

COSEWIC
Assessment and Status Report

on the

White-headed Woodpecker
Picoides albolarvatus

in Canada



ENDANGERED
2010

COSEWIC
Committee on the Status
of Endangered Wildlife
in Canada



COSEPAC
Comité sur la situation
des espèces en péril
au Canada

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COSEWIC Assessment Summary

Assessment Summary – November 2010

Common name

White-headed Woodpecker

Scientific name

Picoides albolarvatus

Status

Endangered

Reason for designation

In Canada, this distinctive woodpecker breeds only in British Columbia. Its Canadian population is extremely small, likely fewer than 100 individuals. The population is exposed to ongoing threats from habitat loss and degradation. Rescue from the U.S., where populations are sparse, is expected to be limited due to U.S. population declines and restricted remaining habitat in Canada.

Occurrence

British Columbia

Status history

Designated Threatened in April 1992. Status re-examined and designated Endangered in November 2000 and November 2010.



COSEWIC
Executive Summary

White-headed Woodpecker
Picoides albolarvatus

Wildlife species description and significance

The White-headed Woodpecker, known as the Pic à tête blanche in French, is a distinctive bird, being the only woodpecker in the world with a black body and a white head. There are two subspecies; only the nominate form is found in Canada and it occurs within a single biogeographic zone, so a single designatable unit is considered here. The White-headed Woodpecker is closely tied to Ponderosa Pine forests.

Distribution

The White-headed Woodpecker is resident from extreme southern British Columbia south along the east slope of the Cascade Mountains to the mountains of California and Nevada. In Canada, known breeding sites are restricted to the Okanagan Valley from Naramata south to the U.S. border.

Habitat

The White-headed Woodpecker breeds in dry conifer forests; from British Columbia south to Oregon it is restricted to Ponderosa Pine forests, while in California it is found in more diverse forests. The unifying factor is the presence of mature pines with large cones and large seeds. The structure of the Ponderosa Pine forest has changed significantly over the past century. It is now dominated by dense stands of younger pines that are less suitable for White-headed Woodpeckers, because they produce fewer cones and generally lack the abundant snags that are essential to the birds for breeding sites.

Biology

Like most members of the woodpecker family, the White-headed Woodpecker excavates cavities in dead or dying trees for nest and roost sites. Unlike other woodpeckers, the White-headed Woodpecker relies heavily on pine seeds for a winter food source and feeds on insects to a much lesser degree. There is no information on survivorship, but the generation time is estimated to be three to four years.

Population sizes and trends

The Canadian population is very small, certainly fewer than 100 and perhaps on the order of 10 breeding adults. Based on the frequency of sightings, the population was likely higher in the 1960s, but was still probably fewer than 100 birds during that period. There are reports of the species every year, so it is a regular species in Canada, but its low population density here makes population trends impossible to calculate. Populations in Washington and Idaho are also very small, but the species is relatively common in parts of southern Oregon and California.

Limiting factors and threats

The Canadian population of the White-headed Woodpecker is largely limited by the loss and degradation of Ponderosa Pine forests. Extensive and intensive forest harvest removed most mature Ponderosa Pines from the Canadian range in the first half of the 1900s. This harvest is not a substantial factor today, but has left a young, dense forest that is generally not suitable for White-headed Woodpeckers. Additionally, frequent, intense forest fires in the past decade, particularly in 2003, destroyed significant areas of habitat that will likely remain as grassland and not return to mature Ponderosa Pine forest for centuries to come. Finally, the Mountain Pine Beetle epidemic that has affected British Columbia pine forests over the past decade threatens to significantly impact the remaining Ponderosa Pine forests of the south Okanagan in the next five years.

Protection, status and ranks

The White-headed Woodpecker is listed as Endangered on Schedule 1 of the *Species at Risk Act*. It was last assessed by COSEWIC in 2000 as Endangered. It is on the British Columbia Red List of candidate species for threatened or endangered status. It is listed as G4 globally, S1 in British Columbia, S2 in Idaho, and S2S3 in Washington and Oregon. The White-headed Woodpecker and its nests and eggs are protected in Canada from hunting and collecting under the *Migratory Birds Convention Act*, 1994. It is also protected in British Columbia under the *Wildlife Act*, 1982. Four provincial Wildlife Habitat Areas, totalling 198.5 hectares, have been created to protect White-headed Woodpecker breeding habitat.

TECHNICAL SUMMARY

Picoides albolarvatus

White-headed Woodpecker

Range of occurrence in Canada: B.C.

Pic à tête blanche

Demographic Information

Generation time (usually average age of parents in the population; indicate if another method of estimating generation time indicated in the IUCN guidelines(2008) is being used)	ca. 3-4 yrs
Is there an [observed, inferred, or projected] continuing decline in number of mature individuals? Inferred decline projected based on continuing habitat loss	Possible
Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations]	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over the last [10 years, or 3 generations].	Unknown
[Projected or suspected] percent [reduction or increase] in total number of mature individuals over the next [10 years, or 3 generations].	Unknown
[Observed, estimated, inferred, or suspected] percent [reduction or increase] in total number of mature individuals over any [10 years, or 3 generations] period, over a time period including both the past and the future.	Unknown
Are the causes of the decline clearly reversible and understood and ceased?	No; causes of habitat loss known, but not ceased.
Are there extreme fluctuations in number of mature individuals?	No

Extent and Occupancy Information

Estimated extent of occurrence	1500 km ²
Index of area of occupancy (IAO) (Always report 2x2 grid value; other values may also be listed if they are clearly indicated (e.g., 1x1 grid, biological AO)).	< 20 km ²
Is the total population severely fragmented?	No
Number of "locations*" Based on threat from Mountain Pine Beetle	1
Is there an [observed, inferred, or projected] continuing decline in extent of occurrence?	No
Is there an [observed, inferred, or projected] continuing decline in index of area of occupancy? Inferred decline projected based on continuing habitat loss	Possible
Is there an [observed, inferred, or projected] continuing decline in number of populations?	No
Is there an [observed, inferred, or projected] continuing decline in number of locations?	No
Is there an [observed, inferred, or projected] continuing decline in [area, extent and/or quality] of habitat?	Yes
Are there extreme fluctuations in number of populations?	No
Are there extreme fluctuations in number of locations*?	No

* See definition of location.

