

**COSEWIC**  
**Assessment and Status Report**

on the

**Lewis's Woodpecker**  
*Melanerpes lewis*

in Canada



**THREATENED**  
**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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Lewis's Woodpecker — supplied by author (courtesy of U.S. Fish and Wildlife Services)

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## COSEWIC Assessment Summary

### Assessment Summary – April 2010

**Common name**

Lewis's Woodpecker

**Scientific name**

*Melanerpes lewis*

**Status**

Threatened

**Reason for designation**

In Canada, this woodpecker breeds only in British Columbia. Its population is small, with fewer than 1000 individuals, and there is evidence of ongoing declines in parts of its Canadian range where it has been monitored over time. The global population (Canada and the USA) is also showing significant declines. Threats include habitat loss and degradation from increasing urban and agriculture development, and fire suppression. Recent surveys have shown the species to be far less numerous than previously believed.

**Occurrence**

British Columbia

**Status history**

Designated Special Concern in April 1999. Status re-examined and confirmed in November 2001. Status re-examined and designated Threatened in April 2010.



**COSEWIC**  
**Executive Summary**

**Lewis's Woodpecker**  
*Melanerpes lewis*

**Species information**

The Lewis's Woodpecker is a medium sized (26-28 cm) woodpecker with dark green upperparts (back of head, back, wings and tail), a silvery grey collar, maroon face and pink breast and belly. Sexes are similar in appearance, with the male being slightly brighter than the female. Juveniles are darker than adults and either lack or have subdued grey, maroon and pink in their plumage.

**Distribution**

The Lewis's Woodpecker occurs only in western North America, where its breeding distribution is approximately the same as the range of Ponderosa Pine. In Canada, it occurs only in valleys of the southern interior of British Columbia, where it currently breeds as far north as the Fraser Basin (near the confluence of the Fraser and Chilcotin Rivers). Within this range, its distribution is patchy, with birds concentrated in areas with suitable habitat.

**Habitat**

Lewis's Woodpeckers require open habitat with scattered or edge trees. Large open areas are necessary for foraging. Trees are used as hawking perches and for nesting. Large-diameter trees, either living, with partial decay, or dead, with more advanced decay, are especially valuable for nest sites. A diverse ground cover of low shrubs, grasses and herbaceous plants that produce berries or provide habitat for insects is an important habitat component. Three distinct habitats are used by the species: open forest or grassland with scattered trees, riparian forests adjacent to open areas, and burns.

## **Biology**

Most Lewis's Woodpeckers in Canada are migratory, returning to their breeding habitats in early May. They raise a single brood each season and show strong nest site fidelity. The average clutch size in British Columbia is 4.8 eggs. Both adults tend the nest. The diet during the nesting period is mainly free-living insects. Wild and cultivated fruits are also consumed depending on availability.

Adults and juveniles form pre-migrant flocks in late August through early September. They typically depart British Columbia in late September, although a few individuals stay in the southern Okanagan Valley if the weather conditions and food supply are favourable.

## **Population sizes and trends**

The Canadian breeding population is estimated at 630-920 mature individuals based on surveys conducted through most of the range in 2006 and 2007. The only information on potential change in abundance over time comes from the East Kootenay Trench, where approximately one quarter of the Canadian population occurs. Surveys conducted in this area in 1997/98 and again in 2007 show a 22% reduction in the number of nests recorded during this period.

## **Limiting factors and threats**

Habitat loss and degradation are considered to be the greatest threats to Lewis's Woodpeckers. Urbanization, increasingly industrialized agricultural practices and forestry practices have all contributed to habitat loss and degradation. Removal of trees for firewood, human safety or aesthetic reasons reduces habitat quality by eliminating nest trees, a critical habitat feature for this species. Many decades of fire suppression in Ponderosa Pine forests has resulted in infilling by Douglas-fir and reduction of open pine forests which are suitable for this species. Competition from the introduced European Starling may be a threat to Lewis's Woodpeckers in areas where European Starling populations are high and nest sites are scarce. Accidental mortality of breeding adults through collision with vehicles may affect populations around highway corridors, many of which are in prime Lewis's Woodpecker valley bottom habitat.

## **Special significance of the species**

The Lewis's Woodpecker is a unique woodpecker in behaviour and appearance. It is sought after by recreational birders and is an indicator species for fire-maintained Ponderosa Pine ecosystems. Woodpeckers are also culturally significant to First Nations people.

## Existing protection

The Lewis's Woodpecker and its eggs and active nests are protected from direct persecution under the *Migratory Birds Convention Act* of 1994 (Canada) and the *British Columbia Wildlife Act* of 1982 in British Columbia. COSEWIC designated this species as Special Concern in November 2001, and it is currently designated as Special Concern, under Schedule 1 of the Canadian *Species At Risk Act*. Guidelines for habitat conservation are also provided to the forest harvesting industry under the British Columbia *Forest and Range Practices Act* Identified Wildlife Management Strategy (2004). These guidelines provide suggestions for maintaining trees suitable for nesting through establishment of wildlife tree retention areas in suitable sites scattered across a landscape-level planning area.

## TECHNICAL SUMMARY

*Melanerpes lewis*

Lewis's Woodpecker

Pic de Lewis

Range of Occurrence in Canada: British Columbia

### Demographic Information

Generation time (usually average age of parents in the population;  Estimate based on an estimated adult annual survivorship of 59% to 85% and an assumed life expectancy of no more than 10 years.	3 yrs
Is there an [observed, inferred, or projected] continuing decline in number of mature individuals?  Inferred decline in individuals from one region of breeding range based on decline in number of nests	Yes
Estimated percent of continuing decline in total number of mature individuals within [5 years or 2 generations]	Unknown
Estimated percent reduction in total number of mature individuals over the last [10 years, or 3 generations].  In Canada, 22% reduction in the number of nests recorded between 1997/98 and 2007 in the E. Kootenay's (1/4 of the Canadian population), the only area where there has been more than one abundance estimate over time	22% reduction in nests recorded
[Projected or suspected] percent [reduction or increase] in total number of mature individuals over the next [10 years, or 3 generations].	Unknown, but likely a decline with habitat loss and degradation
[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, but likely a decline with habitat loss and degradation
Are the causes of the decline clearly reversible and understood and ceased?	Not likely reversible, generally understood and not ceased
Are there extreme fluctuations in number of mature individuals?	No

### Extent and Occupancy Information

Estimated extent of occurrence	86,000 km <sup>2</sup>
Index of area of occupancy (IAO) Based on a 2x2 km <sup>2</sup> grid intersecting known areas of occupancy for the species.	Between 500 and 2,000 km <sup>2</sup>
Is the total population severely fragmented?	No
Number of "locations"	N/A
Is there an [observed, inferred, or projected] continuing decline in extent of occurrence?	Yes – has declined since the 1960s
Is there an [observed, inferred, or projected] continuing decline in index of area of occupancy?	Likely
Is there an [observed, inferred, or projected] continuing decline in number of populations?	N/A
Is there an [observed, inferred, or projected] continuing decline in number of locations?	N/A

\* See definition of location.

