

Lewis's Woodpecker
(Melanerpes lewis)
Survey
East Kootenay Trench,
British Columbia
2007



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1 INTRODUCTION

1.1 Background

The Lewis's Woodpecker (*Melanerpes lewis*; LEWO) is a rare woodpecker that occurs in Canada only in southernmost parts of British Columbia (Godfrey 1986; Campbell et al. 1990; Cooper et al. 1998). The species is Red-listed in the province of British Columbia (CDC 2007), was assessed by Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as "Special Concern" (COSEWIC 2001), and is on Schedule 1 of the *Species at Risk Act* (SARA). The Lewis's Woodpecker has been identified as a priority species for the Great Basin Partners in Flight program (PIF 2007).

In support of an ongoing conservation assessment program, information on current population sizes and population trends in the province of British Columbia was needed. Previous population estimates for British Columbia were made with insufficient data (Cooper et al. 1998) and population trend data were unavailable. During 2005-2006, populations in the Okanagan, Thompson and West Kootenay regions of British Columbia had been inventoried leaving only the East Kootenay region unsurveyed in recent years (Luszcz and Sawicz 2007). Unique for British Columbia, a comprehensive survey for Lewis's Woodpecker was conducted in the East Kootenay region in 1997-1998 (Cooper and Beauchesne 2000). A significant population, representing perhaps one-fifth of the national population was found to breed there. This region therefore afforded the only opportunity to assess population trend in British Columbia by comparing current (2007) survey results to 1997-1998 survey results.

In the 1997-1998 survey, the majority (69%; n=85) of the East Kootenay population was found to be breeding in areas which had experienced relatively recent (<30 years) high-intensity stand-destroying burns (Cooper and Beauchesne 2000; Cooper and Gillies 2000). The Lewis's Woodpecker is known to be a "burn specialist" (Tobalske 1997) but, as burns age, they decline in habitat quality for this species as suitable nest trees fall down and new forest regenerates (Saab and Vierling 2001; Gentry and Vierling 2007). It was thought that few new burns which may provide suitable habitat for this species had occurred in the region since 1998.

This report provides the results of the 2007 survey for Lewis's Woodpecker in the East Kootenay Trench, including estimates of the regional population, population trend, and nest productivity. This report will also support ongoing conservation efforts by informing biologist who are developing conservation strategies and are updating the COSEWIC assessment and the draft National Management Plan for Lewis's Woodpecker in Canada.

1.2 Study Area

Surveys were conducted in the East Kootenay Trench (EKT) from the USA border north to the vicinity of Brisco. Survey areas included all of the historically known breeding areas (Figure 1) as well as all of the accessible areas thought to have potentially suitable

habitats. All survey areas fell within the Bunchgrass, Ponderosa Pine and Interior Douglas-fir BEC zones.

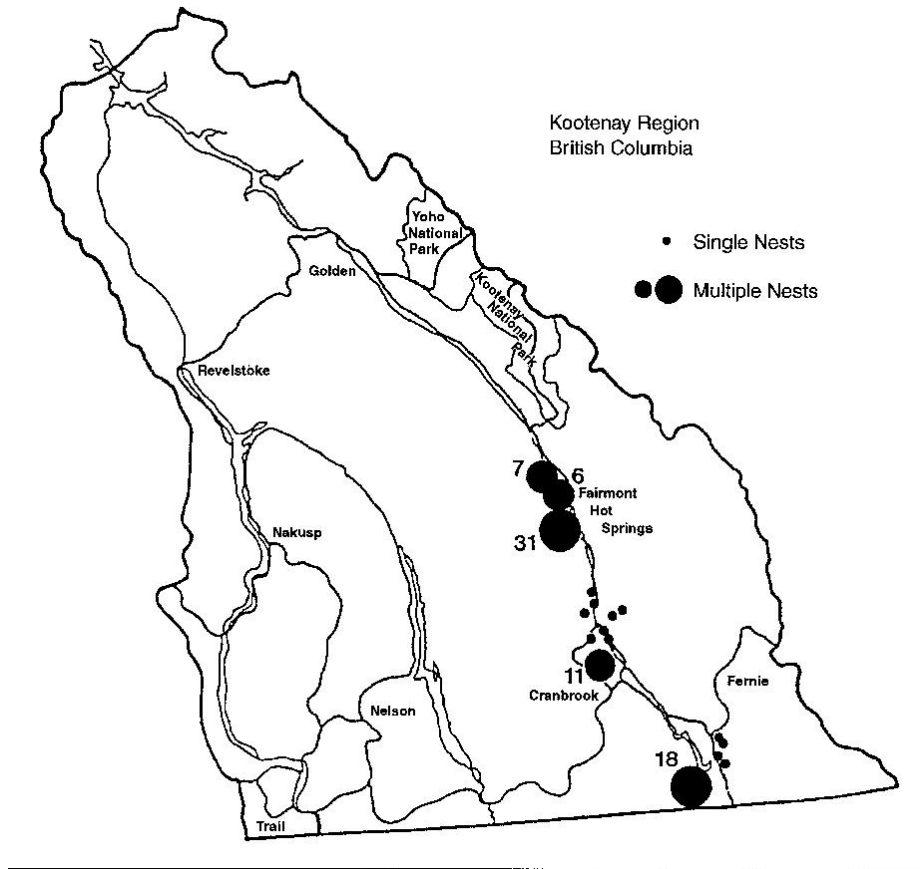


Figure 1. Map of study area showing known locations of breeding Lewis's Woodpeckers in the EKT (from Cooper and Beauchesne 2000). Numbers indicate number of breeding pairs in 1998.

1.3 Objectives for 2007

1. Conduct an inventory for Lewis's Woodpecker in all suitable habitats in the East Kootenay Trench region.
 - a) re-survey breeding habitats identified in the previous intensive surveys of 1997 and 1998.
 - b) identify and survey any recently created or previously unknown potential habitat.
2. To the extent possible, attempt to locate, map and mark any active nests for all individuals detected. Where and if feasible, provide estimates of productivity and or nest success.
3. Re-visit all known nest sites from 1997-1998 surveys and indicate whether the former nest tree is currently used, unused and/or no longer suitable.
4. Characterize nest sites and nest trees.

