenile Molt	Molting into juvenile plumage Must have molting body and/or flight feathers	2 / HY
FCJ First Cycle Juvenile Plumage	Full juvenile plumage Only juvenile feathers present NO molting feathers	2 / HY
FPF First Preformative Molt	Molting into formative plumage Must have molting body and/or flight feathers	2 / HY
FCF First Cycle Formative Plumage	Full formative plumage - NO molting feathers Mixture of retained juvenile feathers & replaced formative feathers Can be fresh HY or worn SY	2 / HY 5 / SY
FPA First Prealternate Molt	Molting into first alternate plumage	5 / SY
FCA First Cycle Alternate Plumage	Full first alternate plumage - NO molting feathers Mixture of juvenile, formative & first alternate feathers	5 / SY
SPB Second Prebasic Molt	Molting into second prebasic plumage Must have molting primaries, & still retains some juvenile, formative and/or alternate feathers	5 / SY
FAJ After First Cycle Juvenile	No juvenile feathers, but unable to determine if plumage is formative or basic e.g., Bushtits, Swallows, House Sparrows, etc.	1 / AHY
DCB Definitive Cycle Basic Plumage	Full basic plumage NO molting feathers, only basic feathers	6 / ASY
DPA Definitive Prealternate Molt	Molting into definitive alternate plumage Must have molting body and/or flight feathers	6 / ASY
DCA Definitive Cycle Alternate Plumage	Full alternate plumage NO molting feathers Mixture of basic & alternate feathers	6 / ASY
DPB Definitive Prebasic Molt	Molting from 1 basic plumage to another basic pl. Must have molting primaries & show retained & replaced definitive basic and/or alternate feathers	6 / ASY
UCA Unknown Cycle Alternate	Alternate plumage but cycle is unknown NO molting feathers	1 / AHY
SCB Second Cycle Basic (Woodpeckers)	Second basic plumage with few retained juvenile feathers NO molting feathers	7 / TY

WRP Code	Description	Age
SAB After Second Basic Plumage	Has surpassed Second Basic Plumage; used for species with incomplete prebasic molts i.e., woodpeckers, seabirds, raptors	6 / ASY
TPB Third Prebasic Molt (Woodpeckers)	Molting into 3rd basic plumage Molting primaries & retains some juvenile & 2nd basic feathers	7 / TY
TCB Third Cycle Basic Plumage (Woodpeckers)	Third basic plumage with retained juvenile & second basic feathers NO molting feathers	8 / 4Y
FCU First Cycle Unknown Plumage	Retained juvenile feathers, but unknown if it is in formative or alternate plumage e.g., OVEN or F COYE	5 / SY
DCU Definitive Cycle Unknown Plumage	Definitive cycle but unknown if it is basic or alternate plumage e.g., OVEN or F COYE	6 / ASY
UPB Unknown Prebasic Molt	Molting into definitive basic plumage but unknown if previous plumage was formative or basic Must have molting primaries Also used for bird completing a prebasic molt with p10 or s6 growing, but no other older feathers remaining	1 / AHY
UCU Unknown Cycle Unknown Plumage	Unknown which cycle or plumage No molting feathers	1 / AHY 0 / U
UCB Unknown Cycle Basic Plumage	Plumage is basic, but molt cycle is unknown No molting feathers	1 / AHY 0 / U
UCA Unknown Cycle Alternate Plumage	Plumage is alternate, but molt cycle is unknown. No molting feathers	1 / AHY 0 / U
UPU Unknown Cycle Unknown Plumage	Molting, but unknown if bird is undergoing FPF or DPB	1 / AHY 0 / U
UUU Unknown Cycle, Plumage & Molt Status	Everything unknown	0 / U

## Appendix 10. Sexing by Wing Chord and Skulling card.

Current version can be found on Google Drive in folder: Migration>Forms>Station Binder