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?	N/A
Are there extreme fluctuations in number of locations?	N/A
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:	630-920

**Quantitative Analysis**

Probability of extinction in the wild is at least [20% within 20 years or 5 generations, or 10% within 100 years].	Not done
--	----------

**Threats (actual or imminent, to populations or habitats)**

<ul style="list-style-type: none"> <li>Loss or degradation of habitat caused by urbanization (especially in the Okanagan, Thompson, Nicola regions), industrialized agriculture (Okanagan) and fire suppression.</li> <li>Competition with introduced European Starlings a possible threat where nest sites are scarce.</li> <li>Accidental mortality associated with increased human presence in limited habitat.</li> </ul>
---

**Rescue Effect (immigration from outside Canada)**

Status of outside population(s)? declining in the U.S.	
Is immigration known or possible?	Unknown, but likely
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 source populations also declining
If southern populations are also small and declining, it is not likely they will expand into the northern extent of their range.	

**Current Status**

COSEWIC: Threatened (April 2010)
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**Status and Reasons for Designation**

<b>Status:</b> Threatened	<b>Alpha-numeric code:</b> C2a(i), D1
<b>Reasons for Designation:</b> In Canada, this woodpecker breeds only in British Columbia. Its population is small, with fewer than 1000 individuals, and there is evidence of ongoing declines in parts of its Canadian range where it has been monitored over time. The global population (Canada and the USA) is also showing significant declines. Threats include habitat loss and degradation from increasing urban and agriculture development, and fire suppression. Recent surveys have shown the species to be far less numerous than previously believed.	

### Applicability of Criteria

<b>Criterion A</b> (Declining Total Population): Does not meet criterion.
<b>Criterion B</b> (Small Distribution, and Decline or Fluctuation): Does not meet criterion.
<b>Criterion C</b> (Small Total Population Size and Decline): Meets Threatened C2a(i) because a continuing decline is expected based on population declines observed on part of the Canadian breeding range and globally (Canada and the USA) and continuing declines in habitat quality; and the population is < 1000 mature individuals.
<b>Criterion D</b> (Very Small Population or Restricted Distribution): Meets Threatened D1 because population < 1000 mature individuals.
<b>Criterion E</b> (Quantitative Analysis): None available.



### 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

## **Lewis's Woodpecker**

*Melanerpes lewis*

**in Canada**

2010

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## SPECIES INFORMATION

### Name and classification

Scientific name: *Melanerpes lewis*  
English name: Lewis's Woodpecker  
French name: Pic de Lewis

### Morphological description

The Lewis's Woodpecker is a medium-sized (26-28 cm) woodpecker with dark green upperparts (back of head, back, wings and tail), a silvery grey collar, maroon face and pink breast and belly. The sexes are similar in colour and size and therefore are not readily distinguishable in the field, even by experienced observers. Juveniles are darker than adults and either lack or have subdued grey, maroon and pink in their plumage. (Tobalske 1997).

In flight, the Lewis's Woodpecker resembles the American Crow (*Corvus americanus*) or Clark's Nutcracker (*Nucifraga columbiana*) more than it does other woodpeckers. Its flight is direct and even rather than undulating, with deep wing beats. It will also soar and glide in elaborate patterns when fly-catching (Tobalske 1997; Sibley 2000).

### Genetic description

There has been no work on the genetics of this species.

### Designatable units

There are no subspecies recognized for the Lewis's Woodpecker (Tobalske 1997) nor are there other distinctions that warrant assessment below the species level. This report is based on a single designatable unit, *Melanerpes lewis*.

## DISTRIBUTION

### Global range

The Lewis's Woodpecker occurs only in western North America, where its breeding distribution is approximately the same as the range of Ponderosa Pine (*Pinus ponderosa*; Saab and Vierling 2001). It currently breeds from the interior of southern British Columbia, south through central Washington, Oregon and California, and east to eastern Colorado, central Arizona and southern New Mexico (Tobalske 1997; see Figure 1). Throughout its range, the distribution of Lewis's Woodpecker is patchy, with local concentrations in areas of suitable habitat (Tobalske 1997; Cooper *et al.* 1998). The former breeding distribution of Lewis's Woodpecker included the Georgia Depression of southwestern British Columbia (Cooper *et al.* 1998; Beauchesne and Cooper 2002), western Washington, western Oregon (Galen 2003), and western California (Small 1994).

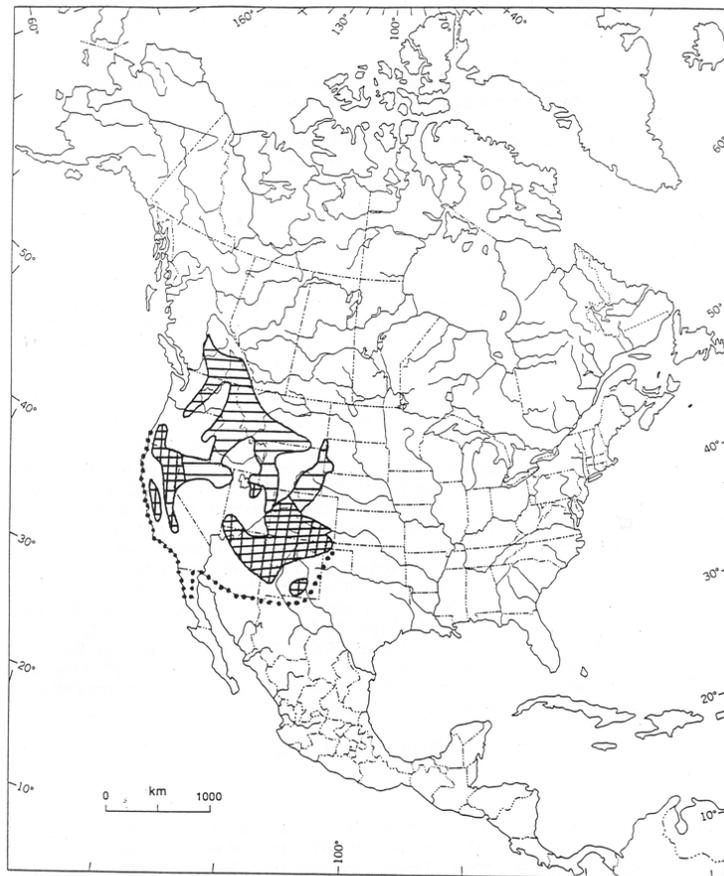


Figure 1. Distribution of Lewis' Woodpecker.  = breeding range;  = year-round resident. The species winters occasionally as far south and west as the dotted line.

