Appendix 5

Robertson Environmental Services Limited Spotted Owl Survey Results and Memoranda Summer/fall 2005

ROBERTSON ENVIRONMENTAL SERVICES LTD.

MEMORANDUM

To: **Mike McPhee, Sea to Sky WP1 Environmental Co-ordinator** **June 17, 2005**
Cc: Isobel Doyle, Sea to Sky Environmental Co-ordinator

From: Alana Hilton and Anré McIntosh

Re: Spotted owl survey and potential impacts of WP1 construction activities

According to the Owner's Commitments and Responsibilities agreed to as a condition of Environmental Certification, pre-construction surveys for spotted owls would be conducted along the Sea-to-Sky Highway Corridor in areas where spotted owls and/or their habitat could be impacted by project activities (Commitment 4.6). Such habitat exists in WP1 north of Eagle Ridge Bluffs and in WP'2 and 8.

Need for surveys in WP1

Since 1985 the Ministry of Environment/Ministry of Environment Lands and Parks has coordinated surveys to locate spotted owls within the North Shore watersheds. In 1992, a spotted owl nest was discovered in the Capilano Watershed, just east of Lions Bay (approximately 5 km from the STS study area). Subsequent searches in 1993, 1996, 1998, 2000 and 2001 detected a male spotted owl near the initial nest site detection (Ian Blackburn, Rare and Endangered Species Specialist, MWLAP, pers. comm.) An extensive search effort in 2002 (Ian Blackburn, Rare and Endangered Species Specialist, MWLAP, pers. comm.) failed to locate the owl: no subsequent surveys have been conducted by MWLAP/MOE.

Robertson Environmental Services Ltd. conducted spotted owl surveys in WP1 in 2004 on behalf of the Sea-to-Sky Highway Improvement Project: thirteen hours of survey time were completed during four surveys of the area between April and June. No spotted owls were detected. Additional spotted owl surveys were thus necessary in 2005 to ensure that there had been no change to the spotted owl occupancy status and nesting status in the habitat adjacent to WP1.

Alana Hilton of Panorama Wildlife Research, and an assistant, conducted spotted owl surveys on behalf of Robertson Environmental Services Ltd. along an estimated 2.25 km stretch of the Black Mountain Trail, as well as a spot check at the Ansell Place exit.

The objectives of these surveys were to:

1. Determine whether spotted owls are using habitats adjacent to the highway in areas where project related activities could cause disturbance.
2. Determine whether there are spotted owls nesting adjacent to the alignment that may be impacted by project related activities.

The methods and results of these surveys are presented in this memo report, along with recommendations.

Background

Spotted owls use mature and old-growth forest within their home ranges for foraging, roosting and nesting (Forsman *et al*. 1984, Carey *et al.* 1990, Carey *et al*. 1992, Bart and Forsman 1992, Hanson *et al*. 1993, Ripple *et al*. 1997). Specifically, coniferous forest with an uneven-aged, multi-layered, multi-species canopy that contains numerous large trees with broken tops, deformed limbs, and large cavities is considered suitable for spotted owls (summarized in Thomas *et al*. 1990).

Based on habitat suitability maps developed by the Ministry of Water, Land and Air Protection (MWLAP 2001), small patches of suitable spotted owl nesting habitat occur throughout and adjacent to WP1. Much of the suitable habitat is not directly impacted by construction activities within WP1, but is within 500 m of the project footprint, and in some areas appears to be connected to areas of high quality spotted owl habitat farther away from the highway.

Spotted owl breeding chronology

Little information is available on the breeding chronology of spotted owls in British Columbia, but it is thought to closely follow that of spotted owls in Washington (Hobbs *et al.* 2005). In Washington, spotted owls begin nesting in early to mid April, with incubation lasting until late May, when eggs hatch (Forsman *et al.* 2002). Juveniles remain in the nest until late June, and fledging from the nest occurs in late June to mid-July (Forsman *et al.* 2002). Recent fledglings remain close to the nest site for several weeks as they develop their flying ability (Alana Hilton, pers. obs.). Thus, nest disturbance is likely of most concern between early April and mid-July. Little is known about the susceptibility of recent fledglings to noise disturbance. Once the flight abilities of fledglings have improved, which may take until early August (Alana Hilton, pers. obs.), noise disturbance concerns are likely negligible, as juveniles should be able to move away from the source of disturbance to other areas of the home range.

