

**RADAR AND AUDIO-VISUAL SURVEYS
FOR MARBLED MURRELETS IN THE CEDAR RIVER
MUNICIPAL WATERSHED, WASHINGTON, 2005–2007**

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**RADAR AND AUDIO-VISUAL SURVEYS FOR MARBLED MURRELETS
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2005–2007**

FINAL REPORT

Prepared for
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EXECUTIVE SUMMARY

- This report summarizes the results from the final year of a three-year effort to use a combination of ornithological radar and standard audio-visual (AV) methods to collect baseline information on distribution and abundance of Marbled Murrelets (*Brachyramphus marmoratus*) in the Cedar River Municipal Watershed (CRMW), Washington, 2005–2007.
- The purpose of the 2007 study was to use radar and audio-visual techniques to monitor trends in the distribution and abundance of murrelets in the CRMW. Specifically, the objectives of the 2007 study were: (1) to collect baseline radar information on numbers of Marbled Murrelets using the watershed in 2007 as the third year of a long-term monitoring effort; (2) to conduct audio-visual surveys for murrelets in the sub-basins identified by radar in 2006 as having murrelet presence, or in sites identified as having the best potential murrelet nesting habitat in the CRMW; and (3) to obtain a better understanding of interannual variation in radar counts of murrelets in the CRMW.
- We conducted a total of 23 mornings of radar observations during summer 2007. We used radar to sample four long-term sites used for monitoring purposes. Radar sampling was conducted for five mornings at all sites (not including mornings when sampling was cancelled by rain) during late June to July. Radar sampling occurred during the morning activity period for Marbled Murrelets, from 105 min before sunrise to 75 min after sunrise.
- We recorded a total of 25 pre-sunrise murrelet targets during 20 mornings of radar observation in the CRMW during summer 2007. An additional three mornings of radar sampling were cancelled by inclement weather. Of the 25 radar targets we observed, eight (32%) were flying in a landward direction, 15 (60%) were flying in a seaward direction, and 2 (8%) were flying in “other” directions. We had no audio-visual observations of Marbled Murrelets during radar sampling.
- Similar to 2005 and 2006, mean daily counts of landward radar targets generally were quite low in 2007. Mean landward counts ranged between 0 and 1 target per morning. The highest landward counts occurred at the Chester Morse site.
- Mean landward radar counts did not differ significantly between 2005, 2006, and 2007.
- We observed relatively high among-day variation in landward counts. Coefficients of Variation (CV’s) ranged from 130% at Chester Morse to 173% at the three Powerline sites.
- We used Monte Carlo simulations to determine our power to detect increases in radar counts of murrelets as nesting habitat develops in the Cedar River drainage. This prospective power analysis indicated that we could expect to have adequate power (i.e., power > 0.8) to detect between a 2–3% annual increase in the murrelet counts at the Cedar River study sites in future years (i.e., in ~ 25–50 years).
- Mean landward flight directions generally were centered along the main axis of the valley near each radar site.
- During summer 2007, we conducted 54 mornings of standard audio-visual surveys (plus one tandem visit) at sites with the best murrelet habitat in CRMW, and/or in areas of suitable habitat where radar observations in 2006 suggested presence of marbled murrelets. We detected no murrelets at the nine sites (155.1A, Chester North, Lindsay Creek North, Lost Creek, Lower Rex East (Findley), Rack Creek, South Fork North, South Fork Northeast, and Taylor Ridge North) where we conducted five audio-visual surveys from late June through the end of July. Likewise, we did not detect any murrelets during our single late-July visit to the South Fork Taylor Creek site.
- In summary, during 2005–2007 we established four long-term radar monitoring stations in the CRMW for marbled murrelets. Baseline data were collected and power analyses indicated that we could expect to detect between a 2–3% annual increase in radar counts when surveys are conducted using similar methods in ~25

and 50 years. We also used a combination of radar and audio-visual techniques combined with murrelet nest habitat surveys to determine current nesting locations of murrelets in the CRMW and verified murrelet use at two sites (i.e., Rex River and confluence of North Fork and South Fork Cedar River). Additional radar sightings in areas that had some nesting habitat but were not surveyed for a full two years suggested that low numbers of murrelets also were possible at a few other areas within the CRMW (i.e., at West Fork, 155.1A, South Fork Northeast, and South Fork Taylor) besides the two documented sites.

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INTRODUCTION

The Marbled Murrelet (*Brachyramphus marmoratus*) is a seabird that nests in large trees in old-growth coastal forests throughout most of its range in North America (Nelson 1997). Marbled Murrelets fly at high speeds, visit their nests primarily during periods of low ambient light, and nest up to ~80 km inland. Because of their secretive behaviors, their semicolonial nesting behavior, and the difficulty of locating their nests in large trees, only limited information is available on their nesting behavior, habitat associations, population size in specific areas, and demography. The Washington, Oregon, and California population of the Marbled Murrelet was federally listed as a Threatened Species in 1992 because of excessive loss and fragmentation of nesting habitat and because of mortality associated with oil spills and gill-net fishing (USFWS 1992, 1997). The species also is classified as endangered at the state level in California and as threatened at the state level in Washington and Oregon and is listed as threatened in Canada. Comparison of historical and current data suggest that Marbled Murrelets have disappeared or become rare over much of their range south of Alaska, but current population trends of the species in the Pacific Northwest are unknown (Nelson 1997).

The current ground-based Inland Forest Survey Protocol (IFSP) for Marbled Murrelets depends on the use of audio-visual cues to detect birds in flight (Evans Mack et al. 2003). Collecting information on murrelets this way is difficult because of the low light conditions during their dawn and dusk peaks in inland activity and their small size, cryptic coloration, rapid flight speed, and habitat preference for old-growth, closed canopy forests. Further, because 85% of the murrelet detections are auditory (Paton et al. 1990), it is difficult to determine with accuracy the number of birds that actually are flying over a particular survey area. In fact, audio-visual surveys (Evans Mack et al. 2003) were not designed to provide an index of abundance and, even if they were used, the high variation in audio-visual counts would require a massive survey effort to detect trends (Jodice et al. 2001, Bigger et al. 2006).

Several studies have shown that radar is an excellent tool for observing Marbled Murrelets (Hamer et al. 1995; Cooper et al. 2001, 2006a; Cooper and Blaha 2002; Cooper and Hamer 2003; Burger 1997, 2001; Raphael et al. 2002; Burger et al. 2004). The main advantages of using radar for inventorying murrelets are that it works under all light conditions, does not have the auditory bias of audio-visual surveys, and can sample a large area. Although radar cannot be used at all stands because certain terrain types preclude its use, it can be used in appropriate locations to determine quickly and accurately whether murrelets are present in a forest stand. Radar is particularly useful for detecting birds at low-use sites, where murrelets often are missed completely by audio-visual observers (Cooper and Blaha 2002). Radar data also can be used to focus ground observers' efforts toward "hot-spots" of murrelet activity. Further, radar can improve survey efficiency because it samples a much larger area (up to a 1,500-m radius) than audio-visual observers do (up to a 200-m radius).

In addition to determining presence of murrelets in an area, radar can provide a good index of abundance for Marbled Murrelets on several scales, including a river-drainage-sized scale that can be used for monitoring (Hamer et al. 1995; Burger 1997, 2001; Cooper et al. 2001, 2005, 2006a; Raphael et al. 2002; Cooper and Blaha 2002; Evans Mack et al. 2003). Power analyses have revealed that radar-based monitoring of murrelets can produce statistically-sensitive results in a timely, cost-effective fashion because of the low among-day variation in counts (Cooper et al. 2001, 2006a; Burger et al. 2004; Bigger et al. 2006).

The Cedar River Watershed Habitat Conservation Plan commits Seattle Public Utilities to managing the Cedar River Municipal Watershed (CRMW) as an ecological reserve with active forest restoration. Monitoring Marbled Murrelet activity in the CRMW is designated by the Habitat Conservation Plan: over the 50-year course of the HCP, local population indices of murrelets are expected to provide a barometer to gauge how well the old-growth forests are being restored. In this program, the activity of murrelets will be assessed within both old-growth and second-growth forests of the CRMW during three time periods that

encompass the early (i.e., 2005–2007), middle, and late stages of the HCP. This report summarizes the results from the third year of the 2005–2007 effort to use radar and audio-visual methods to collect initial baseline information on murrelet distribution and abundance in the CRMW. Results of the first and second years of the study are summarized in Cooper et al. (2006b and 2007).

OBJECTIVES

The purpose of this study was to use radar and audio-visual techniques to monitor trends in the distribution and abundance of murrelets in the CRMW. Specifically, the objectives of the 2007 study were: (1) to collect baseline radar information on numbers of Marbled Murrelets using the watershed in 2007 as the third year of a long-term monitoring effort; (2) to conduct audio-visual surveys for murrelets in the sub-basins identified by radar in 2006 as having murrelet presence, or in sites identified as having the best potential murrelet nesting habitat in the CRMW; and (3) to obtain a better understanding of interannual variation in radar counts of murrelets in the CRMW.

STUDY AREA

The entire 90,546-acre Cedar River Municipal Watershed (CRMW) lies within 45 miles of Puget Sound and encompasses roughly 14,000 acres of old-growth forest and 71,500 acres of second-growth forest (Figure 1). The elevation of the area ranges from ~400 to ~1,500 m above sea level. Currently managed under the 50-year Cedar River Watershed Habitat Conservation Plan, old-growth forest in the watershed is protected as a reserve and the second-growth forests are subject to limited habitat restoration with the objective of shortening the time to old-growth forest conditions. Marbled Murrelets were detected at one location in the CRMW in the mid-1990s (W. P. Ritchie, WDFW, pers. comm.); however, there has been no other systematic assessment of use of this area by murrelets until the current study. During summer 2007, we conducted radar-based sampling for Marbled Murrelets at four sites in the study area that provided good radar coverage over areas of interest (Figure 1, Table 1). All radar sites were

photo documented to help future observers compare suitability of the sites in the future with current suitability, in terms of the amount of screening of the radar view by nearby vegetation (Appendix 1). We also conducted audio-visual observations for murrelets at 10 sites within the CRMW (Figure 2, Table 2).

METHODS

DATA COLLECTION

We conducted a total of 23 mornings of radar observation and 54 mornings of audio-visual observations (plus one tandem visit) during summer 2007 (Tables 3 and 4). Radar sampling was conducted at the four long-term monitoring sites (i.e., the Powerline North, Powerline Central, Powerline South, and Chester Morse) on five mornings at each site from late June to July 2007 (Table 3). Radar sampling occurred during the morning activity period for Marbled Murrelets, from 105 min before sunrise to 75 min after sunrise. This period encompasses the known peak of daily murrelet activity (Burger 1997, Cooper et al. 2001, Cooper and Blaha 2002, Cooper and Hamer 2003).

During sampling, a single observer set up the radar and video recorder, and then attempted to obtain an audio-visual confirmation of each radar target to confirm the species identity of Marbled Murrelets and other species likely to be confused with murrelets on radar. Audio-visual observations were transmitted by voice directly to the videotape of the radar screen. For each radar target, we recorded date, time, flight direction (to the nearest 1°), transect quadrant, minimal distance to target, groundspeed (mi/h), flight behavior (straight-line, erratic, circling), overlap category (recorded only on radar, recorded only by audio-visual observer, recorded by both radar and audio-visual observer), species (if known), number of birds represented by that radar echo (if known), flight altitude (if known), and audio-visual detection category (not detected by audio-visual observer, heard only, seen only, both seen and heard). We also plotted the flight path of each target on a transparency overlay of the radar screen. We recorded the following weather information at the beginning of each session or when conditions changed during a

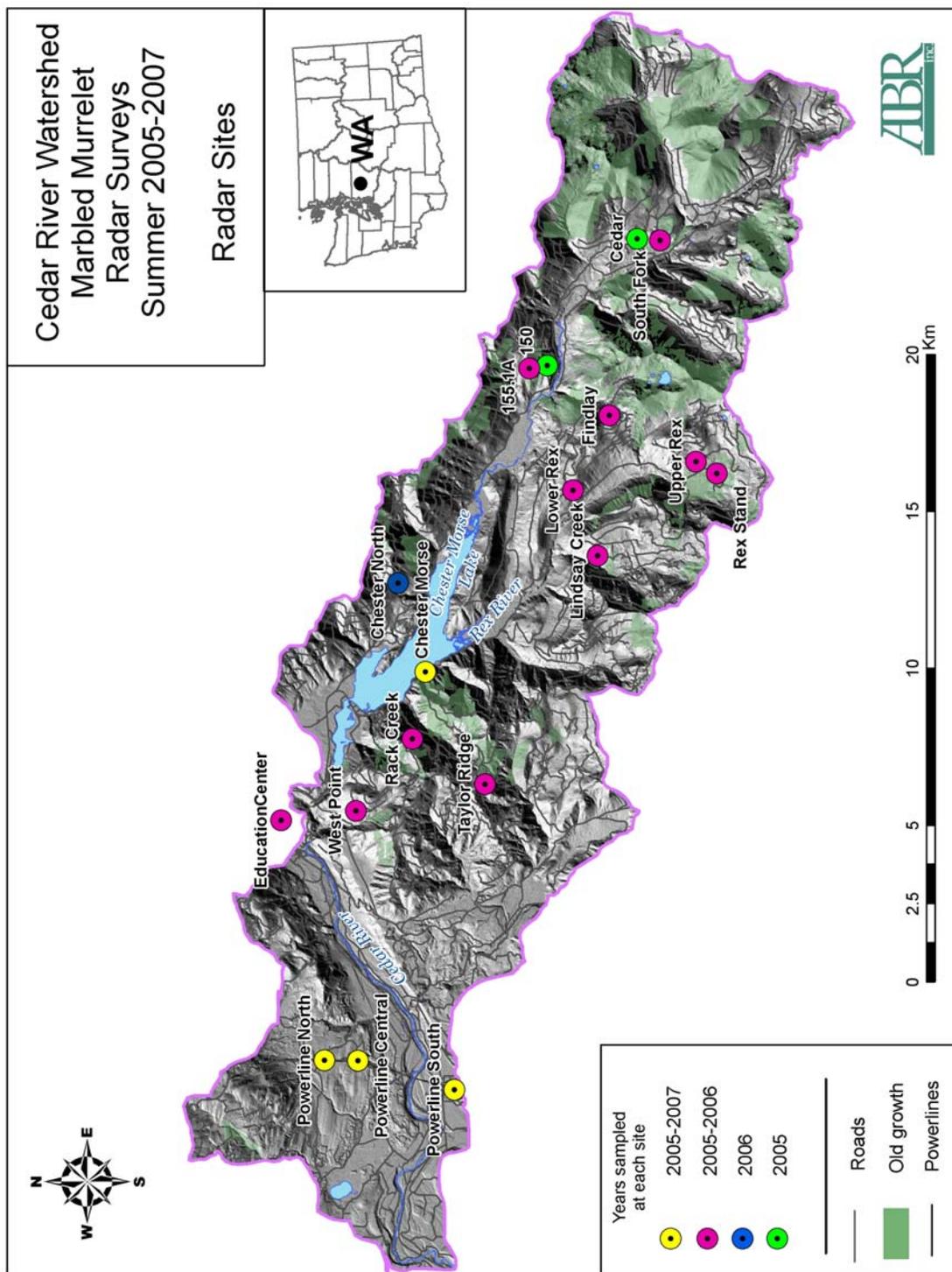


Figure 1. Map showing the locations of radar sampling sites in the Cedar River Municipal Watershed, Washington, during summer 2005, 2006, and 2007.

Table 1. Location of summer 2005, 2006, and 2007 radar sampling sites in the Cedar River Municipal Watershed, Washington.

Site type/site name	UTM coordinates ¹		Elevation	Comments
LONG-TERM SITES				
Powerline North	584934 E	5251791 N	408 m	1.07 km north of Powerline Central.
Powerline Central	584945 E	5250723 N	333 m	At end of road, 3.15 km from Powerline South.
Powerline South	584115 E	5247628 N	280 m	On north side of Line 1, Mile 22, Tower 1; northern side of third set of poles south of road.
Chester Morse	597393 E	5248917 N	502 m	In largest pullout on lake side of road.
155.1A ⁴	607146 E	5245901 N	872 m	Park in Spur Road 155.1a.
South Fork ⁴	611339 E	5241839 N	767 m	At landing at end of Road 521.
SHORT-TERM SITES				
Education Center ⁴	592538 E	5253385 N	275 m	In middle of northern lot at Education Center.
West Point ⁴	592897 E	5251013 N	799 m	On large landing at end of Road 820.
Taylor Ridge ⁴	593869 E	5246922 N	1065 m	At end of Spur Road #815.5.
Rack Creek ⁴	595244 E	5249277 N	961 m	Along Road 811, ~100 m before fork.
Lindsay ⁴	601245 E	5243557 N	817 m	100 m from end of Spur Road 205, adjacent to large log pile.
Chester North ³	600135 E	5249969 N	813 m	Along roadside, 400 m from end of road 110.8.
Upper Rex ⁴	604331 E	5240500 N	1,033 m	At end of Spur Road 730.1.
Rex Stand ⁴	603962 E	5239832 N	954 m	In opening next to log pile.
Lower Rex ⁴	603301 E	5244402 N	888 m	At end of Road 310.
Findley ⁴	605714 E	5243307 N	1,076 m	At end of Road 354.
150 ²	607248 E	5245332 N	761 m	Park along road with downhill slant toward the east.
Cedar ²	611373 E	5242572 N	748 m	Western end of opening with few trees alongside road.

¹UTM Zone 10; ²Site only sampled in 2005; ³Site only sampled in 2006; ⁴Site only sampled in 2005 and 2006.

session: wind direction, average wind speed at ground level, estimated cloud cover (%), average ceiling height (in meters) above ground level at the radar sampling site, visibility, precipitation, and air temperature (°C). See Appendix 2 for categories for each target and weather variable.

During summer 2007, we also conducted 54 mornings of standard audio-visual surveys (plus one tandem visit) at sites with the best murrelet habitat in CRMW, and/or in areas of suitable habitat where radar observations in 2006 suggested

presence of Marbled Murrelets. All surveys occurred from late June to July (Table 4). Except for the seasonal timing of surveys, the audio-visual survey methods followed standard protocols (Evans Mack et al. 2003). Survey conditions (e.g., ceiling height, wind conditions) met protocol requirements on all but eight surveys, which were later resurveyed (Table 4) so that all sites had a minimum of five survey visits, unless occupancy was determined before then. The exception to this occurred at South Fork Taylor Creek, which was

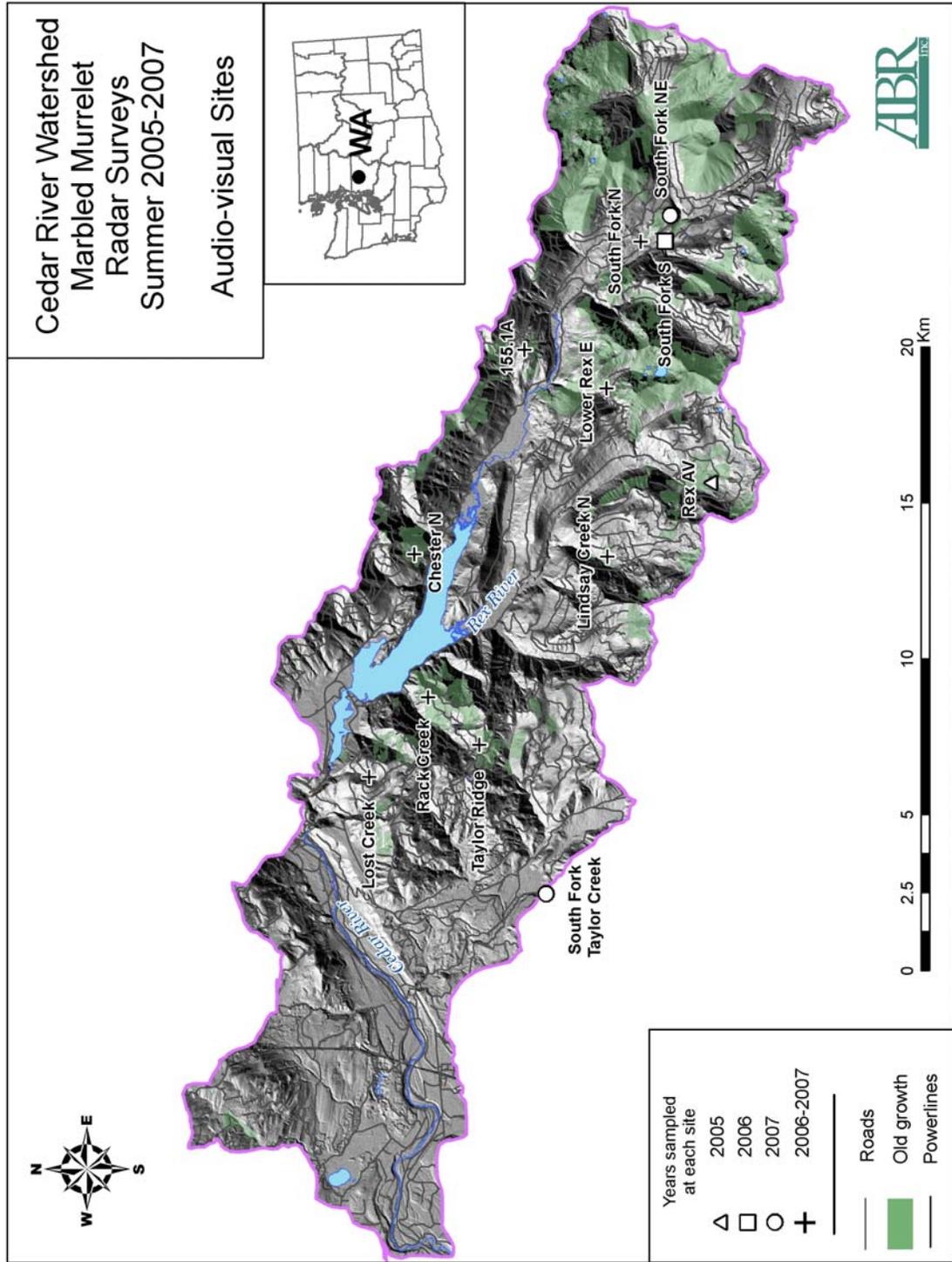


Figure 2. Map showing the locations of audio-visual sampling sites in the Cedar River Municipal Watershed, Washington, during summer 2005, 2006, and 2007.