Figure 1. Global distribution of the Lewis's Woodpecker. The cross-hatched area is occupied year-round; horizontal lines indicate breeding season only (except for the occasional winter vagrant); the dotted line indicates the extent of potential wintering distribution (from Tobalske 1997).

Lewis's Woodpeckers winter in the southern part of their breeding range from southwestern Oregon, central Utah and central Colorado in the north, south to northern Mexico (Howell and Webb 1995; Tobalske 1997). If weather conditions and food supply are favourable, some individuals may remain at northern latitudes. A few birds are recorded most years in the winter in the Okanagan Valley, British Columbia (Cooper *et al.* 1998).

### **Canadian range**

In Canada, the Lewis's Woodpecker occurs only in southern British Columbia, where it currently breeds as far north as the Fraser Basin (near the confluence of the Fraser and Chilcotin Rivers), along the Thompson River valleys (north to near Barriere in the North Thompson River valley, and east to near Pritchard in the South Thompson River valley), in the Okanagan and Boundary area, occasionally in the West Kootenays, and in the East Kootenay Trench as far north as Fairmont (Luszcz and Sawicz 2007; Beauchesne and Cooper 2008). Within this range, distribution is patchy, with birds concentrated in areas with suitable habitat.

The current westernmost extent of the range is Lillooet (Campbell *et al.* 1990; J. Hobbs pers. comm.). The historic distribution of Lewis's Woodpecker included populations on southern Vancouver Island, and in the lower Fraser River valley. Single birds are still occasionally found in these areas, mainly during the post-breeding season. Most of these records are of juveniles, whose origin is unknown. The last breeding records for Vancouver Island and the Fraser River valley are 1962 and 1964, respectively (Campbell *et al.* 1990; Beauchesne and Cooper 2002).

The species also formerly occurred in the Columbia Basin as far north as Golden and Revelstoke, and to near Wells Gray Park in the North Thompson River valley (Campbell *et al.* 1990). There have been no records in these northern locations for several years. An extensive search of the Columbia Basin region in 2007 produced no records farther north than Fairmont (Beauchesne and Cooper 2008).

The species also occasionally occurred in the foothills and lower mountain slopes of western Alberta, but the most recent breeding record in this province was in 1946 (Cooper *et al.* 1998). Lewis's Woodpecker is considered a vagrant species (more than 10 records, fewer than 50) and very rare breeder in Alberta (Semenchuk 1992; FAN 2007). Historically there are also a few records of vagrant birds as far east as Manitoba (Hatch and L'Arrivee 1981).

The Lewis's Woodpecker Management Team developed a map (Figure 2) indicating three separate regions in British Columbia where Lewis's Woodpeckers occur. These three regions are separated by large areas with no Lewis's Woodpeckers or suitable habitat. These regions also have very different population densities. The West Kootenay region, for instance, is considerably larger than the East Kootenay region, yet there are very few breeding records of Lewis's Woodpeckers in the West Kootenays whereas there are many records for the East Kootenay region.

The extent of occurrence for the Lewis's Woodpecker is approximately 86,000 km<sup>2</sup>, based on a minimum convex polygon encompassing the three zones of occurrence shown on Figure 2 (A. Filion pers. comm.). Within this range, the area of occupancy is estimated at 19.2 to 28.1 km<sup>2</sup>. This estimate assumes a population of 315 to 460 breeding pairs, with an average territory size of 6.1 ha (Thomas *et al.* 1979). The index of area of occupancy cannot be estimated with precision, but based on a 2x2 km<sup>2</sup> grid intersecting known areas of occupancy it is estimated at between 500 and 2,000 km<sup>2</sup> (A. Filion pers. comm.).