Are there extreme fluctuations in extent of occurrence?	No
Are there extreme fluctuations in index of area of occupancy?	No

Number of Mature Individuals (in each population)

Population	N Mature Individuals
Total	<100

Quantitative Analysis

Probability of extinction in the wild is at least [20% within 20 years or 5 generations, or 10% within 100 years].	None conducted
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Threats (actual or imminent, to populations or habitats)

<ol style="list-style-type: none"> 1. Past forest harvest has created poor quality habitat with small trees in dense stands that produce relatively few cones 2. Stand-destroying forest fires will likely increase in frequency and severity 3. Pine beetle epidemic has destroyed large areas of habitat and will continue to do so for the next five years
--

Rescue Effect (immigration from outside Canada)

Status of outside population(s)? low population density in neighbouring Washington	
Is immigration known or possible?	Yes
Would immigrants be adapted to survive in Canada?	Yes
Is there sufficient habitat for immigrants in Canada?	Yes
Is rescue from outside populations likely?	Possible, but likely limited
Small population in Washington likely to limit rescue	

Current Status

COSEWIC: Endangered (November 2010)

Status and Reasons for Designation

Status: Endangered	Alpha-numeric code: B1ab(ii,iii)+2ab(ii,iii); C2a(i,ii); D1
Reasons for designation: In Canada, this distinctive woodpecker breeds only in British Columbia. Its Canadian population is extremely small, likely fewer than 100 individuals. The population is exposed to ongoing threats from habitat loss and degradation. Rescue from the U.S., where populations are sparse, is expected to be limited due to U.S. population declines and restricted remaining habitat in Canada.	

Applicability of Criteria

Criterion A (Decline in Total Number of Mature Individuals): No trend information available for population in Canada.
Criterion B (Small Distribution Range and Decline or Fluctuation): Meets Endangered B1ab(ii,iii)+2ab(ii,iii) because EO is < 5000 km ² and IAO is < 500 km ² and it is known to exist at < 5 locations and there is a projected continuing decline in the index of area of occupancy and habitat quality.
Criterion C (Small and Declining Number of Mature Individuals): Meets Endangered C2a(i,ii) because the total number of mature individuals is < 2500 and a decline is expected based on continuing declines in habitat quality; and no population is estimated to contain > 250 individuals; and one population has > 95% of all mature individuals.
Criterion D (Very Small or Restricted Total Population): Meets Endangered D1 because the population is estimated to have < 250 mature individuals.
Criterion E (Quantitative Analysis): None conducted.



COSEWIC HISTORY

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) was created in 1977 as a result of a recommendation at the Federal-Provincial Wildlife Conference held in 1976. It arose from the need for a single, official, scientifically sound, national listing of wildlife species at risk. In 1978, COSEWIC designated its first species and produced its first list of Canadian species at risk. Species designated at meetings of the full committee are added to the list. On June 5, 2003, the *Species at Risk Act* (SARA) was proclaimed. SARA establishes COSEWIC as an advisory body ensuring that species will continue to be assessed under a rigorous and independent scientific process.

COSEWIC MANDATE

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses the national status of wild species, subspecies, varieties, or other designatable units that are considered to be at risk in Canada. Designations are made on native species for the following taxonomic groups: mammals, birds, reptiles, amphibians, fishes, arthropods, molluscs, vascular plants, mosses, and lichens.

COSEWIC MEMBERSHIP

COSEWIC comprises members from each provincial and territorial government wildlife agency, four federal entities (Canadian Wildlife Service, Parks Canada Agency, Department of Fisheries and Oceans, and the Federal Biodiversity Information Partnership, chaired by the Canadian Museum of Nature), three non-government science members and the co-chairs of the species specialist subcommittees and the Aboriginal Traditional Knowledge subcommittee. The Committee meets to consider status reports on candidate species.

DEFINITIONS (2010)

Wildlife Species	A species, subspecies, variety, or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature and is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years.
Extinct (X)	A wildlife species that no longer exists.
Extirpated (XT)	A wildlife species no longer existing in the wild in Canada, but occurring elsewhere.
Endangered (E)	A wildlife species facing imminent extirpation or extinction.
Threatened (T)	A wildlife species likely to become endangered if limiting factors are not reversed.
Special Concern (SC)*	A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
Not at Risk (NAR)**	A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient (DD)***	A category that applies when the available information is insufficient (a) to resolve a species' eligibility for assessment or (b) to permit an assessment of the species' risk of extinction.

* Formerly described as "Vulnerable" from 1990 to 1999, or "Rare" prior to 1990.

** Formerly described as "Not In Any Category", or "No Designation Required."

*** Formerly described as "Indeterminate" from 1994 to 1999 or "ISIBD" (insufficient scientific information on which to base a designation) prior to 1994. Definition of the (DD) category revised in 2006.



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The Canadian Wildlife Service, Environment Canada, provides full administrative and financial support to the COSEWIC Secretariat.

COSEWIC Status Report

on the

White-headed Woodpecker *Picoides albolarvatus*

in Canada

2010

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SPECIES INFORMATION

Name and classification

Scientific name: *Picoides albolarvatus*

English name: White-headed Woodpecker

French name: Pic à tête blanche

Classification: Class Aves

The White-headed Woodpecker is an atypical member of the genus *Picoides*. Its unusual morphological features, including short tongue, black body plumage, black tail, white wing patches and reduced facial patterning (Figure 1) separate it from other members of the genus, and it was for some time placed in the monotypic genus *Xenopicus*. There are two subspecies, *P. a. gravirostris* in the mountains of southern California and the nominate *P. a. albolarvatus* throughout the remainder of the range. *P. a. gravirostris* is considered weakly differentiated on the basis of a slightly longer bill (Garrett *et al.* 1996).