Table 2. Location of summer 2005, 2006, and 2007 audio-visual sampling sites in the Cedar River Municipal Watershed, Washington.

Site	Station	UTM coordinates ¹		Elevation (m)
155.1A ²	1	607495 E	5245965 N	894
	2	607568 E	5245843 N	825
Chester North ³	2	601264 E	5249531 N	977
	3	600811 E	5249252 N	723
Lindsay Creek ³	1	601172 E	5243187 N	871
	2	601032 E	5243132 N	826
	3	601178 E	5243286 N	849
Lost Creek ³	1	594882 E	5250301 N	739
Lower Rex E (Findley) ³	1	606326 E	5243160 N	958
	2	606438 E	5243247 N	832
Rack Creek ³	1	596219 E	5248719 N	934
	2	596282 E	5248774 N	914
	3	596403 E	5248698 N	887
Rex AV ⁴	1	603432 E	5240777 N	871
	2	603645 E	5239650 N	965
	3	603390 E	5239890 N	912
South Fork North ³	1	611067 E	5242333 N	659
	2	611306 E	5242332 N	724
	3	611251 E	5242146 N	728
South Fork Northeast ²	1	611924 E	5241408 N	801
South Fork South ⁵	1	611158 E	5241522 N	684
South Fork Taylor Creek ²	1	589807 E	5744497 N	434
Taylor Ridge North ³	1	594828 E	5247069 N	1053
	3	594696 E	5247009 N	1063

¹UTM Zone 10; ²New site that was not sampled in either 2005 or 2006; ³New site that was not sampled in 2005; ⁴Site only sampled in 2005; ⁵Site only sampled in 2006.

found to contain suitable Marbled Murrelet habitat towards the end of the survey season and was only sampled once.

RADAR EQUIPMENT AND OPERATION

Our mobile radar laboratories consisted of marine surveillance radars mounted on vans. The radars scanned the entire area around the labs and were used to obtain information on flight paths, movement rates, and ground speeds of murrelets. A similar radar laboratory is described in Gauthreaux (1985a, 1985b) and Cooper et al. (1991). The lab was powered by four 6-V batteries that were linked in series. The surveillance radar (Furuno Model

FCR-1510; Furuno Electric Company, Nishinomiya, Japan) is a standard marine radar transmitting at 9,410 MHz (i.e., X-band) through a slotted wave guide (i.e., antenna) 2 m long with a peak power output of 12 kW. The radar was operated at the 1.5-km range with the pulselength set at 0.07 μ sec and the forward edge of the antenna elevated by $\sim 15^\circ$. Figure 3 shows the approximate murrelet-sampling airspace for the Furuno FR-1510 marine radar at the 1.5-km range setting, as determined by field trials with Rock Pigeons, which are similar in size to Marbled Murrelets.

Table 3. Daily counts of radar targets observed at sites in the Cedar River Municipal Watershed, Washington, during summer 2007, by flight direction. Table counts include only targets recorded before sunrise.

Date	Site	Sampling hours	Number of targets recorded on radar		
			Landward	Seaward	Other
19 June	Chester Morse	0324–0624	0	3	0
20 June	Powerline South	0325–0625	2	0	0
21 June	Powerline Central*	0325–0625*	--	--	--
22 June	Powerline Central*	0325–0625*	--	--	--
26 June	Powerline Central	0326–0626	0	4	0
27 June	Powerline North	0327–0627	1	0	0
28 June	Chester Morse	0327–0627	0	0	0
09 July	Powerline South	0335–0635	0	1	0
10 July	Powerline Central	0335–0635	0	0	1
11 July	Powerline North	0336–0636	0	0	0
12 July	Chester Morse	0337–0637	5	1	0
13 July	Powerline South	0338–0638	0	0	0
17 July	Powerline Central	0342–0642	0	0	0
18 July	Powerline North*	0343–0643*	--	--	--
19 July	Powerline North	0344–0644	0	0	0
20 July	Chester Morse	0350–0650	0	0	0
24 July	Powerline South	0337–0637	0	3	0
25 July	Powerline Central	0351–0651	0	1	0
26 July	Powerline North	0352–0652	0	2	0
27 July	Chester Morse	0354–0654	0	0	0
28 July	Powerline South	0355–0655	0	0	0
29 July	Powerline Central	0356–0656	0	0	0
30 July	Powerline North	0357–0657	0	0	1

* Sampling session cancelled by rain.

Whenever energy is reflected from the ground, surrounding vegetation, or other objects that surround the radar unit, a ground-clutter echo appears on the display screen. Because ground clutter can obscure bird targets on the radar display screen, we attempted to minimize it by parking the radar laboratory in a location that was surrounded closely by low vegetation or small hillsides. These objects acted as a radar fence that shielded the radar from low-lying objects farther away from the lab and that produced only a small amount of ground clutter in the center of the display screen. For further discussion of radar fences, see Eastwood (1967), Williams et al. (1972), and Skolnik (1980).

Maximal distances of detection of birds by the surveillance radar depends on body size of the birds, flock size, flight profile of the birds, distance between flying birds, atmospheric conditions, and, to some extent, the amount and location of ground clutter. Marbled Murrelets usually are detectable to at least 1.5 km, whereas single, small passerines are detectable to ~1 km (Figure 3; Cooper et al. 1991, 2001; Cooper, unpubl. data).

DATA ANALYSIS

For all analyses, we classified targets as “landward” or “seaward” if they were flying within 60° of the main axis of the valley in an landward (i.e., inbound flights from the ocean) or seaward (i.e., outbound) direction, respectively, and

Table 4. Daily counts of Marbled Murrelets recorded during audio-visual surveys of the Cedar River Municipal Watershed, Washington, during summer 2007.

Site	Station	Date	Survey to protocol?	Number of detections	
				Presence ¹	Occupied ¹
155.1A	2	14 June	No	0	0
	1	22 June	No	0	0
	1	28 June	Yes	0	0
	1	06 July	Yes	0	0
	2	13 July	Yes	0	0
	2	20 July	Yes	0	0
	2	27 July	Yes	0	0
Chester North	3	13 Jun	Yes	0	0
	2	21 Jun	Yes	0	0
	3	08 Jul	Yes	0	0
	2	12 Jul	Yes	0	0
	2	28 Jul	Yes	0	0
Lindsay Creek North	1	12 June	Yes	0	0
	1	15 June	No	0	0
	1	19 June	Yes	0	0
	2	28 June	Yes	0	0
	3	12 July	Yes	0	0
	1	20 July	No	0	0
	1	25 July	Yes	0	0
Lost Creek	1	13 June	Yes	0	0
	1	21 June	Yes	0	0
	1	29 June	Yes	0	0
	1	09 July	Yes	0	0
	1	29 July	Yes	0	0
Lower Rex East (Findley)	1	13 June	Yes	0	0
	1	15 June	No	0	0
	1	20 June	Yes	0	0
	1	30 June	No	0	0
	1	07 July	Yes	0	0
	1	10 July	Yes	0	0
	2 audio	26 July	Yes	0	0
2 visual	26 July	Yes	0	0	

Table 4. Continued.

Site	Station	Date	Survey to protocol?	Number of detections	
				Presence ¹	Occupied ¹
Rack Creek	2	12 June	Yes	0	0
	2	15 June	Yes	0	0
	2	26 June	Yes	0	0
	2	11 July	Yes	0	0
	2	18 July	No	0	0
	2	19 July	Yes	0	0
South Fork North	2	14 June	Yes	0	0
	3	22 June	Yes	0	0
	1	09 July	Yes	0	0
	3	13 July	Yes	0	0
South Fork Northeast	3	27 July	Yes	0	0
	1	20 June	Yes	0	0
	1	29 June	Yes	0	0
	1	10 July	Yes	0	0
	1	17 July	Yes	0	0
South Fork Taylor Creek	1	25 July	Yes	0	0
	1	30 July	Yes	0	0
Taylor Ridge North	3	12 June	Yes	0	0
	3	14 June	Yes	0	0
	3	27 June	Yes	0	0
	3	11 July	Yes	0	0
	3	18 July	No	0	0
	3	19 July	Yes	0	0

¹ Murrelet detections, as defined by the PSG survey protocol (Evans Mack et al. 2003).

classified targets as “other” if they were not flying in a landward or seaward direction. Following Cooper et al. (2001, 2006a), we used radar counts of landward-flying targets as our daily index of murrelet abundance at a site.

Marbled Murrelet targets detected on radar were distinguished from other species by their flight speed, timing, and (sometimes) target signature. We have determined that a >40-mi/h (64-km/h) speed cutoff minimizes the number of non-murrelet species while eliminating a small percentage (~3%) of Marbled Murrelets (Cooper and Blaha 2002, Cooper et al. 2001). Thus, all targets with a flight speed greater than 40 mi/h (64 km/h) were considered to be Marbled Murrelets,

unless the target signature was typical of a flock of Band-tailed Pigeons (*Columba fasciata*) or the target was observed after sunrise. Band-tailed Pigeon flocks sometimes exhibit a characteristic signature that is large and composed of multiple targets that repeatedly break apart, and then coalesce. These targets are easily distinguished from a typical Marbled Murrelet target. In addition, we eliminated targets that were observed after sunrise to help eliminate single Band-tailed Pigeons from the data set. We have found that Band-tailed Pigeon activity generally does not start until a few minutes after sunrise (i.e., 105 min after our radar surveys begin). So, we have a higher degree of confidence in the radar identification of

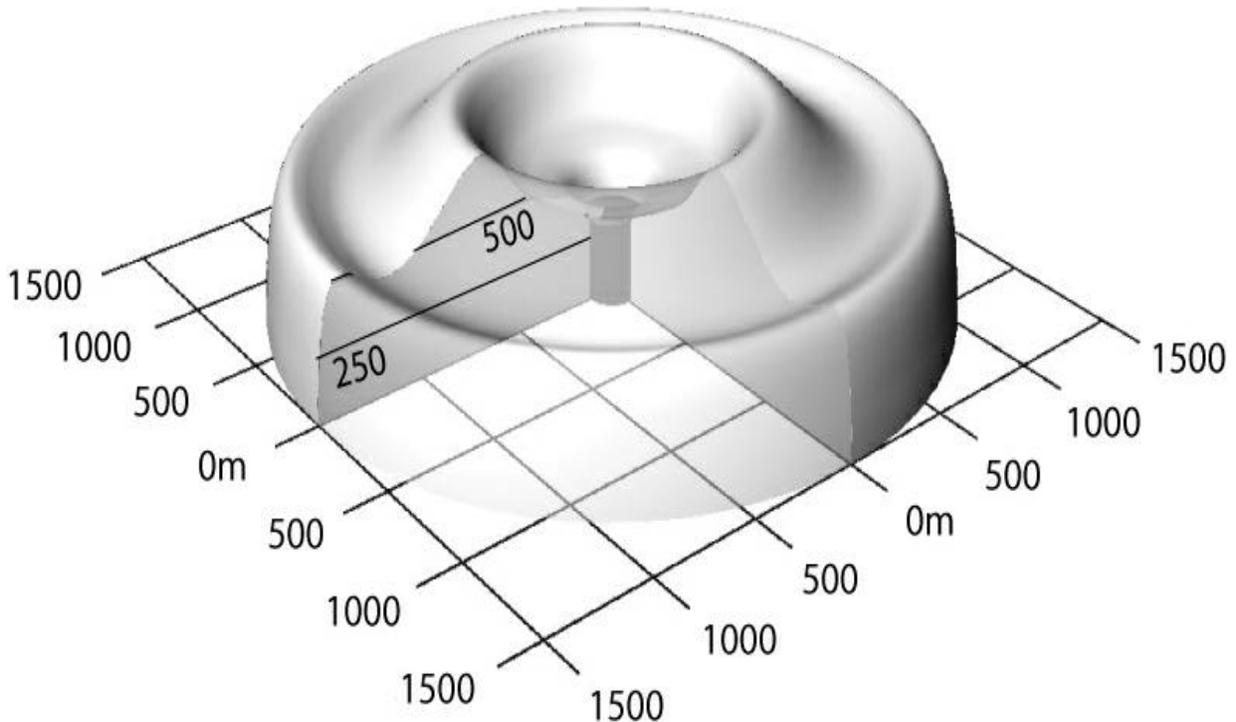


Figure 3. Approximate sampling airspace for the Furuno FR-1510 marine radar at the 1.5-km range setting, as determined by field trials with Rock Pigeons, which are similar in size to Marbled Murrelets. Note that the configuration of the radar beam within 250 m of the origin (i.e., the darkened area) was not determined.

murrelets before sunrise than after sunrise in areas like the CRMW where Band-tailed Pigeons are common. Nearly all murrelets fly into nesting stands well before sunrise (Cooper et al. 2001, Burger 1997). So, it is likely that few landward targets would be missed using this sunrise cutoff time. Further, a precedent for this method has been set by Burger (2001) and Burger et al. (2005), who used sunrise for their cutoff period to count murrelets.

We used a repeated measures Analysis of Variance to compare differences among all three study years (2005–2007) within sites. Following Bigger et al. (2006) and Cooper et al. (2006a), we used Monte Carlo simulations to conduct prospective power analyses to determine the level of murrelet population increase one could expect to detect if the four sites in the Cedar River drainage were resampled in 25 years (i.e., halfway through the CRMW HCP) and in 50 years (at the end of the HCP period) using methods that were identical to

the ones used in 2005–2007. We analyzed landward radar counts of murrelets using Mixed Models in SPSS 14.0 (SPSS Inc., Chicago, Illinois). Because the Chester Morse site had much higher counts than the other 3 sites, we modeled the among-year and within-year variances separately from the other three sites. For each of the two analyses we ran a mixed model with year as a random effect and assumed the variances were normally distributed. Because models with more complex covariance structures failed to converge, we used a variance components covariance structure to model the among-year variation.

The mixed model estimated the among-year variance and we assumed the within-year variance for each site was equal to the variance of the residuals. Because the means and variances were similar among sites, we assumed that the three lower count sites (i.e., the Powerline sites) had the same among year and within-year variances (Table 5). We assumed that the same sites would be

Table 5. Baseline levels of among-site variance, within-year variance, total variance, and coefficient of variation (CV) used in the generation of simulation data sets for landward radar counts at four sites in the Cedar River Municipal Watershed, Washington, 2005–2007.

Site	Among-year variance	Within-year variance	Total variance	CV
Chester Morse	6.41	14.72	21.14	1.30
Powerline South	0.08	0.53	0.62	1.73
Powerline Central	0.08	0.53	0.62	1.73
Powerline North	0.08	0.53	0.62	1.73

surveyed in future years and therefore did not estimate among-site variances. We calculated the total variance as the sum of the among-year and the within-year variances. We calculated coefficients of variation (CV) for each site as the square root of the total variance divided by the mean landward count (Table 5).

Using the actual average landward counts for each site, the estimated among-year and within-year variances (Table 5), and annual rates of increase, we generated 1000 random data sets for each rate of increase (i.e., for a 0.5%, 1%, 2%, 3%, 4%, 5%, and 10% annual increase in radar counts; Table 6). In order to account for expected increases in the variance of landward counts with increasing mean values in future years, we increased the variances to levels that kept the CV's constant. We assumed that an identical sampling strategy would be used in 25 years and 50 years as was used during 2005–2007 and that the population increased at a constant annual rate.

We analyzed the 1000 data sets for each different rate using mixed models and site as a fixed effect, year as a linear covariate, and $\ln(\text{count} + 1)$ as the dependent variable. We modeled all counts conducted at a site during a year using an autoregressive (1) covariance structure to account for among-count covariance. Because we were only interested in detecting increases in landward counts we used one-sided significance tests. We therefore calculated the power as the proportion of the 1000 analyses that had a significant year term ($p < 0.10$) and a parameter estimate for the change in landward counts by year that was greater than zero. We conducted analyses over a 25-year time span and a 50-year time span.

RESULTS

We recorded a total of 25 pre-sunrise murrelet targets on 20 mornings of radar observation in the CRMW during summer 2007 (Table 3, Appendix 3). An additional three mornings of radar sampling were cancelled by inclement weather. Of the 25 radar targets, eight (32%) were flying in a landward direction, 15 (60%) were flying in a seaward direction, and two (8%) were flying in “other” directions. We had no audio-visual observations of Marbled Murrelets during radar sampling.

DISTRIBUTION AND ABUNDANCE

Similar to 2005 and 2006, mean daily counts of landward radar targets generally were quite low in 2007. Mean landward counts ranged between 0 and 1 target per morning (Figure 4, Table 7). As in 2005 and 2006, the highest landward counts occurred at the Chester Morse site, which is situated at the bottleneck formed by the valley along Chester Morse Lake. No landward targets were observed at Powerline Central in 2007. Mean landward counts did not differ significantly between 2005, 2006, and 2007 ($F_{2,6} = 2.138$, $P = 0.199$; Table 5) at four long-term radar sites (i.e., Chester Morse, Powerline North, Powerline Central, Powerline South).

Even though the range of daily landward counts varied by only a few birds, we still observed relatively high among-day variation in landward counts because of the low counts. Coefficients of Variation (CV's) ranged from 130% at Chester Morse to 173% at the three Powerline sites (Table 5).

Table 6. The average landward radar counts by year for each annual rate of increase used in the generation of simulated data sets for the Cedar River Watershed, Washington.

Site	Years	Annual Increase						
		0.5%	1%	2%	3%	4%	5%	10%
Chester Morse	2005–2007	3.55	3.55	3.55	3.55	3.55	3.55	3.55
	2030–2032	4.02	5.90	5.82	7.42	9.45	12.01	38.41
	2055–2057	4.55	7.56	9.54	15.54	25.20	40.66	416.20
Powerline South	2005–2007	0.45	0.45	0.45	0.45	0.45	0.45	0.45
	2030–2032	0.51	0.58	0.75	0.95	1.21	1.54	4.92
	2055–2057	0.58	0.75	1.22	1.99	3.23	5.21	53.36
Powerline Central	2005–2007	0.50	0.50	0.50	0.50	0.50	0.50	0.50
	2030–2032	0.57	0.64	0.82	1.05	1.33	1.69	5.42
	2055–2057	0.64	0.82	1.35	2.19	3.55	5.73	58.70
Powerline North	2005–2007	0.45	0.45	0.45	0.45	0.45	0.45	0.45
	2030–2032	0.51	0.58	0.75	0.95	1.21	1.54	4.92
	2055–2057	0.58	0.75	1.22	1.99	3.23	5.21	53.36

POWER TO DETECT INCREASES IN MURRELET COUNTS

We used Monte Carlo simulations to determine our power to detect increases in radar counts of murrelets as nesting habitat develops in the Cedar River drainage. This prospective power analysis indicated that we could expect to have adequate power (i.e., power > 0.8) to detect between a 2–3% annual increase in the murrelet counts at the Cedar River study sites in future years (i.e., in ~ 25–50 years; Figure 5). There were relatively minor differences in power detect annual increases >2% in radar counts between 25 years and 50 years (Table 8).

FLIGHT PATHS

Mean landward flight directions generally were centered along the main axis of the valley near each radar site (Figure 6). We also examined specific flight paths of all murrelet targets to obtain information on smaller-scale patterns of movement. At Powerline North, Powerline Central, and Powerline South, most of the movements were either inbound or outbound birds flying along the approximate axis of the Cedar River valley, although several targets traveling in “other” directions also were observed (Figure 7).

As in previous years, nearly all of the 2007 targets at Chester Morse were flying over the lake along the approximate axis of the valley (Figure 8).

