"Vancouver Island" Northern Pygmy-Owl

Glaucidium gnoma swarthi

Original prepared by John Cooper and Suzanne M. Beauchesne

Species Information

Taxonomy

Of the seven subspecies of Northern Pygmy-Owl currently recognized in North America, three breed in British Columbia including *Glaucidium gnoma swarthi* that is endemic to Vancouver Island and adjacent islands (AOU 1957; Cannings 1998; Campbell et al. 1990; Holt and Petersen 2000). *Glaucidium gnoma swarthi* is noticeably darker than other subspecies; however, there is some uncertainty in the validity of *swarthi*'s status as a subspecies (Munro and McTaggart-Cowan 1947; Godfrey 1986). Taxonomy of the entire *G. gnoma* complex requires further examination as there may be two or more species within the complex (Johnsgard 1988; Holt and Petersen 2000).

Description

The Northern Pygmy-Owl is a very small owl (~17 cm in length). It has no ear tufts and has a relatively long tail. A pair of black patches on the nape is a distinguishing feature.

Distribution

Global

The Northern Pygmy-Owl is resident in a variety of forest types from southeastern Alaska, northern British Columbia (absent from Queen Charlotte Islands), and southwestern Alberta, south through mountainous regions of the western states and central Mexico to central Honduras (Holt and Petersen 2000).

British Columbia

The Vancouver Island Northern Pygmy-Owl is endemic to Vancouver Island and possibly the adjacent Gulf Islands (AOU 1957; Campbell et al. 1990; Cannings 1998).