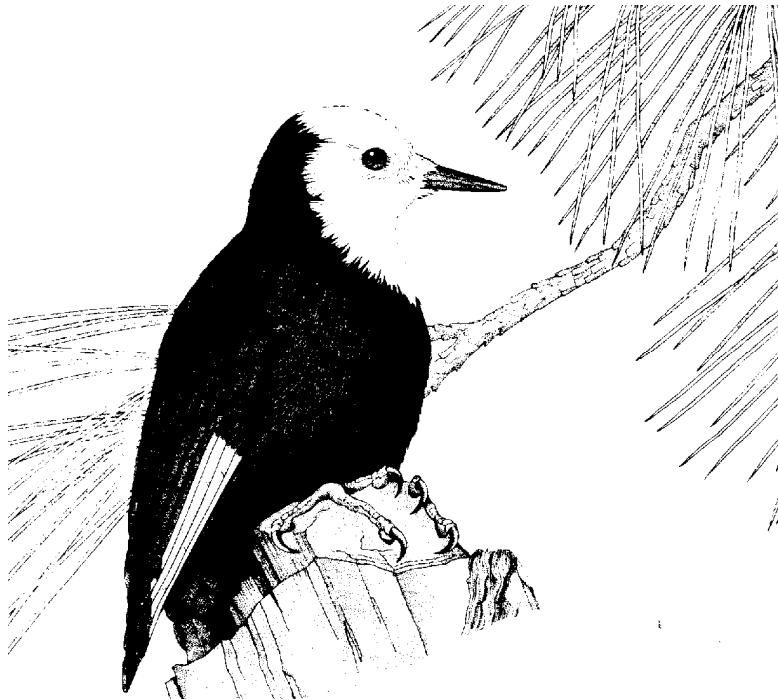


Figure 1. White-headed Woodpecker. Line drawing by Robert A. Cannings. Used with permission of R.A. Cannings.

Morphological description

The White-headed Woodpecker is unmistakable in appearance; no other North American woodpecker has a white head, and only the much larger Pileated Woodpecker (*Dryocopus pileatus*) has a similarly all-black body. The only bird that is occasionally mistaken for the White-headed Woodpecker is the Clark's Nutcracker (*Nucifraga columbiana*), a corvid that has a pale grey head, black-and-white wings, a woodpecker-like bill, and often acts like a White-headed Woodpecker when pecking at Ponderosa Pine (*Pinus ponderosa*) cones.

Population spatial structure and variability

Alexander and Burns (2006) sampled 78 White-headed Woodpeckers to study the genetic relationships of populations throughout the range of the species. Their results supported the validity of the two subspecies. The Canadian population was not sampled in this study, but the adjacent population in Washington State was part of a widespread clade. Average nucleotide diversity (p) for the species was 0.002 and the overall AMOVA yielded a Φ_{st} of 0.33, with 67% of the molecular variation explained by within-population differences and 33% by among-population differences. When populations were separated into subspecific groups, 27% of the variation was explained by differences between the northern and southern subspecies.

Designatable units

There is only one subspecies recognized in Canada and one population occurs within a single biogeographic zone. Therefore, only a single designatable unit is considered here.

Special significance

The White-headed Woodpecker shares its pine forest habitat with several other species at risk, including the SARA-listed Western Rattlesnake (*Crotalus viridis*), Western Yellow-bellied Racer (*Coluber constrictor*), Great Basin Gophersnake (*Pituophis melanoleucus*), Spotted Bat (*Euderma maculatum*), Nuttall's Cottontail (*Sylvilagus nuttallii*), Western Harvest Mouse (*Reithrodontomys megalotis*), and Lewis's Woodpecker (*Melanerpes lewis*); along with the provincially blue-listed California Bighorn Sheep (*Ovis canadensis californiana*) and Gray Flycatcher (*Empidonax wrightii*).

DISTRIBUTION

Global range

The White-headed Woodpecker is resident in coniferous forests from extreme southern British Columbia south through eastern Washington and northern Idaho to southern California and Nevada (American Ornithologists' Union 1998) (Figure 2). In Washington, populations are restricted to a narrow band along the east slopes of the Cascades, with small disjunct populations in the Spokane and Blue Mountain areas (Smith *et al.* 1997).

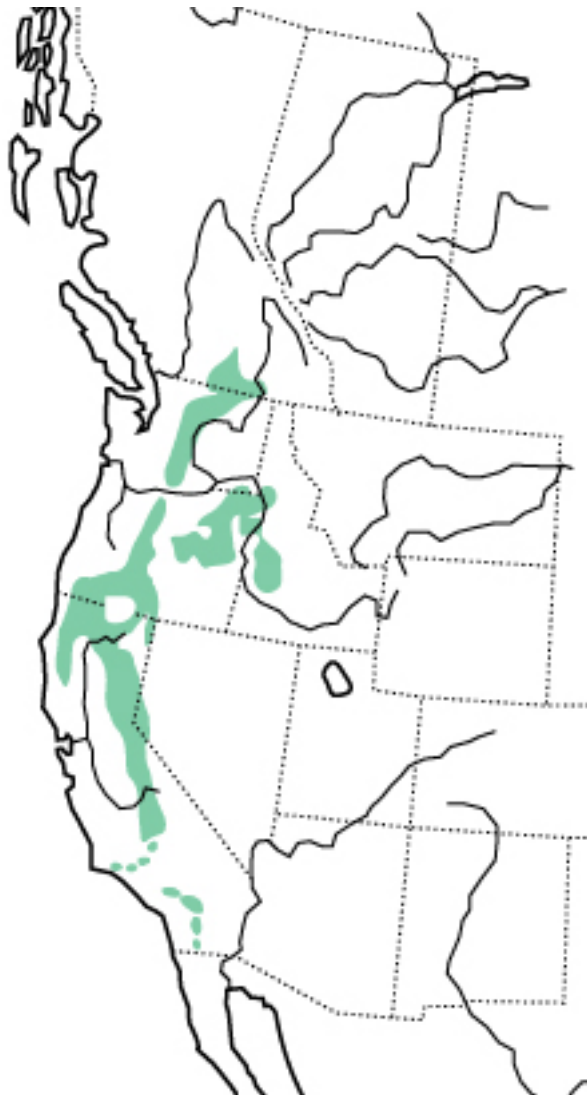


Figure 2. Distribution of the White-headed Woodpecker (from Garrett *et al.* 1996).

Canadian range

In Canada, the White-headed Woodpecker is found only in British Columbia, where it is a very rare resident in the Okanagan Valley from Naramata south, and casual (not reported annually) in the Similkameen Valley, Grand Forks area, and the Kootenays (Weber and Cannings 1976, Cannings *et al.* 1987, Campbell *et al.* 1990) (Figure 2, Figure 3). All breeding records to date and about 90 percent of all sight records have been from the southern Okanagan Valley (Weber and Cannings 1976, Campbell *et al.* 1990). There has been no detectable change in the Canadian range over the past century (Campbell *et al.* 1990), although before 1950 the species was thought to be an irregular visitor to Canada (Munro and Cowan 1947). White-headed Woodpeckers were first reported from Canada in 1890 and there were only five records of the species after that until the 1950s (Campbell *et al.* 1990). While this may reflect a real absence, it was probably an artifact of the small number of bird enthusiasts in the valley before the 1950s.