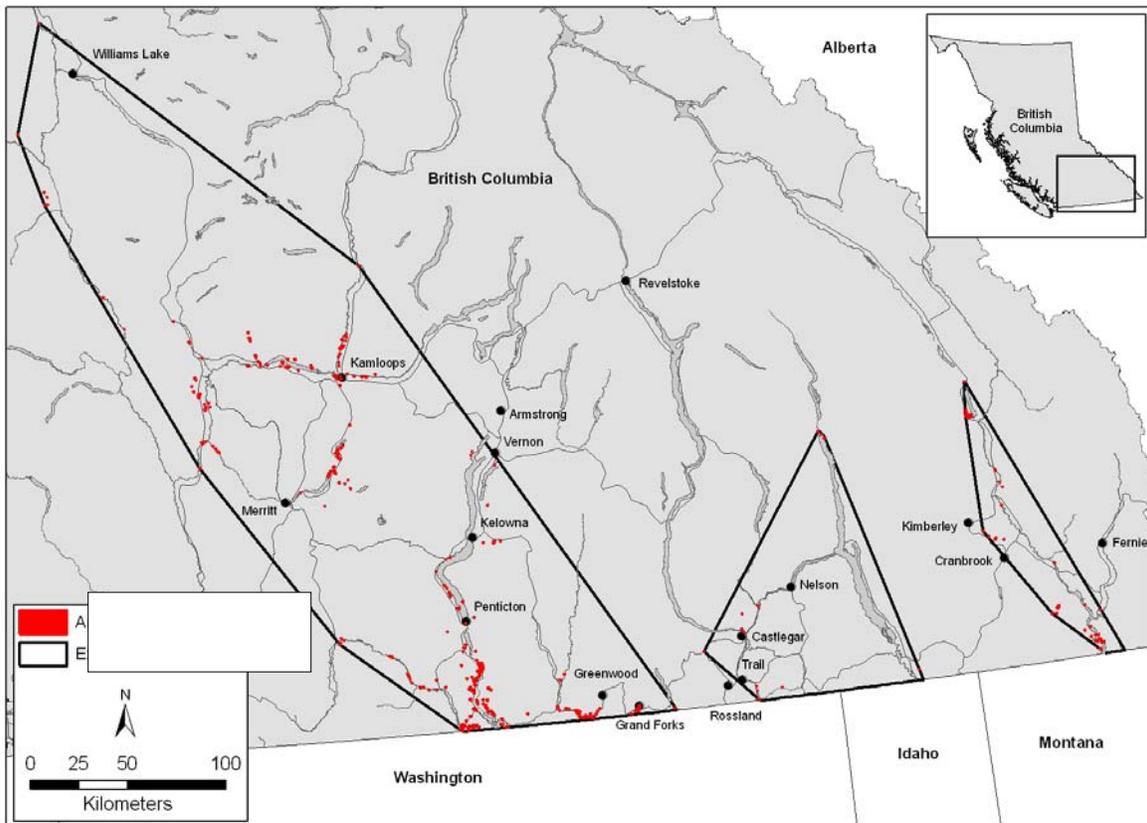


Figure 2. Breeding range for Lewis's Woodpecker in British Columbia (Tanya Luszc pers. comm.).

## HABITAT

### Habitat requirements

Lewis's Woodpeckers are birds of open forest, riparian woodland or grassland with scattered trees, which are used as perches and for nesting. Large-diameter trees, either living, with partial decay, or dead, with more advanced decay, are especially valuable for nest sites (Fraser *et al.* 1999; Cooper and Beaudesne 2000; Galen 2003; Fenger *et al.* 2006). Large open areas near nest sites are necessary for foraging. A diverse ground cover of low shrubs, grass and herbaceous plants that produce berries or provide habitat for insects is an important habitat component (Sousa 1983; Campbell *et al.* 1990; Beaudesne and Cooper 2008).

Three distinct habitats are used by Lewis's Woodpeckers: open forest or grassland with scattered trees, riparian forests adjacent to open areas, and burns (Bock 1970; Campbell *et al.* 1990; Vierling 1997; Cooper and Beaudesne 2000; Cooper and Gillies 2000; Saab and Vierling 2001; Abele *et al.* 2004; Gentry and Vierling 2007).

The open forest or grassland habitats used by Lewis's Woodpeckers have a low or very low tree stem density (Schwab *et al.* 2006), veteran Ponderosa Pines or Douglas-firs, abundant wildlife trees, and rich herb and shrub layers. A crown closure of up to 30% may be suitable (Sousa 1983; Zhu 2006); however, Lewis's Woodpeckers often nest within or adjacent to foraging habitats if there is even a single suitable nest tree (crown closure < 1%). In some situations, a utility pole may be used as a substitute (Cooper and Beaudesne 2000). Open forest habitats are usually fire-maintained with frequent low intensity fires that maintain the open features (i.e., mature trees of large diameter that have lost lower limbs and saplings are mostly eliminated) and create an understory mosaic. In the interior of British Columbia, Ponderosa Pine is the dominant tree species used for nest sites in open forest habitats. However, Douglas-fir (*Pseudotsuga menziesii*), Western Larch (*Larix occidentalis*), Trembling Aspen (*Populus tremuloides*), and Paper Birch (*Betula papyrifera*) also are used for nest sites (Luszcz and Sawicz 2007; Beaudesne and Cooper 2008). Formerly, in the Georgia Depression, the open forest of the Garry Oak (*Quercus garryana*) ecosystem was used by Lewis's Woodpeckers. Regular, low intensity fires would also have been important in maintaining habitat suitability in this ecosystem (Beaudesne and Cooper 2002).

The riparian forest used by Lewis's Woodpeckers is typically mature Black Cottonwood (*Populus balsamifera*) stands adjacent to suitable open foraging areas. In these habitats, the cottonwoods provide nest sites and the birds forage over water or open land. The importance of the riparian habitat type varies by region (e.g., Galen 2003). In British Columbia, cottonwood use is most prevalent in the Okanagan (Table 1; Cannings *et al.* 1987; Luszcz and Sawicz 2007; Beaudesne and Cooper 2008).

**Table 1. Lewis's Woodpecker habitat use by region for nests found during 2006 and 2007 surveys in British Columbia.**

Region	Nests in open forest	Nests in riparian cottonwood	Nests in burns	Total nests
Cariboo	8	0		8
Thompson	49	16		65
Okanagan - Boundary	104	55		159
West Kootenay	0	0		0
East Kootenay	22	6	38	66
<b>Total</b>	<b>184</b>	<b>77</b>	<b>38</b>	<b>299</b>

Stand-destroying fires create the third habitat type, usually referred to as “burns”. In these situations, burned snags that are of sufficient diameter (>25 cm) provide potential nest sites and the habitat is otherwise completely open (crown closure zero). There is usually an initial lag time after the fire, before dispersing Lewis's Woodpeckers have an opportunity to locate and colonize the newly burned area. Lag time between habitat creation and occupation by Lewis's Woodpecker may also be partly due to dependence on other species (primarily Northern Flickers, *Colaptes auratus*) to colonize and create potential nest cavities. Burns are colonized more rapidly by Lewis's Woodpeckers when trees with pre-existing cavities remain after the burn (e.g., 2003 Plumbob burn, T. Antifeau pers. comm.). Once colonized, burns are a temporary habitat, with peak suitability for Lewis's Woodpeckers between 10 and 30 years of age (Cooper and Gillies 2000). As burns age, they decline in quality as suitable nest trees fall down and new forest regenerates (Saab and Vierling 2001). The burnt snags left after an intense, stand-destroying fire are typically fragile and have a higher rate of loss than other nest site types (S. Beauchesne unpublished notes). Forest succession within the open areas leads to infilling, which eventually reduces or eliminates the suitability of a site (Krannitz 2007).

In British Columbia, not all seemingly suitable burns are occupied by breeding Lewis's Woodpeckers (Cooper and Beauchesne 2000; Cooper and Gillies 2002). Subtle microhabitat differences are likely a factor in determining which burns are occupied. Burns are an important habitat type in the East Kootenay Trench (Table 1), but even in this region some large burns are not occupied despite having burnt snags, available nest cavities and other preferred habitat features (e.g., the Wildhorse burn: Cooper and Gilles 2000; Beauchesne and Cooper 2008). An assessment of the use of wildfire burns in the East Kootenay region by Lewis's Woodpeckers, found that only four of nine apparently suitable burns were actually used for nesting (Cooper and Gillies 2000).