Forest regions and districts

Coast: Campbell River, North Island, South Island

Ecoprovinces and ecosections

COM: NIM, NWL, OUF, QCT, WIM

GED: LIM, NAL, SGI

Biogeoclimatic units

CDF: mm

CWH: dm, mm, vh, vm, xm

MH: mm, mmp, wh

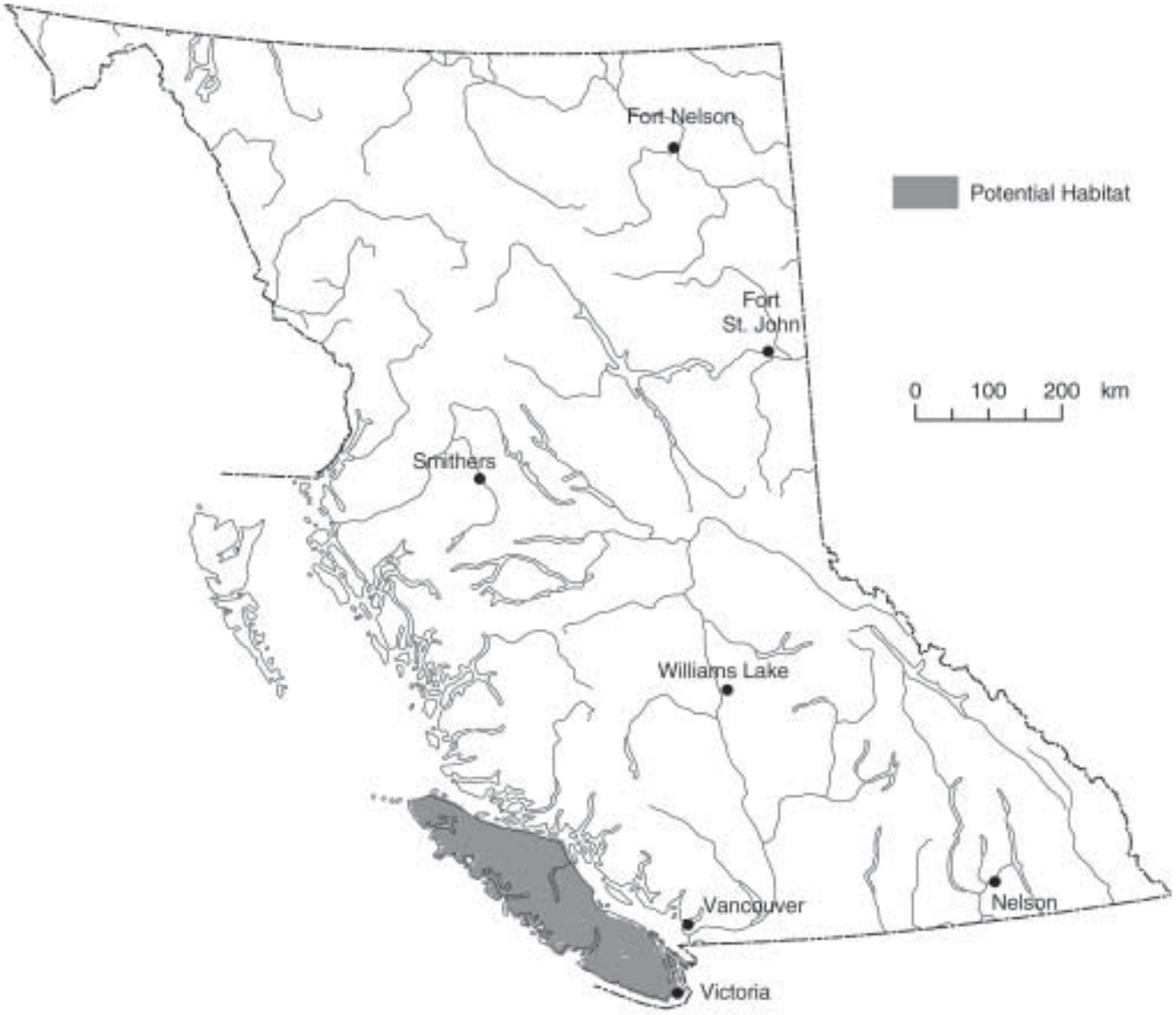
Broad ecosystem units

CD, CG, CH, CW, DA, FR, GO, HP, MF, SR

Elevation

In British Columbia, Northern Pygmy-Owls (not *G. gnoma swarthi*) nests have been found between 440 and 1220 m although individuals have been recorded from sea level to 1710 m (Campbell et al. 1990). *Glaucidium gnoma swarthi* has been detected in the breeding season in the Nimpkish Valley between 50 and 950 m (Deal and Lamont 1996; Matkoski 1997), but likely occur at higher elevations.

Northern Pygmy-Owl - subspecies *swarthi*
(Glaucidium gnoma swarthi)



Note: This map represents a broad view of the distribution of potential habitat used by this species. The map is based on several ecosystem classifications (Ecoregion, Biogeoclimatic and Broad Ecosystem Inventory) as well as current knowledge of the species' habitat preferences. This species may or may not occur in all areas indicated.

Life History

Little is known about the specifics of the biology of the Northern Pygmy-Owl on Vancouver Island; although one study was conducted in Tree Farm Licence 37 on northern Vancouver Island (Setterington 1998). Much of the following information is inferred from the limited data available for other races of this species.

Diet and foraging

Northern Pygmy-Owls are crepuscular or diurnal, and use a perch and pounce hunting method to capture small mammals including voles and mice, a wide range of bird species, invertebrates, reptiles, and amphibians (Johnsgard 1988; Holt and Leroux 1996). It has also been observed raiding nests of a variety of other bird species (Holt and Petersen 2000). The Northern Pygmy-Owl on Vancouver Island forages along roads through forested areas, openings within continuous forest, more open stands, riparian corridors, or mosaics of forested and open habitats along lakeshores and at higher elevations where stands tend to thin.

Reproduction

Clutches contain one to seven eggs (Frost 1972; Campbell et al. 1990; Holt and Petersen 2000). Unlike most other owls, incubation probably begins after the clutch is complete (Johnsgard 1988). The female alone incubates the eggs for 28 days. The male brings food to the female in the cavity during incubation and until the hatchlings are about 9 days old, at which point both parents feed the nestlings. Nestlings fledge after about 23 days and may stay near the nest, dependent upon the parents for food, for up to 3 weeks (Bent 1938; Holt and Norton 1986). In British Columbia, nests with eggs or young could be found between late April through to late August (Campbell et al. 1990). One brood is produced annually (Holt and Petersen 2000).

Little information exists for pair formation, nest site selection, or nest building behaviours (Holt and Petersen 2000). Nesting habitat details are also scarce; however, the Northern Pygmy-Owl is an obligate secondary cavity nester, dependent upon woodpecker or natural cavities as nest sites (Campbell et al. 1990; Holt and Leroux 1996). In British Columbia, all of the nests reported in Campbell et al. (1990) were found in old woodpecker cavities in coniferous trees.

Site fidelity

Nest cavities have been reused by this species, although it is not known if it was by the same or different individuals (Holt and Petersen 2000). The closely related Eurasian Pygmy-Owl has been documented reusing a nest for at least four consecutive years (Johnsgard 1988).

