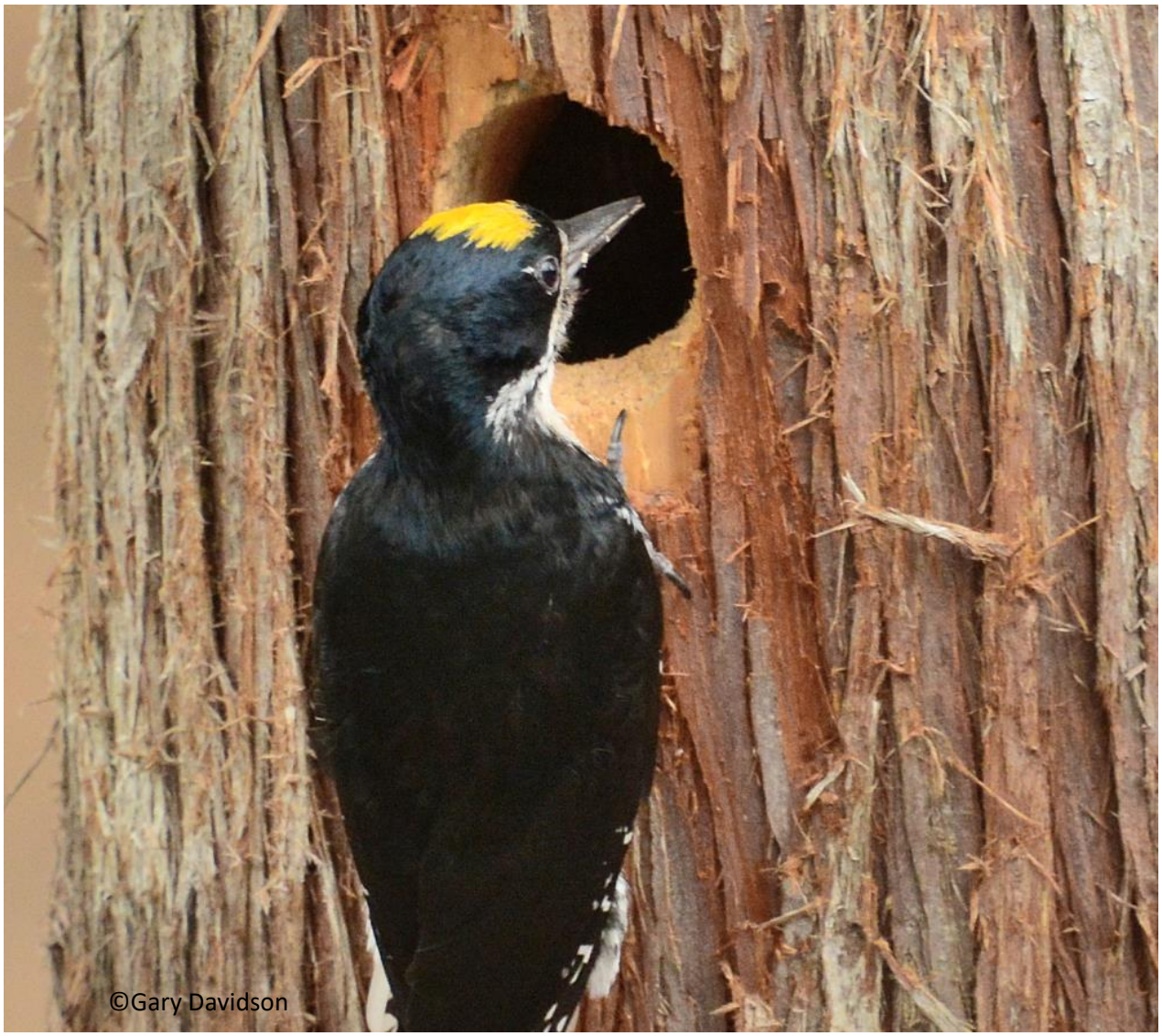
NACFOR
NAKUSP AND AREA
COMMUNITY FOREST

Beneficial Management Practices for Migratory Birds



Document Prepared by
True North Forestry Consulting Ltd.
August 2018

Table of Contents

Scope

This is a non-legal guidance document that provides a framework to manage for migratory birds on the Nakusp community forest. It describes the legislative requirements and suggests management practices and procedures to comply with legislation that protects bird species. This document focuses mainly on migratory birds and compliance with the *Migratory Birds Convention Act* (1994), and includes measures required to protect raptors and categories of species at risk.

The beneficial management practices (BMPs) covered in this document apply to primary forest management and should be implemented at all stages of operations, during planning, harvesting, and silviculture activities. The BMPs have been adapted from Southern Interior forest company guidance documents and modified for use on Nakusp and Area Community Forest (NACFOR) agreement areas on Upper Arrow Lake in the Selkirk Forest District in British Columbia.

NACFOR operations include forest harvesting, road construction, deactivation and maintenance, silviculture activities, forest health management activities, research and stewardship partnerships, and recreational trail construction and maintenance.

The NACFOR community forest agreement (CFA) area is located in the Central Columbia Mountains (CCM) Ecosection, the A2 Ecodistrict, and Bird Conservation Region (BCR) 10. The community forest agreement area has a gross area of 9192 ha, of which 6367 ha comprises the working forest[1]. The CFA is composed of Interior Cedar Hemlock (ICH) and Engelmann Spruce Subalpine Fir (ESSF) BEC zones. Most of NACFOR's harvesting occurs in the ICH zone. The main leading species are Douglas-fir, Western larch, Western red cedar, and Western hemlock[1].

Legislation

NACFOR will implement and follow a Standard Operating Procedure and Beneficial Management Practices for migratory birds to comply with the following Acts and Orders. Legislation is enforced by conservation officers who have the right to issue an order outlining measures that must be taken to comply with the law. See Appendix 1 for a list of all the birds protected by these Acts and Orders.

Migratory Birds Convention Act, 1994

The *Migratory Birds Convention Act* (MBCA) was created in 1917, amended in 1994, and signed by Canada and the United States. The *Act* conserves and protects migratory birds (as individuals and populations), their nests, and eggs and prohibits the incidental killing, harming, disturbance or destruction of migratory birds, their nests, and eggs. All migratory birds listed under the MBCA (Appendix 1) are protected equally, although some species may also be protected by other federal or provincial legislation.

To comply with the *MBCA*, NACFOR must take appropriate measures to mitigate impact and reduce the risk of incidental take of migratory birds, their nests, and eggs. Under the *MBCA,* nests may not be

removed if they are occupied by migratory birds. An unoccupied nest may be removed if not being used by a migratory bird.

The *MBCA* is enforced by Environment and Climate Change Canada's Enforcement Branch.

Species at Risk Act

The *Species at Risk Act* (*SARA*) prohibits the killing, harming, harassing, capturing, or taking of an individual of a species listed as threatened, endangered, or extirpated. It also prohibits the destruction or damaging of a residence (e.g. a nest) of a species listed as threatened, endangered, or extirpated. The species listed under Schedule 1 of *SARA* require special protection and management. Recovery strategies and action plans provide measures to protect at-risk species and critical habitat.

SARA is enforced by Environment and Climate Change Canada's Enforcement Branch.

Wildlife Act

British Columbia`s provincial *Wildlife Act* protects native wildlife from death and harm. The *Act* prohibits the destruction, harm, or take of native birds and their occupied nests and eggs. It is an offence to destroy a nest of an eagle, peregrine falcon, osprey, or great blue heron. Endangered and threatened species are protected from wounding and killing. The *Wildlife Act* primarily pertains to hunting and trapping. With regards to forest operations, the *Wildlife Act* is similar to the *MBCA* and *SARA*.

The provincial *Wildlife Act* is the responsibility of the Ministry of Forests, Lands, Natural Resource Operations, and Rural Development (FLNRORD) under the Fish and Wildlife Branch and is enforced by conservation officers.

Identified Wildlife Management Strategy

The BC Ministry of Environment Identified Wildlife Management Strategy (IWMS) provides direction, policy, procedures and guidelines for managing Identified Wildlife – any species listed as a species at risk and any regionally important wildlife. Associated documents are a resource for planners, foresters and wildlife managers and to help achieve effective management and conservation of Identified Wildlife under the *Forest and Range Practices Act* (FRPA).