AUDIO-VISUAL SURVEYS

During summer 2007, we conducted 54 mornings of standard audio-visual surveys (plus one tandem visit) at sites with the best murrelet habitat in CRMW, and/or in areas of suitable habitat where radar observations in 2006 suggested presence of Marbled Murrelets (Figure 2, Table 4). We did not observe Marbled Murrelets during any of our five protocol survey visits at the 155.1A, Chester North, Lindsay North, Lower Rex East (Findley), Rack Creek, South Fork North, South Fork Northeast, and Taylor Ridge North sites (Table 4). We also did not detect any murrelets during our single, late season, visit to the South Fork Taylor Creek site.

DISCUSSION

SUITABILITY OF CMRW FOR RADAR OBSERVATIONS

The CRMW is heavily forested and has very few natural or human-made openings, so there are few good radar sampling sites in the area.

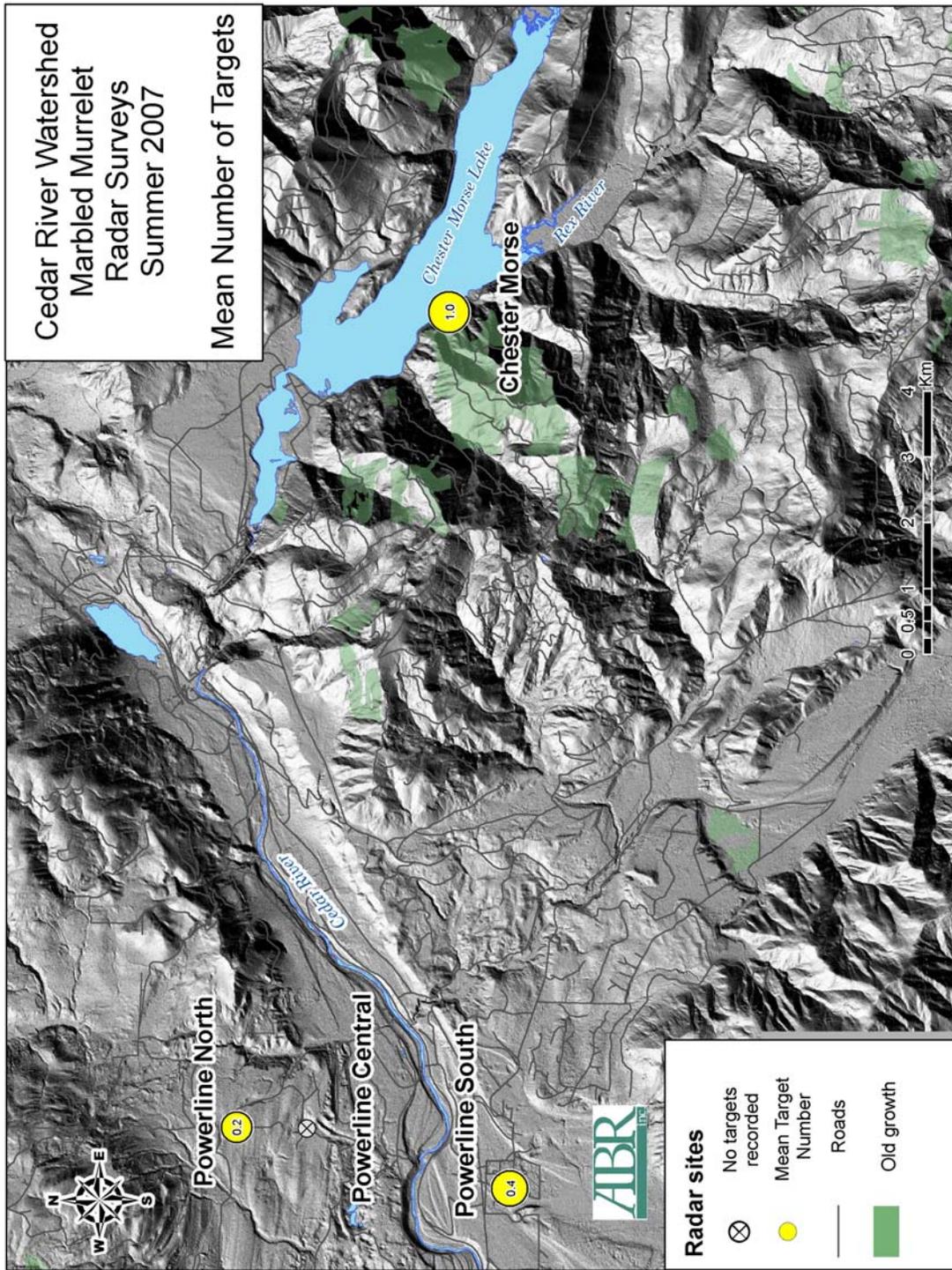


Figure 4. Map showing the mean number of landward targets/day observed on radar at each site in the Cedar River Municipal Watershed, Washington, during summer 2007. Sizes of circles are proportional to the mean rate; numbers within the circles are the actual means.

Table 7. Mean counts (targets or flocks/day \pm 1 SE) of radar targets by flight direction at sites in the Cedar River Municipal Watershed, Washington, during summer 2005, 2006, and 2007. Table excludes data for days with high winds or persistent precipitation; counts only include targets recorded before sunrise. n =number of sampling days.

Site	Year	Mean number of targets recorded on radar			n
		Landward-flying	Seaward-flying	Other directions	
LONG-TERM SITES					
Powerline North	2005	0.7 \pm 0.7	0.0 \pm 0.0	0.0 \pm 0.0	3
	2006	0.7 \pm 0.3	1.0 \pm 0.6	1.0 \pm 0.6	3
	2007	0.2 \pm 0.2	0.4 \pm 0.4	0.2 \pm 0.2	5
Powerline Central	2005	1.0 \pm 0.4	1.8 \pm 0.9	0.0 \pm 0.0	4
	2006	0.7 \pm 0.7	0.3 \pm 0.3	1.3 \pm 0.9	3
	2007	0.0 \pm 0.0	1.0 \pm 0.8	0.2 \pm 0.2	5
Powerline South	2005	1.0 \pm 0.6	0.3 \pm 0.3	0.3 \pm 0.3	3
	2006	0.0 \pm 0.0	3.7 \pm 2.7	0.7 \pm 0.3	3
	2007	0.4 \pm 0.4	0.8 \pm 0.6	0.0 \pm 0.0	5
Chester Morse	2005	7.3 \pm 3.5	2.7 \pm 1.5	0.0 \pm 0.0	3
	2006	4.0 \pm 2.1	1.7 \pm 0.7	0.0 \pm 0.0	3
	2007	1.0 \pm 1.0	0.8 \pm 0.6	0.0 \pm 0.0	5
155.1A	2005	2	0	0	1
	2006	0.0 \pm 0.0	2.0 \pm 0.6	0.3 \pm 0.3	3
South Fork	2005	0	1	1	1
	2006	0.0 \pm 0.0	0.0 \pm 0.0	0.0 \pm 0.0	3
SHORT-TERM SITES					
Education Center	2005	1	2	0	1
	2006	0.0 \pm 0.0	0.0 \pm 0.0	0.5 \pm 0.5	2
West Point	2005	1	2	0	1
	2006	2.0 \pm 2.0	0.5 \pm 0.5	1.5 \pm 0.5	2
Taylor Ridge	2005	0	0	0	1
	2006	0.0 \pm 0.0	0.0 \pm 0.0	1.0 \pm 1.0	2
Rack Creek	2005	4	0	0	1
	2006	1.0 \pm 1.0	0.5 \pm 0.5	0.0 \pm 0.0	2
Lindsay	2005	0	0	0	1
	2006	1.0 \pm 1.0	1.0 \pm 1.0	0.0 \pm 0.0	2
Chester North	2006	0.5 \pm 0.5	0.0 \pm 0.0	0.0 \pm 0.0	2
Upper Rex	2005	1	0	0	1
	2006	1.5 \pm 0.5	0.0 \pm 0.0	0.5 \pm 0.5	2
Rex Stand	2005	0	1	0	1
	2006	1.0 \pm 0.0	1.0 \pm 1.0	0.0 \pm 0.0	2
Lower Rex	2005	0	0	1	1
	2006	0.5 \pm 0.5	1.0 \pm 1.0	0.0 \pm 0.0	2
Findley	2005	0	0	0	1
	2006	2.5 \pm 0.5	0.5 \pm 0.5	0.5 \pm 0.5	2

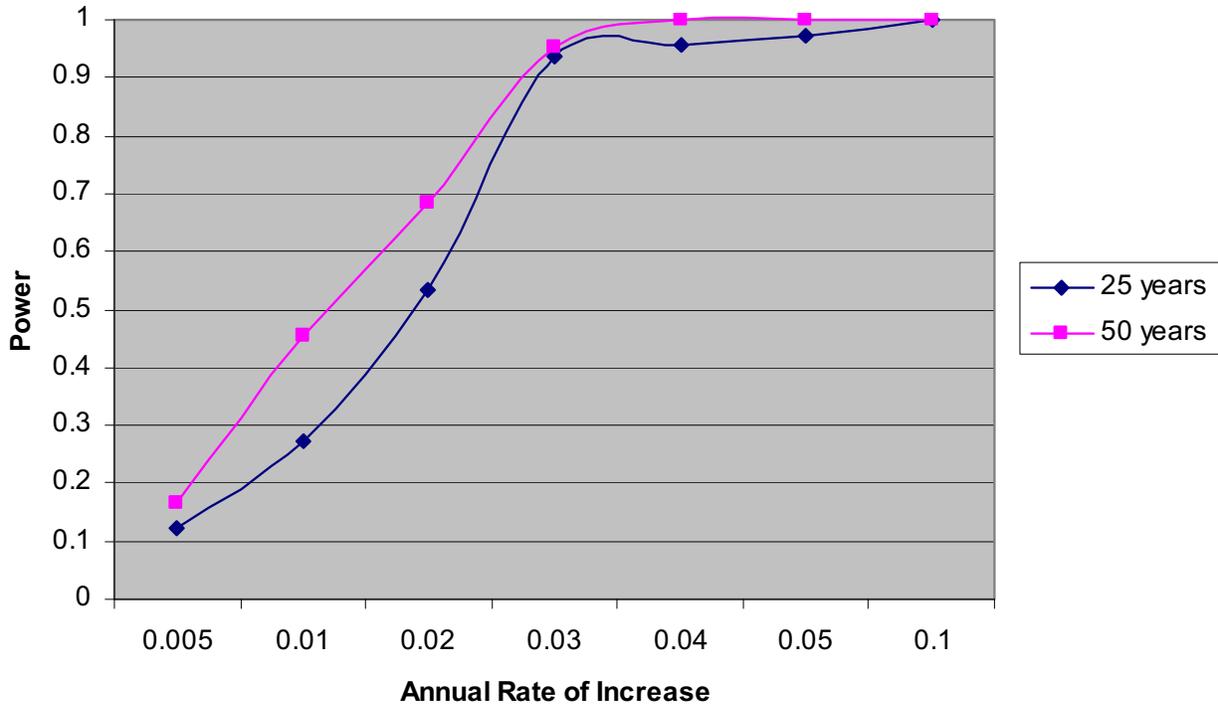


Figure 5. Estimates of statistical power to detect annual increases in landward radar counts at four sites in the Cedar River Municipal Watershed, Washington, in 25 years and in 50 years.

Table 8. Estimates of statistical power to detect increases in landward radar counts at four sites in the Cedar River Municipal Watershed, Washington, in 25 years (i.e., 2030–2032) and in 50 years (i.e., 2055–2057).

Annual Increase (%)	Power to detect increase	
	In 25 years	In 50 years
0.5	0.121	0.166
1	0.272	0.456
2	0.535	0.685
3	0.936	0.954
4	0.956	1.000
5	0.973	1.000
10	1.000	1.000

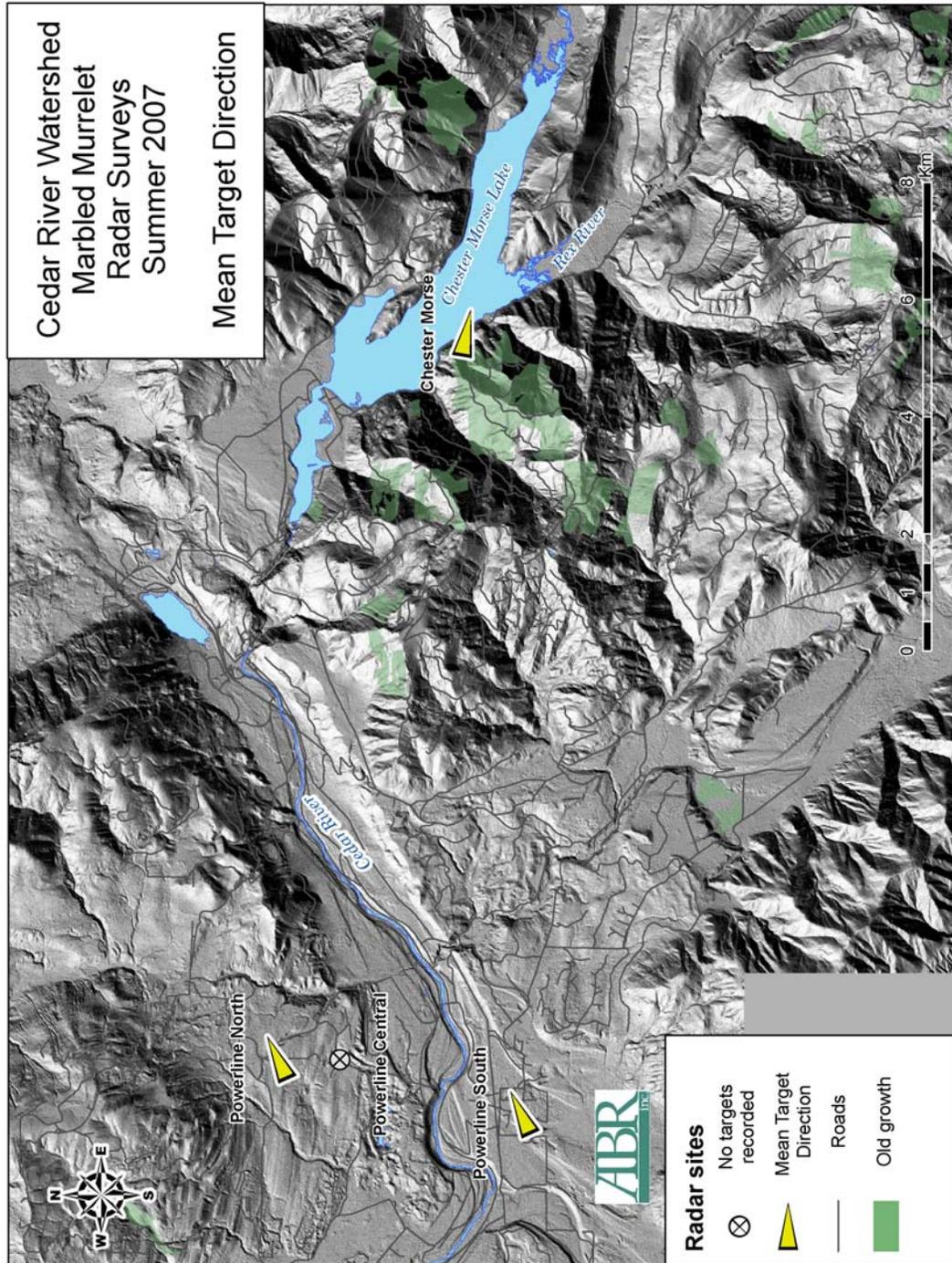


Figure 6. Map showing the mean flight direction of landward targets observed on radar at each site in the Cedar River Municipal Watershed, Washington, during summer 2007. Arrows indicate the mean direction of flight; sites without an arrow are locations where no landward targets were detected.

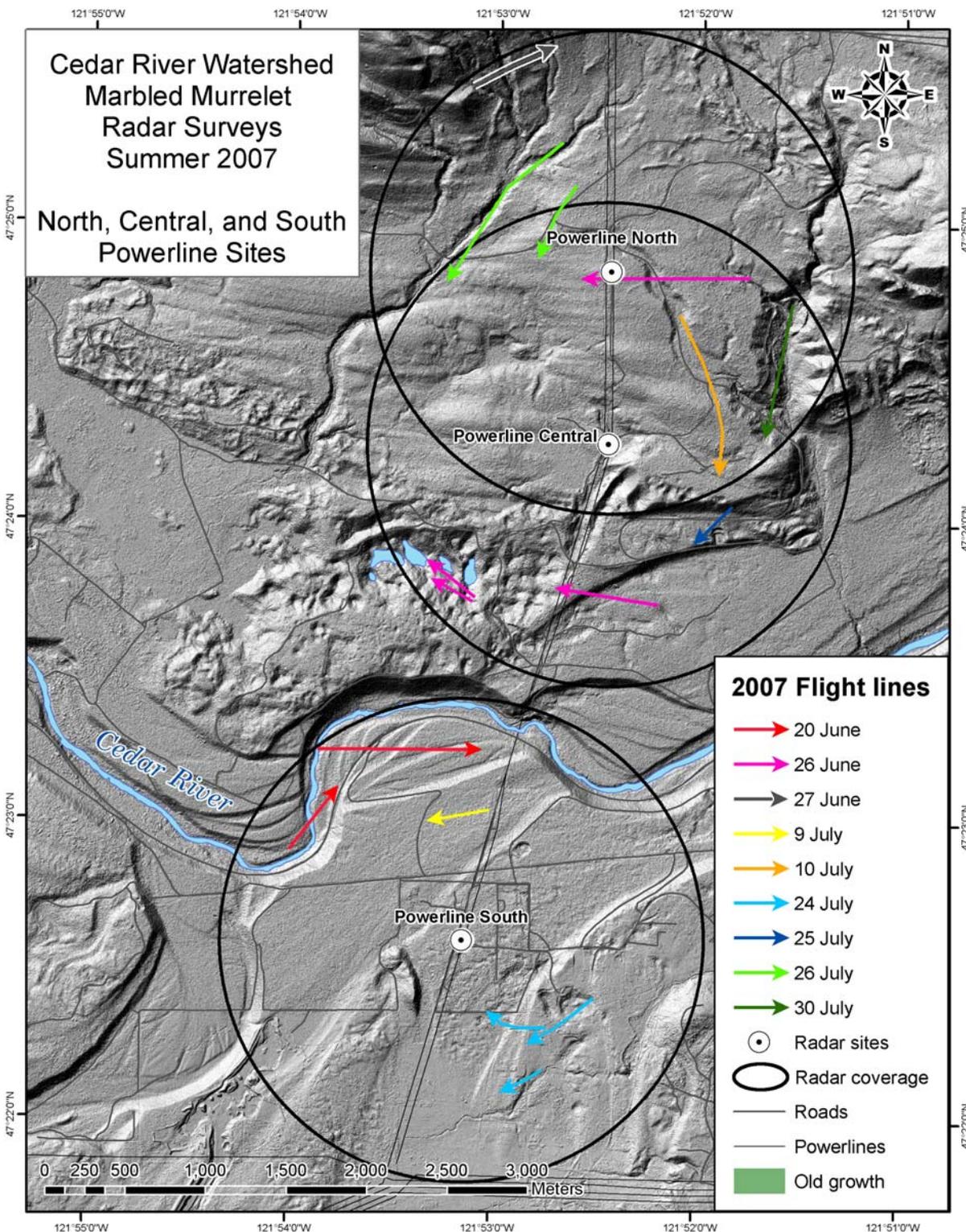


Figure 7. Map showing the flight paths of radar targets observed before sunrise at the Powerline North, Powerline Central, and Powerline South sites in the Cedar River Municipal Watershed, Washington, during summer 2007. Note that the 1.5-km ring denotes the maximal range of the radar, but there were gaps in radar coverage within that range because of radar shadows and ground clutter.