5. Assess current availability of suitable breeding habitat, and compare and comment on trends between 1997-1998 and 2007.
6. Based on current findings provide recommendations for conservation and / or enhancement of Lewis's Woodpecker breeding habitat in the East Kootenay Trench.

2 METHODS

We identified suitable Lewis's Woodpecker breeding habitat by reviewing:

- Our data base of historical occurrences from the 1997-1998 surveys (Cooper and Beauchesne 2000) and subsequent visits to the region, as well as records from the Conservation Data Centre.
- Occurrences obtained from contacting local biologists and naturalists.
- Review of fire records within Lewis's Woodpecker range in the EKT to identify potential new sites with suitable breeding habitat.

Areas to be searched were prioritized based on historical information, new information and our personal knowledge of the study area. All 1997 and 1998 nest sites were revisited (with the exception of the Wigwam River valley south of Elko) and any other areas with good habitat (open stands of mature ponderosa pine, riparian black cottonwood bordering on open areas and burned areas with wildlife trees) were surveyed. We also visited any area where Lewis's Woodpeckers had been recently reported by local biologists and naturalists.

Once we established areas to search for Lewis's Woodpeckers, we used similar survey techniques to that established in 1997 and 1998 as we felt it important for trend estimation that methods were similar. Our survey methods therefore varied somewhat from the stand watch technique for Lewis's Woodpecker described by Luszc and Sawicz (2007), as our primary focus was on finding nests to confirm breeding pairs. Similar to their methodology, we looked for locations with good vantage points over suitable habitat. In areas with a single good vantage point and / or limited Lewis's Woodpecker activity, a single stand watch was sometimes sufficient to survey the area. However, when Lewis's Woodpeckers were detected visually our survey method varied from Luszc and Sawicz (2007). We did not conduct surveys for a specified length of time, but rather, once a bird was sighted and a pattern of behaviour was observed, we would move to a new vantage point to better observe the bird and locate a potential nest site. In large areas with multiple vantage points (e.g., Strauss Wildlife Reserve) or in areas with concentrations of activity (e.g., the Findlay Creek burn) the result was a meandering transect with observations made along the route and multiple fixed points of observation.

Lewis's Woodpecker nests were confirmed by observing an adult entering or exiting a cavity during incubation period or repeated visits to provision young after eggs had hatched (young were also usually audible at this stage). Locations of nests were described and UTM's were recorded with a hand held Garmin GPS (GPS Map 76) with coordinates accurate to <5m. Nest trees were described and photographed. The interior of accessible nest cavities were photographed with a small camera, so that the contents could be

determined. Observations of individual or pairs of Lewis's Woodpeckers for whom a nest could not be found were also recorded.

Areas visited by surveyors who had previously been to those sites in 1997-1998 surveys were evaluated for changes in cavity availability or habitat quality. Unfortunately not all surveyors for the 2007 surveys were also involved in the 1997-1998 surveys, so not all areas could be evaluated for change.

Surveys were conducted between June 25 and July 20, which was similar to the 1998 surveys dates (June 22 to 15 July).

3 RESULTS

3.1 Survey Effort

During the 25 June to 20 July survey period, 54 person days of surveys were conducted. All areas with 1997-1998 breeding records were surveyed with the exception of the Wigwam River south of Elko. Areas with potential habitat but no nests in 1997-1998 were also surveyed in 2007. In addition, the Tobacco Plains, on the east side of Lake Koochanusa was surveyed more extensively further to the south than had been possible in 1997-1998. We also spent more time in black cottonwood riparian areas north of Invermere than we had in 1997-1998. We believe that the majority of suitable habitat in the East Kootenay Trench south of Brisco was surveyed in 2007.

3.2 Population estimate for 2007

Sixty-six Lewis's Woodpecker nests were found in the EKT in 2007 (Table 1; Appendix 2). Concentrations of breeding LEWO occurred in four areas: the Findlay Creek burn (26 nests), Wycliffe (7 nests), Newgate Wildlife Reserve (WR; 7 nests), and the Tobacco Plains (8 nests). An additional four pairs or separate individual birds were observed for which no nest could be found. These birds may have been non-breeders or birds whose nests had failed and therefore could not be located. In total, therefore, we estimate a minimum population of 70 pairs of Lewis's Woodpecker for the East Kootenay Trench region for 2007.

3.3 Population trend 1997-1998 to 2007

3.3.1 East Kootenay Trench Region

Region-wide, 85 nests were found in 53 person days of survey effort in 1998 versus 66 nests with a similar level of effort in 2007; a 22 % decline in nest sites found. Surveyors were able to locate nests for the majority of the individual Lewis's Woodpeckers observed in 1998 and 2007 (94.4% in 1998 and 94.3% in 2007) suggesting that the majority of individuals present are breeding.

3.3.2 Local sub-populations

On a local scale, concentrations of breeding pairs in 1997-1998 occurred at Dutch Creek burn (west of Windermere Lake and Fairmont Hot Springs), Findlay Creek burn (west of the south end of Columbia Lake and Canal Flats), Wycliffe, Strauss WR (north of Gold Creek on the west side of Lake Kooconusa) and Newgate WR (south of Gold Creek on the west side of Lake Kooconusa). Some of these local areas showed marked changes from 1997-1998 to 2007 (Table 1).

Table 1: Lewis's Woodpecker breeding records in the East Kootenay Trench by site, 1997, 1998 and 2007.

Area	Number of nests 1997	Number of nests 1998	Number of nests 2007
Dutch Creek burn	9	7	0
Fairmont	4	6	1
Findlay Creek burn	3 (incomplete survey)	31	26
Kootenay River, Skookumchuck	0	0	4
Skookumchuck Prairie	1	2	0
Moan Road		1	0
Wolf Creek Road	1	2	0
Ta Ta Creek	2	1	0
Wasa Slough	Unknown	2	0
Bummers Flats	0	0	1
Wycliffe	8	10	7
Eugene Mission	2	1	1
Bull River	0	0	2
Cutts Rd burn	1	2	3
Newgate WR	9	12	7
Newgate farmland	0	0	3
Strauss WR	7	6	2
Tobacco Plains	Unknown	1 (incomplete survey)	8
Wigwam River	Unknown	1	Unknown
Kikomen PP	0	0	1
Total	47	85	66

In 2007, no breeding pairs of Lewis's Woodpeckers were detected in the Dutch Creek burn (a 100% decline, down from a high of 9 in 1997). Nest habitat in this burn is much reduced from 1997-1998 as the majority of burnt wildlife trees have now decayed and fallen down.