Identified Wildlife are managed through the establishment of Wildlife Habitat Areas (WHAs) and General Wildlife Measures (GWMs). WHAs are not protected, but operations may be limited in those areas according to the GWMs. Forest licensees should be aware of all established and proposed WHAs in their operating areas. The B.C. Conservation Data Centre and B.C. Data Warehouse contain the WHA mapping layers. Operations within WHAs are approved by the Delegated Decision Maker.

IWMS compliance and identified wildlife provisions are enforced by conservation officers. Compliance is the responsibility of conservation officers and FLNRORD`s Compliance and Enforcement Branch.

Wildlife Habitat Features Order

Governed by the B.C. Minister of Environment and created as an Order under the *Forest and Range Practices Act (FRPA)*, the Kootenay Boundary Wildlife Habitat Features Order protects specific features

of the habitat (not areas) that are important to wildlife in the Kootenay Boundary region. Wildlife habitat features (WHFs) for birds are the nests of bald eagles, ospreys, great blue herons, or a category of bird species at risk. Under the Order, an authorized person carrying out forest activity must not damage or render the feature to be ineffective. A feature becomes ineffective if it can no longer be used for its original purpose or if wildlife avoids or abandons the feature. The Ministry of Environment or NACFOR may monitor the WHFs to ensure they are protected and remain intact. New wildlife habitat features must be reported to the WHF database by June 1 each year. The data will be publicly available through the B.C. Data Warehouse. Field guides and field cards for the WHF Order provide more information for identifying features and proper protection measures. An exemption from protecting a WHF may be granted by the DDM if it may not be practical or realistic to meet regulatory requirements.

WHFs are enforced by the FLNRORD Compliance and Enforcement Branch. The NACFOR Standard Operating Procedure (Table 1) for WHFs will be implemented to ensure compliance with the Kootenay Boundary Wildlife Habitat Features Order.

Standard Operating Procedure (SOP) and Flowchart

The standard operating procedure and flowchart are meant to provide guidance to mitigate the risk of incidental take. The standard operating procedure (Figure 1) outlines the steps that should be followed during all operations and the SOP flowchart (Figure 2) is a tool used to incorporate field data and forest health observations to adjust the risk rankings for an area.

Standard Operating Procedure

Risk Ranking	
#	Risk
1	Very Low
2	Low
3	Moderate
4	Moderate High
5	High
6	Very High

Step #	Description of Work Element (use with flowchart)	Involvement	Supporting Information
1	All managers, supervisors, and contractors will be provided with information on migratory birds and incidental take so they are familiar with the migratory bird management practices, how the practices apply to their operations, and what they must do to meet legal obligations.	All NACFOR contractors	Training Module
2	The nest density risk ranking layer is overlaid with the development area and used to evaluate the risk of incidental take of birds in NACFOR tenure. High risk areas should be avoided.	GIS Specialist and planning forester	Nest density risk ranking interactive map and GIS layer
3	Known nest locations are overlaid on the development area. Known nests are visited to monitor activity and to create the necessary buffers around the nests.	GIS Specialist, planning forester, and layout crew	Nest Database and WHF database
4	During block layout, high risk areas should be avoided as much as possible and not have roads through them. Any active nests and WHFs that are encountered should be buffered and the location should be entered into the Nest Database and possibly reported as a WHF.	Planning forester and layout crew	Nest Database, risk rankings, and WHF database
5	Site-specific field data on stand type(s) is used to update the risk Rank(s) and improve the accuracy of the risk assessment.	Planning forester and layout crew	Nest density risk ranking matrix (Appendix 2), field data, and SOP flowchart
6	Forest health issues within the block are assessed using the Forest Health Guidance Chart (Appendix 3) and may alter the risk Rank(s).	Planning forester and layout crew	Risk rankings, forest health data (field observations, BC Data Centre), Forest Health Guidance Chart (Appendix 3), and SOP flowchart
7	Final risk Ranks are determined for the development area. BMPs are applied depending on the Rank.	Planning forester and operational supervisors	Risk rankings, SOP flowchart, and BMPs
8	All BMPs applied to the development area should be documented in the Site Plan and all contractors operating in the area should be made aware of the BMPs in place.	Planning forester and operational supervisors	BMPs and nesting period tables
9	If a nest is encountered during harvesting or road construction, the Stop Work Procedures (Appendix 5) must be followed and a Chance Encounter Form (Appendix 6) must be filled out and returned to the NACFOR Supervisor or Project Manager.	Planning forester and operational supervisors	Stop Work Procedures (Appendix 5) and Chance Encounter Form (Appendix 6)
10	Perform a nest sweep of the Site to avoid impacting breeding birds during silviculture operations. Buffer known nests, change the work schedule, and apply BMPs as necessary.	Planning forester and operational supervisors	Risk rankings and BMPs

Figure 1 - Standard Operating Procedure

Risk Ranking	
#	Risk
1	Very Low
2	Low
3	Moderate
4	Moderate High
5	High
6	Very High

Standard Operating Procedure Flowchart

Overlay development area boundaries with the nest density risk ranking GIS layer to determine the ranked polygon(s) in the development area.

Is the site-specific field data consistent with the BEC and VRI map layers?
If more than one stand type is present in the development area, examine the stands separately.

No

Use the nest density ranking matrix (Appendix 2) and site-specific field data to update the mapped Rank(s).

Yes

Has the development area been impacted by forest health or are there any forest health concerns (e.g. insect infestations, forest fire)?

Yes

Use the Forest Health Guidance Chart (Appendix 3) to determine if the Rank(s) should be modified.

No

Are there any Rank 3, Rank 4, Rank 5, or Rank 6 polygons in the development area?

No

Rank 1	Rank 2
No BMPs needed. Buffer all known nests.	Implement one Field Layout or Harvest Operations BMP.

Yes

Polygon Configuration	Rank 3	Rank 4	Rank 5	Rank 6
The development area is entirely within polygon(s) of the same Rank.	Implement one Planning BMP and one Field Layout or Harvest Operations BMP.	All operations must be scheduled for outside the critical nesting period. **OR** Implement one Planning BMP and one Field Layout or Harvest Operations BMP.	All operations must be scheduled for outside the full nesting period. **OR** Implement one Survey BMP, two Planning BMPs, and one Field Layout or Harvest Operations BMP.	All operations must be scheduled for outside the full nesting period. **OR** Leave high retention in clumps. Select leave trees based on nest avoidance, nesting feature availability/potential, and create a diverse stand structure. **OR** Implement two Survey BMPs, two Planning BMPs, one Field Layout BMP, and one Harvest Operations BMP.
The development area overlaps one or more non-contiguous polygons. If more than one Rank exists, priority order for prescribing BMPs is Rank 6, Rank 5, Rank 4, Rank 3.	Implement one Planning BMP and one Field Layout or Harvest Operations BMP.	Implement one Planning BMP and one Field Layout or Harvest Operations BMP. **OR** Reserves must be placed on the Rank 4 and/or Rank 5 polygons so no roads go through them and they are not harvested. **OR** Rank 4 polygons must be scheduled for harvest outside the critical nesting period. **OR** All operations must be scheduled for outside the critical nesting period.	Implement one Survey BMP, two Planning BMPs, and one Field Layout or Harvest Operations BMP. **OR** Reserves must be placed on the Rank 4 and/or Rank 5 polygons so no roads go through them and they are not harvested. **OR** Rank 5 polygons must be scheduled for harvest outside the full nesting period. **OR** All operations must be scheduled for outside the full nesting period.	All operations must be scheduled for outside the full nesting period. **OR** Reserves must be placed on the Rank 6 polygons so no roads go through them and they are not harvested. **OR** Rank 6 polygons must be scheduled for harvest outside the full nesting period. **OR** Leave high retention in clumps in Rank 6 polygons. Select leave trees based on nest avoidance, nesting feature availability/potential, and creating a diverse stand structure. **OR** Implement two Survey BMPs, two Planning BMPs, one Field Layout BMP, and one Harvest Operations BMP.