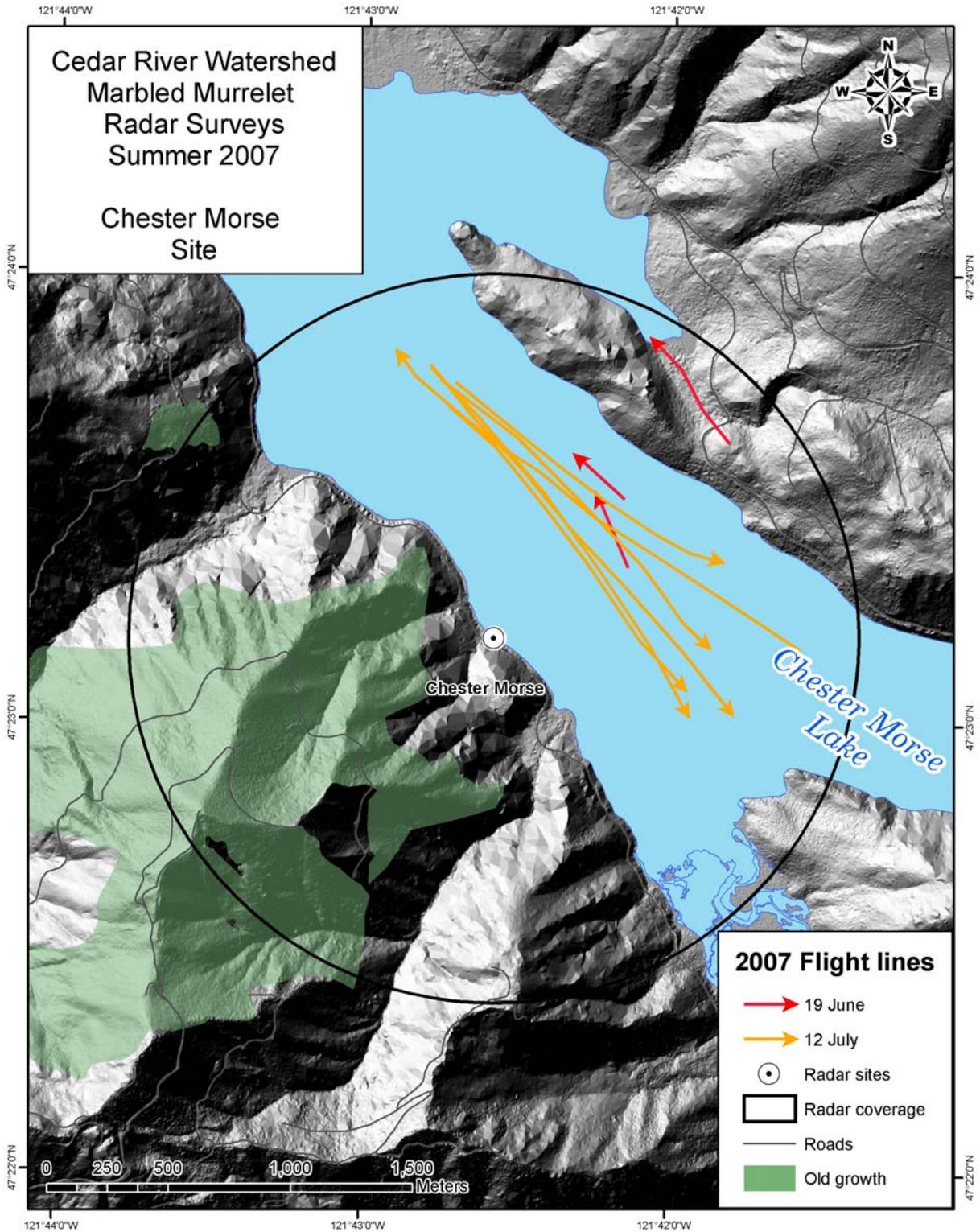


Figure 8. Map showing the flight paths of radar targets recorded before sunrise at the Chester Morse site in the Cedar River Municipal Watershed, Washington, during summer 2007. Note that the 1.5-km ring denotes maximal range of the radar, but there were gaps in radar coverage within that range because of radar shadows and ground clutter.

Fortunately, we were able to find excellent sites at key locations for long-term sampling. The three long-term sites located along the wide powerline corridor near the western border of the CRMW (i.e., Powerline North, Powerline Central, and Powerline South) are good sampling sites, but will have good radar-sampling views in the future only if there is long-term maintenance of a wide powerline corridor. The Chester Morse site offers an excellent view over Chester Morse Lake, across the entire width of the Cedar River Valley, and should remain a good sampling site well into the future with minimal management effort. Along with the good radar view over the lake, an additional benefit of the Chester Morse site is that it is located at a topographical bottleneck that helps funnel most Marbled Murrelets in the area through the radar-sampling zone.

The three Powerline sites were placed to provide the best possible radar coverage of the western edge of the CRMW. The Powerline North and Powerline Central sites are within 1.5 km of each other, so there is some overlap in radar coverage, but there was no spatial overlap in targets detected at the two sites during concurrent sampling in 2005 or in 2006 (Cooper et al. 2006b, 2007). This apparent lack of overlapping targets probably occurred because of differences in altitudinal bands that were sampled and because ground-clutter patterns differed between the two sites; therefore, we did not conduct concurrent sampling at the two sites during 2007.

Judging by the higher counts at Chester Morse (~7, ~4, and ~1 targets/day in 2005, 2006, and 2007 respectively) than at all three powerline sites combined (~3, ~2, and ~0 targets/day in 2005, 2006, and 2007 respectively), it is likely that some murrelets are entering and exiting the western end of the CRMW over areas not covered by the three Powerline sites (e.g., areas to the north or south of those sites). Unfortunately, no additional radar sites were available to cover those areas to the north or south of the existing Powerline sites; however, the Powerline sites should still provide a good index of abundance for monitoring.

All short-term radar sites sampled in 2005 and 2006 were in locations where trees will grow large enough to obscure the radar view within a few years. There are only a few additional sites where radar observations are currently possible in the

CRMW besides those sampled in 2005 and 2006, with each of them being likely to be obscured by tree cover in the future. Thus, both those additional sites and the short-term radar sites probably are of minimal value for future monitoring purposes.

SPECIES IDENTIFICATION

Band-tailed Pigeons were common in the CRWM, and Common Loons (*Gavia immer*) were seen flying over Chester Morse Lake. Both of these species can be confused with Marbled Murrelet targets on radar, suggesting the need to continue the dawn cutoff time for observations and the continued need for target confirmation by audio-visual observers during radar surveys. We have found that Band-tailed Pigeon activity generally does not start until a few minutes after sunrise (i.e., 105 min after our radar surveys begin), so a sunrise cutoff time is very effective in minimizing contamination of the radar data. Further, nearly all murrelets fly into nesting stands well before sunrise (Burger 1997, Cooper et al. 2001), so there is little risk of missing the majority of landward flights, even with a sampling-cutoff time of sunrise. Others also have used sunrise for their cutoff time for radar monitoring of Marbled Murrelets (Burger 2001, Burger et al. 2005). In future years, we recommend that observers continue to attempt to get visual verification on as many targets as possible, however, and not solely rely on the timing of sampling to eliminate non-murrelet targets from the radar data.

DISTRIBUTION AND ABUNDANCE

Our radar counts in the CRMW were lower than those at most locations on the Olympic Peninsula (Cooper et al. 2001; 2006a), the Oregon coast (Cooper et al. 2000), and California (Cooper et al. 2005), which is no surprise given the much smaller amount of nesting habitat in the CRMW and the large distance from many parts of the CRMW to ocean foraging areas. In contrast, our CRMW radar counts generally were similar to those at other sites far inland in the Washington Cascades (Cooper et al. 1999; Cooper and Blaha 2001a, 2001b; ABR, Inc. 2005). In Washington, the most-inland known Marbled Murrelet nest location is 35 km, and the most-inland occupied site is 84 km (Evans Mack et al. 2003). The upper

reaches of the CRMW is ~70 km inland (i.e., approaching the limit of murrelet distribution in Washington).

The lack of nesting platform structure is another possible explanation for the low number of targets in the CRMW. Much of the current old-growth habitat in CRMW is above 1,000 m in elevation and lacks abundant nest platforms. Nests normally occur below 1,000 m because the trees at higher elevations often lack the structural features that form platforms (Nelson 1997, Burger 2002). Because of this general relationship between altitude and nest platform densities, it is likely that the lower-elevation lands in the western portion of the CRMW ultimately could develop higher platform densities than the eastern (higher) half of the CRMW. Note that nests have been found up to 1,530 m asl, however, so elevation per se should not be used to assess habitat suitability in the future. Instead, habitat suitability should be based on the availability of nesting platforms and other features common to known nest sites. For example, sites with the highest likelihood of nesting murrelets generally have more potential nesting platforms, larger trees, and greater moss cover on tree limbs than do other sites (Grenier and Nelson 1995, Hamer 1995, Kuletz et al. 1995, Nelson 1997, Burger 2002). Specifically, murrelet nesting and activity usually is positively associated with: older stands of trees, tree diameter (dbh), density of large (dbh >80 cm) trees/ha, areas with larger basal area of trees, areas with greater vertical complexity in canopy structure, areas with greater epiphyte cover on branches, areas with a higher density of potential nesting platforms, areas in lower elevations and areas >500 m from the coastline.

The flight directions that we observed on radar mostly followed the main axis of valleys, except in some cases where local movements into, or toward, patches of potential nesting habitat suggested possible use of those patches by nesting or prospecting murrelets. For example, our 2005 radar data suggested that Marbled Murrelets might be using old-growth patches in West Point, Rack Creek, Rex Stand, Upper Rex, and South Fork (and perhaps the old-growth patch southwest of the Lower Rex site). The 2006 radar data suggested possible murrelet use of habitat near West Point, Rack Creek, Taylor Ridge, Chester North, 155.1A,

Findley, Rex Stand, Upper Rex, and Lindsay Creek. When habitat with nesting platforms was found in these areas, we conducted audio-visual surveys to help verify presence of murrelets. Murrelet presence (and occupancy) was verified in Rex River drainage in 2005 (Cooper et al. 2006b) and near the confluence of the North Fork and South Fork of the Cedar River in 2006 (Cooper et al. 2007). No murrelets were detected during audio-visual surveys in 2007. Thus, we documented murrelet occupancy in two areas of the CRMW during these studies, but radar observations in additional areas (especially West Fork, 155.1A, South Fork Northeast, and South Fork Taylor Creek where audio-visual were not conducted for a full two years) suggest the possibility that there could be low numbers of murrelets nesting in a few additional areas of the CRMW besides the two documented sites.

USE OF RADAR TO MONITOR TRENDS OF MURRELETS

Factors known to affect murrelet activity during the breeding period include human activities (e.g., recreation and timber harvesting; Carter and Erickson 1992, Hebert and Golightly 2006), oceanic conditions (Ainley et al. 1994, Oedekoven et al. 2001), and predator activity (Hebert and Golightly 2007). In particular, changes in ocean conditions, such as those that occur as the result of the El Niño–Southern Oscillation (ENSO) and the Pacific Decadal Oscillation, (PDO) have been linked to changes in diet, productivity, survival, and distribution of Marbled Murrelets along the Pacific coast (Ainley et al. 1995, Becker 2001, Becker and Beissinger 2003, Peery et al. 2006, Becker et al. 2007) and has been associated with widespread reproductive failure in several species of seabirds in the northeastern Pacific (Hodder and Graybill 1985, Ainley and Boekelheide 1990, Wilson 1991). There is evidence from central California indicating that nonbreeding murrelets rarely fly inland during the breeding season, which suggests that lower radar-based counts should occur during years of poor breeding effort and that they are essentially indices of the potential breeding effort in that area (Peery et al. 2004, Bigger et al. 2006). In contrast, Cooper et al. (2006a) did not find a relationship

between oceanographic conditions and radar counts on the Olympic Peninsula, Washington, during 1996–2004, which included the strong 1998 ENSO event. In combination, the Cooper et al. (2006a) results and lack of a strong ENSO event in 2005–2007 suggest to us that radar counts should have been somewhat average in the study area during 2005–2007. Not surprisingly, no statistically significant differences in radar counts of Marbled Murrelets in the CRMW were detected during the course of our study (i.e., during 2005–2007).

In this first three years of study, we found high Coefficients of Variation (CVs) in landward radar counts at our long-term sites (i.e., 130–170%). These values suggest that there generally was high among-day variation in CRMW radar counts compared to counts at many other locations. For example, CVs of landward radar counts were 28% in the Olympic Peninsula (Cooper et al. 2001), 10–55% in Oregon (Cooper et al. 2000, Cooper and Augenfeld 2001), and 23–25% in California (Cooper et al. 2005, Bigger et al. 2006). Note that most of the sites in these cited studies had much higher daily counts than the extremely low counts that we observed in the CRMW, which could have contributed to the higher percent variation we had in the current study. To help put some of those CV's into perspective, power analyses on the Olympic Peninsula radar data (Cooper et al. 2006a) indicated that they had high power ($\geq 80\%$) to detect a 2%/yr decline in 15 years with ~ 3 surveys/year at their seven sites. Bigger et al. (2006) did a radar study in northern California and determined it would take 22 sites surveyed 4 times/yr to detect a 2.5%/yr decline in 10 years, with the same ($\geq 80\%$) power.

In spite of the fact that our CVs at CRMW suggest that we have much lower power than other radar studies to detect changes in radar counts, our prospective power analysis indicated that we could expect to have adequate power (i.e., power > 0.8) to detect between a 2–3% annual increases in the murrelet counts at the Cedar River study sites in future years (i.e., in 25–50 years). Thus, it appears that the radar technique will be able to detect fairly small annual changes in murrelet numbers in future years.

Interestingly, there were not dramatic differences in power to detect increases in radar

counts between the 25-year sampling interval and the 50-year sampling interval. We speculate that the likely reason for this was that with small rates of increase, there was little increase in populations even after 50 years, and with large rates of increase the increases were so large that the power was high even at 25 years. The relatively small differences in power at intermediate rates may have been, in part, due to random variation in the results of a power analysis with 1000 simulations.

MONITORING TRENDS IN DIFFERENT AREAS OF THE WATERSHED

Although the western portion of the CRMW currently is largely devoid of Marbled Murrelet nesting habitat, it will likely have significant amounts of habitat develop over the next 50 years. Thus, there is interest in being able to separately determine local population trends of murrelets between the western portion and the eastern portion of the watershed. The Chester Morse site should provide good trend information for the eastern half of the CRMW. Trends in the western half of the CRMW could be difficult to determine, however, since the Powerline sites would sample murrelets using the eastern half of the CRMW in addition to birds using the western half. During 2005 and 2006, we attempted to use the mean landward count at Chester Morse as an index of murrelet levels in the eastern side of the CRMW and the difference between the Chester Morse site and the sum of the three Powerline sites as an index of murrelet abundance in the western side. The major problem with this approach is that it assumes that the Powerline site samples all the birds that later pass by the Chester Morse site, which we have found is not true; the mean count at the Chester Morse site always was higher than the sum of counts at the three Powerline sites. Thus, it is likely that some murrelets are accessing the CRMW over areas that are not sampled by the Powerline sites. In 2005 and 2006, we attempted to correct the Powerline counts for a “detectability” factor to help account for the proportion of birds flying into the western portion of CRMW beyond the radar coverage of the three powerline sites (i.e., either north of, south of, or between the three sites), however, that detectability metric could not be used in future years without making the assumption that murrelet flight paths would not

change in future years (i.e., that the proportion of birds using the CRMW that also flew over the three Powerline sites would remain the same). This assumption is unlikely to be true in the future, because habitat development in new areas will almost certainly affect murrelet flight path locations in and out of the area. Thus, the monitoring scheme we have developed for the CRMW will be applicable to the entire area in future years, but probably will not provide solid insights into separate trends for the eastern and western portions of the area.

SUMMARY OF 2005–2007 STUDIES

During 2005–2007, we established four long-term radar monitoring stations in the CRMW for marbled murrelets. Baseline data were collected and power analyses indicated that we could expect to detect between a 2–3% annual increase in radar counts when surveys are conducted using similar methods in ~25 and 50 years. We also used a combination of radar and audio-visual techniques combined with murrelet nest habitat surveys to determine current nesting locations of murrelets in the CRMW. We verified murrelet use at two sites (i.e., Rex River and confluence of North Fork and South Fork Cedar River). Additional radar sightings in areas that had some nesting habitat but were not surveyed for a full two years suggested that low numbers of murrelets also were possible at a few other areas within the CRMW (i.e., at West Fork, 155.1A, South Fork Northeast, and South Fork Taylor) besides the two documented sites.

For future radar monitoring efforts, it is imperative that wide openings are maintained around the Powerline radar sites and at the Chester Morse radar site, so that vegetation does not obscure the radar view and thus impede radar sampling. We also suggest continuing to use the sunrise sampling cut-off time to eliminate Band-tailed Pigeons from the data during future radar sampling. Further, we suggest continued efforts to get visual confirmation of all radar targets to help eliminate waterfowl (e.g., loons) over Chester Morse Lake and the occasional Band-tailed Pigeon that is active prior to sunrise. Sampling methodology and radar specifications used in the future obviously need to remain

consistent with those used in 2005–2007, so that future data will be comparable to findings from the first three years of study.

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Appendix 1. Photographs of radar sampling sites in Cedar River Watershed, Washington, 2007.

View toward the east at the Powerline North site.



View toward the north at the Powerline North site.



Appendix 1. Continued.

View toward the southeast at the Poweline Central site.



View toward the south at the Powerline South site.



Appendix 1. Continued.

View toward the east at the Chester Morse site.



View toward the east at the Chester Morse site.



Appendix 1. Continued.

View toward the northwest at the 155.1A site.



View toward the north at the South Fork site.



Appendix 1. Continued.

View toward the southwest at the Education Center site.



Appendix 1. Continued.

View toward the northwest at the West Point site.



View toward the northwest at the West Point site.



Appendix 1. Continued.

View toward the west at the Taylor Ridge site.



View toward the north at the Lindsay site.



Appendix 1. Continued.

View toward the north at the Rack Creek site.



View toward the north at the Rack Creek site.



Appendix 1. Continued.

View toward the northwest at the Chester North site.



View toward the southeast at the Chester North site.



Appendix 1. Continued.

View toward the west at the Upper Rex site.



View toward the southwest at the Lower Rex site.



Appendix 1. Continued.

View toward the west at the Rex Stand site.



View toward the east at the Rex Stand site.

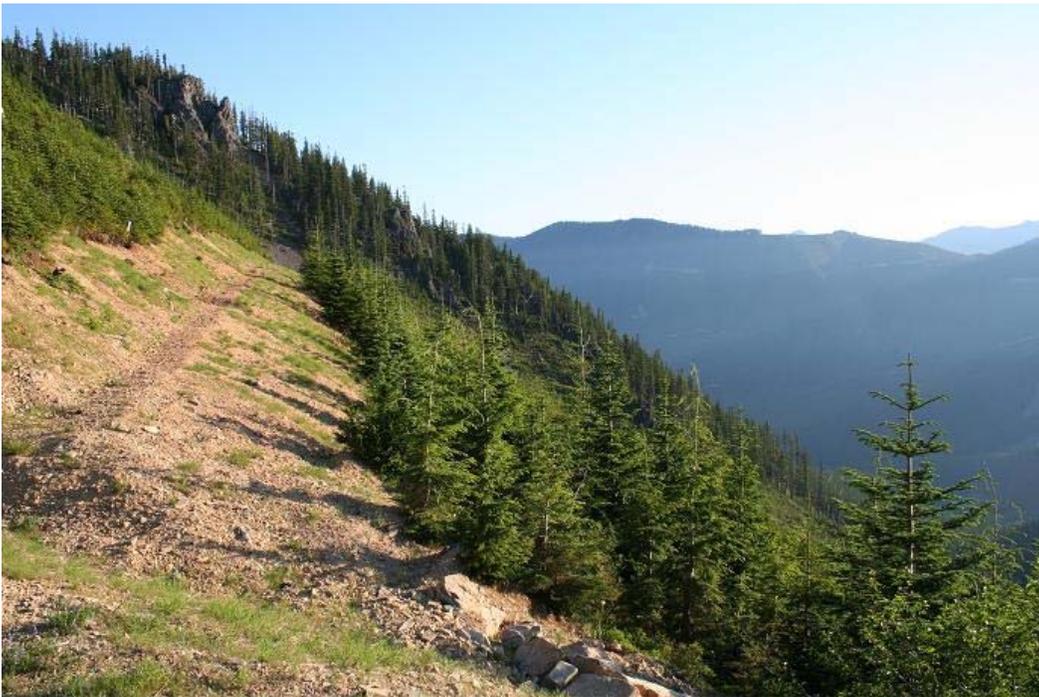


Appendix 1. Continued.

View toward the southwest at the Findlay site.



View toward the northeast at the Findlay site.



Appendix 2. Coding information for radar surveys of Marbled Murrelets in the Cedar River Municipal Watershed, Washington, summer 2007.

GENERAL CODES

OBSERVER

- | | |
|---------------------------------|-----------------------------|
| 1 = Brian A. Cooper (BAC) | 5 = Corey M. Grinnell (CMG) |
| 2 = Richard J. Blaha (RJB) | 6 = Jon H. Plissner (JHP) |
| 3 = Peter M. Sanzenbacher (PMS) | 7 = |
| 4 = Jeff Barna (JBB) | 8 = |

STUDY SITE

- | | |
|------------------------|-----------------------|
| 1 = Chester Morse | 11 = Taylor Ridge |
| 2 = Cedar | 12 = Site 150 |
| 3 = Power Line South | 13 = Rex Stand |
| 4 = Power Line Central | 14 = Rack Creek |
| 5 = Power Line North | 15 = Findlay |
| 6 = South Fork | 16 = Site 155.1A |
| 7 = Cedar | 17 = Lindsay |
| 8 = Upper Rex | 18 = Education Center |
| 9 = Lower Rex | 19 = AV1 |
| 10 = West Point | 20 = AV2 |
| | 21 = Chester North |

SESSION NUMBER (IF USED AT ALL)

(Write as the three-digit Julian date, a decimal point, and a two-digit number counting from 1 through *n* that represents the sequential sample taken. For example, the fifth sampling period on Julian date 182 would be 182.05. Format is XXX.XX; write XXX.00 if the session has to be canceled [e.g., because of weather], then continue the next session with the same number that you had been trying to use.)