Spotted owl survey protocol

The revised Survey Protocol and Standards for the Spotted Owl in B.C. (Hobbs *et al*. 2005) provides survey criteria for determining spotted owl occupancy of an area and breeding status. To determine if spotted owls are "vacant" from an area, surveys must meet the following criteria: a minimum of 13 hours of survey time must be completed during the breeding period (April 1 to September 30) and surveys must take place over three or more nights separated by a minimum of five days (e.g., surveys must be completed at least five days apart). This level of survey effort will allow for a minimum 90% chance of detecting a resident spotted owl if one were present

within the study area. Since there remains a 10% chance that an owl occupies the area but was not detected with this survey effort, Hobbs *et al.* (2005) require that vacant status be obtained over two or more consecutive years prior to officially designating the area vacant. Surveys to establish nesting status and identify nest trees must be conducted between April 19th and June 16th.

WP1 Spotted Owl Survey – April – May 2005

Methods: The two objectives for the spotted owl surveys were to determine whether spotted owls occupy the habitat within and surrounding WP1, and to determine whether any resident spotted owls are nesting. Consequently, thirteen hours of survey time over four night surveys spaced a minimum of 5 days apart were planned, with surveys beginning after April 19th, 2005.

It was determined that any responses from resident or nesting spotted owl(s) along the most of the length of WP1 should be audible from survey call stations located along the Black Mountain Trail. Surveying along the trail has advantages over surveying along the existing highway because surveyor hearing ability is improved by being removed from the noise of the highway. Nine to ten survey call stations were placed along the Black Mountain Trail transect (the number of stations varied with survey date), with call stations spaced 250 m to 300 m apart. The trail survey was approximately 2.25 km in length, and encompassed the area between the junction of the fire access road and the Black Mountain Trail ("the pond"), north to the picnic table. To survey the north end of WP1, an area not adequately surveyed from the Black Mountain Trail transect, an additional spot check was added at the Ansell Place exit, south of the Seascapes development.

Call stations ranged from 10 – 45 minutes in duration: the first call station of the trail transect was 30 – 45 minutes (the duration varied with survey date), with subsequent stations typically alternating between 10 minutes and 15 - 20 minutes (i.e., a 10 minute station was always followed by a longer duration station of 15 – 20 minutes). The Ansell Place spot check was 30 – 45 minutes in duration. At each call station, six spotted owl territorial calls (4-note calls and series calls) were broadcast every five minutes using a Fanon Megaphone (model MV-10S) connected to a tape player. Between calling bouts, surveyors listened for responding owls. A handheld GPS (Magellan 315) was used to obtain the UTM coordinates (NAD 83) at each call station.

R*esults:* Four night surveys for spotted owls were completed on April 21st, May 5th, May 11th, and May 24th, 2005. A total of 13.4 hours of survey time were completed (Table 1). Surveys were spaced more than 5 days apart, as per the spotted owl survey protocol outlined in Hobbs *et al. (*2005), and all surveys took place in good weather conditions (no rain, low wind levels).

No spotted owls responded during any of the surveys, although barred owls were heard along the Black Mountain Trail during each survey (Table 2). See Appendix I for a summary of the barred owl detection results.

Table 1. WP1 spotted owl survey dates, transect start and end locations (NAD 83 UTM), survey durations.

Survey Date	Start UTM (E/N)	End UTM (E/N)	Survey Duration (mins)
21-Apr-05	481542/5469979	481931/5471537	200
05-May-05	481405/5470015	481927/5471525	200
11-May-05	481542/5469979	481930/5471583	204
24-May-05	481257/5469675	481922/5471531	200
Total survey time for transect in 2005 (hrs):			**13.4**

Table 2. WP1 spotted owl survey results. Call station from where was owl detected (as measured from the picnic table), species detected (BAOW = barred owl), call type heard, distance and direction of call response are provided for all owl detections.