BMP Effectiveness
Clumps are more effective than single trees and clumps >2 ha are more effective than small clumps. Planned retention is more likely to decrease incidental take than unplanned retention. Features of ecological value should be included in the retention plan.

Implement the appropriate BMPs in accordance with the Risk Ranking prescriptions to ensure incidental take is mitigated as much as possible and properly manage for species at risk.

Species at Risk
If a migratory bird species that is also a listed species at risk or habitat of this species is known to occur within the development area, additional species-specific management actions or BMPs may be required (Appendix 7).

Documentation
All BMPs applied to the development area should be explained in the Site Plan. All decisions to harvest within the breeding season must be rationalized, signed by the NACFOR supervisor or the planning forester responsible for the decision, and supported by scientific evidence if a species at risk is found in the area.

Figure 2 - Standard Operating Procedure Flowchart

Beneficial Management Practices

Beneficial Management Practices (BMPs) are implemented at the planning, layout, harvesting, and silviculture operational phases. Some BMPs are required practices while others are optional and can be implemented according to the risk rankings in the development area. The SOP flowchart provides guidance for prescribing BMPs.

Planning: Required BMPs

Training

All development and layout contractors will be provided with the information and tools that allow them to understand the migratory bird guidance document. Contractors must understand the information and have the knowledge required to comply with regulations that protecting, their nests, and their eggs. Training will encompass legislation, contractor responsibilities, BMPs, and standard operating procedures, including chance encounters and the stop work procedures. Contractors must have a current bird identification app on a smart device or a bird identification book.

Species-Specific Strategies

Species identified under SARA and IWMS require specific management strategies. These species include the Northern goshawk, Western screech-owl, great blue heron, Lewis's woodpecker, and olive-sided flycatcher. Species-specific strategies developed under *FRPA* will guide management of these species should they be identified in a NACFOR development area. Species-specific management strategy documents can be found in Appendix 7. Full lists of bird species protected under SARA and IWMS can be found in Appendix 1. The WHF database can be used to identify known nest locations and the WHF field guide and field cards provide descriptions of the birds and their nesting habitat.

Planning: Optional BMPs

Nesting Periods

Nesting periods refer to the time of year that birds are breeding and raising young in nests. The full nesting period runs from the earliest possible start date for breeding to the lastest possible date for chicks to be in the nest and takes into account early and late nesting species and some of the variation in the timing of biological events. The critical nesting period defines the time of year when all birds are certain to be breeding and raising young. During the critical nesting period, active nests will contain eggs or young and are the most sensitive and at risk to disturbance and destruction. The nesting periods do not take into account the period when adults are building nests so operators should continue be mindful of birds in the area.

Nesting period tables have been made for NACFOR's Ecodistrict (A2) and can be found in Appendix 4. ***The tables are only a guideline and field observations of birds and activity should be a more accurate measure of nesting periods.***

The most effective method for complying with bird protection legislation is by operating outside of the full nesting period.

Planned Retention

Planned retention is an effective method of preserving important bird habitat and protecting other habitat features such as riparian areas or wildlife habitat features. Reserving unique microsites in an otherwise homogenous stand creates a habitat mosaic and provides birds with a variety of resources. Areas that seem to have a more complex composition (e.g. tall shrub layer, mix of open and closed canopy, varying tree age classes) should be reserved as they provide more valuable habitat and are more likely to be suitable to multiple species of birds.

During block layout, determine areas that are obviously being used by breeding birds and plan retention of complex habitat and highly biodiverse sites. These areas should be protected by a buffer zone, left outside of the harvest area boundary, included in a Wildlife Tree Retention Area (WTRA) or Riparian Management Area (RMA), or protected as WHFs. Any known nests should be revisited and buffered if they are active. In order to maintain the proper habitat requirements for a variety of bird species, stands with varying composition and features should be reserved to create a mosaic across the landscape[2]. Reserved areas should be made as large as possible in order to decrease edge effects and support a high density of birds. Reserving varying stands types and patch sizes will allow species to find suitable habitat and move across the landscape[4]. If *enduring nests* are found during layout but are not active that year, they should be buffered if possible so they are not rendered ineffective and can be used in the future.

Block Design

During preliminary harvest planning, use the nest density risk ranking interactive map tool or the GIS layer to identify high risk areas (Ranks 5 and 6). If possible, the most effective mitigation strategy is to avoid operating in these areas, especially during the full nesting period.

Plan to keep blocks small in size (less than 5 ha) or use silviculture systems that support selective harvesting. Focus block layout on stands that do not provide good habitat for birds, such as even-age, single-species coniferous stands with little or no deciduous trees. Deciduous groves support birds in a higher density than coniferous stands[3]. Stands of aspen and cottonwood should be retained in order to protect prime bird habitat.

Reference the nest database and WHF database while designing block boundaries in order to avoid known nest locations and important features, especially enduring nests (discussed in the Field Layout section). Whenever possible, avoid unique features such as cliffs, old growth stands, wetlands, lakeshore, etc. These features may support bird species that are otherwise not seen in the surrounding forest and use these unique features in the breeding season.

Forest Health

Changes in nest density risk ranks shown in the forest health guidance chart (Appendix 3) are primarily based on the shrub layer and understory conifers. Birds require ground cover and a good shrub layer for foraging and nesting. Understory trees provide nesting habitat and help to bridge the temporal gap between mature forests and recently harvested blocks.

When salvage logging a stand that has been attacked by insects or disease, it is beneficial for birds and other wildlife to retain a healthy understory and leave healthy, mature trees not attacked by the pest or

disease wherever possible. During salvage harvesting in stands that may have larvae or beetles, keep in mind that insects are a source of food for woodpeckers and hence there may be a high density of birds in the salvage area. Trees that have decayed past the point of being salvageable should be retained, if safe to do so, to become wildlife trees. Large diameter snags are important nesting habitat and should be left standing, preferably in tree patches to prevent blowdown.

When salvaging a stand burned by wildfire, retaining unburned, half burned, and a few burned trees singly or in patches provides bird habitat. Retention mimics natural fire regime stands. Fires also create large snags and scar trees, making potential nesting spots and attracting insects for foraging. Some fire specialist species will flourish immediately post fire so caution must be taken when salvaging recently burned areas (=< 2years post burn). More species will be present once the vegetation and understory has established (>2 years post burn).

During block layout in salvage areas, mark potential wildlife trees and non-merchantable trees to be retained for wildlife habitat. Leave tree characteristics should include a mix of species, age classes and densities. Undisturbed ground cover and shrub layer should be maintained during operations if possible to provide foraging habitat for birds.

Survey Methods: Optional BMPs

Point Count Surveys

Point count surveys are performed by an observer who writes down all birds seen or heard during a defined period at the survey point. This method is well-known for being used for the North American Breeding Bird Survey (BBS), a long-term monitoring project supported by Canada (Canadian Wildlife Service), the United States (U.S. Geological Survey), and Mexico (National Commission for Knowledge and Use of Biodiversity)[4]. Point counts should be conducted in a proposed harvest area the breeding season prior, as well as immediately before, harvesting to determine bird species present during the nesting period. If a high density of birds or a species at risk is detected, further BMPs should be applied. If nests are found during point counts they should be documented, mapped and buffered. There are a few weaknesses to point count surveys, including observer bias and birds being disrupted by the presence of the observer. These issues can be addressed by using autonomous recording units to verify point count surveys.

Point count surveys should be conducted by an expert or a trained biologist to ensure observers can identify birds by sight and sound. The full point count survey methodology and training used for the BBS can be found at: https://www.pwrc.usgs.gov/bbs/participate/training/.

Autonomous Recording Units (ARUs)

ARUs can be used as detection devices to determine species present in a proposed harvest area. ARUs make bird identification easier and eliminate some observer bias, decrease disruption, avoid employee time restrictions, and can be used in less accessible areas[5].