Home range

Home range details for this species are limited; however, these birds are usually sparsely distributed within appropriate habitat. Outside of the province, calling Northern Pygmy-Owls have been documented as close as 600 m apart in Oregon, home ranges were estimated at 75 ha in Colorado, and nests have been found as close as 1.25 km apart in Washington (Holt and Petersen 2000).

Movements and dispersal

It is a resident although there may be some seasonal altitudinal movement with birds descending to lower elevations in the fall (Campbell et al. 1990).

Habitat

Structural stage

Nesting

5: young forest (provided suitable wildlife trees)
6: mature forest
7: old forest

Foraging

3: shrub/herb
4: pole/sapling
5: young forest
6: mature forest
7: old forest

Important habitats and habitat features

Nesting

The Northern Pygmy-Owl has been reported breeding in mature and second-growth coniferous forests, mixed riparian forest, and pure deciduous stands. This owl tends to breed near the edge of forest openings, rather than in interior forest. Although this species may be a habitat generalist, using a variety of forest types during the breeding season, it is likely that the availability of suitable nesting sites (woodpecker or natural cavities) is the limiting factor influencing pygmy-owl distribution and abundance. Availability of prey could also affect distribution, although as a prey generalist this is not likely a critical factor.

Of the five known nests in British Columbia, three were in Douglas-fir (*Pseudotsuga menziesii*), one in western hemlock (*Tsuga heterophylla*), and one in western larch (*Larix occidentalis*) (Campbell et al. 1990). In northeastern Oregon, two nest trees (Douglas-fir and grand fir) (45.5 ± 9.2 cm dbh; $n = 2$) were in edge habitat, on or near steep slopes, within 110 m of streams, and had >80% canopy closure (Bull et al. 1987). Both nest-site stands were unlogged, ≤200 m wide and 2 km long. In the Oregon Coast Ranges, Northern Pygmy-Owl abundance was correlated positively with densities of bigleaf maple (*Acer macrophyllum*), although it is not known whether it uses maple for nesting (Nelson 1988). In this study, three nest trees were recorded (54.0 ± 1.7 cm dbh, 18.3 ± 1.2 m tree height, 6.3 ± 1.2 m nest height). Nest trees have been reported from southwest and east-facing slopes in Colorado; slope aspect is not available for other regions (Holt and Petersen 2000). Within British Columbia, its nests are often found on steep hillsides (Campbell et al. 1990)

A study in the Nimpkish Valley found that forest plots with Northern Pygmy-Owl present had lower basal area, crown closure, and average tree height, and were younger than random plots. These plots were also closer to lakes or wetlands than random plots (Setterington 1998). Evidence suggests that this owl is able to nest in wildlife tree retention areas within logged areas, presumably because these areas provide the required nesting sites (Bull et al. 1987; Gyug and Bennett 1995).

Cavities excavated by Northern Flickers (*Colaptes auratus*) and Hairy Woodpeckers (*Picoides villosus*) are likely the most useful for pygmy-owls. Thus the following information about nesting habitats for Hairy Woodpeckers, Northern Flickers, and Pileated Woodpeckers (*Dryocopus pileatus*) may assist in identifying potential nesting habitats for the Northern Pygmy-Owl.

Variables that best characterized Hairy Woodpecker nest plots in the Nimpkish Valley included a greater dbh and density of western hemlock, a greater basal area of deciduous and Douglas-fir trees, and a higher density of Douglas-fir stems (Deal and Setterington 2000). This same study found that the variables that best characterized Northern Flicker habitat were a greater dbh of amabilis fir (*Abies amabilis*), a greater basal area of western hemlock and western white pine (*Pinus monticola*), a greater volume of western hemlock and Sitka spruce, a greater density of western hemlock, and a lower density of yellow-cedar stems (Deal and Setterington 2000). On southeastern Vancouver Island in Coastal Western Hemlock and Coastal Douglas-fir biogeoclimatic zones, Pileated Woodpecker nest sites had significantly greater percentage canopy cover of maple and grand fir and a lower percentage cover of western hemlock than sites without nest trees (Hartwig 1999). Nest tree sites had significantly greater basal area, older structural stage, older successional stage, less disturbance, and significantly lower elevation than non-nest sites. In the Nimpkish Valley of northern Vancouver Island, 77% of Hairy Woodpecker and Northern Flicker nests were found on slopes <20%.