## Habitat trends

The amount of suitable Lewis's Woodpecker habitat available in British Columbia has declined since European occupation, with the logging of Ponderosa Pine parkland areas, clearing of veteran Ponderosa Pines for firewood or other reasons, and the reduction of riparian Black Cottonwood habitats (Cannings *et al.* 1987; Cooper *et al.* 1998). Fire suppression has resulted in forest regeneration, reducing the amount of open forest habitat in many areas of southern British Columbia (Krannitz 2007).

In recent decades, habitat loss has accelerated due to increased urbanization in the southern interior (especially the Okanagan Valley) and Georgia Depression of British Columbia (Campbell *et al.* 2001). This trend is forecast to continue indefinitely. The quality of the remaining habitat has likely been reduced due to factors associated with increased human populations (e.g., increased disturbance and predators). In some areas such as the East Kootenay region, there has been an increase in recreational activities in Lewis's Woodpecker nesting areas (T. Antifeau, pers. comm.). These activities result in a loss of nest trees, which get used for firewood, and in disturbance in nesting areas. Modern intensive agricultural practices have also reduced habitat quality in rural areas (Campbell *et al.* 2001; Abele *et al.* 2004).

Habitat loss in British Columbia through harvesting of Ponderosa Pine has likely slowed in recent years as most of the mature forest in the area has been harvested, but some loss of the remaining forest still occurs, especially on private lands. Where suitable nest trees are scarce, removal of a nest tree or a few potential nest trees can have negative effects on local populations.

In the East Kootenay region, most breeding occurs in areas severely burned by wildfires (e.g., 59% in 1997-1998; Cooper and Gillies 2000). The usefulness of these areas for breeding is limited to about 30 years as standing dead trees eventually fall and forest regrowth occurs. Two areas with concentrated populations of Lewis's Woodpeckers found in 1997-1998 (Newgate [burned in 1970] and Findlay Creek [burned in 1985] burns) had many fewer nest trees in 2007 (Beauchesne and Cooper 2008). The Dutch Creek Burn [burned in 1970], an area with many Lewis's Woodpeckers in the 1980s and 1990s (Cooper *et al.* 1998), held only a few breeding pairs in 1997-1998 and none in 2007 (Beauchesne and Cooper 2008).

In selected low-elevation areas of the East Kootenay region, prescribed burns are currently being used by the Ministry of Environment to manage for more open coniferous forest habitats (T. Antifeau pers. comm.). Cooper and Gillies (2000) estimated there were about 4,700 ha of mature and older Ponderosa Pine in the Invermere and Cranbrook Timber Supply Areas, of which only a few hundred ha were suitable for Lewis's Woodpeckers. These prescribed burns may thus add to the availability of suitable breeding habitat, if forest is opened up sufficiently, but the effects on Lewis's Woodpeckers remain to be determined.

The Mountain Pine Beetle (*Dendroctonus ponderosae*) epidemic that has affected 5+ million ha of Lodgepole Pine (*Pinus contorta*) forest in British Columbia has killed many Ponderosa Pines in the Lewis's Woodpecker breeding range. Effects of these impacts are uncertain because opening up of forests (i.e., through tree death) is usually positive, but retention of suitably large decayed or dead trees (which tend to be eventually cut for firewood) for nesting is essential.

Winter food availability (mast) is also thought to have declined in some areas of the USA and likely affects global populations through diminished winter survival (Abele *et al.* 2004). However, because the winter range of Canadian breeders is uncertain, it is not possible to estimate effects.

### **Habitat protection/ownership**

Lewis's Woodpeckers often occur in valley bottoms and, in southern British Columbia, these areas are often privately owned. Away from valley bottoms, much of their habitat is on Crown land, and some of this area is protected. Protected areas with suitable habitat for Lewis's Woodpecker in British Columbia, include Okanagan Mountain Park, Vaseux Lake National Wildlife Area, Ecological Reserve No. 7, Osoyoos Lake Oxbows, Okanagan River, Inkaneep Park, Cawston Slough, Ecological Reserve No. 100 (Cooper *et al.* 1998), Chopaka Grassland Protected Area, Spotted Lake Grassland Protected Area, Kilpoola Grassland Protected Area, Vaseux Lake Ecological Reserve and SunOka Provincial Park (Zhu 2006). There is also private conservation land where Lewis's Woodpecker occur (e.g., B.C. Nature Trust land).

Land status details for known nest locations by region are currently only available for the East Kootenay Trench, where 20 of 66 nests (30%) found in 2007 were on private land, and 2 (3%) were within protected areas (Nature Conservancy land and a Provincial Park) and the remainder (44 nests) were on provincial Crown land.

Some known breeding sites have been designated as Wildlife Habitat Areas (WHAs) including two in the East Kootenay Trench, three in the Okanagan-Similkameen area, and twelve in the Thompson-Nicola area (CDC 2005). Within Wildlife Habitat Areas, human activities are managed to limit their impact on the identified wildlife element for which the area was established.

## BIOLOGY

### Life cycle and reproduction

Lewis's Woodpeckers return to their breeding sites in May. In the Okanagan, Lewis's Woodpeckers most often select large diameter trees in intermediate decay classes for nesting (Zhu 2006). In 2006 and 2007 inventories, nest tree diameters averaged from 53 cm in the East Kootenay Trench to 70 cm in the Boundary and Princeton areas and nest tree heights were highly variable averaging from 14 m to 19 m (Beauchesne and Cooper 2007; Luszcz and Sawicz 2007). Lewis's Woodpeckers frequently re-use nest trees from year to year, often the same cavity. In Wyoming, 37% of pairs returned to their previous year's nest (Linder 1994). Sixty percent of nests were reoccupied by Lewis's Woodpecker from 1997 to 1998 in the East Kootenay (Cooper and Gillies 2000). In the Thompson region, of the nests monitored again in the following year, 53% were reused by Lewis's Woodpeckers, 28% were not re-used and 19% were unconfirmed (Ferguson and Iredale 2007). They will, however, abandon breeding habitats if insect prey abundance is limited (Bock 1970).

Pair formation likely occurs near the nest site and many pairs are thought to have long-term pair bonds (Tobalske 1997). Most nests in British Columbia have eggs by late May and early June (Campbell *et al.* 1990).

In British Columbia, clutch size for 30 nests ranged from 2 to 8 eggs, with an average of  $4.8 \pm 1.6$  (Campbell *et al.* 1990). In the south Okanagan, clutch size was similar with an average of  $5.0 \pm 0.14$  eggs in 57 nests (Zhu 2006). The incubation period is 13-16 days (Tobalske 1997). In British Columbia, the number of young fledged/successful nest for 28 broods ranged from 1 to 5 with an average of  $2.9 \pm 1.0$  (Campbell *et al.* 1990). In the south Okanagan 20 of 57 nests successfully fledged young and successful nests fledged an average of  $2.62 \pm 0.22$  fledglings/nest (Zhu 2006). The nestling period is 4-5 weeks (Tobalske 1997). One brood is raised annually.