RPBO sexing by wing chord		
Species	Female	Male
Rufous Hummingbird	≥ 42.6	≤ 42.5
Sharp-shinned Hawk	183-217	≤ 182
Cooper's Hawk	251-292	221-251
Olive-sided Flycatcher	≤ 102	≥ 106
Willow Flycatcher	≤ 63	≥ 70
Hammond's Flycatcher	≤ 64	≥ 73
Violet-green Swallow	≤ 112	≥ 117
Chestnut-backed Chickadee	≤ 56	≥ 64
Bewick's Wren	≤ 50 / tl ≤ 50	≥ 54 / tl ≥ 55
Swainson's Thrush	≤ 90	≥ 100
Pine Siskin	≤ 68	≥ 76
"Puget Sound" White-crowned Sparrow (wg ≤ 75)	≤ 66	≥ 72
"Gambel's" White-crowned Sparrow (wg ≥ 69)	≤ 73	≥ 80
Golden-crowned Sparrow	≤ 75	≥ 82
Fox Sparrow	≤ 75	≥ 84
Lincoln's Sparrow	≤ 56	≥ 64
Spotted Towhee (tail)	tl ≤ 87	tl ≥ 97
Brown-headed Cowbird	≤ 104	≥ 106
Orange-crowned Warbler ( <i>lutescens</i> )	≤ 54	≥ 60
Orange-crowned Warbler (Gray-headed)	≤ 56	≥ 65
Northern Waterthrush	≤ 70	≥ 79
MacGillivray's Warbler	≤ 53 / tl ≤ 48	≥ 62 / ≥ tl 56

The following species should have wing chord combined with plumage features by age

Species	Female	Male
American Goldfinch	≤ 65	≥ 76
"Oregon" Junco	≤ 70	≥ 78
"Audubon's" Warbler	≤ 70	≥ 79
"Myrtle" Warbler	≤ 70	≥ 76
Townsend's Warbler	≤ 61	≥ 69
Wilson's Warbler	≤ 52 / cap ≤ 10 (HY), ≤ 15 (AHY)	≥ 58 / cap ≥ 14
Western Tanager	≤ 87	≥ 98

### SKULLING

1 trace



2 <1/3



3 half

peripheral pattern



median line pattern



4 >2/3



5 almost complete



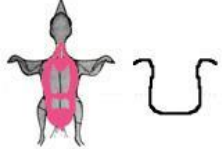
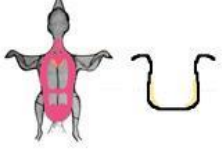
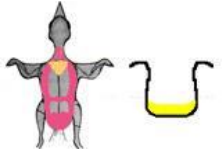
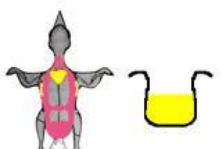

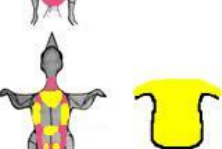
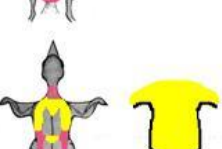
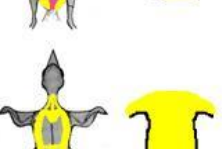
6 complete



## Appendix 11. Rocky Point Bird Observatory Fat Score Card.

Current version can be found on Google Drive in folder: Migration>Forms>Station Binder

### FAT SCORES

	SCORE	FURCULUM	ABDOMEN
	0	No fat	No fat
	1	Trace, furcular hollow less than 5% full	None or a trace
	2	Thin layer, less than one third full (5 - 33%)	Trace or thin layer
	3	One-half full (50%)	Small patches, but not covering some areas
	4	Furcular hollow full (100%) fat in wingpits	Covering pad, slightly mounded
	5	Fat slightly bulging above furcular hollow and wingpits	Well mounded
	6	Fat greatly bulging in all areas	Greatly distended
	7	Excessive; fat nearly joined from all areas	Excessive, meets furcular hollow

## Appendix 12. Sample Data Entry Sheet and Bandit Data Screen.

Current version can be found on Google Drive in folder: Migration>Forms>Station Computer