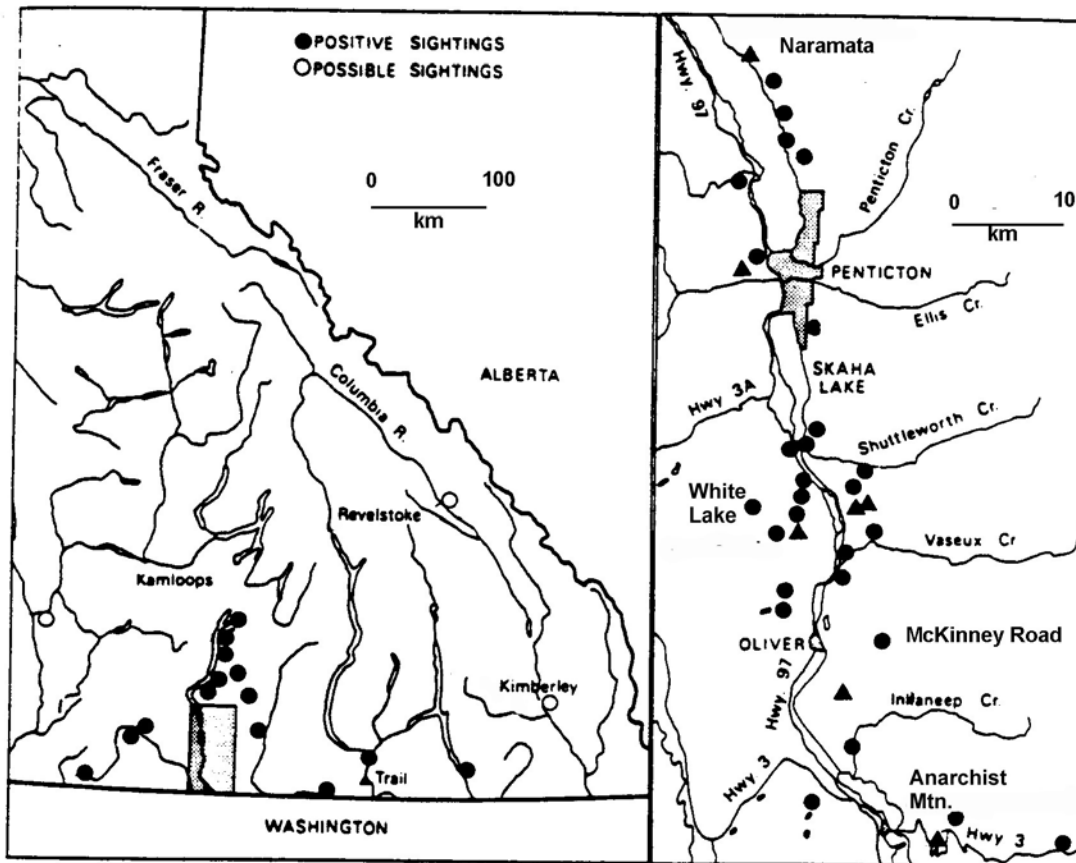


Figure 3. Distribution of White-headed Woodpecker in British Columbia. Filled circles indicate confirmed sightings, open circles indicate unconfirmed sightings, triangles indicate known breeding sites (adapted from Cannings 1992).

There are approximately 66,000 ha of *potentially* suitable habitat (Ponderosa Pine and dry Douglas-fir, *Pseudotsuga menziesii*, forests) in the south Okanagan (Ministry of Environment, Lands and Parks 1998); adjacent areas such as the Bridesville-Rock Creek district of the Kettle Valley could bring this figure to 100,000 ha. How much of this is occupied likely varies greatly from year to year, but it would be difficult to make even an educated guess as to the figure, as this species tends to be difficult to detect and occurs at very low densities in Canada.

The Canadian extent of occurrence is approximately 1500 km² based on a convex polygon, and the index of area of occupancy is 20 km² based on the 2X2-km grid and an assumption of five breeding pairs, each with a home range < 4 km².

HABITAT

Habitat requirements

The White-headed Woodpecker has long been considered a classic example of a species dependent on Ponderosa Pine and/or its close relatives, such as Jeffery Pine (*P. jefferyi*), Sugar Pine (*P. lambertiana*) and Coulter Pine (*P. coulteri*) (Garrett *et al.* 1996). In Oregon it selects multistoried, old-growth Ponderosa Pine forests with canopies > 51%, maximum height > 32 m and shrub cover > 30% (Dixon 1995). Throughout its range, the dominant requisite habitat components include an abundance of mature pines, relatively open canopy (50-70%), and availability of snags for nesting (Garret *et al.* 1996). Local populations are most common in burned or cut forests where residual large-diameter live and dead trees are present (Raphael 1981, Raphael and White 1984, Raphael *et al.* 1987). White-headed Woodpeckers reach their greatest abundance where more than one species of large-seeded pine is present (Garret *et al.* 1996).

As to habitat structure, Milne and Hejl (1989) state that the White-headed Woodpecker tends to nest in open-canopied stands of mature and overmature trees; 22 nests were in stands with less than 40% canopy cover and 21 were in stands with 41-69% cover; 10 nests were in snags in meadows, presumably surrounded by forest. Eighty-seven percent were in mature and older stands of conifer forest and 68% were on southern rather than northern aspects.

Thomas (1979) states that White-headed Woodpeckers primarily use mature and old-growth pure Ponderosa Pine and mixed forests. Grand Fir (*Abies grandis*), Subalpine Fir (*Abies lasiocarpa*), and Lodgepole Pine (*Pinus contorta*) forests were of secondary importance. According to Thomas (1979) and Bull (1977), snags must be a minimum of 25 cm dbh (diameter at breast height) for use as nest or roost sites, and a snag density of 558/100 ha (about 45/territory) is needed for maximum population density. That is the highest snag density requirement for any Oregon woodpecker (Thomas 1979).