On northern Vancouver Island, in the Coastal Western Hemlock and Mountain Hemlock bio-geoclimatic zones, most of Hairy Woodpecker nests ($n = 73$) were found in western hemlock (60%), Douglas-fir (20%), amabilis fir (10%), red alder (4%), and western white pine (3%). Nests were found less than expected in western redcedar, but in other tree species according to their availability. In the Nimpkish Valley, Northern Flicker nests were

found in western hemlock (47%), Douglas-fir (18%), amabilis fir (15%), western white pine (9%), mountain hemlock (7%), and red alder (4%) (Deal and Setterington 2000). Northern flicker nests were found more than expected in western white pine and Douglas-fir. On southeastern Vancouver Island, Pileated Woodpecker nest cavities were found in grand fir, Douglas-fir, and red alder (Hartwig 1999). In western Oregon, nest and roost trees were found in Douglas-fir and red alder (Mellen 1987). The dbh of nest trees for these three species of woodpeckers differed depending on species of woodpecker and nesting location (Table 1). The dbh also differed depending on species of woodpecker and species of nest tree on northern Vancouver Island (Table 2).

Hairy Woodpeckers used wildlife tree classes 2–7 inclusive for nesting while the highest number of nests were found in classes 4 and 5 suggesting they prefer to nest in trees in a significant state of decay (Deal and Setterington 2000). Hairy Woodpecker nests were found more often than expected in bark class 1 trees (all bark present) and 55% of the Hairy Woodpecker nests were found in snags with >95% of the bark remaining (Deal and Setterington 2000).

In the Nimpkish Valley, Northern Flickers appeared to be select trees of decay classes 3–6 and trees with all the bark in tact. Pileated Woodpecker nest and roost trees usually had broken tops and were within the upper canopy (Hartwig 1999). Nest or roost trees ranged from being live and healthy to dead with most branches gone or absent, decay classes 2–5. In western Oregon, nest or roost trees typically had a broken top and retained most of the bark (Mellen 1987).

Foraging

This owl forages in a variety of forest types, ranging from deciduous or mixed forests in the valley bottoms to purely coniferous forest at higher altitudes. It is usually associated with the forest edge,

Table 1. Dbh (mean ± SD) (cm) of nest trees of Hairy Woodpeckers (HAWO), Northern Flickers (NOFL), and Pileated Woodpeckers (PIWO) in four locations

Forest	Location	*n*	HAWO	N	NOFL	*n*	PIWO	Citation
Western hemlock	Oregon Coast Ranges	23	72.2 ± 48.0	9	95.8 ± 30.0	15	68.9 ± 25	Nelson 1988
Mixed conifer to Douglas-fir	South. Cascades	18	73.9 ±33.4	3	127.7 ± 38.5	2	88.0 ±19.8	Lundquist 1988
CWHxm, CWHvm, MHmm	Northern Vancouver	73	78.6 ± 28.1	85	73.1 ± 3.4	2	84.2 ± 17.5	Deal and Setterington 2000
CWHxm, CDF	SE Vancouver Island					7	82 ± 42	Hartwig 1999

Table 2. Dbh (mean ± SD) (cm) of nest trees of Hairy Woodpeckers (HAWO), and Northern Flickers (NOFL) by tree species found in the Nimpkish Valley (after Deal and Setterington 2000)

Species	HAWO	*n*	NOFL	*n*
Amabilis fir	66.4 ± 23.0	8	71.0 ± 36.6	11
Douglas-fir	95.1 ± 37.6	15	110.6 ± 37.2	15
Western hemlock	76.6 ± 22.9	48	64.7 ± 18.7	39
Western white pine	77.5 ± 34.6	2	60.1 ± 18.1	9

rather than continuous tracts of forest (Campbell et al. 1990; Holt and Petersen 2000), including road edges and regenerating clearcuts. It seems to prefer habitats with a diverse understorey structure, which provides habitat for a variety of small mammals and birds.

Conservation and Management

Status

The Vancouver Island Pygmy-Owl is on the provincial *Blue List* in British Columbia. Its status in Canada has not been determined (COSEWIC 2002).