In 2007, the population at Findlay Creek burn has declined by 16% (n=31 in 1998, n=26 in 2007) and many of the existing nest sites are nearing the end of their usefulness.

The population in Wycliffe has declined 42 % (n=12 in 1997, n=7 in 2007). This population has also become more concentrated, with five of seven nests occurring on three adjacent private properties along the Airport Road. Several formerly used, more dispersed nest sites (2 on NCC properties, 1 by Reade Lake, 1 on the Wycliffe-Mission Rd, 1 on McLure Rd, and 1 on Pighin Road) are no longer being used, even though nest trees still exist and the surrounding habitat still looks suitable.

Breeding records have declined considerably (71%) at the Strauss WR (n=7 in 1998, n=2 in 2007).

The population at Newgate WR has declined 42% (n=12 in 1997, n=7 in 2007). In the Newgate WR, most of the wildlife trees originating from the original burn that were suitable for nesting in 1997-1998 have fallen. All of the original well burnt stems from the 1970 fire are in their last years of suitability. Three new nest sites were found on private land south of the Newgate WR in 2007, an area surveyed with no results in 1997 and 1998, bringing the total for the general Newgate area to ten nests.

In 2007, one nest was found at Fairmont, down from six in 1998. This is one area where survey effort was less in 2007 than in 1997-1998 as access is now restricted due to gates on roads and private property issues.

3.3.3 New breeding sites in 2007

In 2007, nests were found in four new areas:

- Kootenay River, Skookumchuck (4 nests)
- Bummers Flat (1 nest)
- Bull River (2 nests)
- Kikomun Provincial Park (NE shore of Lake Kookanusa; 1 nest)

The four sites listed above were surveyed repeatedly in 1997 and 1998 with no results giving a high level of confidence that these are truly new nest site locations.

In addition, the Tobacco Plains on the south-eastern shore of Lake Kookanusa was surveyed further to the south than had been accessed in 1997 or 1998 and this yielded six new nest sites in a fairly concentrated area. It is unknown if this area was occupied in 1997 or 1998.

3.3.4 Historic breeding sites with no evidence of breeding in 2007

In addition to the Dutch Creek burn discussed above, Lewis's Woodpeckers were not detected at four other historically-known breeding areas despite no perceivable changes in nest site availability or habitat quality:

- Skookumchuck Prairie (formerly 2 nests)
- Moan Road (formerly 1 nest)
- Wolf Creek Road (formerly 2 nests)
- Wasa Slough (formerly 2 nests)

Other historically-known nest sites were reported to us by knowledgeable persons. We searched these areas but did not locate nesting pairs at:

- Radium, reported for the late 1990's (K. Stuart-Smith pers. comm.). There are many suitable cottonwood trees for nest sites and the surrounding habitat looked suitable.
- St. Mary's Indian Reserve, reported recently (P. Ohanian pers. comm.). The habitat looked suitable in places although cavities are very scarce.
- km 15 Findlay Creek Road (I. Adams pers. comm.). The habitat and potential nest cavities looked suitable.

Lewis's Woodpeckers had been recorded as far north as Radium in the late 1990's (Kari Stuart-Smith pers. comm.). In 1997-1998 and 2007, our northern-most records were nests at Fairmont, although this population is down to one breeding pair in 2007. With the Dutch Creek burn being apparently abandoned, by Lewis's Woodpeckers, the Findlay Creek burn area is the next most northerly breeding location for 2007.

3.4 Habitat trends

In general, there is more development in the East Kootenay Trench, particularly in the Canal Flats to Radium area where many new residential developments are developed or are in the process of being built; there is also some infilling further south. Development has thus far directly affected only a few Lewis's Woodpecker nest sites, however this could increase in the future as some nest trees are on private properties that are currently for sale (e.g., 3 nests on one parcel of land on Airport Road, Wycliffe and 3 nests within a subdivision of vacant lots in the Findlay burn, east of Hwy 93).

Traffic has increased significantly on all major routes throughout the region, increasing the risk of vehicle collision for Lewis's Woodpeckers with nests near roads.

More locally, habitat quality of the Dutch Creek burn was in decline in 1998 as many nest sites were in trees that were unlikely to last much longer (Beauchesne and Cooper 2000). Most of the burnt wildlife trees have fallen and there are very few other options

for Lewis's Woodpecker nest sites (Table 2), rendering the Dutch Creek burn apparently unsuitable for Lewis's Woodpecker breeding habitat. Considerable infilling by sapling conifers has also occurred in the upper slopes, reducing the overall habitat quality.

Table 2: Cavity availability and habitat quality for Lewis's Woodpeckers at known breeding locations (a subjective analysis).

Area	Cavity availability 2007 vs 1997/98	Habitat quality 2007 vs 1997/98
Dutch Creek burn	Significant decline	Some infilling of forest in upper areas
Fairmont	Probable decline	Reduced due to development.
Findlay Creek burn	Decline	Similar, some infilling with regeneration.
Kootenay River, Skookumchuck	No change	Similar
Skookumchuck Prairie	Small decline	Similar
Moan Road	No change	Similar
Wolf Creek Road	No change	Similar
Ta Ta Creek	Decline	Similar
Wasa Slough	No change	Similar, some development
Bummers Flats	No change	Similar
Wycliffe	Decline	Similar
Eugene Mission	Decline	Similar
Bull River	Not evaluated	Not evaluated
Cutts Rd burn	Decline	Similar
Newgate WR	Decline	Increase in recreational activity
Newgate farmland	No change	Similar
Strauss WR	Decline	Increase in recreational activity
Tobacco Plains	Decline	Similar
Wigwam River	Not evaluated	Not evaluated
Kikomen PP	Not evaluated	Not evaluated

The land surrounding the Fairmont Golf course has been developed into a residential community. Vacant lots that had Lewis's Woodpeckers nest trees in 1998 are now built upon. Access is restricted to this gated community, but it seems unlikely that many wildlife trees were retained as the landscaping that is visible favours lawn and ornamental shrubs. In addition to the probable loss of nest sites, loss of native vegetation, increased built structure and increased human disturbance factors have likely also reduced habitat quality.