Habitat trends

The extent of Ponderosa Pine forests has not substantially decreased within the Canadian range of White-headed Woodpeckers, but the structure of these forests has significantly changed over the last century. Historically, there were approximately 32,000 ha of forests dominated by Ponderosa Pine in the south Okanagan and lower Similkameen Valleys, of which about 4358 ha have been converted to agricultural or urban habitats in the past century (BC Ministry of Environment, Lands and Parks, unpubl. data, Cannings *et al.* 1998). Of the remaining 27,500 ha, about 9500 ha (34.5%) were classed as old growth in the mid-1990s (Ministry of Environment, Lands and Parks 1998).

It is not known what the proportion of old-growth forests was before European settlement of the area in the mid-1800s, but it was likely in excess of 75% (Klenner *et al.* 2008). Summaries of merchantable Ponderosa Pine in the British Columbia interior as a whole indicated that in 1917, 3,921,450 m³ were available. By 1937, total volume of pine had declined to 1,239,542 m³, and by 1957, only 715,761 m³ remained (18% of 1917 levels) (Department of Land and Forests 1957). By the 1950s, concern was being expressed that the harvest of Ponderosa Pine in British Columbia was unsustainable (Klenner *et al.* 2008). Old-growth Ponderosa Pine is now considered one of the rarest forest types in western North America (Illg and Illg 1994). Logging activity in White-headed Woodpecker habitat has declined steadily since the 1960s; in that decade about 7 percent of the habitat was harvested in British Columbia. That figure fell to about 5 percent in both the 1970s and 1980s, and about 1.5 percent in the 1990s (Klenner *et al.* 2008). Although almost all this forest harvest was selective (i.e. large trees removed and smaller trees retained), snags vital to White-headed Woodpeckers were almost always removed before felling of live trees began (Stone *et al.* 2002).

These declining trends are mirrored in adjacent Washington State. Jim Acton, commenting on the species' status around Spokane in Stepniewski (1999) states "Around Fort Spokane is about the only place we see them regularly in the region now. Formerly they were much more widespread. In the past, there were decent sized pines, now they're all cut down." So, while the Canadian population may well have always been small in the last century, opportunities for rescue from the United States are likely minimal.

This past harvest has produced forests consisting of dense stands of smaller trees with very few snags. Fire suppression since 1950 and the cessation of prescribed burning actions by indigenous people since the late 1800s have helped maintain this forest structure (Everett *et al.* 2007). Forests of this type are not as suitable for White-headed Woodpeckers because they lack snags and do not produce as many cones as open stands of large trees (Oliver and Ryker 1990). Dense forests are also much more susceptible to catastrophic, stand-destroying fires (Mutch *et al.* 1993).

There has been a recent increase in the size, number and severity of forest fires in the region (Klenner *et al.* 2008). This increase is likely attributable to both the dense structure of the forest and the recent trend to longer, hotter, drier summers. The increase in fire severity and frequency may significantly impact the extent of White-headed Woodpecker habitat in Canada if climatic trends continue. In 2003, three major fires burned over 10,000 ha of Ponderosa Pine habitat in the Okanagan Valley at Okanagan Mountain (25,000 ha, about 7,000 of which was Ponderosa Pine), Vaseux Lake (3300 ha, almost all Ponderosa Pine), and Anarchist Mountain (1230 ha, almost all Ponderosa Pine) (BC Forest Service 2003). These fires thus affected about a third of the suitable habitat for White-headed Woodpeckers in the Okanagan Valley.

The Mountain Pine Beetle (*Dendroctonus ponderosae*) epidemic now underway in British Columbia has mainly affected Lodgepole Pine forests, but about 95 percent of the mature Ponderosa Pines in the Thompson Valley were killed in August 2006 when a massive flight of these insects blanketed the valley forests (Klenner and Arsenault 2009). Westfall and Ebata (2008) report that 83,420 ha of Ponderosa Pine in British Columbia were affected by pine beetle in 2007, almost double the figure recorded in 2006. High mortality of Ponderosa Pine is now occurring farther south in the Nicola and Similkameen valleys. While almost all these losses have occurred just north of the range of the White-headed Woodpecker, over half of the pines in the Okanagan Valley are predicted to be affected by 2014 (Westfall and Ebata 2008, Klenner and Arsenault 2009). While pine beetle epidemics provide a substantial short-term food source for other species of woodpeckers, White-headed Woodpeckers do not feed on these insects to any extent and so do not benefit from them in that sense (Garret *et al.* 1996).

Habitat protection/ownership

Of the habitat that was suitable for White-headed Woodpeckers in the south Okanagan in the year 2000 (including foraging habitat in dry Douglas-fir forests), ownership is divided as follows: provincial Crown Land, 35%; Indian Reserves, 28%; private land, 21%, and conservation lands (parks, Nature Trust properties, etc.), 16% (adapted and updated from Ministry of Environment, Lands and Parks 1998). Other provincially protected areas that consist largely of White-headed Woodpecker habitat are Vaseux (1014 ha), Anarchist (188 ha) and White Lake Grasslands (3408 ha). The South Okanagan Grasslands protected area (1106 ha) also has some suitable habitat. Vaseux-Bighorn National Wildlife Area and various properties owned by the Nature Trust of B.C. around Vaseux Lake also protect White-headed Woodpecker habitat. Land tenures in the south Okanagan Valley and woodpecker locations are shown in Figure 4.