TIME

(Write in 24-hour clock. Remember--midnight is 0000 h, **not** 2400 h.)

DATE

(People writing on forms should enter as, for example, "6 MAR" or "8 APR." Keypunchers should enter as mo/dy/yr, as in 9/30/95.)

JDATE

(Enter the Julian date + 2,006,000)

Appendix 2, continued.

WEATHER CODES AND MEASUREMENTS

WIND DIRECTION

(**Direction** on the ground **from which the wind is blowing**, to the nearest ordinal point. Be sure to use the local declination to correct the compass reading.)

0 = unknown/default

1 = North

2 = Northeast

3 = East

4 = Southeast

5 = South

6 = Southwest

7 = West

8 = Northwest

9 = direction is variable or no wind

WIND SPEED (mph)

(Sustained average speed at ground level, -9 = default/unknown)

0 = Calm

1 = 1-5 mph

2 = 6-10 mph

3 = 11-15 mph

4 = 16-20 mph

5 = 21-25 mph

6 = 26-30 mph

7 = 31-35 mph

etc., etc.....

ESTIMATED CLOUD COVER (to the nearest 5%)

(Estimated for the area from the coast to the mountains north of the site.)

-9 = unknown/default

CEILING HEIGHT

(An average height, taken from where you are in m agl, so either in a particular section or at the radar lab. Haze that allows a distinct shadow to be cast is counted as clear sky, whereas haze that causes indistinct shadows is counted as clouds. The same is true at night, when you can see stars and the moon through the haze.)

-9 = clear sky -99 = unknown/default

MINIMAL VISIBILITY

(Record the minimal distance you can see. If you are high on a ridge, use the minimal horizontal distance, for you may be able to see lower elevations clearly but nothing up high.)

0 = unknown/default

1 = 0-50 m

2 = 51-100 m

3 = 101-500 m

4 = 501-1000 m

5 = 1001-2500 m

6 = 2501-5000 m

7 = >5000 m

Appendix 2, continued.

WEATHER CODES AND MEASUREMENTS (CONTINUED)

PRECIPITATION

(Precipitation is considered to occur if it is recorded anywhere within ~5 km of the site.)

99 = unknown/default

0 = none

1 = fog

2 = drizzle (heavy mist)

3 = light rain (continuous drops of rain)

4 = heavy rain

5 = scattered showers

6 = snow flurries

7 = light snowfall

8 = heavy snowfall

9 = sleet

10 = hail

AIR TEMPERATURE (to the nearest 1°C)

(Be sure to keep the thermometer out of direct sunlight.)

99 = unknown/default

RADAR CODES AND MEASUREMENTS

TIME

(Write in 24-hour clock. Remember--midnight is 0000 h, **not** 2400 h.)

TARGET MULTIPLIER

(Record the number of targets flying "in a similar direction and fashion" and crossing the same segment. This category will be "1" for times when movement rates are so slow that you can record data for individual targets but will be, for example, "7" for seven targets flying the same direction and fashion during periods of high movement rates.)

0 = default

DIRECTION OF FLIGHT (to the nearest 1°)

(Measured on the radar display with the Electronic Bearing Line [EBL].)

999 = default

TRANSECT CROSSED

(That primary transect line that a bird did cross or would have crossed if you extrapolated its directional flight pattern.

Transect lines are extrapolated all the way off the screen.)

0 = default

1 = Northern Transect

3 = Eastern Transect

5 = Southern Transect

7 = Western Transect

MINIMAL DISTANCE (to the nearest meter)

(The smallest distance to the radar lab that a target became or would become if you extrapolated its flight direction.)

999 = default

VELOCITY (to the nearest 5 mph) Speeds **NOT to be recorded in KPH!!**

(Measured on the radar display with the hand-held speed scales.) 0 = default

Appendix 2, Continued.

RADAR MEASUREMENTS AND CODES (CONTINUED)

FLIGHT BEHAVIOR

(Some erratically-flying or circling birds still may have an overall direction of movement; if so, record that overall direction. Otherwise, their direction is 999.)

- | | |
|--|-----|
| 0 = default/unknown | 4 = |
| 1 = straight-line (directional) | 5 = |
| 2 = circling (NOTE: Direction may be 999.) | 6 = |
| 3 = erratic (NOTE: Direction may be 999.) | 7 = |

OVERLAP

- 0 = default/unknown
- 1 = seen on radar only
- 2 = observed on radar and audiovisually
- 3 = observed audiovisually only

SPECIES (if known)

(Write in the 4-letter code in the field; **If the species is unknown, leave the space blank. If have a target that is fast enough to be a murrelet (i.e., >40 mph), but you have a strong indication by target shape or behavior that it is not, enter "NOMU" and note reasons for classification in margin.**)

NUMBER OF BIRDS IN THAT TARGET (if known)

0 = default (**If the number of birds is not counted, leave the space blank.**)

DATE

JDATE (add a 2006 before the jdate, e.g., 1 Jan 1999 = 2006001)

OBSERVER 1 (BAC = 1, RJB = 2, etc.).

OBSERVER 2 (Enter 0 if only one observer.)

FLIGHT ALTITUDE **If flight altitude is ≤ 25 m agl, estimate it as closely as possible to the nearest meter; if it is 26-50 m, estimate it to the nearest 2-3 m; if it is >50 m agl, your estimate will be more approximate and in categories of at least 5 m.)** 0 = default

HEARSEE

Was bird heard, seen, or both? (0 = default or radar only, S = seen only, H = Heard only, B = Both seen and heard)

Appendix 3. Data file for Marbled Murrelet targets recorded on radar in the Cedar River Municipal Watershed, Washington, during summer 2007. See Appendix 2 for coding information. Also, note that Appendix 3 does not contain the weather data, data on targets that were non-murrelets or that were recorded after sunrise, or data from dates when weather or other factors cancelled sampling.

TIME	MULT	DIR	TRAN	MINDIS	VEL	BEH	OV.LAP	SPP	NO	FLTALT	HEARSEE	DATE	JDATE	SITE
324	0	0	0	999	0	0	0	WDAT	0	0	0	19-Jun-2007	2,007,170	1
359	1	302	1	579	45	1	1		0	0	0	19-Jun-2007	2,007,170	1
407	1	272	1	864	50	1	1		0	0	0	19-Jun-2007	2,007,170	1
442	1	283	1	1280	52	1	1		0	0	0	19-Jun-2007	2,007,170	1
325	0	0	0	999	0	0	0	WDAT	0	0	0	20-Jun-2007	2,007,171	3
332	1	39	7	1177	42	1	1		0	0	0	20-Jun-2007	2,007,171	3
406	1	91	1	1211	45	1	1		0	0	0	20-Jun-2007	2,007,171	3
326	0	0	0	999	0	0	0	WDAT	0	0	0	26-Jun-2007	2,007,177	4
359	1	279	5	946	65	1	1		0	0	0	26-Jun-2007	2,007,177	4
404	1	271	1	1043	56	1	1		0	0	0	26-Jun-2007	2,007,177	4
455	1	313	5	1223	65	1	1		0	0	0	26-Jun-2007	2,007,177	4
456	1	311	5	1257	65	1	1		0	0	0	26-Jun-2007	2,007,177	4
326	0	0	0	999	0	0	0	WDAT	0	0	0	27-Jun-2007	2,007,178	5
506	1	65	1	1426	42	1	1		0	0	0	27-Jun-2007	2,007,178	5
335	0	0	0	999	0	0	0	WDAT	0	0	0	9-Jul-2007	2,007,190	3
520	1	259	1	822	42	1	1		0	0	0	9-Jul-2007	2,007,190	3
335	0	0	0	999	0	0	0	WDAT	0	0	0	10-Jul-2007	2,007,191	4
425	1	167	3	647	52	1	1		0	0	0	10-Jul-2007	2,007,191	4
337	0	0	0	999	0	0	0	WDAT	0	0	0	12-Jul-2007	2,007,193	1
420	1	268	1	737	42	1	1		0	0	0	12-Jul-2007	2,007,193	1
456	1	102	1	600	46	1	1		0	0	0	12-Jul-2007	2,007,193	1
457	1	88	1	837	49	1	1		0	0	0	12-Jul-2007	2,007,193	1
458	1	102	1	712	47	1	1		0	0	0	12-Jul-2007	2,007,193	1
502	1	108	1	546	42	1	1		0	0	0	12-Jul-2007	2,007,193	1
511	1	103	1	520	41	1	1		0	0	0	12-Jul-2007	2,007,193	1
347	0	0	0	999	0	0	0	WDAT	0	0	0	24-Jul-2007	2,007,205	3
523	1	232	3	760	44	1	1		0	0	0	24-Jul-2007	2,007,205	3
524	1	238	5	929	50	1	1		0	0	0	24-Jul-2007	2,007,205	3
530	1	288	5	419	50	1	1		0	0	0	24-Jul-2007	2,007,205	3
351	0	0	0	999	0	0	0	WDAT	0	0	0	25-Jul-2007	2,007,206	4
408	1	223	3	800	42	1	1		0	0	0	25-Jul-2007	2,007,206	4
352	0	0	0	999	0	0	0	WDAT	0	0	0	26-Jul-2007	2,007,207	5
436	1	228	8	752	45	1	1		0	0	0	26-Jul-2007	2,007,207	5
538	1	215	8	426	50	1	1		0	0	0	26-Jul-2007	2,007,207	5
357	0	0	0	999	0	0	0	WDAT	0	0	0	30-Jul-2007	2,007,211	5
522	1	192	3	1107	80	1	1		0	0	0	30-Jul-2007	2,007,211	5

Appendix 4. Data sheets for all audio-visual surveys for Marbled Murrelets in the Cedar River Municipal Watershed, summer 2007 (attached).

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y kmr

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or N

Area Name: Cedar River Ruck Creek Watershed Site Name / Number: Ruck Creek Station Number: 1

Station Location - T 22 N, R 8 (circle one) E or W, S 24, QQ (1/16) NW, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 596219 N (y) coordinate: 5448719 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Neil Eric Jensen Initials: NEJ Affiliation: ABR, Inc. Phone: (503) 359-7525

Station Elevation: 934 Ft / M Position on Slope (circle one): Bottom/plain, Lower 1/3, Mid 1/3, Upper 1/3, Ridgetop

Station Placement (circle one): Inside, Outside

Distance from Survey Site Boundary: 10 Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0510 Table: North Bend Begin Survey Time: 0425 End Survey Time: 0625

Temperature at Sunrise: 3.2 ° Temperature at End of Survey: 5.5 ° (circle one) C or F revised: 2/2000

TIME	VERTICAL VIEWING		HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER			VISIBILITY TO 2 CANOPY	RAIN	FOG			
0425	UL	0	Y	Y	N	L		1	B,A,C	Begin Survey, fog over lake
0510	UL	0	Y	Y	N	L		1	B,A,C	Sunrise, fog over lake
0625	UL	0	Y	Y	N	L		1	B,A,C	End Survey, fog over lake

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤ 1.25 canopy height, U = Unknown.
 Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
 Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
 Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
 Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
 Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Date Point No.	Sequence No.	Reference No.
Quad Code	Photo Code	General Location	
Data Entry Initials	Data Entry Date	Data QC Initials	Data QC Date
Protocol Review Initials	Review Date	Highest Biological Status	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total:

Pg 2 of 2

Observer (s) Initials: MEJ

Month 06 Day 12 Year 2007

Area Name: Cedar River Watershed
 Site Name / No: Road Creek

Date Reference Number: _____

Units of Measure (circle one): U.S. Metric

Station Number: 1

SURVEY ACTIVITY:

Note Significant Weather Changes on Page 1

revised: 2 / 2000

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY			# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN	CLOSEST DIST. TO BIRDS SEEN (M)	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES
					VOCAL SERIES	OTHER	Start								
		0425													Bean Survey K HETH K WATH
		0425													
		0425													K T OSE
		0432													
		0443													K T OSE
		0451													
		0510													K T OSE
		0520													
		0527													Sunrise
		0550													
		0602													K T CORA K T STA K T RBW
		0625													
															End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.

AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, — = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. OL = Overlapping Vocalizations (Y or N).

AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, — = None or N/A. If both are heard write W / J.

BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (< 1.0), B = Circle At or Below Canopy (< 1.0), L = Seen Landing in or

Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.

(Check Reverse Side When Using 2-Sided Forms)

Species of concern: Common Loon

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y CMC

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or **(N)**

Month June Day 12 Year 2007

Area Name: Cedar River Watershed Site Name/Number: Lindsay Creek Station Number: 3

Station Location - T 21N N, R 9 (circle one) **(E)** or W, S 4, QQ (1/16) NW, of Q (1/4) SE

UTM zone: 10 E (x) coordinate: 601178 N (y) coordinate: 5243286 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Alden J. Miller Initials: AJM Affiliation: ABR Inc. Phone: (503) 359-7525

Station Elevation: 849 Ft / **(M)** Position on Slope (circle one): Bottom/plain, Lower 1/3, **(Mid 1/3)**, Upper 1/3, Ridgetop

Station Placement (circle one): Inside, **(Outside)**

Distance from Survey Site Boundary: 5 Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0510 Table: North Bend Begin Survey Time: 0425 End Survey Time: 0625

Temperature at Sunrise: 3.5 ° Temperature at End of Survey: 3.5 ° (circle one) **(C)** or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0425	UL	0	Y	Y	Y	N	N	N	0	N	Begin Survey
0510	UL	0	Y	Y	Y	N	N	N	0	N	Sunrise
0535	HI	1	Y	Y	Y	N	N	N	1	N	
0617	UL	0	Y	Y	Y	N	N	N	1	N	
0625	UL	0	Y	Y	Y	N	N	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Date Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

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(Y or N, initials): Y CM6

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

Month June Day 13 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Lost Creek Station Number: 1

Station Location - T _____ N, R _____ (circle one) E or W, S _____, QQ (1/16) _____, of Q (1/4) _____

UTM zone: 10 E (x) coordinate: 594882 N (y) coordinate: 5250301 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Corey M. Gannell Initials: CM6 Affiliation: ABR, Inc. Phone: (503) 359-7525

Station Elevation: 739 Ft / (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3), Upper 1/3, Ridgetop

Station Placement (circle one): (Inside), Outside

Distance from Survey Site Boundary: - Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25%, (2 = 26 to 50%), 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0509 Table: North Bend Begin Survey Time: 0424 End Survey Time: 0624
 Temperature at Sunrise: 8.5 ° Temperature at End of Survey: 9 ° (circle one) (C) or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0424	H1	3	Y	Y	Y	N	N	N	0	N	Begin Survey
0450	H1	3	Y	Y	Y	N	N	N	1	N	wind increases
0523	H1	3	Y	Y	Y	L	N	N	1	N	light rain
0539	H1	3	Y	Y	Y	N	N	N	0	N	light rain ended
0624	H1	3	Y	Y	Y	N	N	N	0	N	End Survey

Ceiling: UL = Unlimited (clear), HI =>2.0 canopy height, MID =>1.25 to <= 2.0 canopy height, LO = <=1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Data Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y N

Total Detections: 1

Species of Concern (circle one, details on last pg.): Y or N

Month June Day 13 Year 2007

Area Name: Cedar River Watershed Site Name/Number: Findley Creek Station Number: 1

Station Location - T 21 N, R 10 (circle one) E or W, S 6, QQ (1/16) SW, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 606326 N (y) coordinate: 5243160 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Alden J. Miller Initials: AJM Affiliation: ABR Inc. Phone: (503) 359-7525

Station Elevation: 958 Ft M Position on Slope (circle one): Bottom/plain, Lower 1/3, Mid 1/3, Upper 1/3, Ridgetop

Station Placement (circle one): Inside, Outside

Distance from Survey Site Boundary: 20 Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0509 Table: North Bend Begin Survey Time: 0424 End Survey Time: 0624

Temperature at Sunrise: 8.5 ° Temperature at End of Survey: 8.0 ° (circle one) C or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0424	H1	3	Y	Y	Y	N	N	N	0	N	Begin Survey
0442	H1	3	Y	Y	Y	N	N	N	1	N	
0509	H1	3	Y	Y	Y	N	N	N	1	N	Sunrise
0534	H1	3	Y	Y	Y	L	N	N	1	N	
0547	H1	3	Y	Y	Y	N	N	N	1	N	
0624	H1	3	Y	Y	Y	N	N	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Data Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Observer(s) Initials: ASM

Month June Day 13 Year 2007

Data Reference Number: _____

Units of Measure (circle one): U.S. / Metric

Detections - This Side Page Total: 0
 Area Name: Findlay
 Site Name / No: _____
 Station Number: 1

SURVEY ACTIVITY:

Note Significant Weather Changes on Page 1

revised: 2 / 2000

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	AUDITORY			# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN	CLOSEST DIST. TO BIRDS SEEN (units)	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES
				VOCAL SERIES	OTHER	W/J								
				Start	End	#	OL			Canopy = 1.0				
	1	04214												Begin Survey Steller Jay End Survey
	1	0530												
	1	0624												

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.
AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, — = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. OL = Overlapping Vocalizations (Y or N).
AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, — = None or N/A. If both are heard write W / J.
BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls <100 m), U = Unknown.
 (Check Reverse Side When Using 2-Sided Forms)

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y CR

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

Month 06 Day 13 Year 2007

Area Name: Cedar Creek Watershed Site Name / Number: Chester North Station Number: 3

Station Location - T 22 N, R 9 (circle one) (E) or W, S 16, QQ (1/16) NE, of Q (1/4) SW

UTM zone: 10 E (x) coordinate: 600811 N (y) coordinate: 5249252 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Neil Jensen Initials: NEJ Affiliation: ABR, Inc Phone: (503) 359-7525

Station Elevation: 723 Ft / (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3) Upper 1/3, Ridgetop

Station Placement (circle one): (Inside) Outside

Distance from Survey Site Boundary: NA Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, (4 = 76 to 100%)

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0509 Table: North Bend Begin Survey Time: 0424 End Survey Time: 0624

Temperature at Sunrise: 6.5 ° Temperature at End of Survey: 7.5 ° (circle one) (C) or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0424	HI	3	Y	Y	Y	N	N	N	0	C	Begin Survey
0435	HI	3	Y	Y	Y	N	N	N	0	C,B	
0439	HI	3	Y	Y	Y	L	N	N	0	C,B	Dizzle
0446	HI	3	Y	Y	Y	N	N	N	0	C,B	
0507	HI	3	Y	Y	Y	N	N	N	1	C,B	
0509	HI	3	Y	Y	Y	N	N	N	1	C,B	Sunrise
0605	HI	3	Y	Y	Y	N	N	N	2	C,B	
0624	HI	3	Y	Y	Y	N	N	N	2	C,B	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Data Point No.	Sequence No.	Reference No.
Quad Code	Photo Code	General Location	
Data Entry Initials	Data Entry Date	Data QC Initials	Data QC Date
Protocol Review Initials	Review Date	Highest Biological Status	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total: 0

Observer(s) Initials: VEI

Month 06 Day 13 Year 2007

Data Reference Number: _____

Units of Measure (circle one): U.S. Metric

Area Name: Leahurst Watershed
 Site Name / No: Chickadee Abkth
 Station Number: 1

SURVEY ACTIVITY:

Note Significant Weather Changes on Page 1

revised: 2 / 2000

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYP	AUDITORY			# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN	CLOSEST DIST. TO BIRDS SEEN (units)	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES	
					VOCAL SERIES	OTHER	W/I/J									
	0424															
	0435															
	0438															
	0441															
	0455															
	0509															
	0522															
	0534															
	0624															

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard

AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, — = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. **OL** = Overlapping Vocalizations (Y or N).

AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, — = None or N/A. If both are heard write W / J.

BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (< 1.0), B = Circle At or Below Canopy (< 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.