Findlay Creek burn habitat quality is declining as cavities become scarcer and some forest infilling occurs. Many of the 2007 nest trees appear very fragile and are unlikely to

last for more than another year or two. Unfortunately there are very few recruitment trees in this area.



Fig. 2: Example of a 2007 nest tree at Findlay Creek burn that is unlikely to remain standing for long (tall tree, centre of photo with decayed base).

Wycliffe is currently undergoing some development pressure (e.g., 4 Winds selling and subdividing) and some change in land use (e.g., the farm by Reade Lake using more intensive hay production) although for the most part the overall habitat remains unchanged.

Newgate and Strauss WRs are being actively managed as NDT4 ecosystems by Ministry of Environment and Columbia Basin Fish and Wildlife Compensation Program. This management regime is maintaining open to very open ponderosa/Douglas-fir forest in most of the areas used by Lewis's Woodpeckers, which is positive. In the Newgate WR live trees with defects provide a high percentage of nest sites (50% in 1998, 43% in 2007). This class of tree will likely be increasingly important for the Newgate population as more of the dead wildlife trees from the original fire fall or are otherwise destroyed.

Both Newgate and Strauss WR's have seen significantly increased pressure from recreation use since 1997. Lake Koochanusa now draws a large crowd of summer camping activity. For example, on the July long weekend a group of 16 adults with seven recreational vehicles and a variety of trailers with a boat, ATV, dune buggy and dirt bike, were camped beside the concentration of Lewis's Woodpecker nests at Newgate WR. Similar groups were found all along the both shores of the lake on that weekend. Firewood cutting (either as a stand alone activity, or to supply campers) is prevalent and ATV's are used to access all areas of the grassland. At least two former (1997-1998) nest trees (one housing three nests, one with two) have been cut for firewood in the Newgate WR area (Fig. 3). It is possible that ideal Lewis's Woodpecker trees are targeted because they are recognized as "dying" and are either preferred for firewood or thought to be of lower forest value. In the Strauss WR, there were very few class 2 wildlife trees available for nesting, an apparent change from 1997-1998 when all (n=6) recorded nests were in Class 2 wildlife trees. The protection of suitable nest trees in these two areas appears to be a significant management issue.



Fig. 3: The remains of a wildlife tree that supported 3 breeding pairs of Lewis's Woodpeckers in 1997.

3.5 Nest tree trends

Five species of trees (ponderosa pine, Douglas-fir, western larch, black cottonwood trembling aspen) were used as nest trees in 2007 (Table 3, see Appendix 1 for details). No nests were found in paper birch, compared to four in 1998. Two nests were found in utility poles in both 2007 and 1998.

The most notable result was a 41% decline in 2007 of nests found in Class 3-6 Douglas-fir wildlife trees. We believe this result is due to declining suitability of aging Douglas-fir wildlife trees in areas of Lewis's Woodpecker concentrations (e.g., Newgate WR and the lack of more recent burns at lower elevations which would have created new areas with suitable Lewis's Woodpecker habitat).

Table 3: Species of trees used by nesting Lewis's Woodpeckers in 1998 and 2007.

Tree Species	1998	2007	Difference
Ponderosa Pine, WTC 2	13	9	30% decline
Ponderosa Pine, WTC 3-6	21	20	5% decline
Douglas Fir, WTC 2	1	1	
Douglas Fir, WTC 3-6	29	17	41% decline
Western Larch	3	3	
Black Cottonwood	3	6	100% increase
Trembling Aspen	6	6	
Paper Birch	4	0	100% decline
Utility Pole	3	2	50% decline
Unknown	2	2	
Total	85	66	

3.6 Fate of known nest trees

Nest sites are often reused for many years but may be rendered unsuitable over time as the tree decays, falls, is cut down or the cavity is predated or usurped by a competitor. In 2007, we attempted to locate nest trees used in 1998 as well as the 22 trees that had nests in 1997, but were not reused in 1998. We were able to locate 60 nest sites used in 1998 and an additional 12 nest sites recorded in 1997 only. Of the 60 1998 nest cavities relocated, 11 (18%) were active in 2007, 21 (35%) were still standing and appeared suitable, nine (15%) were in still standing but the cavity now appeared unsuitable, 13 (22%) had fallen to the ground, five (8%) had been cut for firewood and one was taken by an American Kestrel. Of the 25 nest trees that had uncertain fates, we believe that nine had likely fallen and at least six had likely been cut.

Table 4: Fate of Lewis's Woodpecker nest trees from 1998-2007.

Area	# of nests 1998	Fate Unknown	Fell	Cut	Standing, cavity unsuitable	Looks suitable, not used	Active 2007	Taken over by competitor
Dutch Creek burn	7	7 - probably fallen						
Fairmont	6	5 - probably removed					1	
Findlay Creek burn	31	3	12		7	4	5	
Skookum-chuck Prairie	2				1	1		
Moan Road	1					1		
Wolf Creek Road	2					2		
Ta Ta Creek	1					1		
Wasa Slough	2					2		
Wycliffe	7			1		6		
Wycliffe Eugene Mission	3					2	1	
Cutts Rd burn	1						1	
	2	1				1		
Newgate WR	12	2 - probably fell	1 *	4	1		3	1 (AMKE)
Strauss WR	6	5						1 (AMKE)
		1 - probably fell or was cut						
Tobacco Plains	1							
Wigwam River	1	1						
Total	85	38	13	7	11	23	11	1

* this nest tree was on the lake shore in an area where the bank had caved in

Of the 22 nest sites from 1997 that were not reused in 1998, the fate of 12 of these trees was determined in 2007. Five had fallen, two had been cut down, two trees were still standing but the nest cavity no longer looked suitable and two were standing and still looked suitable. An additional nest site in a wooden utility pole was no longer available as the pole had been replaced by a metal tower.

3.7 Influence of weather on habitat

On June 29 there was a very strong wind event in the East Kootenay region that brought down thousands of trees, including several trees near known Lewis's Woodpecker nest trees (Figure 4). In at least one instance (Strauss WR), there was strong evidence that an active nest had been destroyed during that wind storm based on a Lewis's Woodpecker remaining close to a wildlife tree which had snapped off at a woodpecker cavity entrance hole and that the cavity contained adult Lewis's Woodpecker feathers.