Lewis's Woodpeckers likely begin breeding at one year of age (Abele *et al.* 2004). In British Columbia, it appears that almost all adult birds in the population attempt to breed. For example, in the East Kootenay Trench, an active nest was found for 94% of adults detected in both the 1998 and the 2007 surveys (Cooper and Beauchesne 2000; Beauchesne and Cooper 2008).

Life spans of up to 10 years have been estimated based on the reuse of the same nest cavity over time, although the birds were not banded, so they may be different individuals (Beauchesne and Cooper 2008). Other melanerpine species have life spans of up to 12 years (Abele *et al.* 2004).

The only information available on Lewis's Woodpecker survivorship comes from a study in Colorado where overwinter survivorship was 88% (Tobalske 1997). Estimates of annual adult survivorship in other melanerpine species range from 59 to 75% (Abele *et al.* 2004). Generation time (average age of parents in the population) is calculated at approximately 3 years (range: 2.4 to 4.2 years) based on adult survivorship values ranging from 59 to 85% and a maximum age of 10 years. There are no data on lifetime reproductive success (Tobalske 1997).

Lewis's Woodpeckers often nest in close proximity to one another in a semi-colonial manner (Currier 1928; Bock 1970; Cooper and Beaudesne 2000; Beaudesne and Cooper 2008). In British Columbia, there is at least one instance of three pairs simultaneously nesting in a single tree, and multiple instances of two pairs nesting in a single tree (Cooper and Beaudesne 2000; Beaudesne and Cooper 2008). There is evidence of cooperation in nest defence between near-neighbours and in rare instances more than two adults have been observed tending the same nest (Cooper and Beaudesne 2000). Tobalske (1997) reports up to five adults tending a single nest near Osoyoos, British Columbia.

### **Parasitism/predation**

The Red-tailed Hawk (*Buteo jamaicensis*) is the only reported predator of adult Lewis's Woodpecker (Tobalske 1997), although other large raptors are also potential predators. The American Kestrel (*Falco sparverius*) is reported to prey on recently fledged young. Periodically, nest cavities are torn open, suggesting that Black Bears (*Ursus americanus*) occasionally prey on nestlings (S. Beaudesne unpublished notes). Other potential predators of eggs and nestlings are snakes, voles, and squirrels (Saab and Vierling 2001).

### **Physiology**

No information is available on nutrition, energetics, metabolism, or temperature regulation (Tobalske 1997). Flight speeds are slower than other North American woodpeckers and pectoral muscle composition has morphological traits and glycolytic capacity that have been associated with species that show gliding flight (Tobalske 2001).

## **Dispersal/migration**

In British Columbia, family groups move together for a short period of time post-fledging (J.M. Cooper pers. comm.), and then form nomadic post-breeding flocks of multiple family groups before migration (Tobalske 1997). In British Columbia, pre-migrant flocks form in late summer and most individuals leave the province by late September, although a few overwinter most years in the Okanagan Valley (Cannings *et al.* 1987; Campbell *et al.* 1990). The migration route and winter destination of British Columbia's breeding population is unknown, although there is a suggestion that northern birds move to the southern extent of the USA breeding range for the winter (Tobalske 1997).

In the spring, most birds return to breeding areas in British Columbia in early May (Campbell *et al.* 1990).

## **Interspecific interactions**

Within their Canadian range, Lewis's Woodpeckers compete for cavities with Northern Flickers, European Starlings (*Sturnus vulgaris*), and American Kestrels. Several instances are documented where each of the three species have occupied former Lewis's Woodpecker cavities (Cooper and Beaugesne 2000; Beaugesne and Cooper 2008). It is also likely that Lewis's Woodpeckers occupy old Northern Flicker cavities.

## **Diet**

Lewis's Woodpecker diets vary seasonally. During the breeding season they are predominantly insectivorous. Unlike other woodpeckers, Lewis's Woodpeckers feed mainly on free-living insects, rather than wood-boring species. Insects are taken in the air, from bark and foliage of trees, from shrubs and on the ground (Tobalske 1997).

In summer, Lewis's Woodpeckers also forage on berries and fruits and in commercial orchards. One pair with large young in the nest, near Churn Creek (near the confluence of the Chilcotin and Fraser Rivers), fed their young extensively with Saskatoon berries (*Amelanchier* spp.; Cooper *et al.* 1998).

In winter in British Columbia, Lewis's Woodpeckers are restricted to urban areas and orchards where they forage on fruit (especially apples) left over in orchards, and nuts of ornamental trees (Cannings *et al.* 1987). In the USA, they forage heavily on oak nuts, corn, and other mast sources (Tobalske 1997).

## **Adaptability**

Some Lewis's Woodpeckers are able to co-exist with humans (Linder and Anderson 1998) demonstrating potential adaptability to human disturbance. Nests have been recorded in backyards, golf courses, beside busy roads and beside a city parking lot (Cannings *et al.* 1987; Cooper and Beaudesne 2000). However, most Lewis's Woodpeckers nest in more remote situations and are susceptible to disturbance (Bock 1970; S. Beaudesne unpublished notes; Mark Nyhof pers. comm.). Bock (1970) found that birds subjected to continued disturbance occasionally deserted their nest.

Lewis's Woodpeckers have low adaptability in terms of nest site requirements. Because they are relatively weak excavators, they require nesting trees that have more advanced decay than other woodpecker species (Cooper and Beaudesne 2000; Galen 2003; Fenger *et al.* 2006; Beaudesne and Cooper 2008). Since dead and decayed trees usually occur in far less abundance than live trees (in most landscapes in British Columbia) nest sites are limited.

Lewis's Woodpeckers also nest in cavities originally excavated by Northern Flickers or Pileated Woodpeckers (*Dryocopus pileatus*). Occasionally these cavities are in power poles, indicating some level of adaptability in this species (Cannings *et al.* 1987; Cooper and Beaudesne 2000; Beaudesne and Cooper 2008).