(Check Reverse Side When Using 2-Sided Forms)

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y CM

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

Area Name: Cedar Creek Watershed Site Name / Number: Taylor Ridge Station Number: 1
 Station Location - T 22 N, R 8 (circle one) (E) or W, S: 26, QQ (1/16) NW, of Q (1/4) NE
 UTM zone: 10 E (x) coordinate: 594828 N (y) coordinate: 5247069 Source: GPI Datum: NAD83 FOM: -
 Observer (s) Name: Neil Jensen Initials: NEJ Affiliation: ARR, Inc. Phone: (503) 359-7525

Station Elevation: 1053 Ft / (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, Mid 1/3, (Upper 1/3) Ridgetop

Station Placement (circle one) (Inside) Outside

Distance from Survey Site Boundary: NA Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, (2 = 26 to 50%), 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0509 Table: North Bend Begin Survey Time: 0424 End Survey Time: 0624
 Temperature at Sunrise: 6.5 ° Temperature at End of Survey: 8.5 ° (circle one) (C) or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0424	HI	3	Y	Y	Y	N	N	N	1	B,C	Begin Survey
0521	HI	3	Y	Y	Y	N	L	N	1	B,C	
0533	HI	3	Y	Y	Y	N	N	N	1	B,C	
0541	HI	3	Y	Y	Y	N	L	N	1	B,C	
0615	HI	3	Y	Y	Y	N	L	N	1	B,G,A	
0624	HI	3	Y	Y	Y	N	L	N	1	B,G,A	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Date Point No.	Sequence No.	Reference No.
Quad Code	Photo Code	General Location	
Data Entry Initials	Data Entry Date	Data QC Initials	Data QC Date
Protocol Review Initials	Review Date	Highest Biological Status	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total: 0 Pg. 2 of 2
 Area Name: Cedar Creek Watershed

Observer (s) Initials: MEI Month 06 Day 14 Year 2007
 Data Reference Number: _____ Units of Measure (circle one): U.S. / Metric Site Name / No: Taylor Creek
 Station Number: 1

SURVEY ACTIVITY:

Note Significant Weather Changes on Page 1

revised: 2 / 2000

STATUS - I / O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY			# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy = 1.0	CLOSEST DIST. TO BIRDS SEEN (.1/1 units)	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES (L = Loud, M = Moderate, F = Faint)
					Start	End	OTHER								
		0424													
		0424													Begin Survey, Lt AWB
		0435													Lt BSEL, Lt VATH
		0438													Lt DELD
		0441													Lt WVR
		0442													Lt RCH
		0456													Lt WETH
		0500													Lt RBW
		0504													Lt RECR
		0509													Lt RUHU
		0518													Source
		0531													Lt OSFL
		0624													Lt HAWD
															End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard
 AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, --- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. OL = Overlapping Vocalizations (Y or N).
 AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, --- = None or N/A. If both are heard write W / J.
 BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (< 1.0), B = Circle At or Below Canopy (< 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.
 (Check Reverse Side When Using 2-Sided Forms)

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y CAL

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

Month June Day 14 Year 2007

Area Name: Cedar River Watershed Site Name / Number: South Fork Cedar River North Station Number: 2

Station Location - T 21 N, R 10 (circle one) (E) or W, S 10, QQ (1/16) NW, of Q (1/4) NW

UTM zone: 10 E (x) coordinate: 0611306 N (y) coordinate: 5242332 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Alden J. Miller Initials: AJM Affiliation: ABR Inc. Phone: (503) 359-7525

Station Elevation: 724 Ft / M Position on Slope (circle one): Bottom/plain, (Lower 1/3) Mid 1/3, Upper 1/3, Ridgetop

Station Placement (circle one): (Inside) Outside

Distance from Survey Site Boundary: 2 Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25% (2 = 26 to 50%) 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0509 Table: North Bend Begin Survey Time: 0424 End Survey Time: 0624

Temperature at Sunrise: 6.5 ° Temperature at End of Survey: 7.0 ° (circle one) (C) or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0424	H1	3	Y	Y	Y	N	N	N	1	N	Begin Survey
0509	H1	3	Y	Y	Y	N	N	N	0	N	Sunrise
0624	H1	3	Y	Y	Y	N	N	N	0	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.
 Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
 Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
 Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
 Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
 Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Date Point No. _____	Sequence No. _____	Reference No. _____
Quad Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Date Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): N/CM

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or **(N)**

Month June Day 15 Year 2007

Area Name: Cedar River Watershed Site Name/Number: Findley Creek Station Number: 1

Station Location - T 21 N, R 10 (circle one) **(E)** or W, S 6, QQ (1/16) SW, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 606326 N (y) coordinate: 5243160 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Corey M. Grinnell Initials: CM Affiliation: ABR, Inc. Phone: (541) 359-7525

Station Elevation: 958 Ft **(M)** Position on Slope (circle one): Bottom/plain, Lower 1/3, **(Mid 1/3)**, Upper 1/3, Ridgetop

Station Placement (circle one): Inside, **(Outside)**

Distance from Survey Site Boundary: 20 Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): **(1 = 0 to 25%)**, 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0509 Table: North Bend Begin Survey Time: 0424 End Survey Time: 0628

Temperature at Sunrise: 7 ° Temperature at End of Survey: 7 ° (circle one) **(C)** or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0424	H1	3	Y	Y	Y	L	N	N	0	N	Begin Survey
0433	H1	3	N	Y	Y	M	N	N	0	N	rain impairs vertical vis
0442	H1	3	N	Y	N	H	N	N	0	P	heavy rain impairs hearing
0505	H1	3	Y	Y	Y	L	N	N	0	N	rain no longer impairs
0518	H1	3	Y	Y	Y	M	N	N	0	N	moderate rain
0524	H1	3	N	Y	N	H	N	N	0	P	heavy rain impairing
0534	L0	3	N	N	N	H	Y	N	0	P	fog rolls in
0545	H1	3	Y	Y	Y	M	N	N	0	N	fog clears / rain decreases
0603	H1	3	Y	Y	Y	L	N	N	0	N	light rain
0628	H1	3	N	Y	N	H	N	N	0	P	heavy rain impairing

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Data Point No.	Sequence No.	Reference No.
Quad Code	Photo Code	General Location	
Data Entry Initials	Data Entry Date	Data QC Initials	Data QC Date
Protocol Review Initials	Review Date	Highest Biological Status	

** WDOF DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): W/CAC

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

Month 06 Day 15 Year 2007

Area Name: Cedar Creek Watershed Site Name / Number: Lindsay Creek Station Number: 1

Station Location - T 21 N, R 9 (circle one) (E) or W, S 4, QQ (1/16) SE, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 69172 N (y) coordinate: 5243787 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Neil Jensen Initials: NEJ Affiliation: ABR, Inc. Phone: (503) 359-7525

Station Elevation: 871 Ft / (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3), Upper 1/3, Ridgetop

Station Placement (circle one): (Inside) Outside

Distance from Survey Site Boundary: NA Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, (2 = 26 to 50%), 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0509 Table: North Bend Begin Survey Time: 0424 End Survey Time: 0624
 Temperature at Sunrise: 85 ° Temperature at End of Survey: 110 ° (circle one) (C) or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0424	HI	3	Y	Y	N	H	N	N	1	T,C	Begin Survey
0441	HI	3	Y	Y	N	H	N	N	1	T,C,B	
0501	HI	3	Y	Y	Y	L	N	N	1	T,C,B,A	
0509	HI	3	Y	Y	Y	L	N	N	1	T,C,B,A	Sunrise
0515	HI	3	Y	Y	N	H	N	N	1	T,C,B,A	
0547	HI	3	Y	Y	Y	L	N	N	1	T,C,B,A	
0607	HI	3	Y	Y	Y	M	N	N	1	T,C,B,A	
0624	HI	3	Y	Y	Y	L	N	N	1	T,C,B,A	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Data Point No.	Sequence No.	Reference No.
Quad Code	Photo Code	General Location	
Data Entry Initials	Data Entry Date	Data QC Initials	Data QC Date
Protocol Review Initials	Review Date	Highest Biological Status	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total: 0
 Area Name: Cedar Creek Watershed
 Site Name / No: Lindsay Creek
 Station Number: 1

Observer (s) Initials: NEI
 Month 06 Day 15 Year 2007
 Units of Measure (circle one): U.S. / Metric

Date Reference Number: _____

SURVEY ACTIVITY:

Note Significant Weather Changes on Page I

revised: 2 / 2000

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY				# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS SEEN (M /) units	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
					VOCAL SERIES		OTHER									
					Start	End	#	OL								
		0424														Begin Survey
		0445														1st WTR
		0447														1st AMRO
		0449														1st WRTI
		0459														1st DLGR
		0509														Sunrise
		0512														1st CRCH
		0515														1st SPTD
		0548														1st RECR
		0555														1st HAWD
		0601														1st GRIA
		0624														End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.
AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, -- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. **OL** = Overlapping Vocalizations (Y or N).
AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, -- = None or N/A. If both are heard write W/J.
BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls <100 m), U = Unknown.
 (Check Reverse Side When Using 2-Sided Forms)

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y Cnb

Total Detections: 0

Species of Concern (circle one, details on last pg.): (Y) or N

Month June Day 15 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Rack Creek Station Number: 2

Station Location - T 22 N, R 8 (circle one) (E) or W, S 24, QQ (1/16) NW, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 596282 N (y) coordinate: 5248774 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Alden J. Miller Initials: AJM Affiliation: ABR Inc Phone: (503) 359-7525

Station Elevation: 914 Ft / (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3), Upper 1/3, Ridgetop

Station Placement (circle one): (Inside), Outside

Distance from Survey Site Boundary: - Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0509 Table: North Bend Begin Survey Time: 0421 End Survey Time: 0628

Temperature at Sunrise: 7.5 ° Temperature at End of Survey: 7.5 ° (circle one) (C) or F revised: 2 / 2000

TIME	VERTICAL VIEWING		HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER			RAIN	FOG	OTHER			
0421	HI	3	Y	Y	L	N	N	0	N	Begin Survey
0509	HI	3	Y	Y	L	N	N	1	N	Sunrise
0517	HI	3	Y	Y	M	N	N	1	N	
0524	HI	3	N	Y	H	N	N	1	N	
0527	HI	3	Y	Y	M	N	N	1	N	
0531	HI	3	Y	Y	L	N	N	1	N	
0628	HI	3	Y	Y	L	N	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤ 1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Data Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y Can-

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or N

Month 06 Day 19 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Lindsey Creek Station Number: 1

Station Location - T _____ N, R _____ (circle one) E or W, S _____, QQ (1/16) _____, of Q (1/4) _____

UTM zone: 10 E (x) coordinate: _____ N (y) coordinate: _____ Source: _____ Datum: _____ FOM: _____

Observer (s) Name: Neil Jensen Initials: NEJ Affiliation: ARR, Inc Phone: (503) 359-7525

Station Elevation: _____ Ft / M Position on Slope (circle one): Bottom/plain, Lower 1/3, Mid 1/3, Upper 1/3, Ridgetop

Station Placement (circle one): Inside Outside

Distance from Survey Site Boundary: NA Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 0 to 25% 2 = 26 to 50% 3 = 51 to 75% 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0509 Table: US Navy Begin Survey Time: 0424 End Survey Time: 0624

Temperature at Sunrise: 55 ° Temperature at End of Survey: 7.0 ° (circle one) C or F revised: 2/2000

TIME	VERTICAL VIEWING		HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER			VISIBILITY TO 2 CANOPY	RAIN	FOG			
0424	UL	0	Y	Y	N	N	N	1	B,C	Begin Survey
0509	UL	0	Y	Y	N	N	N	1	B,C	Sunrise
0606	HI	2	Y	Y	N	N	N	1	B,C	very high clouds
0624	HI	2	Y	Y	N	N	N	1	B,L,A	End Survey

Ceiling: UL = Unlimited (clear), HI =>2.0 canopy height, MID =>1.25 to <=2.0 canopy height, LO = <=1.25 canopy height, U = Unknown.
 Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
 Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
 Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
 Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
 Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Data Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Observer(s) Initials: NEJ

Month 06 Day 19 Year 2007

Units of Measure (circle one): U.S. / Metric

Detections - This Side Page Total: 0
 Area Name: Cedar Creek Watershed
 Site Name / No: Lindsey Creek

Station Number: 1

SURVEY ACTIVITY:

Note Significant Weather Changes on Page 1

revised: 2 / 2000

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY			# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN	CLOSEST DIST. TO BIRDS SEEN	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES
					Start	End	OTHER								
	0424														
	0424														Begin Survey
	0431														1st WILR
	0434														1st COIT
	0436														1st WRTT
	0441														1st DUGR
	0448														1st GR1A
	0452														1st SPT0
	0454														1st RBW1
	0504														1st HAWB
	0509														Swamp
	0514														1st RECR, 1st BSEL
	0519														1st AWRO
	0521														1st CBCH
	0531														1st STJA
	0614														1st RTP1
	0624														End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.
 AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, — = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. OL = Overlapping Vocalizations (Y or N).
 AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, — = None or N/A. If both are heard write W/J.
 BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (< 1.0), B = Circle At or Below Canopy (< 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.
 (Check Reverse Side When Using 2-Sided Forms)

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y CR

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

Month 06 Day 20 Year 2007

Area Name: Cedar Creek Watershed Site Name / Number: Finley Creek Station Number: 1

Station Location - T 21 N, R 10 (circle one) (R) or W, S 6, QQ (1/16) SW, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 606326 N (y) coordinate: 5243160 Source: GPS Datum: NAD 83 FOM: -

Observer (s) Name: Neil Jensen Initials: NEJ Affiliation: ABR, Inc Phone: (503) 359-7525

Station Elevation: 958 ft (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3) Upper 1/3, Ridgetop

Station Placement (circle one): Inside, (Outside)

Distance from Survey Site Boundary: 20 Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): (1 = 0 to 25%) 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0510 Table: North Bend Begin Survey Time: 0425 End Survey Time: 0625

Temperature at Sunrise: 4.5 ° Temperature at End of Survey: _____ ° (circle one) (C) or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0425	UL	0	Y	Y	Y	N	N	N	2	B,C	Begin Survey
0510	UL	0	Y	Y	Y	N	N	N	2	B,C,A	Sunrise
0625	UL	0	Y	Y	Y	N	N	N	2	B,C,A	End Survey

Celling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤ 1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Data Point No.	Sequence No.	Reference No.
Quad Code	Photo Code	General Location	
Data Entry Initials	Data Entry Date	Data QC Initials	Data QC Date
Protocol Review Initials	Review Date	Highest Biological Status	

** WDPW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total: Cedar Creek Watershed
 Area Name: Cedar Creek Watershed
 Site Name / No: Finley Creek
 Station Number: 1

Observer (s) Initials: MEJ Month 06 Day 20 Year 2007
 Units of Measure (circle one): Metric U.S.

revised: 2 / 2000

SURVEY ACTIVITY: **Note Significant Weather Changes on Page 1**

STATUS - I / O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY				# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS SEEN (AA) units	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
					VOCAL SERIES		OTHER									
					Start	End	#	OL								
		0425														Begin Survey, kt OSEFL
		0425														kt HCONT, kt VATH
		0425														kt SWTH, kt WTR, kt HETH
		0428														kt CRCH, kt WDFL
		0505														kt WRTI
		0509														Sunrise
		0516														kt RUHU
		0519														kt STIA
		0521														kt VASW
		0522														kt HAWD
		0556														kt NDFI
		0625														End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.
AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, --- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. **OL** = Overlapping Vocalizations (Y or N).
AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, --- = None or N/A. If both are heard write W / J.
BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls <100 m), U = Unknown.
(Check Reverse Side When Using 2-Sided Forms)

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y Cmb

Total Detections: 8

Species of Concern (circle one, details on last pg.): Y or (N)

Month June Day 20 Year 2007

Area Name: Cedar River Watershed

Site Name / Number: South Fork Cedar River Northeast Station Number: 1

Station Location - T 21 N, R 10 (circle one) (E) or W, S 10, QQ (1/16) NW, of Q (1/4) SE

UTM zone: 10 E (x) coordinate: 611924 N (y) coordinate: 5241408 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Alden J. Miller Initials: AM Affiliation: ABR Inc Phone: (503) 359-7528

Station Elevation: 801 Ft / (M) Position on Slope (circle one): Bottom/plain, (Lower 1/3), Mid 1/3, Upper 1/3, Ridgetop

Station Placement (circle one): (Inside) Outside

Distance from Survey Site Boundary: - Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, (4 = 76 to 100%)

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0510 Table: North Bend Begin Survey Time: 0422 End Survey Time: 0625

Temperature at Sunrise: 10.0 ° Temperature at End of Survey: 10.5 ° (circle one) (C) or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0422	UL	0	Y	Y	Y	N	N	N	1	N	Begin Survey
0510	UL	0	Y	Y	Y	N	N	N	1	N	Sunrise
0625	UL	0	Y	Y	Y	N	N	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤ 1.25 canopy height, U = Unknown.
 Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
 Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
 Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
 Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
 Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Data Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDEW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y [CMR]

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or **(N)**

Month June Day 21 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Chester North Station Number: 2

Station Location - T 22 N, R 9 (circle one) **(E)** or W, S 16, QQ (1/16) SE, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 60264 N (y) coordinate: 5249531 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Alden J. Miller Initials: AJM Affiliation: ABR Inc. Phone: (503) 359-7525

Station Elevation: 977 Ft / **(M)** Position on Slope (circle one): Bottom/plain, Lower 1/3, **(Mid 1/3)**, Upper 1/3, Ridgetop

Station Placement (circle one): **(Inside)** Outside

Distance from Survey Site Boundary: Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, **(4 = 76 to 100%)**

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0510 Table: North Bend Begin Survey Time: 0425 End Survey Time: 0625

Temperature at Sunrise: 8.5 ° Temperature at End of Survey: 8.0 ° (circle one) **(C)** or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0425	HI	3	Y	Y	Y	L	N	N	1	N	Begin Survey
0440	HI	3	Y	Y	Y	N	N	N	1	N	
0510	HI	3	Y	Y	Y	N	N	N	1	N	Sunrise
0559	HI	2	Y	Y	Y	N	N	N	1	N	
0611	HI	1	Y	Y	Y	N	N	N	2	N	
0625	HI	1	Y	Y	Y	N	N	N	2	N	End Survey

Ceiling: UL = Unlimited (clear), HI =>2.0 canopy height, MID =>1.25 to <=2.0 canopy height, LO =<=1.25 canopy height, U = Unknown.
 Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
 Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
 Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
 Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trces start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
 Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Data Point No.	Sequence No.	Reference No.
Quad Code	Photo Code	General Location	
Data Entry Initials	Data Entry Date	Data QC Initials	Data QC Date
Protocol Review Initials	Review Date	Highest Biological Status	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): W Cmt

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

Month June Day 22 Year 2007

Area Name: Cedar River Watershed Site Name / Number: 155.1A Station Number: 1

Station Location - T 22 N, R 10 (circle one) (E) or W, S 30, QQ (1/16) NW, of Q (1/4) SE

UTM zone: 10 E (x) coordinate: 607 495 N (y) coordinate: 541 5965 Source: GPS Datum: NAD 83 FOM: -

Observer (s) Name: Alden J. Miller Initials: AJM Affiliation: ABR Inc. Phone: 503 359-7525

Station Elevation: 894 Ft / (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3), Upper 1/3, Ridgetop

Station Placement (circle one): (Inside), Outside

Distance from Survey Site Boundary: - Units of Measure for ALL Horizontal Distances: METERS

Station Canopy Cover (circle one): 1 = 0 to 25%, (2 = 26 to 50%), 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0510 Table: North Bend Begin Survey Time: 0425 End Survey Time: 0655

Temperature at Sunrise: 9 ° Temperature at End of Survey: 9.5 ° (circle one) (C) or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0425	HI	3	Y	Y	Y	L	N	N	1	N	Begin Survey
0448	MID	3	N	Y	Y	L	N	N	1	N	
0452	LO	3	N	Y	Y	L	L	N	1	N	Distant fog
0456	LO	3	N	N	Y	L	L	N	1	N	
0510	MID	3	N	Y	Y	L	N	N	2	N	Sunrise
0625	HI	3	Y	Y	Y	N	N	N	1	N	
0655	HI	3	Y	Y	Y	N	N	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI =>2.0 canopy height, MID =>1.25 to <=2.0 canopy height, LO =<=1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Data Point No.	Sequence No.	Reference No.
Quad Code	Photo Code	General Location	
Data Entry Initials	Data Entry Date	Data QC Initials	Data QC Date
Protocol Review Initials	Review Date	Highest Biological Status	

** WDPW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y [CRH]

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

Month 06 Day 21 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Lost Creek Station Number: 1

Station Location - T 22 N R 8 (circle one) (E) or W, S 11, QQ (1/16) SW, of Q (1/4) SW

UTM zone: 10 E (x) coordinate: 599882 N (y) coordinate: 5256301 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Neil Jensen Initials: NEJ Affiliation: ARR, Inc. Phone: (509) 359-7825

Station Elevation: 739 Ft / (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3), Upper 1/3, Ridgetop

Station Placement (circle one): (Inside) Outside

Distance from Survey Site Boundary: 0m Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, (3 = 51 to 75%), 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0510 Table: North Bend, WA Begin Survey Time: 0425 End Survey Time: 625

Temperature at Sunrise: 12.5 ° Temperature at End of Survey: 14.0 ° (circle one) (C) or F revised: 2 / 2000

TIME	VERTICAL VIEWING		HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER			VISIBILITY TO 2 CANOPY	RAIN	FOG			
0425	HI	3	Y	Y	L	N	N	0	N	Begin Survey, drizzle
0428	HI	3	Y	Y	N	N	N	0	N	
0440	HI	3	Y	Y	N	N	N	0	N	
0508	HI	3	Y	Y	N	N	N	1	N	
0510	HI	3	Y	Y	N	N	N	1	N	Sunrise
0530	HI	2	Y	Y	N	N	N	1	N	
0537	HI	1	Y	Y	N	N	N	1	N	
0544	HI	0	Y	Y	N	N	N	1	N	
0625	HI	0	Y	Y	N	N	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.:	Data Point No.:	Sequence No.:	Reference No.:
Quad Code:	Photo Code:	General Location:	
Date Entry Initials:	Data Entry Date:	Data QC Initials:	Date QC Date:
Protocol Review Initials:	Review Date:	Highest Biological Status:	