Survey Date	Call Station	Owl Detected	Call/Detection Type	Distance (m)	Direction (degrees)
21-Apr-05	1.0 km	1 male BAOW	"Who cooks…"	300	120
21-Apr-05	1.5 km	1 male BAOW	"Who cooks…"	200	180
21-Apr-05	2.0 km	1 male BAOW	"Whinney" + visual	200	80
05-May-05	0.0 km	1 male BAOW	"Who cooks…"	250	328
05-May-05	0.5 km	1 male BAOW	"Who cooks…"	500	190
05-May-05	0.5 km	1 female BAOW	Monkey calls	100	160
05-May-05	0.5 km	1 female BAOW	"Who cooks…"	500	190
05-May-05	2.0 km	1 male BAOW	"Who cooks…"	200	140
11-May-05	0.0 km	1 BAOW	"Who cooks…"	400	210
11-May-05	0.5 km	1 BAOW	"Who cooks…"	400	195
11-May-05	0.9 km	1 male BAOW	"Who cooks…"	400	160
11-May-05	2.25 km	1 male BAOW	"Who cooks…"	200	85
24-May-05	0.0 km	1 male BAOW	"Who cooks…"	350	116
24-May-05	0.25 km	1 male BAOW	"Who cooks…"	350	104

Conclusions and Recommendations

These surveys allowed for the following conclusions:

- Given that spotted owls were not detected during WP1 surveys conducted over two consecutive years (2004 and 2005), with at least three surveys conducted per year, the habitat surrounding WP1 can be officially classified as being “vacant” (Hobbs *et al.* 2005).

- Despite the area being officially classified as being “vacant”, spotted owls may occupy and/or nest in the habitat within or adjacent to WP1 in the future. Consequently, if construction activities in WP1 are not confined to 2005, the requirement for further spotted owl surveys should be determined in consultation with Ministry of Environment spotted owl biologists.

- Given that spotted owls did not respond during the 13.4 hours of survey time along WP1, we can be 90% confident that a spotted owl does not reside, and is not nesting, within 500 m of the WP1 project footprint in 2005. There remains a 10% chance that a spotted owl resides and/or is nesting in the habitat within or adjacent to WP1, but that it wasn't detected during the 2005 spotted owl surveys. Construction activities commencing after mid- to late July 2005 should cause little disturbance to any spotted owls residing or nesting in the area, since critical nesting times will have ended, and any juveniles should have fledged from the nest by that time.

References

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THOMAS, J. W., E. D. FORSMAN, J. B. LINT, E. C. MESLOW, B. R. NOON AND J. VERNER. 1990. A conservation strategy for the northern spotted owl. Report of the interagency Scientific Committee to address the conservation of the northern spotted owl. Portland, OR.

Appendix I Summary of barred owl detections during 2005 spotted owl surveys

On the April 21st survey, a male barred owl responded at three call stations along the Black Mountain Trail transect: at the 1.0 km, 1.5 km, and 2.0 km stations. Since the responses were from call stations that were closely spaced, it's difficult to determine whether or not the responses were from a single owl, or whether the responses were from two owls. Due to this uncertainty, we conservatively conclude that the responses were from a single owl that moved between call stations.

On the May 5th survey, a male barred owl responded with typical calls during the 0.0 km, 0.5 km, and 2.0 km stations of the Black Mountain Trail transect. During the 0.5 km station, a female barred owl also responded with monkey calls, then appeared to fly to the same location as the male and continued calling with the male. This survey confirmed the presence of a pair of barred owls in the vicinity of the Black Mountain Trail; it's difficult to determine whether the male barred owl detected at the 2.0 km station was a different owl.

On the May 11th survey, a barred owl responded during the 0.0 km and 0.5 km stations: the sex of this owl could not be determined. On the same survey, a male barred owl responded during the 0.9 km and 2.25 km stations; as with the previous surveys, it is difficult to determine whether the same owl was moving between call stations throughout the survey.

On the May 24th survey, a male barred owl responded during the 0.0 km and 0.25 km stations; these responses were likely from the same owl due to the proximity of the stations.