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
1	Bander	Species	Band size	Band number	Net	Capture time	Body mass	Age	How aged	WRP code	Sex	How sexed	Skull	Wing	Fat	Tail	Status	Capture date	Station	Comments
2	RG	PSWS	1B	2981-15101	8	5:25	24.3	HY	PL	FCJ	U			67	0		300	07/21/2021	PEBA	
3	RG	PSWS	1B	2981-15102	8	5:25	23.2	HY	PL	FCJ	U			69	0		300	07/21/2021	PEBA	
4	RG	PSWS	1B	2981-15103	8	5:25	23.6	HY	PL	FCJ	U			70	1		300	07/21/2021	PEBA	
5	RG	BEWR	1	2871-23873	3	5:25	11.3	HY	PL	FCJ	U			52	1		300	07/21/2021	PEBA	
6	RG	HOFI	1B	2981-15104	7	5:25	22.4	HY	PC	FCJ	U			76	2		300	07/21/2021	PEBA	
7	RG	PAWR	0A	2950-06801	9	5:45	8.5	HY	MB	FCJ	U			45	0		300	07/21/2021	PEBA	
8	DIB	ANHU	X6.2	7100-62961	6	5:45	4.1	HY	PL	FPF	M	PL		50	2		300	07/21/2021	PEBA	
9	RG	AMRO	2	1462-00501	14	5:45	73.8	HY	PL	FCJ	U			130	0		300	07/21/2021	PEBA	
10	RG	SPTO	2	1462-00502	8	5:45	43.3	HY	PL	FCJ	U			84	0		300	07/21/2021	PEBA	
11	RG	SOSP	1B	2981-15105	12	6:05	22.7	HY	PL	FCJ	U			66	0		300	07/21/2021	PEBA	
12	RG	HOWR	0	2960-11300	15	6:25	9.4	HY	MB	FCJ	U			49	0		300	07/21/2021	PEBA	
13	RG	HAWO	1A	2731-16301	6	6:25	66.9	HY	PC	FPF	U			115	0		300	07/21/2021	PEBA	

## Bandit Data

Bandit - [Bandit App]

File Edit View Format Records Help

Records: 272 Total (Unsorted) 85157

Layout: Bands View As: Preview

**Bandit: The Information Manager for Banding Operations** You are in Banding Module

Inventory Locations Bands Recaptures Mortality Reference Settings

Table Details Table Details Table Details Table Details

Report Name: Last Note For File (Bands)

Go to Detail View Submit New Data Submit Modified Data Submit Selected Data Export Bands Save as Excel Show/Print Report