Summary of ABI status in BC and adjacent jurisdictions (NatureServe Explorer 2002)

BC	Canada	Global
S3	N3	G5T3Q

Trends

Population trends

Population size is unknown but is presumably small. There are few breeding records and no data on breeding ecology. Populations were generally thought to be declining (Campbell et al. 1990; Fraser et al. 1999). Sufficient data are lacking and long-term trends cannot be estimated. In the Nimpkish Valley, on northern Vancouver Island, numbers of Northern Pygmy-Owls remained relatively stable from 1995 to 1997, and were much more stable compared with other small forest owls such as the Western Screech-Owl (*Otus kennicotti*) and Northern Saw-whet Owl (*Aegolius acadicus*) (Setterington 1998).

Habitat trends

The Northern Pygmy-Owl is not a bird of continuous old-growth coniferous forest. It is most frequently encountered along forest edges or in disturbed areas. Since the Northern Flicker, the primary provider of nest cavities for Northern Pygmy-Owls, prefers edge habitat, and modern forestry practices include conservation of riparian forest, smaller cutblocks, and wildlife tree retention areas, it seems likely that breeding habitat is increasing rather than decreasing.

Threats

Population threats

Barred Owls (*Strix varia*) are increasing throughout Vancouver Island. Anecdotal evidence suggests that the increased population of the larger Barred Owl, following forest fragmentation, may have led to local declines in Northern Pygmy-Owls, Western Screech-Owls and Northern Saw-whet Owls on Vancouver Island where Barred Owls occur. However, data on impacts of Barred Owls are not available.

Populations of this subspecies are endemic to Vancouver Island and the Gulf Islands.

Habitat threats

Holt et al. (1999) stated that no populations of Northern Pygmy-Owl are threatened or endangered, but one local population was extirpated from a California redwood forest in which snags had been removed while owls still occurred in an unlogged adjacent forest (Marshall 1988). This example suggests there is potential for inappropriate forest management practices to negatively impact on pygmy-owl populations.

Populations of *G. gnoma swarthi* likely have few long-term threats even though nesting habitat was thought to be generally threatened by forest harvesting (Campbell et al. 1990; Fraser et al. 1999). Traditional clearcuts remove entire stands as nesting habitat, whereas historical partial cut logging often removed the larger trees needed for recruitment as future nest trees for woodpeckers and subsequently pygmy-owls (Fraser et al. 1999). With the current practices of smaller clearcuts with wildlife tree retention areas and riparian reserve zones, large-scale population reduction is unlikely. In fact, since this owl prefers edge habitat to continuous forest, current forest practices may be increasing available habitat.

Local population fluctuations can be expected if owl territories are logged without adequate retention of wildlife tree habitat. Workers' Compensation Board (WCB) regulations require cutting of decadent trees that have been identified as "danger trees" in partial cut situations, both within the work area and within falling distance of the edge of the work area. Cutting of these "danger trees" removes potential high-quality nest trees.

Legal Protection and Habitat Conservation

The Northern Pygmy-Owl, its nests, and its eggs are protected from direct persecution by the provincial *Wildlife Act*.

Much of the *G. gnoma swarthi*'s habitat is on Crown land, some of which is currently conserved in provincial or federal protected areas (e.g., Goldstream, Strathcona, Englishman River Falls, Carmanah-Walbran Provincial Parks, and Clayoquot Sound and Pacific Rim National Parks).

Under the results based code, the old forest retention targets (old growth management areas), riparian reserves, and wildlife tree retention area recommendations may partially address the requirements of this subspecies. Habitat may also be conserved in other management areas that have specific management guidelines concerning the retention of wildlife trees and related forest structure (e.g., ungulate winter range). Patches of mature or old forest habitat that include potential nest trees and recruitment trees should maintain breeding pairs because foraging could be accommodated in younger stands (Gyug and Bennett 1995).

Identified Wildlife Provisions

Sustainable resource management and planning recommendations

Because this species is largely dependent on woodpecker cavities, particularly those of medium-sized woodpeckers (e.g., Hairy Woodpecker and Northern Flicker), for nest sites, management practices that benefit woodpeckers will also enhance habitat for the Northern Pygmy-Owl.

- The objective for this species is to maintain suitable wildlife trees and green recruitment trees for nesting across the breeding range and over time. Consider WTR, OGMA, or riparian objectives for this species in all forest districts on Vancouver Island.
- Blocks should be assessed to identify potentially suitable WTR areas for the Northern Pygmy-Owl on Vancouver Island. Suitable WTR areas or OGMAs for this species should be based on the information in Table 3.
- It is recommended that salvage not occur in WTR areas and OGMAs established to provide habitat for this species. In addition, these areas should be designed to include as many suitable wildlife trees as possible that should be maintained over the long term (>80 years).