ARUs can be deployed in proposed harvest areas the summer prior to the expected harvest, as well as immediately prior to harvesting, to record bird song throughout the breeding period. Recordings can

then be analysed to determine species that may be present during the harvest period. If the recordings suggest a high density of birds or the presence of a species at risk then further avoidance measures should be taken. If left in the field for a long period of time, such as the full breeding season, ARUs can be just as effective as point count surveys for recording bird species present in an area[5]. For surveys over a shorter time frame, ARUs can be used to supplement point count surveys so that birds can be seen and heard[5.]

The two biggest drawbacks to using ARUs are the cost of deploying multiple units across proposed harvest areas and the time and expertise required to analyze the recordings. Sounds recognition software used for species identification is not always reliable so the data may have to be analyzed using audio techniques.

Survey design for ARUs will be dependent on the recording capability of the model used but a suggested sampling density is to deploy one ARU per hectare across the proposed harvest area, ensuring all habitat types are sampled. ARUs could be set to record the first 10 minutes of every hour from 4 am to 10 am daily between April 30th and July 31st. The recordings should give an accurate sample of the species present in the proposed harvest area.

Species-Specific Surveys

Species listed in Schedule 1 of the Order for Category Species at Risk (SAR) require special attention – Appendix 7 provides the link to the Ministry of Environment accounts and measures for managing species at risk, including species-specific strategies and survey methods for migratory birds and birds of prey. SAR listed in the FPPR Arrow Boundary Forest District Section 7 Notice have not been identified in the NACFOR operating area, however, if new information becomes available or a species at risk is identified during forest management operations, the species-specific strategies will be implemented.

Nest Sweeps

Nest sweeps are used to identify nests in proposed or active harvest areas. Although widely used as a mitigation and avoidance strategy, Environment and Climate Change Canada states that nest sweeps are not considered effective at identifying nests and decreasing incidental take. Sweeps can be influenced by multiple variables and nests may not be identified depending on the time of the survey, the experience of the observer, and the bird species. Nest sweeps may be an appropriate survey method if combined with other methods or in some circumstances, such as small sample areas or during brushing activities, but generally other survey methods may be more effective or preferred.

Field Layout: Required BMPs

Enduring Nest Identification

Stick nests and cavities that are used more than once, either by the same species or another species, over successive years are known as enduring nests. Damaging or destroying enduring nests could result in limited nesting opportunities for some bird species. Determining the species using an enduring nest is necessary to ensure appropriate measures are implemented to minimize disturbance. Once identified, stick nests and cavities should be marked in the field and documented in the NACFOR nest database.

Enduring nests occupied by osprey, bald eagle, great blue heron, or a species at risk are considered Wildlife Habitat Features and must be protected. They should be buffered by no-disturbance zones per recommended WHF guidance and submitted to the WHF database.

Wildlife Habitat Features

A "wildlife habitat feature" is defined as a feature used by one or more wildlife species to meet their life history requirements; special management is necessary to ensure that these features are protected and remain functional.4 Under the GAR Order for Wildlife Habitat Features in the Kootenay Boundary Region nests of bald eagles, ospreys, great blue herons, and species at risk have been identified as wildlife habitat features. In addition to special management, wildlife habitat features must be reported to government and tracked to ensure effective management.

A Wildlife Habitat Features field guide and field cards were developed in 2018 by the Ministry of Environment and Climate Change Strategy to provide suggested management strategies for consideration when carrying out forest management operations. These documents should be used by field personnel and the prescribing forester during forest development and operations.

Field Layout: Optional BMPs

Riparian Protection

Riparian areas provide important habitat for many bird species. Birds tend to congregate in riparian areas because water is readily available, the ground cover and shrub layer provide cover, and more abundant deciduous trees and snags provide good nesting and foraging. Riparian management areas (RMAs) are established for classified streams and wetlands under *FRPA*. Forest harvesting is restricted and tree retention levels are specified in RMAs based on riparian classification. Established riparian areas help to preserve bird habitat and support displaced nesting birds post-harvest.

Due to the narrow, linear nature of most RMAs, the reserved or managed area is subject to 'edge effect' and thus does not provide sufficient habitat to support a large bird population. Conversely, the long narrow shape does create a good travel corridor for birds to move between larger patches of forest.

It is important to remember that not all bird species are present in riparian areas and RMAs do not always contain suitable habitat for forest birds that mainly rely on mature forest stands. RMAs may be better suited as travel corridors between larger mature stands[2]. Although deciduous stands and riparian areas support a high number of bird species, forest birds still require coniferous habitat for breeding and foraging[2, 3].

When establishing an RMA as a mitigation tool to manage for migratory birds, ensure the RMA is large enough to decrease the 'edge effect' along the watercourse and provides sufficient retention to meet habitat needs. When establishing an RMA, consider connectivity to larger stands of mature forest to enhance nesting habitat.

Wildlife Tree, Snag, and Stub Retention

During layout, establish appropriate buffers around nest trees and potential wildlife trees. Buffer size depends on the feature and species of use. Dead snags in the early stages of decay and large coniferous trees with heart rot are good nest trees for cavity nesters. Stubbing snags and deciduous trees during harvesting is a good method of creating wildlife trees in cut blocks deficient in nest trees. Look for cavities, broken tops, and large diameter trees with possible heart rot during development area reconnaissance and block layout. Retaining single or groups of conifers and deciduous trees – targeting vets and mature trees with poor form – will provide good wildlife habitat. Leave trees will protect understory layers, provide diversity in the new stand and be recruited as wildlife trees over time.

Harvest and Roads Operations: Required BMPs

Chance Encounters

Discovering a nest during operations is defined as a 'chance encounter'. When a nest is found, ***stop work procedures*** must be followed immediately (Appendix 5). All chance encounters must be reported to the NACFOR Supervisor or Project Manager using the chance encounter form (Appendix 6). The supervisor or manager will positively identify the bird and/or nest and determine the best course of action. Work can then only commence once adequate measures have been taken to protect the nest and birds.

All chance encounters will be recorded in the NACFOR database.

Harvest Operations: Optional BMPs

Dispersed Retention

Tree retention specifications will be prescribed in the Site Plan for every cut block. In areas with moderately high and high risk ranking, a minimum of 10% basal area retention should be prescribed. Retaining single or groups of conifers and deciduous trees – targeting vets and mature trees with poor form – will provide good wildlife habitat. Leave trees will protect understory layers, provide diversity in the new stand and be recruited as wildlife trees over time. Larger dispersed retention areas provide higher value habitat.

Block Stratification and Timing of Harvest

If a cut block overlaps one or more non-contiguous high risk polygons (Risk 5 or 6) or high value bird habitat is identified in the proposed harvest area, these areas should be stratified into separate harvest units and treated accordingly with the appropriate BMPs. If possible, high risk and high value habitat areas should be harvested outside of the full nesting period to ensure incidental take is avoided. Harvesting can occur in lower risk strata anytime throughout the year.

Silviculture Systems

High retention and partial cutting silviculture systems are more beneficial for migratory birds as they result in lower disturbance and create a mosaic of stand types. Small dispersed openings with a shrub layer provide foraging opportunities and cover. In very dense stands, partial cutting and high retention can create more suitable habitat for birds by opening up flyways and allowing the understory to grow in and create a more complex forest structure. Small-patch group selection (defined as 1/3 of the timber

volume in the block removed in 0.2 ha sections) causes less disturbance to bird abundance and species composition compared to clearcutting and two-story silviculture systems[6, 7]. Partial cutting and high retention harvesting can be designed for species-specific residual stand types. Aerial foragers, generalist species, and species that need a heterogeneous landscape perform well in clear cuts and partial cuts[8]. Species that rely on old-growth forests do well in areas where single-tree harvesting or small-group selection systems are implemented because they mimic forest succession patterns in old-growth forests[8].

Silviculture Activities: Required BMPs

Tree Planting

Tree planting has a relatively low impact on breeding birds. Planters should avoid any ground nests and nests in leave trees and shrubs found in the block. Ground nests can be very well camouflaged and difficult to see. Often the first indication of a ground nest is distressed behaviour of the adult. If a nest is found during planting, follow the **stop work procedures** and fill out a chance encounter form. Mark the nest area with flagging tape so planters and others are aware of the nest location. Once the crew is aware of a nest, planting may resume. Decrease the amount of traffic around the nest so the adult birds and chicks are not disturbed. Have one planter plant the area around the nest to cause the least amount of disturbance.