Bandit ID	Band Number	Band...	Dis...	Species	Banding Date	Age	How Aged	Sex	How...	Wing...	Tail Length	Bird Status	Remar...	Location	Errors	Bypass errors	Bird Weight	Fat S...	S...	Capture Time	Net N
KJS	2690-31833	U	1	LISP	09/01/2012	HY	PL	U		58	300	300		PEBA		OY ● N	15	2		09:02:00	11
MCD	2690-31834	0	1	WAVI	09/01/2012	HY	SK	U		66	300	300		PEBA		OY ● N	11.5	1		12:00:00	14
RJS	2690-31835	0	1	OCWA	09/02/2012	HY	PL	F	PL	61	300	300		PEBA		OY ● N	9.1	2		07:00:00	8
RJS	2690-31836	0	1	LISP	09/02/2012	HY	PL	U		63	300	300		PEBA		OY ● N	15	0		07:30:00	9
RJS	2690-31837	0	1	LISP	09/02/2012	HY	PL	U		64	300	300		PEBA		OY ● N	15	1		08:00:00	9
RJS	2690-31838	0	1	CBCH	09/02/2012	HY	PL	U		61	300	300		PEBA		OY ● N	9.8	0		08:00:00	9
RJS	2690-31839	0	1	LISP	09/02/2012	HY	PL	U		60	300	300		PEBA		OY ● N	15.2	1		08:00:00	9
RJS	2690-31840	0	1	WIFL	09/02/2012	HY	PL	U		62	300	300		PEBA		OY ● N	10.6	0		08:30:00	9
RJS	2690-31841	0	1	ORJU	09/02/2012	HY	PL	F	PL	70	300	300		PEBA		OY ● N	17.1	0		08:30:00	6
RJS	2690-31842	0	1	YEWB	09/02/2012	AHY	PL	F	PL	60	300	300		PEBA		OY ● N	8.5	1		09:30:00	11
JLF	2690-31843	0	1	LISP	09/03/2012	HY	PL	U		63	300	300		PEBA		OY ● N	15.4	1		06:35:00	9
JLF	2690-31844	0	1	LISP	09/03/2012	AHY	PL	U		56	300	300		PEBA		OY ● N	13.2	0		06:35:00	2
RJS	2690-31845	0	1	YEWB	09/03/2012	HY	PL	M	PL	62	300	300		PEBA		OY ● N	8.7	1		06:35:00	15
ASH	2690-31846	0	1	LISP	09/03/2012	HY	PL	U		61	300	300		PEBA		OY ● N	15.8	2		06:35:00	15
RJS	2690-31847	0	1	OCWA	09/03/2012	HY	PL	F	PL	54	300	300		PEBA		OY ● N	8	1		07:05:00	9
RJS	2690-31848	0	1	CBCH	09/03/2012	HY	PL	U		58	300	300		PEBA		OY ● N	9.1	1		07:05:00	9
ASH	2690-31849	0	1	LISP	09/03/2012	HY	PL	U		57	300	300		PEBA		OY ● N	12.8	1		08:05:00	5

Showing: All Records Filter By Prefix: 7100 Suffix Range: 7597  Used  Submitted Filter Show All

Fill Down By  Species  Age  Sex  Banding Date  Disposition  Bird Status  How Aged  How Sexed  Location  Bandit ID Fill Down

Band Record Pipe Version  
1|M|269031849|LISP|5830|300|2|PL|0|PEBA|20120903|08.05.00|||ASH|1078||5||||57|12.8|00.00.00|1|||||||||DM|||||||

### Appendix 13. Example of Daily Log.

Current version can be found on Google Drive in folder: Migration>Forms>Station Binder

Rocky Point Bird Observatory Species Totals: RP Day\_\_Month\_\_Year\_\_

<b>Net Opening</b> Standard banding 13 nets. Exceptions:		<b>Close:</b> Exceptions:		<b>Hours:</b>		<b>Narrative</b>
<b>Personnel</b> BIC: Census: Volunteers:		<b>Vol Hrs:</b>		<b>Obs Hrs:</b>		
<b>Coverage Code</b>						
<b>Banded:</b>		<b>Recap:</b>				
<b>Season Total:</b>						
<b>Weather</b>	<b>W dir</b>	<b>W sp.</b>	<b>cloud</b>	<b>Temp.</b>	<b>Via.</b>	
Opening:						
Closing						

Species	Band	Rec.	Cens.	Obs.	ET	Species	Band	Rec.	Cens.	Obs.	ET
Gr. White-Fr. Goose						Whimbrel					
Canada Goose						Black Turnstone					
Northern Shoveler						Surfbird					
American Wigeon						Dunlin					
Mallard						Least Sandpiper					
Northern Pintail						Semipalmated Sandp.					
Green-winged Teal						Western Sandpiper					
Harlequin Duck						peep sp.					
Surf Scoter						Short-billed Dowitcher					
White-winged Scoter						Long-billed Dowitcher					
Long-tailed Duck						dowitcher sp.					
Bufflehead						Wilson's Snipe					
Hooded Merganser						Red-necked Phalarope					
Common Merganser						Red Phalarope					
Red-breasted Merg.						Phalarope sp.					
California Quail						Spotted Sandpiper					
Horned Grebe						Greater Yellowlegs					
Red-necked Grebe						Lesser Yellowlegs					
Western Grebe						Parasitic Jaeger					
Band-tailed Pigeon						Common Murre					
Eurasian Collared-dove						Pigeon Guillemot					
Mourning Dove						Marbled Murrelet					
Common Nighthawk						Ancient Murrelet					
Black Swift						Rhinoceros Auklet					
Vaux's Swift						Bonaparte's Gull					
Anna's Hummingbird						Heermann's Gull					
Rufous Hummingbird						Short-billed Gull					
Virginia Rail						Ring-billed Gull					
Sora						Western Gull					
Sandhill Crane						California Gull					
Black Oystercatcher						Iceland Gull					
Black-bellied Plover						Glaucous-winged Gull					
Semipalmated Plover						gull sp.					
Killdeer						Pacific Loon					
<b>SUBTOTAL</b>						<b>SUBTOTAL</b>					