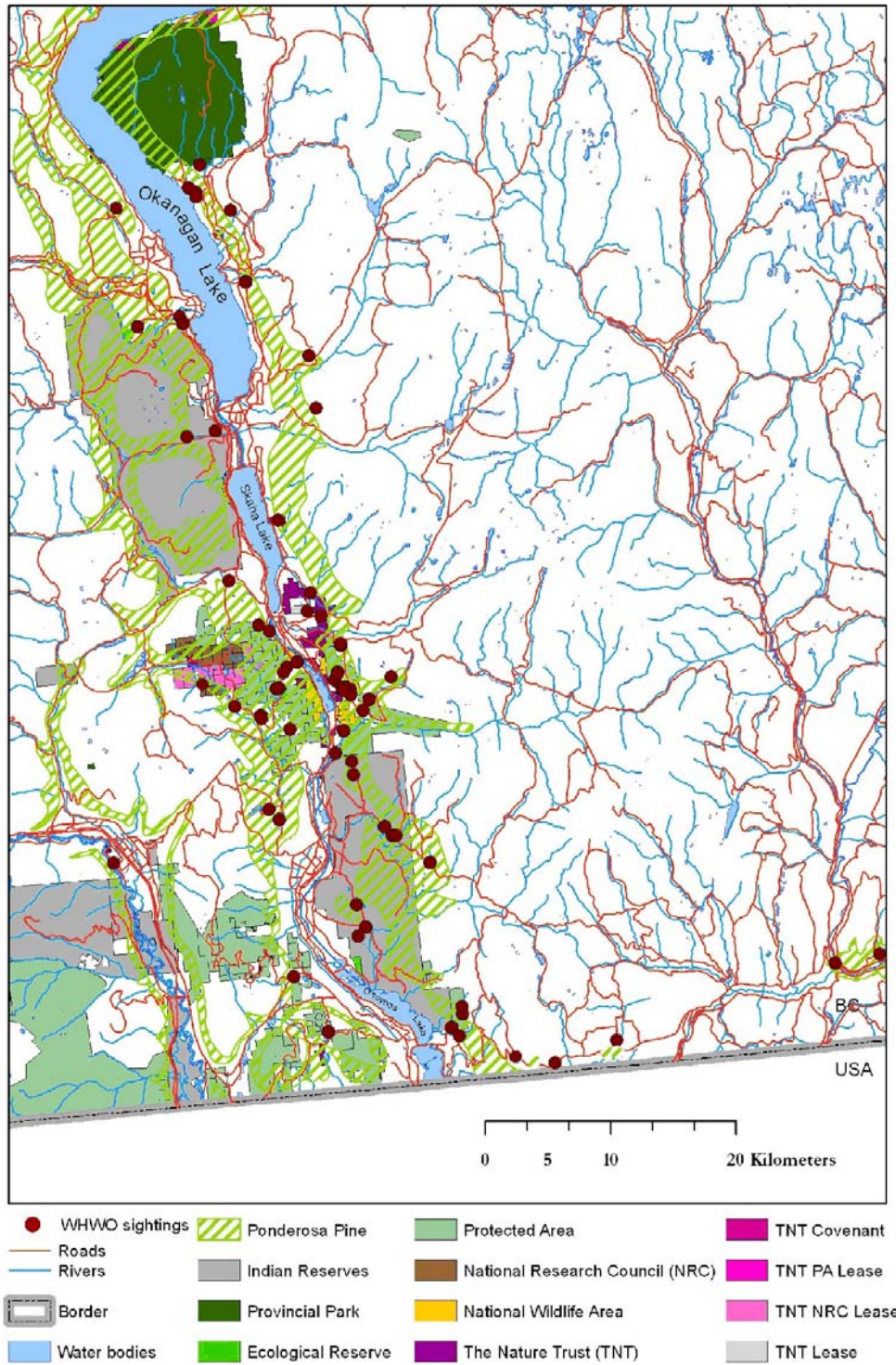


Figure 4. South Okanagan-Similkameen region with general land ownership, and White-headed Woodpecker sightings up to 2009. Okanagan Mountain Provincial Park is the dark green shape at the north end of the map.

The areas discussed above are for Ponderosa Pine habitat of varying quality. About half of the protected lands are in Okanagan Mountain Provincial Park, which was largely burned in 2003. The Vaseux and Anarchist Protected Areas were burned in 2003 as well, destroying large areas of suitable habitat (BC Forest Service 2003), so the overall conservation land component of White-headed Woodpecker habitat is likely much smaller now, likely less than 10% instead of the 16% reported above.

Some habitat enhancement projects, about 100 ha in extent, have been undertaken on the Vaseux-Bighorn National Wildlife Area and the White Lake Grasslands Protected Area. These involve thinning of young pines and prescribed burns to create a more open forest (Orville Dyer, pers. comm.).

BIOLOGY

White-headed Woodpeckers are territorial, monogamous birds; like other woodpeckers they excavate cavities in dead or dying trees for roost and nest sites (Garrett *et al.* 1996).

White-headed Woodpeckers eat a variety of insects, but more than most species of woodpeckers rely on seeds, specifically large pine seeds, for survival (Beal 1911, Tevis 1953, Koch *et al.* 1970, Garrett *et al.* 1996). Ponderosa Pine seeds are usually only widely available in the late summer and fall except in years of good cone crops (Dahms and Barrett 1975). The best seed crops are produced by large, mature trees growing in open situations, and good crops occur every four to five years in the Pacific Northwest (Oliver and Ryker 1990).

When searching for insects, White-headed Woodpeckers tend to flake away bark or glean from the needles, and, more than other woodpecker species, tend to forage on live trees (Ligon 1973, Morrison and With 1987).

Life cycle and reproduction

Clutch size is usually four to five eggs, and typically one to three young are fledged from each successful nest (Garrett *et al.* 1996). The only closely examined British Columbia nest contained four fresh eggs (Cooper 1969). There is no evidence for more than one brood per season; young have been found in British Columbia nests from 30 May to 16 July (Campbell *et al.* 1990).

There are no data available on survivorship (Garrett *et al.* 1996). Data from similar species (e.g. Downy and Hairy woodpeckers, *Picoides pubescens* and *P. villosus*) suggest that White-headed Woodpeckers could have a life span of more than 10 years in the wild (Clapp *et al.* 1983). The average generation time is likely three to four years.

Physiology

The White-headed Woodpecker is adapted to life in continental montane environments, so it can presumably tolerate a wide range of temperatures and other climatic conditions, as long as food is readily available.

Dispersal and migration

The White-headed Woodpecker is non-migratory, but does undertake significant dispersal movements. Birds have been seen outside the usual breeding range in British Columbia, sometimes up to 250 km away (e.g. Manning Provincial Park, Golden; Campbell *et al.* 1990). It is possible that the Canadian population could increase after a year of high breeding success in Washington State because dispersing young birds from that population could reach the south Okanagan.

Interspecific interactions

White-headed Woodpeckers compete with Pygmy Nuthatches (*Sitta pygmaea*) and Red Crossbills (*Loxia curvirostra*) for pine seeds, and have been seen chasing those species from feeding sites (Garrett *et al.* 1996). They also chase, and are chased by, Hairy Woodpeckers at cones (Garrett *et al.* 1996).

White-headed Woodpeckers also frequently interact with other cavity-nesting species such as bluebirds (*Sialia* spp.), Pygmy Nuthatches, and Violet-green Swallows (*Tachycineta thalassina*) around nest sites. Nest sites in Oregon have been taken over by Flying Squirrels (*Glaucomys sabrinus*) and European Starlings (*Sturnus vulgaris*) (Garrett *et al.* 1996).