Brushing and Thinning

Deciduous and herbaceous brushing during the breeding season can have a significant impact on migratory birds. Ground nests and nests in deciduous saplings and shrubs may be destroyed across the cut block. Percent cover of the shrub layer is positively related to bird species richness[9]. To mitigate impacts, conduct a nest sweep of the area to be brushed immediately before treatment. Buffer nests found during the sweep with a 2 – 8 metre no-treatment zone, depending on the species. The best mitigation strategy for brushing is to conduct treatment outside of the nesting period. If nests are encountered while brushing, the **stop work procedures** must be followed and a chance encounter form must be completed and submitted to the NACFOR supervisor. Brushing with power tools causes more disturbance than brushing with hand tools, so consider leaving a 6-8 m buffer around nests when using power tools.

Thinning planted stands benefits bird species because it opens up the stand and increases foraging opportunities[9, 10]. The number of bird species present in an area increases as the number of saplings decreases[8]. Thinning saplings ensures that the mature stand will have lower density larger diameter stems and an understory layer. Caution must be taken when thinning to mitigate disturbance or damage to ground nesters and birds nesting in the shrub layer or saplings. The best mitigation strategy for thinning is to conduct treatment outside of the nesting period. If thinning during the nesting period, a nest sweep should be conducted immediately before treatment. Buffer nests found during the sweep with a 2 – 8 metre no-treatment zone, depending on the species. If a nest is found in a target sapling, consider leaving it to avoid disturbing the nest. When a nest is found during thinning, the **stop work procedures** must be followed and a chance encounter form must be completed and submitted to the NACFOR supervisor.

Common ground nesting species such as the pacific wren, common yellowthroat, dark-eyed junco, and hermit thrush usually nest between May 5 and August 1. If a nest sweep shows that there are a lot of nests in a planted block, consider scheduling silviculture activities outside of the critical nesting period (Appendix 4). Any nests that are not considered enduring nests are unlikely to be used by another pair of breeding birds. These nests can be removed if the qualified individual performing the nest sweep determines the nests are not being used. If non-enduring nests are going to be removed, it is best to do so outside the full nesting period, such as during the winter.

Monitoring, Evaluation, and Reporting

Chance encounter forms must be completed if a nest is encountered during operational activities. The species of bird, location of the nest, and other valuable information must be recorded to track nesting activity in the community forest.

A Nest Database has been created to track and monitor nests found during NACFOR operations. The database should be updated when a new nest is located or a nest is revisited. The Nest Database contains a spreadsheet for compiling information about known nests as well as a spreadsheet for tracking chance encounters with migratory bird nests. If the nest is occupied by a category of species at risk, a bald eagle, an osprey, or great blue heron, the nest location must be reported to the Conservation Data Centre and reported as a WHF.

References

[1]Davis, R. 2018. Nakusp and Area Community Forest Agreement, Timber Supply Analysis Report. Forsite Consultants Ltd., Salmon Arm, B.C.

[2]Holmes, S.B., McIlwrick, K.A., Kreutzweiser, D.P., Venier, L.A. 2017. Riparian partial harvesting and upland clear cutting alter bird communities in a boreal mixedwood forest. Forests. **8** (141): 1-16.

[3]Johns, B.W. 1993. The influence of grove size on bird species richness in aspen parklands. Wilson Bulletin. **105**(2): 256-264.

[4]Government of Canada. 2018. Citing online sources: breeding bird survey overview. Government of Canada, Environment and Natural Resources.

[5]Klingbeil, B.T. and Willig, M.R. 2015. Bird biodiversity assessments in temperate forest: the value of point count versus acoustic monitoring protocols. PeerJ. **3** (e973): 1-17.

[6]Chambers, C.L., McComb, W.C., Tappeiner, J.C. II. 1999. Breeding bird responses to three silvicultural treatments in the Oregon Coast Range. Ecological Applications. **9** (1): 171-185.

[7]Eng, M.L., Stutchbury, B.J.M., Burke, D.M., Elliott, K.A. 2011. Influence of forest management on pre- and post-fledgling productivity of a Neotropical migratory songbird in a highly fragmented landscape. Canadian Journal of Forest Research. **41**: 2009-2019.

[8]Griffis-Kyle, K.L. and Beier, P. 2003. Small isolated aspen stands enrich bird communities in southwestern ponderosa pine forests. Biological Conservation. **110**: 375-385.

[9]Turchi, G.M., Kennedy, P.L., Urban, D., Hein, D. 1995. Bird species richness in relation to isolation of aspen habitats. Wilson Bulletin. **107**(3): 463-474.

[10]Wood, E.M., Pidgeon, A.M., Liu, F., Mladenoff, D.J. 2012. Birds see the trees inside the forest: the potential impacts of changes in forest composition on songbirds during spring migration. Forest Ecology and Management. **280**: 176-186.

[11]Environment and Climate Change Canada. 2017. Birds protected under the Migratory Bird Convention Act. Legal Protection for Migratory Birds. [Accessed on May 3 2018]. Available from: https://www.canada.ca/en/environment-climate-change/services/migratory-birds-legal-protection/convention-act.html.

Appendices

Appendix 1: List of Protected Birds

SARA Section 7 Notice, December 30 2004:

- Flammulated owl (*Psiloscops flammeolus*)
- "Interior" Western screech-owl (*Megascops kennicottii macfarlanei*)

Wildlife Habitat Features GAR Order, July 1 2018:

- Bald Eagle (*Haliaeetus leucocephalus)*
- Osprey (*Pandion haliaetus*)
- Flammulated owl (*Psiloscops flammeolus*)
- "Interior" Western screech-owl (*Megascops kennicottii macfarlanei*)
- Great blue heron (*Ardea herodias*)
- Lewis's woodpecker (*Melanerpes lewis*)
- Williamson's sapsucker (*Sphyrapicus thyroideus*)

IWMS Species with Established Wildlife Habitat Areas, May 14 2001 - present:

- Lewis's woodpecker (*Melanerpes lewis*)
- Long-billed curlew (*Numenius americanus*)
- Flammulated owl (*Psiloscops flammeolus*)
- Western screech-owl (*Megascops kennicottii*)
- Williamson's sapsucker, *nataliae* subspecies (*Sphyrapicus thyroideus nataliae*)

MBCA Protected Birds[11]:

English Name	Scientific Name
Acadian Flycatcher	*Empidonax virescens*
Alder Flycatcher	*Empidonax alnorum*
American Avocet	*Recurvirostra americana*
American Bittern	*Botaurus lentiginosus*
American Black Duck	*Anas rubripes*
American Coot	*Fulica americana*
American Dipper	*Cinclus mexicanus*
American Golden-Plover	*Pluvialis dominica*
American Goldfinch	*Spinus tristis*
American Oystercatcher	*Haematopus palliatus*
American Pipit	*Anthus rubescens*
American Redstart	*Setophaga ruticilla*
American Robin	*Turdus migratorius*
American Three-toed Woodpecker	*Picoides dorsalis*
American Tree Sparrow	*Spizella arborea*
American Wigeon	*Anas americana*
American Woodcock	*Scolopax minor*
Ancient Murrelet	*Synthliboramphus antiquus*
Anna's Hummingbird	*Calypte anna*
Arctic Tern	*Sterna paradisaea*
Atlantic Puffin	*Fratercula arctica*
Baird's Sandpiper	*Calidris bairdii*
Baird's Sparrow	*Ammodramus bairdii*
Baltimore Oriole	*Icterus galbula*
Band-tailed Pigeon	*Patagioenas fasciata*
Bank Swallow	*Riparia riparia*
Barn Swallow	*Hirundo rustica*
Barrow's Goldeneye	*Bucephala islandica*