Fig. 4: Uprooted tree beside an active Lewis's Woodpecker nest site (similar sized class 2 ponderosa pine standing on left side of photo).

The June 29 windstorm also may have destroyed a nest near the St. Eugene Mission. Two pairs were observed in the cottonwoods besides the St. Mary's River near the mission, but only one nest was located. The second pair did not appear to have an active nest. There was evidence of recent windfall in the stand of cottonwood beside the river and the land owner reported that a woodpecker nest with young was found in one of the fallen trees. This may have been the nest of the second pair of Lewis's Woodpeckers. It is possible that this storm also took out other nests that had not previously been recorded.

3.8 Productivity

Active nests were found for 94% of the adult Lewis's Woodpeckers observed in the East Kootenay region (n=66 pairs of a possible 70). The contents of three nests were observed with a miniature camera and each of these contained four nestlings. Nestlings were at various developmental stages (Table 5).

Table 5. Lewis's Woodpecker nest contents, EKT 2007.

Nest #	Location	Date	# of young	Development
2007-14	Newgate WR	30-June	4	Pin feathers, eyes opening. (Fig. 5)
2007-24	Cutts Rd burn	3-July	4	Feathers more developed, eyes open (Fig. 6)
2007-36	Findlay Creek burn	8-July	4	Fully feathered (Fig. 7)



Figure 5. Lewis's Woodpecker nestlings at Newgate, June 30, 2007.



Figure 6. Lewis's Woodpecker nestlings at Cutts Road burn., July 3, 2007.



Figure 7: Fully feathered nestlings at Findlay Creek burn, July 8, 2007.

4 DISCUSSION

4.1 Survey effort

We believe that survey effort in 2007 was similar (i.e., number of person days and sites visited) to 1997-1998, but was likely more efficient. The number of person days was similar (54 in 2007 versus 53 in 1998) for both survey periods. All observers in both surveys had considerable experience surveying for Lewis's Woodpecker. Surveys in 2007 were thought to be more efficient because more time was spent in the field on a daily basis as observers normally camped out on site, rather than staying in town as in 1997-1998. In addition, we knew where existing concentrations of Lewis's Woodpeckers were in 2007, whereas in 1997 we had very little information and in 1998, were still finding concentrations. In 1998 we almost doubled our 1997 totals and felt confident that we had detected most Lewis's Woodpeckers in the East Kootenay (Cooper and Beauchesne 2000). We believe that the lower number of active nests found in 2007 and our suggestion of a marked decline is well supported by survey effort factors.

4.2 Population estimate for the EKT

After the 1997-1998 survey where we found a maximum of 85 nests in one year (1998) and noted 3 additional pairs and 2 single birds, we estimated that 100-150 pairs of LEWO occurred in the East Kootenay region (Cooper and Beauchesne 2000), but suspected the lower end of that range. In 2007, we found new breeding locations, found old sites seemingly abandoned, and found only 66 nests and 70 possible pairs. We now estimate the East Kootenay population at 75-100 pairs.

There seems to be sufficient reason to believe that breeding populations in the East Kootenay have declined since 1997-1998. In 2007, we found 22% fewer active nests, even considering the new breeding sites found, and found several former breeding areas or specific sites no longer occupied,. There seems to have been some movement of local populations within the region. Birds have shown up in new areas that may represent a slight shift from previous nest areas (e.g. Bummars Flat from Wasa Slough, Newgate farmland from the Newgate WR, and Kootenay River Skookumchuck, from the prairie area, Wolf Creek to Gina Lake). Probably the most telling data are the number of unoccupied sites that have seemingly suitable habitat (nest trees and foraging habitat). Several isolated breeding sites in the Wycliffe, Ta Ta Creek, Skookumchuck Prairie areas that were active in 1997-1998 were unoccupied in 2007, as was Dutch Creek burn. In areas of previous concentration, numbers of active nests were lower in 2007 in all cases.

Overall the population trend appears to be declining and the population is contracting to the south. If the actual East Kootenay population has declined by 22% since 1998, then the decline is about -2.4% annually from 1998-2007. Breeding Bird Survey data suggest that Canadian populations of Lewis's Woodpeckers have remained stable in the period

1966-2005, whereas a significant decline of 3.3% ($p < 0.01$) annually has occurred in the USA (Sauer et al. 2007).

4.3 Habitat trend

Our impression is that nest tree availability is declining at many sites in the EKT due to aging of burns and the advanced stage of decay or falling of potential nest trees, and cutting of trees for firewood. In most burns, live trees are also used for nesting but these must have defects caused by lightning or other factors and suitable live nest trees seem very rare.

The best nest trees (large and decayed or dead) are being lost to firewood cutting and development. The most unfortunate loss to firewood cutting was of a ponderosa pine in Newgate WR that housed 3 pairs of LEWO in 1997 and 2 pairs plus an American Kestrel in 1998 (Cooper and Beauchesne 2000). This tree also contained Lewis's Woodpeckers, American Kestrels and Northern Flickers in subsequent years (1999-2003, S.M. Beauchesne unpublished data) but was felled sometime after 2003.

4.4 Productivity

High nest success is common in Lewis's Woodpeckers that breed in burned habitats (e.g., 93% of nests fledged at least one young in South Dakota (Gentry and Vierling 2007; 85% in Wyoming, Tashiro-Vierling 1994; 81% in Idaho, Saab and Dudley 1996). In British Columbia, Campbell et al. (1990) reported 2.9 young fledged ($n=29$) per successful nest and a mean clutch size of 4.8 eggs. Although we were able to check only 3 nests, the number of nestlings (4 in each nest) found in our study, combined with the high percentage of active nests per observed birds suggest a reasonably high productivity.

4.5 Comments on survey methods

Developing a standardized methodology for monitoring this species has been the topic of much discussion recently in British Columbia, however, the Lewis's Woodpecker population size, distribution and behaviour makes it a challenging species to survey using standardized techniques. Methods contemplated have included using BBS data, using a stand watch protocol and simply attempting to locate as many nests in suitable habitat in a given region to get the most complete population count possible.