Cooper's Hawks (*Accipiter cooperi*) and Great Horned Owls (*Bubo virginianus*) are known to feed on adult woodpeckers, and chipmunks (*Tamias* sp.) have been found feeding on eggs and nestlings (Garrett *et al.* 1996).

Adaptability

The White-headed Woodpecker was given the lowest versatility index of any Oregon woodpecker based on its relatively narrow habitat requirements and need for large-diameter trees and high densities of snags (Thomas 1979). This narrow habitat requirement is exacerbated by its reliance on pine seeds for winter survival; pine seeds are produced in quantity only by large, mature trees (Oliver and Ryker 1990).

POPULATION SIZES AND TRENDS

Search effort

Most of the sightings of White-headed Woodpeckers in Canada have been incidental reports from birders or naturalists. The White-headed Woodpecker is one of the most sought-after species for birders in Canada, so a great deal of effort has been put into finding this bird over the past 50 years and much of the suitable habitat for the species is checked thoroughly and regularly by birders (R.J. Cannings pers. obs.). A compendium of such sightings from 1952 to 1991 (BC Ministry of Environment 1992) listed 112 sightings from 37 locations in the south Okanagan. Early effort is harder to quantify, but before 1950 there were less than 10 birders living in the Okanagan, as compared to about 50 in 1960 and over 100 at present.

In the mid-1990s, considerable effort was made to survey for White-headed Woodpeckers in the south Okanagan. Joy *et al.* (1995) surveyed 66 sites identified as potential habitat from forest cover maps, but found that only 21 of them were actually suitable for White-headed Woodpeckers. A 1996 survey involved 595 call playback stations in about 51 areas (Ramsay 1997). The latter survey was continued in 1997, involving a further 216 call playback sites (BC Ministry of Environment, unpubl. data). Also in 1996, two forestry cutting permit areas were searched using call playback and nest searches (Gyug 1996); these areas were searched again in 1997 (Gyug 1997).

From 2002 to 2008, a feeder watch program for White-headed Woodpeckers was instituted. Fifty interested homeowners living in Ponderosa Pine woodlands were provided suet feeders and asked to report the presence of any White-headed Woodpeckers. No White-headed Woodpeckers were seen at the feeders, but there were 13 reports of this species from other members of the public to the project office during this time (Bezener 2009).

Abundance

The global population of White-headed Woodpeckers has been estimated at 70,000 based on extrapolations from the 1990s from the Breeding Bird Survey (Blancher *et al.* 2007). The size of the Canadian population of White-headed Woodpecker is very difficult to determine. All of the dedicated surveys in the 1990s listed in the previous section resulted in only one White-headed Woodpecker detection. This species is hard to detect at low densities, and at least at the northern end of its range, shows little site philopatry over the long term. The general pattern over the last 20 years or so is of pairs breeding at or remaining in a localized area for a year or two, then moving on (BCINTBIRD listserve archives). It is clear from birders' sight records that this species is present in Canada every year, and likely a few pairs nest here annually (Table 1). Recent breeding records are from the Okanagan Valley south of Oliver. A family group was present in 2001 along the McKinney Road east of Oliver, and birds were seen there from 2002, through 2004 and again in 2009-2010 (Table 1). From 2005 through 2008 up to four birds were seen on Anarchist Mountain east of Osoyoos

(Table 1, Bezener 2009). Admittedly, not all habitat is searched annually, but the Ponderosa Pine forests occupied by the woodpeckers occur at relatively low elevations and are easily accessible to birders, who regularly comb this habitat for its specialty species. Considering the small area of habitat available and the small number of birds reported, the true population size must be very low; certainly less than 100 breeding birds and probably less than 10.

Table 1. Sightings of White-headed Woodpeckers in Canada since 2001. Only the year and general location are given because many of these involve multiple sightings from the same location in the same year.

Year	Location	Source
2001	McKinney Road, Oliver	BC Interior birding listserv
2002	McKinney Road, Oliver	BC Interior birding listserv
2003	Green Lake	Bezener 2009
2003	Naramata	Bezener 2009
2003	McKinney Road, Oliver	Drew Campbell, pers. comm. 2003
2003	McLean Creek	Bezener 2009
2003	Anarchist Mountain	Bezener 2009
2004	McKinney Road, Oliver	Greg Tellier, pers. comm. 2004
2004	Anarchist Mountain	Bezener 2009
2005	Anarchist Mountain	Bezener 2009
2005	McLean Creek	Bezener 2009
2006	Anarchist Mountain	Bezener 2009
2007	Anarchist Mountain	Bezener 2009
2007	White Lake	Bezener 2009
2008	Anarchist Mountain	Bezener 2009
2008	White Lake	Bezener 2009
2009	Summerland	Alex Westman, pers. comm. 2009
2009	McKinney Road, Oliver	Tanya Luszcz, pers. comm. 2009
2009	Mahoney Lake	Tanya Luszcz, pers. comm. 2009

Fluctuations and trends

White-headed Woodpeckers have always been a rare species in Canada, but the numbers indicate declines in the last 40 years.

There were 112 sightings of White-headed Woodpeckers in British Columbia in the 1960s, but that rate dropped significantly to only 68 sightings in the 1970s and only 16 from 1980 to 1987 (Campbell *et al.* 1990, St. John 1992). St. John (1992) speculated that the sudden drop in 1970 might have resulted from the record cold Okanagan winter in 1969 documented by Cannings *et al.* (1987); this cold snap may have killed the cone buds on Ponderosa Pines throughout the valley. Four breeding records were reported in the 1960s, three in the 1970s and one in the 1980s (Cannings *et al.* 1987). There were no breeding records reported in the 1990s, but family groups were seen at least three times between 2001 and 2009. The species is still reported annually (Table 1).

Weber and Cannings (1976) suggest that the increase in sightings in the 1960s was largely due to the increase in observer effort, but that cannot explain the subsequent drop in sightings after 1970, because observer effort has likely steadily increased over the last 40 years. Habitat loss has been mostly related to loss of quality rather than quantity, and most of that change happened before the 1960s, so the 10-year increase in population may have been related to climatic changes or food supply increases, such as several years of good cone crops. Unfortunately, there are no hard data to support either of these hypotheses.

White-headed Woodpeckers are still widespread, though rare, in the Ponderosa Pine forests of Washington and Idaho. Populations in Idaho and the Blue Mountains of southeastern Washington and northeastern Oregon have declined due to habitat degradation after logging and forest fragmentation (Blair and Servheen 1993, Gilligan *et al.* 1994).