Bay-breasted Warbler	*Setophaga castanea*
Bewick's Wren	*Thryomanes bewickii*
Bicknell's Thrush	*Catharus bicknelli*
Black Guillemot	*Cepphus grylle*
Black Oystercatcher	*Haematopus bachmani*
Black Scoter	*Melanitta americana*
Black Swift	*Cypseloides niger*
Black Tern	*Chlidonias niger*
Black Turnstone	*Arenaria melanocephala*
Black-and-white Warbler	*Mniotilta varia*
Black-backed Woodpecker	*Picoides arcticus*
Black-bellied Plover	*Pluvialis squatarola*
Black-billed Cuckoo	*Coccyzus erythropthalmus*
Blackburnian Warbler	*Setophaga fusca*
Black-capped Chickadee	*Poecile atricapillus*
Black-chinned Hummingbird	*Archilochus alexandri*
Black-crowned Night-Heron	*Nycticorax nycticorax*
Black-footed Albatross	*Phoebastria nigripes*
Black-headed Grosbeak	*Pheucticus melanocephalus*
Black-headed Gull	*Chroicocephalus ridibundus*
Black-legged Kittiwake	*Rissa tridactyla*
Black-necked Stilt	*Himantopus mexicanus*
Blackpoll Warbler	*Setophaga striata*
Black-throated Blue Warbler	*Setophaga caerulescens*
Black-throated Gray Warbler	*Setophaga nigrescens*
Black-throated Green Warbler	*Setophaga virens*
Blue-gray Gnatcatcher	*Polioptila caerulea*
Blue-headed Vireo	*Vireo solitarius*
Bluethroat	*Luscinia svecica*
Blue-winged Teal	*Anas discors*
Blue-winged Warbler	*Vermivora cyanoptera*
Bobolink	*Dolichonyx oryzivorus*
Bohemian Waxwing	*Bombycilla garrulus*
Bonaparte's Gull	*Chroicocephalus philadelphia*
Boreal Chickadee	*Poecile hudsonicus*
Brant	*Branta bernicla*
Brewer's Sparrow	*Spizella breweri*
Brown Thrasher	*Toxostoma rufum*
Buff-breasted Sandpiper	*Calidris subruficollis*
Bufflehead	*Bucephala albeola*
Buller's Shearwater	*Puffinus bulleri*
Bullock's Oriole	*Icterus bullockii*
Bushtit	*Psaltriparus minimus*
Cackling Goose	*Branta hutchinsii*
California Gull	*Larus californicus*
Calliope Hummingbird	*Selasphorus calliope*
Canada Goose	*Branta canadensis*
Canada Warbler	*Cardellina canadensis*
Canvasback	*Aythya valisineria*
Canyon Wren	*Catherpes mexicanus*
Cape May Warbler	*Setophaga tigrina*
Carolina Wren	*Thryothorus ludovicianus*
Caspian Tern	*Hydroprogne caspia*
Cassin's Auklet	*Ptychoramphus aleuticus*
Cassin's Finch	*Haemorhous cassinii*
Cassin's Vireo	*Vireo cassinii*
Cattle Egret	*Bubulcus ibis*
Cedar Waxwing	*Bombycilla cedrorum*
Cerulean Warbler	*Setophaga cerulea*
Chestnut-backed Chickadee	*Poecile rufescens*
Chestnut-collared Longspur	*Calcarius ornatus*
Chestnut-sided Warbler	*Setophaga pensylvanica*
Chimney Swift	*Chaetura pelagica*
Chipping Sparrow	*Spizella passerina*
Cinnamon Teal	*Anas cyanoptera*
Clark's Grebe	*Aechmophorus clarkii*
Clay-colored Sparrow	*Spizella pallida*
Cliff Swallow	*Petrochelidon pyrrhonota*
Common Eider	*Somateria mollissima*
Common Gallinule	*Gallinula galeata*

Common Goldeneye	*Bucephala clangula*
Common Loon	*Gavia immer*
Common Merganser	*Mergus merganser*
Common Murre	*Uria aalge*
Common Nighthawk	*Chordeiles minor*
Common Poorwill	*Phalaenoptilus nuttallii*
Common Redpoll	*Acanthis flammea*
Common Ringed Plover	*Charadrius hiaticula*
Common Tern	*Sterna hirundo*
Common Yellowthroat	*Geothlypis trichas*
Connecticut Warbler	*Oporornis agilis*
Cordilleran Flycatcher	*Empidonax occidentalis*
Dark-eyed Junco	*Junco hyemalis*
Dickcissel	*Spiza americana*
Dovekie	*Alle alle*
Downy Woodpecker	*Picoides pubescens*
Dunlin	*Calidris alpina*
Dusky Flycatcher	*Empidonax oberholseri*
Eared Grebe	*Podiceps nigricollis*
Eastern Bluebird	*Sialia sialis*
Eastern Kingbird	*Tyrannus tyrannus*
Eastern Meadowlark	*Sturnella magna*
Eastern Phoebe	*Sayornis phoebe*
Eastern Towhee	*Pipilo erythrophthalmus*
Eastern Whip-poor-will	*Antrostomus vociferus*
Eastern Wood-Pewee	*Contopus virens*
Eastern Yellow Wagtail	*Motacilla tschutschensis*
Eskimo Curlew	*Numenius borealis*
Eurasian Collared-Dove	*Streptopelia decaocto*
Eurasian Wigeon	*Anas penelope*
Evening Grosbeak	*Coccothraustes vespertinus*
Field Sparrow	*Spizella pusilla*
Flesh-footed Shearwater	*Puffinus carneipes*
Fork-tailed Storm-Petrel	*Oceanodroma furcata*
Forster's Tern	*Sterna forsteri*
Fox Sparrow	*Passerella iliaca*
Franklin's Gull	*Leucophaeus pipixcan*
Gadwall	*Anas strepera*
Glaucous Gull	*Larus hyperboreus*
Glaucous-winged Gull	*Larus glaucescens*
Golden-crowned Kinglet	*Regulus satrapa*
Golden-crowned Sparrow	*Zonotrichia atricapilla*
Golden-winged Warbler	*Vermivora chrysoptera*
Grasshopper Sparrow	*Ammodramus savannarum*
Gray Catbird	*Dumetella carolinensis*
Gray Flycatcher	*Empidonax wrightii*
Gray-cheeked Thrush	*Catharus minimus*
Gray-crowned Rosy-Finch	*Leucosticte tephrocotis*
Gray-headed Chickadee	*Poecile cinctus*
Great Black-backed Gull	*Larus marinus*
Great Blue Heron	*Ardea herodias*
Great Crested Flycatcher	*Myiarchus crinitus*
Great Egret	*Ardea alba*
Great Shearwater	*Puffinus gravis*
Great Skua	*Stercorarius skua*
Greater Scaup	*Aythya marila*
Greater White-fronted Goose	*Anser albifrons*
Greater Yellowlegs	*Tringa melanoleuca*
Green Heron	*Butorides virescens*
Green-winged Teal	*Anas crecca*
Hairy Woodpecker	*Picoides villosus*
Hammond's Flycatcher	*Empidonax hammondii*
Harlequin Duck	*Histrionicus histrionicus*
Harris's Sparrow	*Zonotrichia querula*
Heermann's Gull	*Larus heermanni*
Henslow's Sparrow	*Ammodramus henslowii*
Hermit Thrush	*Catharus guttatus*
Herring Gull	*Larus argentatus*
Hoary Redpoll	*Acanthis hornemanni*
Hooded Merganser	*Lophodytes cucullatus*
Hooded Warbler	*Setophaga citrina*