Studies that use randomly selected sample points in a region can easily miss all of the relatively small population of scattered and patchily distributed nesting Lewis's Woodpeckers. Even within modelled habitat (e.g., the area defined by Woods and Dyer 2006 need correct ref. ad to list) Lewis's Woodpeckers are far from evenly distributed, so that high-grading to modelled habitat could still produce random points that miss a significant percentage of the population.

Lewis's Woodpecker's behaviour patterns vary considerably with weather making them difficult to detect under some conditions (e.g., inactivity during cold and wet periods) whereas they can be extremely prominent in other conditions (e.g., sunny afternoons with good flying insect activity). Birds can therefore be easily missed on poor weather days. On good weather days, long-distance and convoluted foraging flights may confuse observers who are trying to count them at a single point, possibly leading to an over estimate. Foraging patterns also may vary significantly even with consistent weather. For example, at a single nest observed extensively on the same day, adults at times foraged within a short distance of the nest, provisioning young very rapidly; at other times they made longer flights, being away from the nest for longer periods. This pair was occasionally detected at observation points within the general area as they moved long distances to forage; it was only by following them back to the nest that we knew that we were seeing the same birds that we had already accounted for. A stand watch at a single point could therefore yield different results depending on the weather and time of day.

Breeding Bird Survey (BBS) data is commonly used to monitor population trends in birds but, in our opinion, is inherently less suitable for some species than others. We believe that Lewis's Woodpecker is poorly suited for BBS monitoring for several reasons. This species is not particularly active at dawn and early morning (when BBS surveys are conducted) because it is mainly an aerial forager and flying insects are not as active at that time. Also, Lewis's Woodpeckers rarely vocalize or drums and, unlike many other woodpeckers, its vocalizations and drumming are not loud and do not carry far. BBS survey points, which are set every 800 m beginning at a randomly selected starting point, may easily bypass Lewis's Woodpecker habitat because it is usually very local. In addition, Huggard (2007) has shown from a statistical perspective that, given current or even expanded BBS efforts within the range of Lewis's Woodpecker in BC, there would be insufficient data to calculate trends for many, many years.

Stand watches (where an observer watches a defined area, from one point for a defined period of time) are used routinely for some species of birds (see RISC standards). A stand-watch protocol has been recently developed (Luszcz and Sawicz 2007) and proposed as a method for monitoring Lewis's Woodpeckers. Considerable and thoughtful feedback on that document and on the entire concept of monitoring LEWO populations has also been recently provided by Huggard (2007). Huggard makes several recommendations he feels are necessary to make the stand watch method a defensible way to monitor Lewis's Woodpeckers and we generally agree with these.

Luszcz and Sawicz (2007) outline a concept of using provisioning rates (frequency of adults feeding young in the nest) as a way to determine the length of time for stand watches. The theory is that if the provisioning rate can be determined from known nests in an area then that would provide a suitably long observational period for other sites during the same time periods. From our experience, provisioning rates vary considerably between nests at different stages and within individual birds (as per above discussion). Some birds foraged for awhile near the nest, making short flights and provisioning rapidly. At other times of day the same birds would make much longer excursions,

disappearing from the vicinity of the nest for long periods and provisioning at a much slower rate. This may be due to changing availability of prey near the nest, requiring longer flights and time away, or it may be a predator avoidance technique. These different provisioning rates observed with individual birds, and some variation in nest initiation dates, makes it unrealistic to “calibrate” provisioning rates at a known nest and assume that that time period should be the same for other nests in the area at all times of day.

Huggard (2007) suggests that historically-known nest locations can be inventoried for other purposes but should not be used for population trend monitoring. It seems to us that since almost all of the core breeding areas for Lewis's Woodpeckers in BC are known (from recent survey work), even including locations of each nest tree (e.g., East Kootenay, this study and Cooper and Beauchesne 2000) then it seems impossible to not use historic sites for trend monitoring as there would be little population left to monitor.

We suggest that a reasonable alternative method of monitoring a Lewis's Woodpecker populations is to do a thorough count of nests in the breeding season, attempting to count most of the breeding pairs in any given year to give an estimate of absolute abundance. Essentially, the method involves active searching for Lewis's Woodpecker nests in all suitable habitats within a region, with the ultimate goal being the most complete count of Lewis's Woodpecker nests possible.

For example, in 2007, we were able to survey known breeding locations in the East Kootenay plus additional sites and believe that we found the majority of Lewis's Woodpeckers present in the East Kootenay in 2007. While it is virtually impossible to achieve a complete count of any species, our experience in the East Kootenay, plus our extensive observations of Lewis's Woodpeckers in the Chilcotin, Thompson, Nicola, Deadman, Kettle, Okanagan and Similkameen watersheds suggests to us that a very high percentage of Lewis's Woodpeckers nests can be detected by surveying suitable habitat within local and regional areas.

Such surveys, if conducted with sufficient intensity and at periodic intervals (every 5-10 years) would provide a reliable “snapshot” of populations. Periodic snapshot surveys may suffer from the problem of not being able to know if the snapshot was taken during an up, down or average year. However, if done in different regions (e.g., Okanagan, Thompson, Chilcotin, Kootenay) in different years, then snapshot surveys would cover most possibilities.

5 RECOMMENDATIONS

1. Currently there are a few informational signs placed for the purpose of educating the public about wildlife habitat values in the East Kootenay Trench (e.g., Lake Koocanusa area). There are also signs directing people to avoid damaging wildlife habitat in areas where recreational usage is very high (e.g., signs telling ATV operators to stay on established trails) and these signs appear to be effective as ATV usage does seem to be restricted to “trails” for the most part. Additional signage such as “Firewood Cutting

Prohibited” might be beneficial in areas with Lewis’s Woodpecker nests and where there is heavy recreational use, as long as the boundaries of the area where firewood cutting is prohibited are well-defined and alternative firewood areas are available. This idea should be field tested as there is a possibility that signage requesting no firewood cutting could have the opposite effect of that intended.

2. Recent habitat restoration work at the Newgate WR seems to have been beneficial for Lewis’s Woodpecker. This work could be continued and expanded to maintain NDT4 grassland and open forests habitats that are now so rare in the region. It would be beneficial to have a mechanical clearing of infill and a controlled burn to restore some of the habitat north of Gold Creek at the Strauss WR. Douglas-fir saplings have filled in some of the habitat near the lake shore (around 97-19 and 97-20) making this area less suitable for Lewis’s Woodpeckers at present.