The presence of a barred owl along the Black Mountain Trail was also established during WP1 spotted owl surveys in 2004. During the June 1st, 2004 survey, a male barred owl responded from a location 400 m north of the pond. A barred owl was also detected in the vicinity of the pond during field surveys in 2002 and 2003. These data indicate that this area is home to a resident barred owl.

MEMORANDUM

To: **Isobel Doyle, Par Terre** August 06, 2004
Mike McPhee, Quadra Planning
Cc: **Marni Fedoruk, Ministry of Transportation**

From: Anré McIntosh 04-05

Isobel and Mike

In response to our conversation yesterday regarding questions from the Golder DBFO team I have prepared a summary of owl observations made by RESL in 2002 (Table 1). For each of these observations I have provided species, polygon, area and WP. Several additional individuals were observed in the GCDZ which has since been removed from the project area. I have not included these in the summary below as they will not be impacted by construction activities.

Table 1. Summary of 2002 owl observations along the Sea to Sky Corridor

Species	Polygon	Area	WP
Barred owl	696	Horseshoe Bay	1
	1	Britannia	4
	22	Britannia	4
Northern pygmy owl	483	Ansell Place	2-3
Northern saw-whet owl	1342	Function Junction	8
	1324	South of Function Junction	8
	492	Ansell Place	2-3
Western screech-owl	1247	Civil defense zone	8
	1291	Civil defense zone	8
	266	Civil defense zone	8
	435	Whyte Lake	1

In addition to the 2002 observations, two owls were detected during our spotted owl surveys this year (2004). The first was a barred owl. This individual was detected in WP1 near polygon 696. The second was a northern saw-whet owl detected in WP2 at UTM 483125/5474540. I think it is safe to assume that these are resident individuals as they have been detected in the same location two years apart.

I trust this information will adequately answer the DBFO team's question. Please do not hesitate to contact me or Ian if you require more information.

Anré

MEMORANDUM

To: **Mike McPhee, Coordinator** **July 05, 2004**
Cc: Isobel Doyle, Environmental Manager Revised July 06, 2004
Angela Buckingham, Ministry of Transportation
Marni Fadorik, Ministry of Transportation

From: Alana Hilton, Anré McIntosh, and Ian Robertson

Re: Spotted owl survey and potential impacts of WP1 construction activities

According to the Owner's Commitments and Responsibilities agreed to as a condition of Environmental Certification, pre-construction surveys for spotted owls would be conducted along the Sea-to-Sky Highway Corridor in areas where spotted owls and/or their habitat could be impacted by project activities (Commitment 4.6). The objectives of these surveys were to:

1. Determine whether spotted owls are using habitats adjacent to the highway in areas where project related activities could cause disturbance.
2. Determine whether there are spotted owls nesting adjacent to the alignment that may be impacted by project related activities.

The methods and results of these surveys are presented in this memo report, along with recommendations.

Background

Spotted owls use mature and old-growth forest within their home ranges for foraging, roosting and nesting (Forsman *et al*. 1984, Carey *et al.* 1990, Carey *et al*. 1992, Bart and Forsman 1992, Hanson *et al*. 1993, Ripple *et al*. 1997). Specifically, coniferous forest with an uneven-aged, multi-layered, multi-species canopy that contains numerous large trees with broken tops, deformed limbs, and large cavities is considered suitable for spotted owls (summarized in Thomas *et al*. 1990).

Based on habitat suitability maps developed by the Ministry of Water, Land and Air Protection (MWLAP 2001), small patches of suitable spotted owl nesting habitat occur throughout and adjacent to WP1. Much of the suitable habitat is not directly impacted by construction activities within WP1, but is within 500 m of the project footprint, and in some areas appears to be connected to areas of high quality spotted owl habitat further away from the highway.