** WDPW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total: 0
 Area Name: Cedar River Watershed
 Site Name / No: Last Creek
 Station Number: 1

Observer (s) Initials: NEJ
 Data Reference Number: _____

Month 06 Day 21 Year 2007
 Units of Measure (circle one): U.S. / Metric

SURVEY ACTIVITY:

Note Significant Weather Changes on Page 1

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY				# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS SEEN (M units)	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
					VOCAL SERIES		OTHER									
					Start	End	#	OL								
		0425														Begin Survey
		0428														1st WATH
		0432														1st WWR
		0505														1st STJA
		0510														Swaise
		0521														1st PSFL
		0524														1st DEJU
		0528														1st SWTH
		0530														1st BTPI
		0549														1st NOFL
		0601														1st BCCH
		0622														1st PECK, unk. accipiter
		0625														End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.
AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, -- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. **OL** = Overlapping Vocalizations (Y or N).
AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, -- = None or N/A. If both are heard write W / J.
BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.
 (Check Reverse Side When Using 2-Sided Forms)

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y Lnr

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or **(N)**

Area Name: Cedar River Watershed Site Name / Number: South Fork Cedar River Station Number: 3
 Month 06 Day 22 Year 2007

Station Location - T 21 N, R 10 (circle one) **(E)** or W, S 10, QQ (1/16) SE, of Q (1/4) NW

UTM zone: 10 E (x) coordinate: 611251 N (y) coordinate: 5242146 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Neil Eric Jensen Initials: NEJ Affiliation: ABR, Inc. Phone: (503) 359-7525

Station Elevation: 728 Ft / **(M)** Position on Slope (circle one): Bottom/plain, **(Lower 1/3)**, Mid 1/3, Upper 1/3, Ridgetop

Station Placement (circle one): **(Inside)**, Outside

Distance from Survey Site Boundary: 0 m Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, **(2 = 26 to 50%)**, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 510 Table: North Bend, WA Begin Survey Time: 415 End Survey Time: 625

Temperature at Sunrise: 8.5 ° Temperature at End of Survey: 10.5 ° (circle one) **(C)** or F revised: 2 / 2000

TIME	VERTICAL VIEWING		HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER			VISIBILITY TO 2 CANOPY	RAIN	FOG			
0425	HI	3	Y	Y	N	L	N	1	N	Begin Survey
0438	HI	3	Y	Y	L	L	N	1	N	light drizzle (could see)
0442	HI	3	Y	Y	N	L	N	1	N	drizzle stopped
0452	HI	3	Y	Y	N	N	N	1	N	fog lifted
0510	HI	3	Y	Y	N	N	N	1	N	Sunrise
0551	HI	3	Y	Y	N	N	N	2	N	
0607	HI	3	Y	Y	N	N	N	0	N	
0625	HI	3	Y	Y	N	N	N	0	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Data Point No.	Sequence No.	Reference No.
Quad Code	Photo Code	General Location	
Date Entry Initials	Date Entry Date	Data QC Initials	Date QC Date
Protocol Review Initials	Review Date	Highest Biological Status	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total: 0
 Area Name: Cedar River Watershed

Observer (s) Initials: NEJ Month 06 Day 22 Year 2007 Site Name / No: South Fork Cedar River No. 46
 Data Reference Number: _____ Units of Measure (circle one): Metric Station Number: 3

SURVEY ACTIVITY: **Note Significant Weather Changes on Page 1** revised: 2 / 2000

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY				# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS SEEN (M) units	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
					VOCAL SERIES		OTHER									
					Start	End	#	OL								
		0425														Begin Survey
		0425														1st SWTH, 1st COUZ
		0425														1st RUHL
		0428														1st VATH
		0431														1st OSFL
		0444														1st WJWR
		0445														1st AMRO
		0451														1st WJSP
		0510														Sunrise
		0514														1st PRFL
		0523														1st RBNU
		0526														1st STJA
		0548														1st CBCH
		0611														1st SPTO
		0625														End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.
AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, -- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. **OL** = Overlapping Vocalizations (Y or N).
AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, -- = None or N/A. If both are heard write W/J.
BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls <100 m), U = Unknown.
(Check Reverse Side When Using 2-Sided Forms)

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y [CR]

Total Detections: 0

Species of Concern (circle one, details on last pg.): (Y) or N

Month 06 Day 25 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Rack Creek Station Number: 2

Station Location - T 22 N, R 8 (circle one) (E) or W, S 24, QQ (1/16) NW, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 596282 N (y) coordinate: 5248774 Source: GPI Datum: NAD83 FOM: -

Observer (s) Name: Neil Eric Jensen Initials: NEJ Affiliation: ARR, Inc Phone: (509) 359-7525

Station Elevation: 914 Ft / (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3), Upper 1/3, Ridgetop

Station Placement (circle one): (Inside) Outside

Distance from Survey Site Boundary: 0 m Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): (1 = 0 to 25%) 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0511 Table: North Park, WA Begin Survey Time: 0425 End Survey Time: 0626

Temperature at Sunrise: 6.5 ° Temperature at End of Survey: 8.0 ° (circle one) (C) or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0426	UL	0	Y	Y	Y	N	N	N	2	N	Begin Survey
0428	UL	0	Y	Y	Y	N	N	N	2	N	
0511	UL	0	Y	Y	Y	N	N	N	2	N	Sunrise
0515	UL	0	Y	Y	Y	N	N	N	2	N	wind gusts to 3

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Data Point No.	Sequence No.	Reference No.
Quad Code	Photo Code	General Location	
Data Entry Initials	Data Entry Date	Data QC Initials	Data QC Date
Protocol Review Initials	Review Date	Highest Biological Status	

** WDPW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Area Name: Cedar River Watershed

Observer (s) Initials: NEJ

Month 06 Day 25 Year 2007

Site Name / No: Rack Creek

Units of Measure (circle one): U.S. / Metric

Station Number: _____

Data Reference Number: _____

SURVEY ACTIVITY: revised: 2 / 2000

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY				# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy = 1.0	CLOSEST DIST. TO BIRDS SEEN (<u>M</u>) units	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
					VOCAL SERIES		OTHER	W/J								
					Start	End										
		0426														Begin Survey
		0428														1st VATH
		0429														1st HETH
		0432														1st WTHR
		0433														1st COLO
		0436														1st SWTH
		0438														1st DEJV
		0446														1st BAEA
		0456														1st RUHU
		0459														1st RECR
		0511														Surge
		0524														1st HAWO
		0525														1st CORA
		0536														1st CRCH
		0553														1st RBMV
		0626														End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.
AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, -- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. OL = Overlapping Vocalizations (Y or N).
AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, -- = None or N/A. If both are heard write W/J.
BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.
Species of concern BAEA, COLO

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y Cmr

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

Month 06 Day 27 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Taylor Ridge Station Number: 1

Station Location - T 22 N, R 8 (circle one) (E) or W, S 26, QQ (1/16) NW, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 594928 N (y) coordinate: 5247069 Source: CPS Datum: NAD 83 FOM: -

Observer (s) Name: Neil Eric Jensen Initials: NEJ Affiliation: ARR, Inc Phone: (509) 359-7525

Station Elevation: 1053 Ft / (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, Mid 1/3, (Upper 1/3), Ridgetop

Station Placement (circle one): (Inside) Outside

Distance from Survey Site Boundary: 0m Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, (2 = 26 to 50%), 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0511 Table: North Bend, WA Begin Survey Time: 0426 End Survey Time: 0627

Temperature at Sunrise: 13.0 ° Temperature at End of Survey: 15.0 ° (circle one) (C) or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0426	UL	0	Y	Y	Y	N	N	N	0	N	Begin Survey
0443	UL	0	Y	Y	Y	N	N	N	0	N	
0448	HI	1	Y	Y	Y	N	N	N	0	N	very high cloud cover
0512	UL	1	Y	Y	Y	N	N	N	0	N	Sunrise
0531	UL	1	Y	Y	Y	N	N	N	1	N	
0549	HI	3	Y	Y	Y	N	N	N	1	N	
0627	HI	3	Y	Y	Y	N	N	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.
 Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
 Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
 Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
 Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
 Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Data Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDRW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total: 0 Pg. 2 of 2
 Area Name: Cedar River Watershed

Observer (s) Initials: MEJ Month 06 Day 27 Year 2007

Site Name / No: Taylor Ridge Units of Measure (circle one): U.S. / Metric

Station Number: 1

SURVEY ACTIVITY: **Note Significant Weather Changes on Page 1**

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY				# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS SEEN (M) units	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
					VOCAL SERIES		OTHER									
					Start	End	#	OL								
		0426														Begin Survey, KAVATA
		0426														KANRO, KA DEJU
		0434														1st WJWR
		0448														1st BCCH
		0456														1st Unknown (at Species)
		0501														1st RECR
		0503														1st RFL
		0512														Sunrise, KRBNU
		0515														1st HAWB
		0525														1st SWTH
		0621														1st GRJA
		0627														End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.
AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, -- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. **OL** = Overlapping Vocalizations (Y or N).
AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, -- = None or N/A. If both are heard write W / J.
BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (≤ 100 m), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.
 (Check Reverse Side When Using 2-Sided Forms)

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): YCAF

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or N

Month June Day 28 Year 2007

Area Name: Cedar River Watershed Site Name / Number: 155.1A Station Number: 1

Station Location - T 22N N, R 10 (circle one) E or W, S 30, QQ (1/16) NE, of Q (1/4) SW

UTM zone: 10 E (x) coordinate: 607495 N (y) coordinate: 5245965 Source: GPS Datum: NAD 83 FOM: -

Observer (s) Name: Alden J. Miller Initials: AJM Affiliation: ABR Inc. Phone: (360) 359-7525

Station Elevation: 894 Ft / M Position on Slope (circle one): Bottom/plain, Lower 1/3, Mid 1/3, Upper 1/3, Ridgetop

Station Placement (circle one): Inside Outside

Distance from Survey Site Boundary: 0 m Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0512 Table: North Bend Begin Survey Time: 0427 End Survey Time: 0657

Temperature at Sunrise: 11.5 ° Temperature at End of Survey: 12.0 ° (circle one) C or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0427	H1	3	Y	Y	Y	N	N	N	1	N	Begin Survey
0452	H1	3	Y	Y	Y	N	N	N	2	N	
0512	H1	3	Y	Y	Y	N	N	N	0	N	Sunrise
0607	H1	3	Y	Y	Y	L	N	N	0	N	
0657	H1	3	Y	Y	Y	L	N	N	0	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Data Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y [initials]

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or **(N)**

Month 06 Day 28 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Lindsey Creek Station Number: 2

Station Location - T 21 N, R 9 (circle one) **(E)** or W, S 4, QQ (1/16) SW, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 601032 N (y) coordinate: 5243132 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Neil Eric Jensen Initials: NEJ Affiliation: ARR, Inc. Phone: (503) 359-7525

Station Elevation: 826 Ft / **(M)** Position on Slope (circle one): Bottom/plain, Lower 1/3, **(Mid 1/3)** Upper 1/3, Ridgetop

Station Placement (circle one): **(Inside)** Outside

Distance from Survey Site Boundary: Own Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, **(4 = 76 to 100%)**

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0512 Table: North Bend, WA Begin Survey Time: 0427 End Survey Time: 0627

Temperature at Sunrise: 14.5 ° Temperature at End of Survey: 16.5 ° (circle one) **(C)** or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0427	HI	3	Y	Y	Y	N	N	N	1	N	Begin Survey
0442	HI	3	Y	Y	Y	N	N	N	1	N	
0512	HI	3	Y	Y	Y	N	N	N	1	N	Sunrise
0550	HI	3	Y	Y	Y	L	N	N	1	N	
0558	HI	3	Y	Y	Y	N	N	N	1	N	
0627	HI	3	Y	Y	Y	N	N	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.
 Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
 Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
 Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
 Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
 Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Data Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total: 0
 Area Name: Cedar River Watershed
 Site Name / No: Lindsey Creek
 Station Number: 2

Observer(s) Initials: MEJ Month 06 Day 28 Year 2007
 Units of Measure (circle one): U.S. / Metric

revised: 2 / 2000

Note Significant Weather Changes on Page 1

SURVEY ACTIVITY:

DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY				# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS SEEN (M)	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
				VOCAL-SERIES	OTHER	Start	End								
	0427														Begin Survey, 1st Count
	0427														1st VATH
	0438														1st DEJU
	0442														Vis. on unknown Bat Sp.
	0446														1st WTWB
	0449														1st HETH
	0505														1st GRJA
	0510														1st STA
	0512														Sunrise
	0536														1st RBNU
	0539														1st RECR
	0541														1st AMRO
	0543														1st DUGR, 1st PRZ
	0546														1st VASW
	0549														1st HAWO
	0550														1st BCCH
	0627														End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.
AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, --- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. OL = Overlapping Vocalizations (Y or N).
AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, --- = None or N/A. If both are heard write W / J.
BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.
(Check Reverse Side When Using 2-Sided Forms)

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

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(Y or N, initials): Y CM

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or **(N)**

Month 06 Day 29 Year 2007

Area Name: Cedar River Watershed

Site Name / Number: S Ft. Cedar River NE Station Number: 1

Station Location - T 21 N, R 10 (circle one) **(E)** or W, S 10, QQ (1/16) SW, of Q (1/4) SE

UTM zone: 10 E (x) coordinate: 611924 N (y) coordinate: 5241408 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Neil Eric Jensen Initials: NEJ Affiliation: ABR, Inc. Phone: (503) 359-7525

Station Elevation: 801 Ft / **(M)** Position on Slope (circle one): Bottom/plain, Lower 1/3, **(Mid 1/3)**, Upper 1/3, Ridgetop

Station Placement (circle one): **(Inside)** Outside

Distance from Survey Site Boundary: 0m Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, **(2 = 26 to 50%)** 3 = 51 to 75% 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0512 Table: North Bend, WA Begin Survey Time: 0427 End Survey Time: 0627
 Temperature at Sunrise: 12.0 ° Temperature at End of Survey: 14.5 ° (circle one) **(C)** or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0427	HI	3	Y	Y	Y	N	L	N	1	N	Begin Survey
0445	HI	3	Y	Y	Y	N	N	N	0	N	
0512	HI	3	Y	Y	Y	N	N	N	0	N	Sunrise
0520	HI	3	Y	Y	Y	N	N	N	1	N	
0530	HI	2	Y	Y	Y	N	N	N	1	N	
0548	HI	3	Y	Y	Y	N	N	N	1	N	
0615	HI	3	Y	Y	Y	N	L	N	1	N	very light fog, tree drip, ^{th. drizzle}
0627	HI	3	Y	Y	Y	N	L	N	1	N	End Survey

Canopy: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤ 1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trcs start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other

(explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad-Code _____	Photo Code _____	General Location _____	
Date Entry Initials _____	Date Entry Date _____	Data QC Initials _____	Date QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total: 0 Pg. 2 of 2
 Area Name: Cedar River Watershed
 Site Name / No: SAR Cedar River NE
 Station Number: 1

Observer (s) Initials: NEJ Month 06 Day 29 Year 2007
 Units of Measure (circle one): U.S. / Metric

revised: 2 / 2000

SURVEY ACTIVITY: **Note Significant Weather Changes on Page 1**

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY				# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS SEEN (M) units	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
					VOCAL SERIES		OTHER									
					Start	End	#	OL								
		0427														Begin Survey 1st Count
		0434														1st HETH, 1st VATH
		0436														1st OSFL
		0436														1st AMRO, vs on count
		0448														1st SWTH
		0449														1st WTR
		0451														1st DEJU
		0518														1st BTPI
		0530														1st HAWO
		0612														1st RUHU
		0618														1st CRCH
		0621														1st PSFI
		0627														End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.
AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, -- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. **OL** = Overlapping Vocalizations (Y or N).
AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, -- = None or N/A. If both are heard write W / J.
BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.
 (Check Reverse Side When Using 2-Sided Forms)

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y CAG

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

Month June Day 29 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Lost creek Station Number: 1

Station Location - T 22 N, R 8 (circle one) (E) or W, S 11, QQ (1/16) SW, of Q (1/4) SW

UTM zone: 10 E (x) coordinate: 594882 N (y) coordinate: 5250301 Source: GPS Datum: NAD 83 FOM: —

Observer (s) Name: Alden J. Miller Initials: AJM Affiliation: ABR Inc. Phone: (503) 359-7525

Station Elevation: 739 Ft / (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3), Upper 1/3, Ridgetop

Station Placement (circle one): (Inside) Outside

Distance from Survey Site Boundary: 0 m Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, (3 = 51 to 75%), 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0513 Table: North Bend Begin Survey Time: 0428 End Survey Time: 0628

Temperature at Sunrise: 10.5 ° Temperature at End of Survey: 10.0 ° (circle one) (C) or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0428	MID	3	Y	Y	Y	N	L	N	0	N	Begin survey
0513	HI	2	Y	Y	Y	N	L	N	1	N	Sunrise
0517	HI	2	Y	Y	Y	N	N	N	1	N	
0527	MID	2	Y	Y	Y	N	L	N	1	N	
0546	HI	2	Y	Y	Y	N	N	N	1	N	
0628	HI	2	Y	Y	Y	N	N	N	1	N	End survey
											Note: MID ceiling was @ 2 canopies; never below.

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤ 1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Data Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): N/CMB

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or N

Month June Day 30 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Findley Creek Station Number: 1

Station Location - T Z1 N, R 10 (circle one) E or W, S 6, QQ (1/16) SW, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 606326 N (y) coordinate: 5243160 Source: GPS Datum: NAD 83 FOM

Observer (s) Name: Alden J. Miller Initials: AJM Affiliation: ABR Inc. Phone: 503 359-7525

Station Elevation: 958 Ft M Position on Slope (circle one): Bottom/plain, Lower 1/3, Mid 1/3 Upper 1/3, Ridgetop

Station Placement (circle one): Inside, Outside

Distance from Survey Site Boundary: 20 Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0513 Table: North Bend Begin Survey Time: 0428 End Survey Time: 0628

Temperature at Sunrise: 9.5 ° Temperature at End of Survey: 10.5 ° (circle one) C or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	SKY	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0428	LO	3	N	N	Y	N	M	N	0	N	Begin Survey
0502	H1	2	Y	Y	Y	N	L	N	0	N	
0513	H1	1	Y	Y	Y	N	N	N	1	N	Sunrise
0628	H1	1	Y	Y	Y	N	N	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Data Point No.	Sequence No.	Reference No.
Quad Code	Photo Code	General Location	
Date Entry Initials	Date Entry Date	Data QC Initials	Data QC Date
Protocol Review Initials	Review Date	Highest Biological Status	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y [CB]

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

Month 07 Day 06 Year 2007

Area Name: Cedar River Watershed Site Name / Number: 155.1A Station Number: 1

Station Location - T 22 N, R 10 (circle one) (E) or W, S 30, QQ (1/16) NW, of Q (1/4) SE

UTM zone: 10 E (x) coordinate: 607495 N (y) coordinate: 5245965 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Neil Eric Jensen Initials: NEJ Affiliation: ARR, Inc. Phone: (503) 359-7525

Station Elevation: 894 Ft / (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, Mid 1/3, (Upper 1/3), Ridgetop

Station Placement (circle one): (Inside) Outside

Distance from Survey Site Boundary: 0m Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, (4 = 76 to 100%)

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 5:17 Table: North Bend, WA Begin Survey Time: 0432 End Survey Time: 0632

Temperature at Sunrise: 10.0 ° Temperature at End of Survey: 12.0 ° (circle one) (C) or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0432	UL	0	Y	Y	Y	N	N	N	0	N	Begin Survey
0510	UL	0	Y	Y	Y	N	N	N	1	N	
0517	UL	0	Y	Y	Y	N	N	N	1	N	Sunrise
0632	UL	0	Y	Y	Y	N	N	N	1	N	End Survey

Canopy: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤ 1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other

(explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Data Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total: 0
 Area Name: Cedar River Watershed
 Site Name / No: 155.1A
 Station Number: 1

Observer (s) Initials: MEJ
 Month 07 Day 06 Year 2007
 Units of Measure (circle one): U.S. Metric

Data Reference Number: _____

SURVEY ACTIVITY: ***Note Significant Weather Changes on Page 1** revised: 2 / 2000

STATUS - I/O	DETECTION #	DETECTOR TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY					# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0 units	CLOSEST DIST. TO BIRDS SEEN (M)	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
					VOCAL SERIES		OTHER	W/J									
					Start	End			#								
		0432															Begin Survey, ktcont
		0432															ktcont
		0436															ktcont
		0444															kt OSEA
		0451															1st WTA/R
		0457															kt DUGR
		0517															1st RBAU
		0532															Surprise, kt HAWO
		0558															1st DE IV
		0632															1st BCCH
																	End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.
AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, -- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. **OL** = Overlapping Vocalizations (Y or N).
AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, -- = None or N/A. If both are heard write W / J.
BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.
 (Check Reverse Side When Using 2-Sided Forms)

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y CW

Total Detections: 0

Species of Concern (circle one, details on last pg.): (Y) or N

Month 07 Day 07 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Findley Creek Station Number: 1

Station Location - T 21 N, R 9 (circle one) (E) or W, S 6, QQ (1/16) SEU, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 606326 N (y) coordinate: 5243160 Source: LPI Datum: NAD 83 FOM: -

Observer (s) Name: Neil Eric Jensen Initials: NEJ Affiliation: ABR, Inc. Phone: (503) 359-7525

Station Elevation: 958 Ft (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3), Upper 1/3, Ridgeline

Station Placement (circle one): Inside, (Outside)

Distance from Survey Site Boundary: 20m Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): (1 = 0 to 25%) 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0518 Table: North Bend, WA Begin Survey Time: 0433 End Survey Time: 0633

Temperature at Sunrise: 9.5 ° Temperature at End of Survey: 11.0 ° (circle one) (C) or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0433	UL	0	Y	Y	Y	N	N	N	0	N	Begin Survey
0444	UL	0	Y	Y	Y	N	N	N	1	N	
0518	UL	0	Y	Y	Y	N	N	N	1	N	Sunrise
0524	UL	0	Y	Y	Y	N	N	N	1	N	
0633	UL	0	Y	Y	Y	N	N	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Data Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total: 0
 Area Name: Cedar River Watershed
 Site Name / No: Findley Creek
 Station Number: 1

Observer (s) Initials: NEJ Month 07 Day 07 Year 07
 Units of Measure (circle one): U.S. / **Metric**

SURVEY ACTIVITY: **Note Significant Weather Changes on Page 1** revised: 2 / 2000

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY				# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS SEEN (AA units)	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
					VOCAL SERIES		OTHER									
					Start	End	#	OL								
		0433														Begin Survey, 1st OSE
		0433														1st SWTH 1st HETH
		0433														1st VATH, 1st WTWR
		0442														1st BCCH
		0453														1st WTWVA
		0508														1st DEIV
		0518														Sunrise
		0523														1st VASW
		0526														1st STJA
		0536														1st WIFL
		0548														1st PIW0
		0551														1st RUHV
		0557														1st DUGR
		0559														1st CORA
		0633														End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.
AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, -- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. **OL** = Overlapping Vocalizations (Y or N).
AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, -- = None or N/A. If both are heard write W/J.
BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.