## **POPULATION SIZES AND TRENDS**

### **Search effort**

Lewis's Woodpeckers have been surveyed using the roadside transect-based Breeding Bird Surveys. Several factors associated with the biology of Lewis's Woodpeckers, however, reduce the precision of these surveys. Distribution is very patchy; therefore, clusters of these birds may be missed altogether if the transect does not happen to intercept the cluster. Also, Lewis's Woodpeckers are most active after temperatures warm and flying insects are present, and not in the early morning when Breeding Bird Surveys are conducted. Lewis's Woodpeckers also have weak vocalizations and are seldom detected by sound, unlike other woodpeckers more frequently documented on Breeding Bird Surveys.

Specialized search effort is therefore required to accurately inventory this species. Stand watches (observers survey an area as far as can be seen from a fixed point over a fixed time period) were used as a survey technique in the Thompson-Nicola, Okanagan-Similkameen, Cariboo, Boundary and West Kootenay. Birds detected were then followed to a nest location, if possible. This technique was designed to produce repeatable surveys from year to year. Two hundred and four hours of stand watches were conducted in 2006 in the Okanagan and Cariboo (Luszcz and Sawicz 2007).

Nest searches were conducted in 1997, 1998 and 2007 in the East Kootenay region in an attempt to provide an estimate of absolute abundance. Surveys were conducted in known locations for Lewis's Woodpeckers (based on literature, previous field studies, and local knowledge), and in other areas with apparently suitable habitat. In 1997 and 1998, approximately 50 person days (400 hours) were spent per year (Cooper and Beaudesne 2000). This search effort (50 person days) was repeated in 2007 (Beaudesne and Cooper 2008). All birds observed were followed if possible until a nest was located: 94% of all birds observed were eventually associated with a nest.

## Abundance

Breeding Bird Survey population estimates suggest a global Lewis's Woodpecker population of 70,000 birds (P. Blancher pers. comm.). Previous estimates of Lewis's Woodpecker numbers in Canada suggested a population size of at least 600 breeding pairs or 1200 individuals (Velland and Connolly 1999). More recently, populations in Canada were estimated from results of intensive surveys (described above; Table 2) in 2006 (Luszcz and Sawicz 2007) and 2007 (Beaudesne and Cooper 2008). As part of the estimate, a range is given for each locality based on extent of survey coverage for a region and the confidence of observers that they had covered most of the potential locations and found most pairs. Based on estimates for each region in Canada where this species is known to occur, the Canadian population is estimated at 315-460 pairs or 630-920 individuals (Table 2), representing < 2% of the global population.

**Table 2. Population estimate for Lewis's Woodpeckers in Canada.**

<b>Region</b>	<b>Number of breeding pairs (individuals in brackets)</b>
Cariboo	10-20 (20-40)
Thompson-Nicola	75-125 (150-250)
Okanagan-Boundary	160-200 (320-400)
West Kootenay	0-15 (0-30)
East Kootenay	70-100 (140-200)
<b>Total</b>	<b>315-460 (630-920)</b>

## Fluctuations and trends

The breeding range of the Lewis's Woodpecker has contracted in British Columbia during the last century. Breeding populations in the Georgia Depression were extirpated by the 1960s (1962 on Vancouver Island and 1964 in the lower Fraser River valley: Campbell *et al.* 1990; Cooper *et al.* 1998). In the 1920s to 1940s, Lewis's Woodpeckers were considered an abundant breeding bird near Victoria, B.C. (Cowan 1940). Breeding populations at the extreme northern limits of its Kootenay region range (Golden, Revelstoke) have also disappeared (Cooper *et al.* 1998).

Data from Breeding Bird Surveys between 1966 and 2007 show a non-significant decline in the global (Canada and the USA) population of Lewis's Woodpecker of 1.21% per year (n = 91 routes, P = 0.60; Sauer *et al.* 2008). Data for the most recent 10-year period (1997-2007) indicate a significant decline in the global population of 5.46% per year (n = 47 routes, P = 0.036; Sauer *et al.* 2008). At this rate of decline the global population will have decreased by 43% over the last 10 years or approximately three generations.

The East Kootenay Trench, which includes about one quarter of the Canadian population of Lewis's Woodpeckers, is the only area where the population has been estimated more than once (1997-1998 and 2007). The survey effort was similar across the two periods and is of sufficient intensity to discover most, if not all, of the major clusters of nesting Lewis's Woodpeckers in the East Kootenay. In 1998, 85 active nests were found (Cooper and Beaudouin 2000), while in 2007, 66 active nests were documented. The number of nests thus decreased by 22% over this period. In addition the area occupied in 2007 was reduced from that occupied in 1998 (Beaudouin and Cooper 2008).

### **Rescue effect**

The Lewis's Woodpecker population in Canada is continuous with populations in the USA; therefore, there is potential for a source of new birds from neighbouring populations to the south. However, Breeding Bird Surveys between 1966 and 2007 show a negative trend for Washington (-8.1%/yr, n = 12 routes, P = 0.10), Montana (-3.6%/yr, n = 4 routes, P = 0.41) and U.S.-wide (-3.8%/yr, n = 83 routes, P = 0.00; Sauer *et al.* 2008). If populations to the south are declining as these trends suggest, there is reduced likelihood of rescue.

## **LIMITING FACTORS AND THREATS**

The Lewis's Woodpecker population in Canada is subject to several threats that fall under three broad categories: loss or degradation of habitat, competition from introduced species for nest sites and accidental mortality.

Loss or degradation of habitat is widely believed to be the greatest threat to this species throughout its range (Tobalske 1997; Fraser *et al.* 1999; Galen 2003; Abele *et al.* 2004). Urbanization has removed or reduced habitat in the southern interior of British Columbia and is likely the single most important factor leading to the extirpation of the species in the Georgia Depression (Cooper *et al.* 1998; Beaudouin and Cooper 2002).

Increased human populations on the west coast and in the southern interior have led to increased activity in the remaining natural areas. Although Lewis's Woodpeckers do co-exist with humans in some areas (e.g., Summerland in the Okanagan Valley where they nest in a municipal park and surrounding suburbs), with some individuals becoming very desensitized to human disturbance, the majority of birds are wary of people near their nest sites (Bock 1970; M. Nyhof pers. comm.; S. Beauchesne unpublished data). Disturbed birds will stay away from the nest until the intruder is no longer detected in the vicinity of the nest site (M. Nyhof pers. comm.). Frequent disturbance could, therefore, lead to nest failure, although there are no data on nest success rates in disturbed versus undisturbed sites (Tobalske 1997).