3. Since Lewis’s Woodpeckers often use very decayed and decrepit trees or stumps for nesting, in areas where suitable nest trees are scarce it seems feasible to mechanically “plant” trees or stumps to provide nesting habitat. This technique would likely work very well in grasslands without wildlife trees or in very open forests with few suitable trees. There are many cases of Lewis’s Woodpeckers using the one and only suitable tree in a particular site.

4. A stewardship program that strongly encourages private land owners to protect and not remove key wildlife trees would be beneficial. Nineteen of the nests found in 2007 were in wildlife trees on private land. These nest trees are not protected and are vulnerable as they may be removed at the whim of the property owner. Two nest trees from the 1997-1998 surveys have been cut down by the property owner; both were in very large Ponderosa Pine veterans (estimated age over 300 years old) that will never be replaced. Stewardship programs can encourage private land owners to maintain their wildlife trees, however, in the case of one of the cut pine veterans, the property owner was very interested and happy to have such a tree in his yard; however when the property sold the new owner obviously was not as enamoured of large dead pine trees. We suggest that the stewardship concept could be reinforced by encouraging covenants on specific nest trees and, perhaps, even payment for maintaining a tree. If the property owner is motivated financially to protect a nest tree, its future might be more secure.

6 PERSONAL COMMUNICATIONS

Penny Ohanjanian, East Kootenay resident and biologist

Peter Davidson, retired MELP biologist, East Kootenay resident and contract biologist

Kari Stuart-Smith, East Kootenay resident and biologist

Ian Adams, East Kootenay resident and biologist

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Appendix 1: Summary of Lewis's Woodpecker nest site location, habitat, and nest tree characteristics, 2007.

Year	Nest #	Location	Land Status	Date	Activity
2007	1	Findlay Creek burn	Private	25-Jun	Entering cavity to feed
2007	2	Findlay Creek burn	Private	25-Jun	Adult incubating or staying in cavity after feeding.
2007	3	Findlay Creek burn	Crown	26-Jun	Adults feeding young.
2007	4	Findlay Creek burn	Crown	26-Jun	Adults feeding audible young.
2007	5	Findlay Creek burn	Crown	26-Jun	Adults feeding young, staying in cavity till other comes.
2007	6	Findlay Creek burn	Crown	26-Jun	Adults entering cavity to feed.
2007	7	Findlay Creek burn	Crown	26-Jun	Entered cavity, copulated on branch beside it.
2007	8	Findlay Creek burn	Crown	26-Jun	Mated on branch then looked in cavity.
2007	9	Newgate WR	Crown	29-Jun	Young audible. Both adults feeding rapidly
2007	10	Newgate WR	Crown	30-Jun	Feeding small young.
2007	11	Newgate WR	Crown	30-Jun	Young audible. Both adults feeding.
2007	12	Newgate farmland	Private	01-Jul	Young audible. Both adults feeding.
2007	13	Newgate WR	Crown	30-Jun	Young audible. Both adults feeding.
2007	14	Newgate WR	Crown	30-Jun	Young audible. Both adults feeding.
2007	15	Newgate WR	Crown	30-Jun	Young audible. Both adults feeding.
2007	16	Newgate WR	Crown	30-Jun	No audible young. Incubating?
2007	17	Newgate farmland	Private	01-Jul	Audible (from 60m) young. Adults feeding rapidly.
2007	18	Newgate farmland	Private	01-Jul	Audible (from 60m) young. Adults feeding rapidly.
2007	19	Strauss WR	Crown	01-Jul	Young audible.
2007	20	Strauss WR	Crown	02-Jul	Nest failed (broke off in storm 29-Jun)
2007	21	Tobacco Plains	Crown	03-Jul	Young audible, both adults feeding rapidly.
2007	22	Tobacco Plains	Crown	03-Jul	Young audible, both adults feeding rapidly.
2007	23	Cutts Rd burn	Crown	03-Jul	Both parents feeding - stay in cavity till other returns
2007	24	Cutts Rd burn	Crown	03-Jul	Loud young - 4, feathered young
2007	25	Airport Rd, Wycliffe	Private	04-Jul	Feeding small young, not audible.

Year	Nest #	Location	Land Status	Date	Activity
2007	26	Airport Rd, Wycliffe	Private	04-Jul	Both adults feeding rapidly.
2007	27	Airport Rd, Wycliffe	Private	04-Jul	Incubating.
2007	28	Airport Rd, Wycliffe	Private	04-Jul	Young audible.
2007	29	Airport Rd, Wycliffe	Private	04-Jul	Adults rapidly feeding young.
2007	30	Wycliffe	Private	04-Jul	Adults feeding - they were also feeding young on 27-Jun.
2007	31	Wycliffe	Nature Conservancy	05-Jul	Adults rapidly feeding audible young.
2007	32	Findlay Creek burn	Crown	07-Jul	Young barely audible.
2007	33	Findlay Creek burn	Crown	07-Jul	Both adults feeding audible young.
2007	34	Findlay Creek burn	Crown	07-Jul	Both adults feeding audible young.
2007	35	Findlay Creek burn	Crown	07-Jul	Both adults feeding audible young.
2007	36	Findlay Creek burn	Crown	08-Jul	Both adults feeding audible young.
2007	37	Findlay Creek burn	Crown	08-Jul	Feeding young.
2007	38	Findlay Creek burn	Crown	08-Jul	
2007	39	Findlay Creek burn	Crown	08-Jul	Feeding audible young.
2007	40	Findlay Creek burn	Crown	08-Jul	Young audible. Adults rapidly feeding.
2007	41	Findlay Creek burn	Crown	08-Jul	Audible young.
2007	42	Findlay Creek burn	Crown	08-Jul	Adults feeding, can't hear young but the buzz of the power lines is loud.
2007	43	Findlay Creek burn	Crown	09-Jul	Audible young.
2007	44	Findlay Creek burn	Crown	09-Jul	Audible young.
2007	45	Findlay Creek burn	Crown	09-Jul	Audible young.
2007	46	Findlay Creek burn	Crown	09-Jul	Audible young.