Rescue effect

White-headed Woodpecker populations in the United States are stable or increasing according to the Breeding Bird Survey data (Sauer *et al.* 2008), but most of these data come from California; data from Washington and Oregon are too sparse for calculation of trends, and there are no BBS data from Idaho. There are breeding season records in Washington only 50 km south of Canada (Smith *et al.* 1997) and suitable habitat is more or less continuous between those sites and the border. So, White-headed Woodpeckers could disperse from Washington and perhaps Idaho breeding sites into suitable habitat in British Columbia, but any rescue would probably be slow because of the low densities south of the border and the fact that threats to this species in all three of those jurisdictions are related to ongoing habitat loss and degradation.

LIMITING FACTORS AND THREATS

Although the White-headed Woodpecker has likely always been a rare species in Canada, at least for the last century, factors contributing to habitat degradation and loss likely limit its ability to maintain a viable population in this country. The distribution and abundance of the White-headed Woodpecker is closely tied to Ponderosa Pine forests, and it relies on the seeds of the pines for winter survival; therefore, the important limiting factors and threats for the species are tied to this forest type (Garret *et al.* 1996). Extensive logging of mature Ponderosa Pines in the first half of the 1900s changed the forest landscape from one with a significant component of open, park-like stands of large trees to one with extensive, dense stands of younger trees that produce few cones and have few snags suitable for nest sites (Everett *et al.* 2007). Over the last 50 years other factors have further reduced the amount of suitable habitat.

The cessation of indigenous burning practices in the late 1800s and active fire suppression since 1950 have helped to maintain the dense structure of these forests and made them more susceptible to catastrophic fires. Stand-replacing forest fires also pose a significant threat to White-headed Woodpecker habitat in the Okanagan Valley. A 4000-ha fire that burned mature Ponderosa Pine forest near Oliver in 1970 has had almost no tree recruitment in the past 40 years (R.J. Cannings pers. obs.), and the extensive stands burned in 2003 will likely remain as shrub-steppe habitats for decades to come. If climate change brings longer, hotter, drier summers, these catastrophic fires will likely become regular features of the landscape and mature Ponderosa Pine forests will become rarer, at least over the next few decades.

The Mountain Pine Beetle epidemic poses another significant threat to White-headed Woodpecker habitat in Canada. There has been very little impact up until now, but mature Ponderosa Pine forests in the Thompson Valley were devastated between 2005 and 2008, and those in the Nicola-Similkameen region to the west of the Okanagan are being significantly impacted at present (Klenner and Arsenault 2009). Forests into the northwestern Okanagan show significant pine beetle damage, but it is unknown whether the Ponderosa Pines of the south Okanagan will suffer the same level of damage.

The population of White-headed Woodpecker in British Columbia is considered to occur at a single location. This is because there is a possibility that the Mountain Pine Beetle could destroy the mature Ponderosa Pine forests of the south Okanagan in the near future (Westfall and Ebata 2008, Klenner and Arsenault 2009).

PROTECTION, STATUS AND RANKS

The White-headed Woodpecker was assessed as Threatened by COSEWIC in 1992 (Cannings 1992), then re-assessed as Endangered in 2000 (Cannings 2000) and listed as such on Schedule 1 of the federal *Species at Risk Act*. It is on the British Columbia Conservation Data Centre's Red List of candidate species for threatened or endangered status (BC Ministry of Environment 2009a). NatureServe designates the species as G4 (apparently secure) globally, S1 (critically imperiled) in British Columbia, S2 in Idaho, and S2S3 in Washington and Oregon (NatureServe 2009). It is a Species of Special Concern in Idaho (Blair and Servheen 1993) and is listed as a Sensitive Species in Oregon (Garrett *et al.* 1996) and throughout the intermountain regions of the United States (Spahr *et al.* 1991). The White-headed Woodpecker and other species reliant on old-growth Ponderosa Pine forests were considered at risk in the Interior Columbia Basin (Marcot *et al.* 1997).

The White-headed Woodpecker and its nests and eggs are protected in Canada and the United States from hunting and collecting by the *Migratory Birds Convention Act* 1994. Individuals are also protected under the British Columbia *Wildlife Act*.

The White-headed Woodpecker is listed as an Identified Wildlife Species in British Columbia, meaning Wildlife Habitat Areas (WHAs) may be created to restrict forest harvest activities around nest sites or other important habitat (Ministry of Forests 1999). Four WHAs have been created: Arawana Creek (87.2 ha); Chute Creek (42 ha); Long Joe Creek (50.1 ha) and Wolf Cub Creek (19.2 ha), for a total of 198.5 ha (BC Ministry of Environment 2009b). Within these sites, road construction and timber salvage is prohibited without special permit, all large (> 60 cm dbh) Ponderosa Pine and Douglas-fir trees, alive or dead, must be retained; at least six standing dead trees (the largest available) per hectare must be retained; partial cut systems are to be used to maintain widely spaced mature Ponderosa Pine and Douglas-fir, and sufficient young trees are to be maintained to ensure recruitment into the larger size classes.

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BIOGRAPHICAL SUMMARY OF REPORT WRITER

Richard (Dick) Cannings was born and raised in the Okanagan Valley in a family keenly interested in natural history. This early involvement in birds, bugs and plants led him to a university education in zoology, including a BSc degree from the University of British Columbia and a MSc from Memorial University of Newfoundland. He worked for 15 years as the Curator of the Cowan Vertebrate Museum in the Department of Zoology at the University of British Columbia. He left UBC in 1995 to return to his Okanagan roots.

Dick now works half-time for Bird Studies Canada, coordinating Canadian Christmas Bird Counts, the eBird program and the British Columbia-Yukon Owl Survey. His consulting work is primarily centred on endangered species, particularly those in southern British Columbia. He was co-chair for birds on the Committee on the Status of Endangered Wildlife in Canada for eight years. He has served on both the BC Environmental Appeal Board and the BC Forest Appeals Commission. He has written a number of books, including *The Birds of the Okanagan Valley, British Columbia* with brothers Sydney and Robert Cannings; *British Columbia: A Natural History* with Sydney Cannings, *The BC Roadside Naturalist*, *The Rockies: a Natural History* and *An Enchantment of Birds*.

COLLECTIONS EXAMINED

No collections were examined.