Industrialized agriculture has reduced riparian Black Cottonwood habitat in the interior, particularly in the Okanagan. Expansion of field size, elimination of hedge rows and other natural variations and the planting of monotypic crops are occurring in the south Okanagan (Campbell *et al.* 2001) and all reduce Lewis's Woodpecker habitat quality. Agricultural practices that increasingly depend on pesticides have undoubtedly altered available insect communities, resulting in a reduction of this food source with likely detrimental effects (Boulton *et al.* 1999). The long-term effects of sub-lethal levels of dietary pesticide exposure are difficult to determine with certainty (Gard *et al.* 1993), and have never been studied in Lewis's Woodpecker. Other bird species, however, that frequent agricultural areas in the Okanagan have been found to have a high level of contaminants (Elliot *et al.* 2005). Over the long-term, pesticide exposure may cause indirect effects through reduced fitness resulting in lowered reproductive success (Burkepile *et al.* 2002) or reduced adult survivorship (Sibley *et al.* 2000).

Forest succession has affected habitat quality in other areas. Fire suppression has interfered with stand-maintaining fire frequency (which maintains open Ponderosa Pine forest as suitable habitat) and reduces the availability of new stand-destroying burns as new habitat (Cooper *et al.* 1998; Cooper and Gillies 2000). Historically, stand-maintaining fires were common, occurring on average every 5–15 years in the Ponderosa Pine biogeoclimatic zone; and on average every 10–20 years in the interior Douglas-fir zone (Daigle 1996). These fires maintained open forest habitats and created suitable nest trees, with long-term suitability for Lewis's Woodpeckers (Cooper *et al.* 1998; Cooper and Gillies 2000). Infilling of formerly more open forest habitats has occurred in many Ponderosa Pine stands and these infilled stands are not occupied by Lewis's Woodpeckers (J.M. Cooper pers. comm.).

Large-scale, stand-destroying fires also create suitable Lewis's Woodpecker habitat; however, this habitat is typically only available for the medium term (up to 30 years), after which point most of the suitable nest sites will have fallen and forest regeneration will have reduced the open features, rendering the sites unsuitable (Cooper and Gillies 2000). The Lewis's Woodpecker population occupying declining burns (i.e., burns with snags disintegrating, reducing number of nest sites) will have to find new breeding habitat which may be difficult if suitable new burns are not being created.

In areas where suitable nest trees are scarce, removal of dead and dying trees for firewood, human-safety, aesthetic, or other reasons has a negative impact on this species (Fraser *et al.* 1999; Schwab *et al.* 2006). As the human population increases, the probability of wildlife trees being removed likely increases. Several cases of nest trees being cut for firewood or aesthetic reasons have been documented in British Columbia, including exceptionally high-quality nest trees (Beauchesne and Cooper 2008). This threat is significant in most of this species' range in British Columbia.

Competition from introduced species is frequently listed as a threat to Lewis's Woodpeckers. The decline in Lewis's Woodpecker populations coincides with the arrival of European Starlings on the west coast of British Columbia (Campbell *et al.* 1990), Washington (Lewis *et al.* 2002), and Oregon (Galen *et al.* 2003). Competition with European Starlings has been discounted as a threat to the species in other regions because Lewis's Woodpeckers tend to dominate in aggressive encounters (Cannings *et al.* 1987; Vierling 1997; Tobalske 1997). In the East Kootenay Trench, both species have often been found nesting in the same tree (S. Beauchesne unpublished data), indicating some level of tolerance and ability to share resources. However, where there are few remaining cavities and a very large population of starlings, as is found in the Georgia Depression, competition may be more intense, and the cumulative effect may be detrimental (Campbell *et al.* 1997). Recently in the south Okanagan, 43% of Lewis's Woodpecker's nests found in 2004 were occupied by European Starlings in 2005 suggesting that competition for this limited resource may be becoming more of a threat in this area. Starlings begin nesting activity earlier than Lewis's Woodpeckers and once established are difficult to evict, so in terms of competition, they may simply acquire the cavities first, leaving no chance for the woodpeckers to gain access to a limited resource (Zhu 2006).

Accidental mortality may occur in areas with high human population density. An increase in vehicular traffic increases the risk of mortality through collision (a threat documented by Cooper and Beauchesne 2000). There is also concern that this species may be shot if mistaken for species that are targeted by agricultural avian control programs. As a large portion of this species range is converted to vineyards, and Lewis's Woodpeckers consume fruit, particularly in the post-breeding season, there is a possibility that Lewis's Woodpeckers could be accidentally shot. Accidental mortality could have a negative effect on populations when populations are small and recruitment is low.

### **SPECIAL SIGNIFICANCE OF THE SPECIES**

The Lewis's Woodpecker is a unique woodpecker in behaviour and appearance and it is sought after by recreational birders. It is an indicator species for fire-maintained Ponderosa Pine ecosystems. Woodpeckers are also culturally significant to First Nations people.

## EXISTING PROTECTION OR OTHER STATUS DESIGNATIONS

COSEWIC designated Lewis's Woodpecker as Special Concern in November 2001, and it is currently designated as Special Concern, under Schedule 1 of the Canadian *Species At Risk Act*, which requires a specific Management Plan to be prepared under the Act. The Lewis's Woodpecker and its eggs and active nests are protected from direct persecution under the *Migratory Birds Convention Act* of 1994 (Canada) and the *British Columbia Wildlife Act* of 1982.

In British Columbia, the species is Red-listed by the CDC, which provides heightened awareness and consideration for the species under any environmental assessment process. Guidelines for habitat conservation are also provided to the forest harvesting industry under the British Columbia *Forest and Range Practices Act* Identified Wildlife Management Strategy (2004). These guidelines provide suggestions for maintaining trees suitable for nesting through establishment of wildlife tree retention areas in suitable sites scattered across a landscape-level planning area.

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### **BIOGRAPHICAL SUMMARY OF REPORT WRITER**

Suzanne Beauchesne has had a life-long interest in birds. She completed a B.Sc. in biology at the University of Victoria in 1994. Since then she has studied forest, grassland, and freshwater birds, mammals, amphibians, and molluscs in British Columbia and the western United States. Suzanne has authored or co-authored COSEWIC status reports for Streaked Horned Lark, Vesper Sparrow *affinis*, and Peregrine Falcon. She has also co-authored provincial management strategies for nine bird species, and stewardship accounts for four bird species for the Garry Oak Ecosystem Recovery Team. She has a special fondness for Lewis's Woodpecker and has been studying this species for the past 11 years. Suzanne is a member of the Lewis's Woodpecker Recovery Team.

### **COLLECTIONS EXAMINED**

None.