Spotted owl breeding chronology

Spotted owls nesting or attempting to nest within 500 m of the WP1 project footprint could be disrupted or displaced by noise from blasting and other construction related activities. Little information is available on the breeding chronology of spotted owls in British Columbia, but it is thought to closely follow that of spotted owls in Washington (Hobbs *et al.* 2004). In Washington,

spotted owls begin nesting in early to mid April, with incubation lasting until late May, when eggs hatch (Forsman *et al.* 2002). Juveniles remain in the nest until late June, and fledging from the nest occurs in late June to mid-July (Forsman *et al.* 2002). Recent fledglings remain close to the nest site for several weeks as they develop their flying ability (Alana Hilton, pers. obs.). Thus, nest disturbance is likely of most concern between early April and mid-July. Little is known about the susceptibility of recent fledglings to noise disturbance. Once the flight abilities of fledglings have improved, which may take until early August (Alana Hilton, pers. obs.), noise disturbance concerns are likely negligible, as juveniles should be able to move away from the source of disturbance to other areas of the home range.

Need for surveys in WP1

While no spotted owl surveys have been conducted within the WP1 study area[1], there are historical detections of spotted owls within the neighbouring Capilano Watershed. Since 1985 the provincial government has coordinated surveys to locate spotted owls within the North Shore watersheds. In 1992, a spotted owl nest was discovered in the Capilano Watershed, just east of Lions Bay (approximately 5 km from the STS study area). Subsequent searches in 1993, 1996, 1998, 2000 and 2001 detected a male spotted owl near the initial nest site detection (Ian Blackburn, Rare and Endangered Species Specialist, MWLAP, pers. comm.) An extensive search effort in 2002 (Ian Blackburn, Rare and Endangered Species Specialist, MWLAP, pers. comm.) failed to locate the owl, and no surveys were conducted in 2003.

Due to the presence of suitable spotted owl habitat within and close to WP1, and given the proposed construction of the off alignment at Horseshoe Bay and the extensive amount of blasting that will be required along WP1, it was necessary to determine if spotted owl nest(s) existed within 500 m of the project footprint along the entire length of WP1, prior to construction commencing.

Alana Hilton of Panorama Wildlife Research, assisted by Francine Cooper of the Squamish First Nation, conducted spotted owl surveys on behalf of Robertson Environmental Services Ltd. along an estimated 5.2 km stretch of the highway between the Ansell Place exit and Nelson Creek (approximately STA.104.400 to STA.99.165).

Spotted owl survey protocol

The revised Survey Protocol and Standards for the Spotted Owl in B.C. (Hobbs *et al*. 2004) provides survey criteria for determining spotted owl occupancy of an area and breeding status. To determine if spotted owls are “vacant” from an area, surveys must meet the following criteria: a minimum of 13 hours of survey time must be completed during the breeding period (April 1 to September 30) and surveys must take place over three or more nights separated by a minimum of five days (e.g surveys must be completed at least five days apart). This level of survey effort will allow for a minimum 90% chance of detecting a resident spotted owl if one were present within the study area. Since there remains a 10% chance that an owl occupies the area but was not detected with this survey effort, Hobbs *et al.* (2004) require that vacant status be obtained over two or more consecutive years prior to officially designating the area vacant. If a spotted owl is detected within the study area during the breeding season, two additional surveys are done to establish pair status and breeding status.

[1] This is based on a review of previous surveys conducted and mapped by MWLAP between 1985 and 2003.

WP1 Spotted Owl Survey – April – June 2004

Methods: The two objectives for the spotted owl surveys were to determine whether spotted owls occupy the habitat within and surrounding WP1, and to determine whether any resident spotted owls are nesting. Consequently, thirteen hours of survey time over four night surveys spaced a minimum of 5 days apart were planned, with surveys beginning after April 1st, 2004.

Since the majority of suitable owl habitat adjacent to WP1 is within 500 m of the highway, it was determined that any responses from resident or nesting spotted owl(s) should be audible from survey call stations located along the highway. Consequently, a driving transect was chosen that followed the entire length of WP1. This transect was situated along an estimated 5.2 km stretch of highway between Ansell Place exit (approximately STA.104.400) and Nelson Creek (approximately STA.99.165), and encompassed the area between the southern portal of the proposed tunnel and the south end of WP2. Seven to eight survey call stations were placed along this transect (the number of stations varied with survey date), with call stations spaced 300 m to 1.2 km apart.