Horned Grebe	*Podiceps auritus*
Horned Lark	*Eremophila alpestris*
Horned Puffin	*Fratercula corniculata*
House Finch	*Haemorhous mexicanus*
House Wren	*Troglodytes aedon*
Hudsonian Godwit	*Limosa haemastica*
Hutton's Vireo	*Vireo huttoni*
Iceland Gull	*Larus glaucoides*
Indigo Bunting	*Passerina cyanea*
Ivory Gull	*Pagophila eburnea*
Killdeer	*Charadrius vociferus*
King Eider	*Somateria spectabilis*
King Rail	*Rallus elegans*
Kirtland's Warbler	*Setophaga kirtlandii*
Lapland Longspur	*Calcarius lapponicus*
Lark Bunting	*Calamospiza melanocorys*
Lark Sparrow	*Chondestes grammacus*
Laughing Gull	*Leucophaeus atricilla*
Laysan Albatross	*Phoebastria immutabilis*
Lazuli Bunting	*Passerina amoena*
Le Conte's Sparrow	*Ammodramus leconteii*
Leach's Storm-Petrel	*Oceanodroma leucorhoa*
Least Bittern	*Ixobrychus exilis*
Least Flycatcher	*Empidonax minimus*
Least Sandpiper	*Calidris minutilla*
Lesser Black-backed Gull	*Larus fuscus*
Lesser Scaup	*Aythya affinis*
Lesser Yellowlegs	*Tringa flavipes*
Lewis's Woodpecker	*Melanerpes lewis*
Lincoln's Sparrow	*Melospiza lincolnii*
Little Gull	*Hydrocoloeus minutus*
Loggerhead Shrike	*Lanius ludovicianus*
Long-billed Curlew	*Numenius americanus*
Long-billed Dowitcher	*Limnodromus scolopaceus*
Long-tailed Duck	*Clangula hyemalis*
Long-tailed Jaeger	*Stercorarius longicaudus*
Louisiana Waterthrush	*Parkesia motacilla*
MacGillivray's Warbler	*Geothlypis tolmiei*
Magnolia Warbler	*Setophaga magnolia*
Mallard	*Anas platyrhynchos*
Manx Shearwater	*Puffinus puffinus*
Marbled Godwit	*Limosa fedoa*
Marbled Murrelet	*Brachyramphus marmoratus*
Marsh Wren	*Cistothorus palustris*
McCown's Longspur	*Rhynchophanes mccownii*
Mew Gull	*Larus canus*
Mountain Bluebird	*Sialia currucoides*
Mountain Chickadee	*Poecile gambeli*
Mountain Plover	*Charadrius montanus*
Mourning Dove	*Zenaida macroura*
Mourning Warbler	*Geothlypis philadelphia*
Mute Swan	*Cygnus olor*
Nashville Warbler	*Oreothlypis ruficapilla*
Nelson's Sparrow	*Ammodramus nelsoni*
Northern Cardinal	*Cardinalis cardinalis*
Northern Flicker	*Colaptes auratus*
Northern Fulmar	*Fulmarus glacialis*
Northern Gannet	*Morus bassanus*
Northern Mockingbird	*Mimus polyglottos*
Northern Parula	*Setophaga americana*
Northern Pintail	*Anas acuta*
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*
Northern Shoveler	*Anas clypeata*
Northern Shrike	*Lanius excubitor*
Northern Waterthrush	*Parkesia noveboracensis*
Northern Wheatear	*Oenanthe oenanthe*
Olive-sided Flycatcher	*Contopus cooperi*
Orange-crowned Warbler	*Oreothlypis celata*
Orchard Oriole	*Icterus spurius*
Ovenbird	*Seiurus aurocapilla*
Pacific Loon	*Gavia pacifica*
Pacific Wren	*Troglodytes pacificus*
Pacific-slope Flycatcher	*Empidonax difficilis*
Palm Warbler	*Setophaga palmarum*

Parasitic Jaeger	*Stercorarius parasiticus*
Pectoral Sandpiper	*Calidris melanotos*
Philadelphia Vireo	*Vireo philadelphicus*
Pied-billed Grebe	*Podilymbus podiceps*
Pigeon Guillemot	*Cepphus columba*
Pileated Woodpecker	*Dryocopus pileatus*
Pine Grosbeak	*Pinicola enucleator*
Pine Siskin	*Spinus pinus*
Pine Warbler	*Setophaga pinus*
Pink-footed Shearwater	*Puffinus creatopus*
Piping Plover	*Charadrius melodus*
Pomarine Jaeger	*Stercorarius pomarinus*
Prairie Warbler	*Setophaga discolor*
Prothonotary Warbler	*Protonotaria citrea*
Purple Finch	*Haemorhous purpureus*
Purple Martin	*Progne subis*
Purple Sandpiper	*Calidris maritima*
Pygmy Nuthatch	*Sitta pygmaea*
Razorbill	*Alca torda*
Red Crossbill	*Loxia curvirostra*
Red Knot	*Calidris canutus*
Red Phalarope	*Phalaropus fulicarius*
Red-bellied Woodpecker	*Melanerpes carolinus*
Red-breasted Merganser	*Mergus serrator*
Red-breasted Nuthatch	*Sitta canadensis*
Red-breasted Sapsucker	*Sphyrapicus ruber*
Red-eyed Vireo	*Vireo olivaceus*
Redhead	*Aythya americana*
Red-headed Woodpecker	*Melanerpes erythrocephalus*
Red-naped Sapsucker	*Sphyrapicus nuchalis*
Red-necked Grebe	*Podiceps grisegena*
Red-necked Phalarope	*Phalaropus lobatus*
Red-throated Loon	*Gavia stellata*
Rhinoceros Auklet	*Cerorhinca monocerata*
Ring-billed Gull	*Larus delawarensis*
Ring-necked Duck	*Aythya collaris*
Rock Sandpiper	*Calidris ptilocnemis*
Rock Wren	*Salpinctes obsoletus*
Roseate Tern	*Sterna dougallii*
Rose-breasted Grosbeak	*Pheucticus ludovicianus*
Ross's Goose	*Chen rossii*
Ross's Gull	*Rhodostethia rosea*
Ruby-crowned Kinglet	*Regulus calendula*
Ruby-throated Hummingbird	*Archilochus colubris*
Ruddy Duck	*Oxyura jamaicensis*
Ruddy Turnstone	*Arenaria interpres*
Rufous Hummingbird	*Selasphorus rufus*
Sabine's Gull	*Xema sabini*
Sage Thrasher	*Oreoscoptes montanus*
Sanderling	*Calidris alba*
Sandhill Crane	*Grus canadensis*
Savannah Sparrow	*Passerculus sandwichensis*
Say's Phoebe	*Sayornis saya*
Scarlet Tanager	*Piranga olivacea*
Sedge Wren	*Cistothorus platensis*
Semipalmated Plover	*Charadrius semipalmatus*
Semipalmated Sandpiper	*Calidris pusilla*
Sharp-tailed Sandpiper	*Calidris acuminata*
Short-billed Dowitcher	*Limnodromus griseus*
Short-tailed Albatross	*Phoebastria albatrus*
Short-tailed Shearwater	*Puffinus tenuirostris*
Sky Lark	*Alauda arvensis*
Smith's Longspur	*Calcarius pictus*
Snow Bunting	*Plectrophenax nivalis*
Snow Goose	*Chen caerulescens*
Snowy Egret	*Egretta thula*
Snowy Plover	*Charadrius nivosus*
Solitary Sandpiper	*Tringa solitaria*
Song Sparrow	*Melospiza melodia*
Sooty Shearwater	*Puffinus griseus*
Sora	*Porzana carolina*