Maintain forest riparian management zones.

Wildlife habitat area

Goal

Since there are very few known nest areas for this subspecies, these sites should be established as WHAs. Suitable habitat should be managed through wildlife tree or old forest retention objectives.

Feature

Establish WHAs at known nests or occupied residences. Residency is indicated by detection during the breeding season.

Size

Typically between 80 and 100 ha but size will depend on site-specific conditions.

Design

Design WHA to minimize disturbance and maintain suitable foraging habitat. The WHA should include a 12 ha core area around the nest area if known and a 300–400 m management zone. The management zone should encompass the remaining home range, which should be estimated based on suitable habitat. When the exact location of nest site is not known, design core area to include highly suitable nest trees or known roost sites.

Table 3. Preferred WTP considerations for the Vancouver Island Northern Pygmy-Owl

Attribute	Characteristics
Size (ha)	≥1 ha in size
Features	large dbh and highest density of western hemlock, Douglas-fir, and/or deciduous stems; greater dbh of amabilis fir, greater basal area of western hemlock and western white pine, greater volume of western hemlock and Sitka spruce; greater percentage canopy cover of maple and grand fir, Douglas-fir dominant overstorey
Location	CWHvh, CWHxm, CWHdm, CWHmm, CWHvm, MHwh, MHmmp, MHmm; preferably within 500 m of riparian areas, gully/ravine complexes or forest-meadow edges; steeper gradients may be preferred
Tree features	visible woodpecker or natural cavities; broken tops; trees in upper canopy
Tree species	western hemlock, Douglas-fir, amabilis fir, grand fir, red alder, bigleaf maple, western white pine, western redcedar, mountain hemlock
Tree size (dbh*)	75–105 cm preferred: amabilis fir (70–100), Douglas-fir (100–140), western hemlock (70–95), western white pine (60–85). In the absence of trees of the preferred dbh, trees ≥40 cm dbh should be retained for recruitment
Wildlife tree class	2–6; mix of live and dead trees particularly those with an indication of heart rot
Bark class	1–2

* Weighted mean and pooled standard deviation for Hairy Woodpecker and Northern Flicker (Deal and Setterington 2000).

General wildlife measures

Goals

1. Maintain nest site or potential nest tress.
2. Minimize disturbance during critical breeding times (1 March to 30 June).
3. Maintain important structural elements for breeding and foraging.
4. Ensure WHA is windfirm.

Measures

Access

- Do not construct roads or trails within the core area unless there is no other practicable option.
- Do not construct roads during critical breeding times (1 March to 30 June) within the management zone.

Harvesting and silviculture

- Do not harvest or salvage within the core area.
- Do not salvage within the management zone. If the nest tree and other potential nest trees are not damaged, limit salvage to trees on the ground or hung-up.
- In the management zone, use partial harvesting methods that retain at least 40% basal area. Retain wildlife trees as described in Table 3 or, where not available, retain the largest dbh class trees to meet 40% retention and maintain for a full rotation with no additional harvest entries.
- Do not harvest in the management zone during the breeding season (1 March to 30 June).
- Retain a minimum 10 m riparian reserve zones on all reaches of small streams (i.e., S4, S5, S6) within WHA.

Pesticides

- Do not use pesticides.

Additional Management Considerations

Because nesting habitat is likely much more limiting than foraging habitat, silvicultural systems and practices that benefit Northern Flickers and Hairy Woodpeckers will likely enhance habitat for Northern Pygmy-Owls as well. This includes the application of various partial cut harvesting systems that retain individual trees and/or groups of trees (e.g., variable retention, sheltered, seed tree, clearcut with reserves). In these systems, both patches and individual leave trees should be considered for long-term retention to enhance recruitment of larger diameter dead and dying wildlife trees. In stand-tending operations such as juvenile spacing, if any large diameter wildlife trees are residual, these should be assessed for safety concerns and retained wherever possible. Also avoid isolating quality habitat patches.

Information Needs

1. Population estimates and trends.
2. Distribution and relative abundance in various BEC subzones.
3. Suitability of various sizes and quality of wildlife tree retention areas for nesting habitat.

Cross References

Marbled Murrelet

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