**Appendix 15. Screenshot of CMMN DET Data Entry page (spreadsheet).**

Current version can be found on Google Drive in folder Migration>Forms>Station Computer

3. Enter data. Use this form to enter data for each day. You can only enter one day at a time and must click Save/Next Day to move to the next day. If you have species codes that are not on your standard list, you can add them by entering their 4-letter species codes at the bottom of the day's data form. You do not have to enter a value for every species.

Site code:  Start new form

Date:  Save / Next Day

Start time:  Show Definitions

End time:  Hide Definitions

Observers:

Description	Value	Units	Start	End
Effort1 Standard Net Hours	78	net-hours	7:10	13:10
Effort2 Observer Hours	0	observers-hou		
Effort3 Coverage Code	0	other		
Effort4				
Effort5				
Effort6				
Effort7				
Effort8				
Effort9				
Effort10				

	Banded	Recaps	Census	Obs											Daily estimated total (automatically generated)	Daily estimated total (manual override)
SPECIES	OBS0	OBS0	OBS0	OBS0	OBS05	OBS0	OBS0	OBS0	OBS0	OBS10	OBS11	OBS12	OBS13	ET_autc	ET_man	
GWFG Greater White-fronted Goose															0	
BRAN Brant															0	
CAGO Canada Goose															0	
NSHO Northern Shoveler															0	
AMWI American Wigeon															0	

## Appendix 16. GPS Locations\* of Nets at Rocky Point and Pedder Bay

\* GPS points are being provided as required by CMMN. However, since the stated margin of error of GPS devices would likely result in poles being placed in the wrong positions, these should not be used to actually place the nets. Use the physical markers left in the net lanes instead.

GPS readings were taken at the pole locations for each net. The first location is that of the pole normally encountered first when walking the lanes from the banding station.

### Rocky Point UTM locations, Zone 10U (taken 6 Sep 2023)

Net	Proximal to trail		Distal from trail	
	Easting	Northing	Easting	Northing
1	459483	5351898	459491	5351883
2	459482	5351887	459471	5351883
3	459465	5351917	459464	5351901
4	459439	5351957	459428	5351948
5	459444	5352053	459449	5352033
6	454437	5352097	459451	5352095
7	454437	5352109	459449	5352105
8	454420	5352115	459409	5352023
9	454408	5352130	459420	5352134
10	454412	5352139	459401	5352149
11	454409	5352259	459410	5352276
12	454399	5352235	459396	5352226
13	454373	5352251	459367	5352240

### Pedder Bay UTM locations, Zone 10U (taken 8 Sep 2023)

Net	Proximal to trail		Distal from trail	
	Easting	Northing	Easting	Northing
1	457275	5355271	457292	5355258
2	457264	5355279	457274	5355273
3	457255	5355285	457247	5355278
4	457243	5355305	457253	5355311
5	457235	5355327	457239	5355315
6	457221	5355317	457232	5355328
7	457256	5355363	457256	5355378
8	457258	5355382	457246	5355383
9	457190	5355336	457192	5355353
10	457177	5355341	457176	5355354
11	457170	5355351	457159	5355354
12	457111	5355332	457102	5355336
13	457078	5355339	457061	5355337
14	457009	5355382	456999	5355388
15	456960	5355444	457958	5355335