South Polar Skua	*Stercorarius maccormicki*
Spotted Sandpiper	*Actitis macularius*
Spotted Towhee	*Pipilo maculatus*
Sprague's Pipit	*Anthus spragueii*
Stilt Sandpiper	*Calidris himantopus*
Surf Scoter	*Melanitta perspicillata*
Surfbird	*Calidris virgata*
Swainson's Thrush	*Catharus ustulatus*
Swamp Sparrow	*Melospiza georgiana*
Tennessee Warbler	*Oreothlypis peregrina*
Thayer's Gull	*Larus thayeri*
Thick-billed Murre	*Uria lomvia*
Townsend's Solitaire	*Myadestes townsendi*
Townsend's Warbler	*Setophaga townsendi*
Tree Swallow	*Tachycineta bicolor*
Trumpeter Swan	*Cygnus buccinator*
Tufted Puffin	*Fratercula cirrhata*
Tufted Titmouse	*Baeolophus bicolor*
Tundra Swan	*Cygnus columbianus*
Upland Sandpiper	*Bartramia longicauda*
Varied Thrush	*Ixoreus naevius*
Vaux's Swift	*Chaetura vauxi*
Veery	*Catharus fuscescens*
Vesper Sparrow	*Pooecetes gramineus*
Violet-green Swallow	*Tachycineta thalassina*
Virginia Rail	*Rallus limicola*
Wandering Tattler	*Tringa incana*
Warbling Vireo	*Vireo gilvus*
Western Bluebird	*Sialia mexicana*
Western Grebe	*Aechmophorus occidentalis*
Western Gull	*Larus occidentalis*
Western Kingbird	*Tyrannus verticalis*
Western Meadowlark	*Sturnella neglecta*
Western Sandpiper	*Calidris mauri*
Western Tanager	*Piranga ludoviciana*
Western Wood-Pewee	*Contopus sordidulus*
Whimbrel	*Numenius phaeopus*
White-breasted Nuthatch	*Sitta carolinensis*
White-crowned Sparrow	*Zonotrichia leucophrys*
White-eyed Vireo	*Vireo griseus*
White-faced Ibis	*Plegadis chihi*
White-headed Woodpecker	*Picoides albolarvatus*
White-rumped Sandpiper	*Calidris fuscicollis*
White-throated Sparrow	*Zonotrichia albicollis*
White-throated Swift	*Aeronautes saxatalis*
White-winged Crossbill	*Loxia leucoptera*
White-winged Scoter	*Melanitta fusca*
Whooping Crane	*Grus americana*
Willet	*Tringa semipalmata*
Williamson's Sapsucker	*Sphyrapicus thyroideus*
Willow Flycatcher	*Empidonax traillii*
Wilson's Phalarope	*Phalaropus tricolor*
Wilson's Snipe	*Gallinago delicata*
Wilson's Storm-Petrel	*Oceanites oceanicus*
Wilson's Warbler	*Cardellina pusilla*
Winter Wren	*Troglodytes hiemalis*
Wood Duck	*Aix sponsa*
Wood Thrush	*Hylocichla mustelina*
Yellow Rail	*Coturnicops noveboracensis*
Yellow Warbler	*Setophaga petechia*
Yellow-bellied Flycatcher	*Empidonax flaviventris*
Yellow-bellied Sapsucker	*Sphyrapicus varius*
Yellow-billed Cuckoo	*Coccyzus americanus*
Yellow-billed Loon	*Gavia adamsii*
Yellow-breasted Chat	*Icteria virens*
Yellow-rumped Warbler	*Setophaga coronate*
Yellow-throated Vireo	*Vireo flavifrons*

Appendix 2: Nest Density Ranking Interactive Map Tool and GIS Layer

The interactive map tool can be accessed online https://maps.forsite.ca/migratory_birds/ . The map tool has the nest density risk ranking layer and shows the risk ranking polygons. Development area information can be uploaded onto the map as zipped .shp files. The map can be printed to a PDF and is automatically georeferenced.

The nest density risk ranking GIS layer can be added as a map layer in ArcGIS to show risk ranking polygons on planning and operational maps.

Risk Ranking	
#	Risk
1	Very Low
2	Low
3	Moderate
4	Moderate High
5	High
6	Very High

Appendix 3: Forest Health Guidance Chart

Forest Health Criteria	Forest Conditions		Rank Modification
Stands attacked by insects or disease (e.g. Douglas-fir beetle, mountain pine beetle, spruce beetle, defoliators, needle blight, blister rust)	If the attacked species is the leading species (>75% of the overstory)	Little to no shrub layer or understory conifers	Change to Rank 2
		Good shrub layer or conifer understory developing	Change to Rank 3
	If the attacked species is not the leading species (<75% of the overstory)	Poor or moderate shrub or understory conifer layer	Change to Rank 2
		In ESSF (mixed stands of Pl, Bl, Sx) with a good conifer understory and shrub layer	Change to Rank 3
		In ICH (mixed stands of Cw, Hw, Fd, Lw, Pl, Pw, Sx) with a good conifer understory and shrub layer	Change to Rank 4
Stands burned by wildfire	<1 year post fire	Scorched ground with no regrowth, no understory shrub layer or conifers	Change to Rank 2
	=<2 years post fire	Little to no regrowth of shrub layer and understory conifers	Change to Rank 3
	>2 years post fire	Good regrowth of shrub layer and understory conifers developing	Change to Rank 4

Appendix 4: Nesting Periods

Nesting Period	Start Date	End Date
Full	April 20	August 1
Critical	May 15	July 20

	April	May	June	July	August
Full Nesting Period		April 20 to August 1			
Critical Nesting Period			May 15 to July 20		
For ESSF, add seven days to each start and end date due to later nesting times at higher elevations.					

Data from Environment and Climate Change Canada, 2018.

The date ranges provided in the nesting periods are an estimate of the times when most bird species are nesting in the NACFOR community forest agreement area. Nesting periods may differ depending on the weather and species. ***If field crews are observing active nests outside of the nesting periods provided, the field observations should always be considered more accurate.***

Updated nesting period information can be found on Environment and Climate Change Canada's website.

Appendix 5: Stop Work Procedures

When a nest or a distressed bird behaving like a nest is nearby (e.g. calling, flying around one area, acting aggressive towards intruders) is encountered, the following procedures must be followed to avoid incidental take of migratory birds.

1. Stop working and leave the area of the nest.
2. Report the nest to an immediate supervisor.
3. The supervisor will fill out a Chance Encounter Form (Appendix 6) to document the nest location (exact or general) and the bird species (e.g. bald eagle) or group (e.g. raptor).
4. If the exact location of the nest is known, an appropriate buffer must be placed around the area. Keep in mind that some bird species, especially raptors, can be protective of their nesting area. Buffers may need to be increased so that the breeding birds are not agitated and disturbed by activities.

	Field Layout Activities	Road Construction and Harvesting Operations	Silviculture Activities
Stick nest	5-10 m	75-100 m	5-10 m
Other nest	2-8 m	10-30 m	2-8 m

   If the exact location of the nest is unknown, place a larger buffer around the nest's general area and have a qualified individual assess the area.
5. The buffer must be marked with flagging tape or all workers must be equipped with GPS units containing the nest location and maintain the buffer distance around the nest.
6. Work may resumes once a buffer is established and all operators are made aware of the incident and buffer.
7. If the nest is **being used by a species at risk**, a qualified individual must evaluate the nest to confirm the use of the nest and provide guidance on how to proceed.
8. If the nest is **not** a stick nest or a cavity, once it is confirmed to be inactive the buffer may be harvested. If the nest is a stick nest or a cavity, the buffer must remain untouched.
9. The nest location and species of bird must be entered into NACFOR's Nest Database. If the nest species is a species at risk, the location of the nest must be reported to the BC Conservation Data Centre. If the nest is listed as a Wildlife Habitat Feature (WHF) it must be reported to the WHF Data Centre. Species at risk and WHFs are listed in Appendix 1.
10. If the nest is a stick nest or cavity, the buffer can only be harvested if the nest is damaged or destroyed by natural causes or if the nest remains unused for three consecutive breeding seasons.

Appendix 6: Chance Encounter Form

Migratory Birds: Chance Encounter Form

Date of encounter:

Name(s) of Operator(s) who encountered nest:

Name of reporting Supervisor:

Supervisor contact information:

Type of operation(s):

Name/Location of worksite:

Location of nest (general or exact coordinates):

Species or group of bird:

Size of buffer (see Stop Work Procedures):

Buffer is: ribboned buffer GPS buffer

Was work stopped immediately upon encountering the nest? Yes No

Were all workers made aware of the nest and buffer? Yes No

Notes:

Submit this form to the NACFOR Supervisor or Project Manager immediately (Frances Swan, 250-265-3656 or f.swan@truenorthforestry.com)

Appendix 7: Species-Specific Strategies

Species specific strategies have been developed under *FRPA* and are meant to provide guidance for managing for species of concern. Species-specific strategies for birds of prey, seabirds, songbirds, game birds, shorebirds, and woodpeckers can be found on *FRPA*'s website: http://www.env.gov.bc.ca/wld/frpa/iwms/accounts.html#seventh_.