Year	Nest #	Location	Land Status	Date	Activity
2007	47	Findlay Creek burn	Crown	09-Jul	Audible young.
2007	48	Findlay Creek burn	Crown	09-Jul	Audible young.
2007	49	Findlay Creek burn	Private	10-Jul	Audible young.
2007	50	Skookumchuck	Private	11-Jul	Adults feeding young.
2007	51	St. Eugene Mission	Private	12-Jul	Adults feeding young.
2007	Bum1A	Bummers Flats	Private	10-Jul	
2007	BUR3-A	Bull River	Private	7-Jul	
2007	BUR3-B	Bull River	Private	7-Jul	
2007	Fgc1A	Fairmont Golf Course	Private	11-Jul	
2007	Lko12A	Tobacco Plains S	Crown	8-Jul	
2007	Lko13A	Tobacco Plains S	Crown	8-Jul	
2007	Lko15A	Tobacco Plains S	Crown	8-Jul	
2007	Lko21A	Tobacco Plains S	Crown	9-Jul	
2007	Lko24A	Tobacco Plains S	Crown	9-Jul	
2007	Lko28A	Kikomun PP	Crown	20-Jul	Feeding
2007	Lko8A	Tobacco Plains	Crown	7-Jul	

Year	Nest #	Location	Land Status	Date	Activity
2007	Sko1A	Skookumchuck	Crown	10-Jul	
2007	Sko1B	Skookumchuck	Crown	10-Jul	
2007	Sko1C	Skookumchuck	Crown	10-Jul	
2007	Wig3A	Cutt's Rd burn	Crown	13-Jul	

Nest #	Zone	Easting	Northing	Difference in location	Elevation	Tree Species	Tree Height (m)	Tree DBH (cm)	WLT Class
1	11U	581853	5559022		847	Py	18	45	6
2	11U	581835	5558362		851	Py	19	71	2
3	11U	580547	5557915		957	Py	16	57	2
4	11U	580491	5558035		963	Py	23	44	7
5	11U	580018	5558356		995	Py	17		6
6	11U	579807	5558293		1006	DF	7	38	7
7	11U	580169	5558471		1005	DF	18	50	5
8	11U	580169	5558471		1005	DF	18	50	5
9	11U	630397	5436240		781	Py	14	56	1 to 2?
10	11U	630325	5436156		780	WL	22	110	2
11	11U	629970	5436228		775	TA	13	26	4
12	11U	631600	5432000		780	WL	22	98	2
13	11U	630799	5436100		784	DF	4		7
14	11U	630954	5436055		752	UK	0.9	51	7
15	11U	630920	5435789		768	DF	4.6	68	7
16	11U	630812	5435833		779	Py	24	50	2
17	11U	631884*	5431694*	60m from this point at 220	768	TA	25	est. 40	5
18	11U	631884*	5431694*	60m from this point at 220	768	TA	25	est. 40	5
19	11U	630254	5439206		763	Py	6	60	4
20	11U	628008	5438656		830	Py	?	?	3
21	11U	631940	5439307		830	Py	12	72	7
22	11U	628449	5443648		852	Py	12	65	6
23	11U	634279	545183		872	DF	10	41	6
24	11U	634883	5452834		876	TA	3.5	43	7
25	11U	585972	5494205		967	Py	8.5	103	6
26	11U	585972*	5494205*	600m @ 270		Py	?	?	7

Nest #	Zone	Easting	Northing	Difference in location	Elevation	Tree Species	Tree Height (m)	Tree DBH (cm)	WLT Class
27	11U	585699	5494321		982	DF	25	120	2
28	11U	586177	5494723		970	Py	18	97	2
29	11U	586257*	5494868*	150m @ 350 from this point	962	Py	25	90	2
30	11U	582711*	5496013*	125m @ 300	944	Py	25	90	2
31	11U	580354	5499252		1023	Py	26	76	2
32	11U	579598	5557744		1066	Py	6	54	7
33	11U	579011	5558635		1063	WL	9.5	32	7
34	11U	578998	5558854		1046	DF	11	73	7
35	11U	579715	5558616		999	Py	11	37	7
36	11U	579336	5559464		981	DF	2.5	51	7
37	11U	578950	5559457		1044	Py	19	~70	7
38	11U	578828	5559340		1042	DF	12	59	7
39	11U	579571	5560078		973	DF	17	72	7
40	11U	579544	5560466		960	Power Pole	15	50	n/a
41	11U	579461	5562107		969	DF	6	50	7
42	11U	579390	5561170		954	Power Pole	17	60	n/a
43	11U	580490	5559514		937	DF	12	31	7
44	11U	581169	5558801		905	DF	6	43	7
45	11U	581157	5558292		941	Py	5.5	49	7
46	11U	580886	5558553		952	DF	8.5	30	

Nest #	Zone	Easting	Northing	Difference in location	Elev.	Tree Species	Tree Height (m)	Tree DBH (cm)	WLT Class
47	11U	580519	5558771			Py?	12		7
48	11U	580099	5558979			?	7		7
49	11U	581783	5559181		857	DF	15	52	5
50	11U	590530*	5529477*	250m at 200 100m at 80 from this point.	793	?			
51	11U	590198*	5493633*		814	BC	24	?	2
Bum1 A	11U	591356	5511123			Py	25	30	E6
BUR3 -A	11U	614283	5478424			DF	3.5	30	E6
BUR3 -B	11U	614196	5478819			DF	10	40	E6
Fgc1 A	11U	580288	5576167			BC	24	30	D2
Lko12 A	11U	632405	5436711			TA	14	50	D2
Lko13 A	11U	632973	5435895			Py	23	60	E6
Lko15 A	11U	634347	5435105			Py	25	50	E6
Lko21 A	11U	633166	5435379			Py	25	50	E2
Lko24 A	11U	633838	5435205			Py	25	50	E6
Lko28 A	11U	626947	5455201			BC	16	35	D2
Lko8 A	11U	632145	5436886			Py	5	30	E4

Nest #	Zone	Easting	Northing	Difference in location	Elevation	Tree Species	Tree Height (m)	Tree DBH (cm)	WLT Class
Sko1A	11U	590296	5529384	BC	30	50	D6		10
Sko1B	11U	590296	5529384	BC	30	50	D6		20
Sko1C	11U	590427	5529390	TA	20	70	D1		5
Wig3A	11U	634354	5451608	Py	2.5	30	E7		1.3