A spot check call station was added to the driving transect to survey the habitat east of the Horseshoe Bay ferry toll booths. This spot check was located approximately 150 m up the Black Mountain Trail during the first two surveys, and 300 m up the Black Mountain Trail (where the pond is located) on the last two surveys. A handheld GPS (Magellan 315) was used to obtain the UTM coordinates (NAD 83) at each call station. Call stations ranged from 15 – 62 minutes in duration, depending on the distance between stations (i.e., if the previous call station was 500 m away, 15 minutes would be spent at the current station; if the previous call station was >500 m away, a longer time would be spent at the current station; a spot check was 30-62 minutes in duration). At each call station, six spotted owl territorial calls (4-note calls and series calls) were broadcast every five minutes using a Fanon Megaphone connected to a walkman. Between calling bouts, surveyors listened for responding owls.

R*esults:* Four night surveys for spotted owls were completed on April 8th, April 21st, June 1st, and June 9th, 2004. A total of 12.87 hours of surveys were completed. Surveys were spaced more than 5 days apart, as per the spotted owl survey protocol outlined in Hobbs *et al. (*2004), and all surveys took place in good weather conditions (no rain, low wind levels). Traffic intensity was sufficiently light during three of the four surveys that we feel surveyor hearing ability was adequate. Traffic noise was slightly elevated during the beginning of the first survey of this transect (April 8th, 2004), as the survey was performed the evening before a long weekend; nevertheless, at each call station there were sufficiently long periods where traffic noise was low enough for surveyors to hear adequately. Table 1 provides details of the four surveys completed within WP1.

No spotted owls responded during any of the surveys, although a barred owl (BAOW) responded with a typical call ("Who-cooks-for-you…") at 22:11 and 23:37 on the June 1st, 2004 survey. The male barred owl was first heard calling from the spot check on Black Mountain Trail, and was estimated to be calling from a location 400m north of the spot check location near the pond (NAD 83 UTM 480246/5468239). A male barred owl was heard again from the third call station of the survey; we assume this was the same owl as heard at the Black Mountain Trail spot check based on the estimated location of the calling owl. The second response was estimated to come from a location 600 m southeast of the highway from the call station (NAD 83

UTM 481665/5471286). This detection is not surprising as during field surveys in 2002 and 2003 a barred owl was detected in this area.

Table 1. WP1 spotted owl survey dates, transect start and end locations (NAD 83 UTM), survey durations and results. BAOW = barred owl.

Survey Date	Start UTM (E/N)	End UTM (E/N)	Survey Time (mins.)	Results
08-Apr-04	482029/5471718	481214/5467947	212	none
21-Apr-04	482010/5471984	480283/5467764	180	none
01-Jun-04	480246/5468239	480314/5468849	185	1 BAOW
09-Jun-04	480376/5468501	480216/5467671	195	none
Total survey time for transect in 2004 (hrs):				**12.87**

Conclusions and Recommendations

These surveys allowed for the following conclusions:

- Since spotted owls did not respond during the 12.87 hours of survey time along WP1, we can be 90% confident that a spotted owl does not reside, and is not nesting, within 500 m of the WP1 project footprint in 2004. Consequently, the risk of disturbing a nesting spotted owl in the habitat within and adjacent to WP1 is low if construction activities are confined to 2004.
- There remains a 10% chance that a spotted owl resides and/or is nesting in the habitat within or adjacent to WP1, but that it wasn't detected during the 2004 spotted owl surveys.
- Construction activities commencing after mid- to late July 2004 should cause little disturbance to any spotted owls residing or nesting in the area, since critical nesting times will have ended, and any juveniles should have fledged from the nest by that time.

As construction will continue along this section for the next several years, we recommend that an additional 13 hours of survey time be completed along this transect between April – June 2005 to ensure that there has been no change to the spotted owl occupancy status and nesting status in the habitat adjacent to WP1. Surveys along the existing alignment would be conducted at the same locations due to the lack of safe pullouts. Additional stations should be added up the Black Mountain Trial. This would improve surveyors ability to hear responses as they would be farther from the noise of the existing highway.

The requirement for spotted owl surveys after 2005 should be determined in consultation with Ministry of Water Land and Air Protection spotted owl biologists.

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