Species of Concern: Belted Woodpecker

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y Col

Total Detections: 0

Species of Concern (circle one, details on last pg.): (Y) or (N)

Month 07 Day 08 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Chester North Station Number: 1

Station Location - T 22 N, R 9 (circle one) (E) or W, S 16, QQ (1/16) NE, of Q (1/4) SW

UTM zone: 10 E (x) coordinate: 600911 N (y) coordinate: 5249252 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Neil Eric Jensen Initials: NEJ Affiliation: ARR, Inc. Phone: (503) 359-7525

Station Elevation: 723 Ft / (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3), Upper 1/3, Ridgetop

Station Placement (circle one): (Inside), Outside

Distance from Survey Site Boundary: 0m Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, (4 = 76 to 100%)

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0519 Table: North Bend, WA Begin Survey Time: 0434 End Survey Time: 0634

Temperature at Sunrise: 11.0 ° Temperature at End of Survey: 13.0 ° (circle one) (C) or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0434	HI	3	Y	Y	Y	N	N	N	0	N	Begin Survey, High Fog
0438	HI	3	Y	Y	Y	N	N	N	0	N	
0507	HI	3	Y	Y	Y	N	N	N	01	N	
0519	HI	3	Y	Y	Y	N	N	N	2	N	Sunrise
0544	HI	2	Y	Y	Y	N	N	N	2	N	
0550	HI	2	Y	Y	Y	N	N	N	2	N	
0634	HI	2	Y	Y	Y	N	N	N	2	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.
 Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
 Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
 Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
 Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
 Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Data Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDPW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page, Total: 0
 Area Name: Cedar River Watershed
 Site Name / No: Chester North
 Station Number: 1

Observer (s) Initials: AEJ Month 07 Day 08 Year 2007
 Units of Measure (circle one): U.S. Metric

SURVEY ACTIVITY: 1 **revised: 2 / 2000**
 Note Significant Weather Changes on Page 1

DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY				# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS SEEN (units)	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
				VOCAL SERIES		OTHER									
				Start	End	#	OL								
	0434														Begin Survey
	0438														1st VATH
	0439														1st PSFL
	0442														1st AMRO
	0446														1st CBCH, 1st DEJU
	0455														visual on unk. bat species
	0459														1st RBNU
	0502														1st WTUR
	0519														Swaise
	0526														1st COLO
	0532														1st STJA
	0541														1st HAWO
	0610														1st BTPI
	0634														End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.
AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, -- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. **OL** = Overlapping Vocalizations (Y or N).
AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, -- = None or N/A. If both are heard write W/J.
BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or Departing from a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.
 (Check Reverse Side When Using 2-Sided Forms)

Species of concern: Common Loon

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y [Cub]

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or **(N)**

Month 07 Day 09 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Last Creek Station Number: 3

Station Location - T 22 N, R 8 (circle one) **(E)** or W, S 11, QQ (1/16) SW, of Q (1/4) SW

UTM zone: 10 E (x) coordinate: 600811 N (y) coordinate: 5249252 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Neil Eric Jensen Initials: NEJ Affiliation: ARR, Inc Phone: (503) 359-7525

Station Elevation: 733 Ft / **(M)** Position on Slope (circle one): Bottom/plain, Lower 1/3, **(Mid 1/3)** Upper 1/3, Ridgetop

Station Placement (circle one): **(Inside)** Outside

Distance from Survey Site Boundary: 0m Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, **(3 = 51 to 75%)**, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0520 Table: North Bend, WA Begin Survey Time: 0435 End Survey Time: 0635

Temperature at Sunrise: 13.5 ° Temperature at End of Survey: 15.5 ° (circle one) **(C)** or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0435	UL	0	Y	Y	Y	N	N	N	2	N	Begin Survey
0456	UL	0	Y	Y	Y	N	N	N	2	N	
0518	UL	0	Y	Y	Y	N	N	N	1	N	
0520	UL	0	Y	Y	Y	N	N	N	0	N	Sunrise
0532	UL	0	Y	Y	Y	N	N	N	1	N	
0534	UL	0	Y	Y	Y	N	N	N	2	N	
0624	UL	0	Y	Y	Y	N	N	N	2	N	gusts to 3
0635	UL	0	Y	Y	Y	N	N	N	2	N	End Survey, gusts to 3

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Data Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total: 0
 Area Name: Cedar River watershed
 Site Name / No: Lost Creek
 Station Number: 1

Observer (s) Initials: ME Month 07 Day 09 Year 2007
 Units of Measure (circle one): U.S. / Metric

SURVEY ACTIVITY:

Note Significant Weather Changes on Page 1

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY				# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy = 1.0	CLOSEST DIST. TO BIRDS SEEN (M) units	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
					VOCAL SERIES		OTHER									
					Start	End	#	OL								
		0435														Begin Survey, HVAIA
		0441														1st WTWB
		0445														1st DEJV
		0446														1st AMRO
		0502														1st WTWJA
		0506														1st CBCH
		0510														1st RECR
		0516														1st STJA
		0520														Sunrise
		0551														1st PFL
		0610														1st NOFL
		0635														End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.
AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, -- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. **OL** = Overlapping Vocalizations (Y or N).
AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, -- = None or N/A. If both are heard write W / J.
BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.
(Check Reverse Side When Using 2-Sided Forms)

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y [CM]

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

Month July Day 10 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Findley Creek Station Number: 1

Station Location - T 21 N, R 10 (circle one) (E) or W, S 6, QQ (1/16) SW, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 606326 N (y) coordinate: 5243160 Source: GPS Datum: NAD 83 FOM: -

Observer (s) Name: Alden J. Miller Initials: AJM Affiliation: ABR Inc. Phone: (503) 359-7525

Station Elevation: 958 Ft (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3), Upper 1/3, Ridgetop

Station Placement (circle one): Inside, (Outside)

Distance from Survey Site Boundary: 20 Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0520 Table: North Bend Begin Survey Time: 0435 End Survey Time: 0635

Temperature at Sunrise: 12.5 ° Temperature at End of Survey: 13.0 ° (circle one) (C) or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0435	UL	0	Y	Y	Y	N	N	N	1	N	Begin Survey
0520	UL	0	Y	Y	Y	N	N	N	1	N	Sunrise
0635	UL	0	Y	Y	Y	N	N	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.
Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. **Other:** H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Data Point No.	Sequence No.	Reference No.
Quad Code	Photo Code	General Location	
Date Entry Initials	Date Entry Date	Date QC Initials	Date QC Date
Protocol Review Initials	Review Date	Highest Biological Status	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total: 0
 Area Name: Cedar River Watershed
 Site Name / No: S Fl Cedar River NE
 Station Number: 1

Observer (s) Initials: NEJ Month 07 Day 10 Year 2007
 Data Reference Number: _____ Units of Measure (circle one): U.S. / Metric

SURVEY ACTIVITY:

Note Significant Weather Changes on Page 1

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY				# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS SEEN (M) units	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
					VOCAL SERIES		OTHER									
					Start	End	#	OL								
		0434														Begin Survey, 1st Count
		0434														1st HETH, 1st VATH
		0434														1st DEILL, 1st AMRO
		0443														1st SWTH
		0457														1st WZWR
		0520														Sunrise
		0551														1st STJA
		0601														1st RUHU
		0604														1st NOFL
		0615														1st OSFL
		0624														1st RECR
		0629														1st BTPI
		0635														End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.
AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, -- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. OL = Overlapping Vocalizations (Y or N).
AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, -- = None or N/A. If both are heard write W / J.
BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.
 (Check Reverse Side When Using 2-Sided Forms)

Potential Predate: STJA

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y CM

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

Month July Day 11 Year 2007

Area Name: Cedar River watershed Site Name/Number: Taylor Ridge Station Number: 1

Station Location - T 22N N, R 8E (circle one) (E) or W, S 26, QQ (1/16) NW, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 594828 N (y) coordinate: 5247069 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Alden J. Miller Initials: ASM Affiliation: ABR Inc. Phone: (203) 359-7525

Station Elevation: 1053 Ft (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, Mid 1/3, (Upper 1/3) Ridgetop

Station Placement (circle one): (Inside) Outside

Distance from Survey Site Boundary: - Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25%, (2 = 26 to 50%) 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0521 Table: North Bend Begin Survey Time: 0426 End Survey Time: 0636

Temperature at Sunrise: 22 ° Temperature at End of Survey: 22 ° (circle one) (C) or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0426	UL	0	Y	Y	Y	N	N	N	1	N	Begin survey
0521	UL	0	Y	Y	Y	N	N	N	1	N	Sunrise
0636	UL	0	Y	Y	Y	N	N	N	1	N	End survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.
 Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
 Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
 Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
 Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
 Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Data Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y CEL

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or N

Month 07 Day 11 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Rack Creek Station Number: 2

Station Location - T 22 N, R 8 (circle one) E or W, S 13, QQ (1/16) SW, of Q (1/4) SE

UTM zone: 10 E (x) coordinate: 596282 N (y) coordinate: 5248774 Source: GPS Datum: NAD83 FOM: 0

Observer (s) Name: Neil Eric Jensen Initials: NEJ Affiliation: ARR, Inc Phone: (503) 359-7525

Station Elevation: 914 Ft M Position on Slope (circle one): Bottom/plain, Lower 1/3, Mid 1/3, ~~Upper 1/3~~ Ridgetop

Station Placement (circle one): Inside Outside

Distance from Survey Site Boundary: 0m Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0521

Table: North Bend, WA Begin Survey Time: 0436 End Survey Time: 0636

Temperature at Sunrise: 21.5 °

Temperature at End of Survey: 24.5 ° (circle one) C or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0436	UL	0	Y	Y	Y	N	N	N	1	N	Begin Survey
0521	UL	0	Y	Y	Y	N	N	N	1	N	Sunrise
0636	UL	0	Y	Y	Y	N	N	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤ 1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Data Point No.	Sequence No.	Reference No.
Quad Code	Photo Code	General Location	
Data Entry Initials	Data Entry Date	Data QC Initials	Data QC Date
Protocol Review Initials	Review Date	Highest Biological Status	

** WDFW DATABASE USE ONLY **

VASW

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total: 0

Pg. 2 of 2

Area Name: Cedar River Watershed

Month 07 Day 11 Year 2007

Observer (s) Initials: NEJ

Site Name / No: Rack Creek

Units of Measure (circle one): U.S. / Metric

Station Number: 2

SURVEY ACTIVITY:

Note Significant Weather Changes on Page 1

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY				# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS SEEN (<u>M</u>) units	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
					VOCAL SERIES		OTHER									
					Start	End	#	OL								
		0436														Begin Survey, KHET
		0436														1st VATH
		0448														1st DEJG, KOSFL
		0451														1st COLO
		0503														1st RBNU
		0504														1st WWR
		0509														1st STRA
		0519														1st RECR
		0521														Sunrise
		0527														1st RUHU
		0534														1st VASW, KBTPI
		0631														1st Townsend's Chipmunk
		0636														End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard

AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, --- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. OL = Overlapping Vocalizations (Y or N). AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, --- = None or N/A. If both are heard write W/J.

BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.

Species of concern: VASW, COLO, Puffin, P. alberti, Steller's Jay, Townsend's Chipmunk

revised: 2 / 2000

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y [CMV]

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or N

Month 07 Day 12 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Lindsey Creek Station Number: 3

Station Location - T 21 N, R 9 (circle one) E or W, S 4, QQ (1/16) NW, of Q (1/4) SE

UTM zone: 10 E (x) coordinate: 601175 N (y) coordinate: 5243286 Source: GPS Datum: NAD83 FOM: X

Observer (s) Name: Neil Eric Jensen Initials: NEJ Affiliation: ABR, Inc. Phone: (503) 359-7525

Station Elevation: 849 Ft (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, Mid 1/3, Upper 1/3, Ridgetop

Station Placement (circle one): Inside, Outside

Distance from Survey Site Boundary: 0m Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0522 Table: North Bend, WA Begin Survey Time: 0437 End Survey Time: 0637

Temperature at Sunrise: 14.0 ° Temperature at End of Survey: 15.5 ° (circle one) C or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0437	UL	0	Y	Y	Y	N	N	N	1	N	Begin Survey
0443	UL	0	Y	Y	Y	N	N	N	2	N	
0522	UL	0	Y	Y	Y	N	N	N	1	N	Sunrise
0637	UL	0	Y	Y	Y	N	N	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.
 Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
 Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
 Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
 Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
 Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad. Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Data Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

INBEN DATABASE USE ONLY

VASW

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total: 0
 Area Name: Cedar River Watershed
 Site Name / No: Lindsey Creek
 Station Number: 3

Month 07 Day 12 Year 2007
 Units of Measure (circle one): U.S. / Metric

Observer (s) Initials: AEJ
 Data Reference Number:

SURVEY ACTIVITY: revised: 2 / 2000

****Note Significant Weather Changes on Page 1****

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY				# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS SEEN (<u>M</u>) units	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
					VOCAL SERIES		OTHER									
					Start	End	#	OL								
		0437														Begin Survey 1st VATA
		0437														1st CONT, 1st WETH
		0437														1st SWTH
		0443														1st WTWK
		0447														1st AMRO
		0453														1st NPOW
		0455														1st CBCH
		0505														1st DEJU, 1st RBAL
		0516														1st STJA
		0517														1st VASW
		0522														Sunrise
		0531														1st RB SA
		0555														1st HAWO

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.
AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, -- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. **OL** = Overlapping Vocalizations (Y or N).
AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, --- = None or N/A. If both are heard write W/J.
BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.
 Species of concern: VASW Potomac P. - Atlantic STJA

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y GM

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

Month July Day 12 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Chester North Station Number: 2

Station Location - T 22 N, R 9 (circle one) (E) or W, S 16, QQ (1/16) SE, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 601264 N (y) coordinate: 5249531 Source: GPS Datum: NAD 83 FOM: -

Observer (s) Name: Alden J. Miller Initials: AJM Affiliation: ABR Inc. Phone: (503) 359-7525

Station Elevation: 977 Ft (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3), Upper 1/3, Ridgetop

Station Placement (circle one): (Inside) Outside

Distance from Survey Site Boundary: Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, (3 = 51 to 75%) 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0522 Table: North Bend Begin Survey Time: 0432 End Survey Time: 0637

Temperature at Sunrise: 16 ° Temperature at End of Survey: 16 ° (circle one) (C) or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0432	UL	0	Y	Y	Y	N	N	N	0	N	Begin Survey
0522	UL	0	Y	Y	Y	N	N	N	0	N	Sunrise
0637	UL	0	Y	Y	Y	N	N	N	0	N	End survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.
 Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
 Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
 Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
 Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
 Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quadrant Code _____	Photo Code _____	General Location _____	
Date Entry Initials _____	Date Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	
** WDFW DATABASE USE ONLY **			

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y CR

Total Detections: 0

Species of Concern (circle one, details on last pg.): (Y) or N

Month 07 Day 13 Year 2007

Area Name: Cedar River Watershed Site Name / Number: SFK Cedar River rd Station Number: 3

Station Location - T 21 N, R 10 (circle one) (E) or W, S 10, QQ (1/16) NW, of Q (1/4) NW

UTM zone: 10 E (x) coordinate: 611251 N (y) coordinate: 5242146 Source: GPS Datum: NAD83 FOM

Observer (s) Name: Neil Eric Jensen Initials: NEJ Affiliation: ARR, Inc. Phone: (503) 359-7525

Station Elevation: 728 Ft (M) Position on Slope (circle one): Bottom/plain, (Lower 1/3), Mid 1/3, Upper 1/3, Ridgetop

Station Placement (circle one): (Inside), Outside

Distance from Survey Site Boundary: 0m Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, (2 = 26 to 50%), 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0523 Table: North Bend, WA Begin Survey Time: 0437 End Survey Time: 0644

Temperature at Sunrise: 11.5 ° Temperature at End of Survey: 12.5 ° (circle one) (C) or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0437	HI	1	Y	Y	Y	N	N	N	0	N	Begin Survey
0459	HI	2	Y	Y	Y	N	N	N	0	N	
0518	HI	1	Y	Y	Y	N	N	N	0	N	
0523	HI	1	Y	Y	Y	N	N	N	0	N	Sunrise
0545	HI	2	Y	Y	Y	N	N	N	0	N	
0559	HI	2	Y	Y	Y	EA	N	N	0	N	Rain ends at 604-610
0612	HI	3	Y	Y	Y	N	N	N	0	N	
0618	HI	2	Y	Y	Y	L	N	N	0	N	
0628	HI	2	Y	Y	YN	M	N	N	0	N	Rain becomes Light 631
0644	HI	2	Y	Y	Y	L	N	N	0	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤ 1.25 canopy height, U = Unknown.
 Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
 Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
 Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
 Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
 Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad. Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Data Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDFW DATABASE USE ONLY **

PIWO

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y CML

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

Month July Day 13 Year 2007

Area Name: Cedar River Watershed Site Name / Number: 155.1A Station Number: 2

Station Location - T 22 N, R 10 (circle one) (E) or W, S 30, QQ (1/16) SW, of Q (1/4) SE

UTM zone: 10 E (x) coordinate: 607568 N (y) coordinate: 5245843 Source: GPS Datum: NAD 83 FOM: —

Observer (s) Name: Alden J. Miller Initials: AJM Affiliation: ABR Inc Phone: (503) 359-7525

Station Elevation: 825 Ft (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3), Upper 1/3, Ridgetop

Station Placement (circle one): (Inside), Outside

Distance from Survey Site Boundary: — Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0523 Table: North Bend Begin Survey Time: 0433 End Survey Time: 0708

Temperature at Sunrise: 15 ° Temperature at End of Survey: 15 ° (circle one) (C) or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0433	HI	1	Y	Y	Y	N	N	N	1	N	Begin Survey
0523	HI	1	Y	Y	Y	N	N	N	2	N	Sunrise
0604	HI	2	Y	Y	Y	M	N	N	1	N	
0626	HI	3	Y	Y	N	H	N	N	1	P	
0632	HI	3	Y	Y	Y	L	L	N	1	N	
0639	HI	3	Y	Y	Y	N	L	N	1	N	*survey extended
0704	LO	3	N	Y	Y	N	M	N	1	N	30 min, due to weather
0707	LO	3	N	N	Y	N	M	N	1	N	
0708	LO	3	N	N	Y	N	M	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Data Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y (CR)

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or **(N)**

South Fork Month July Day 17 Year 2007

Area Name: Cedar River watershed Site Name / Number: Cedar River Northeast Station Number: 1

Station Location - T 21 N, R 10 (circle one) **(E)** or W, S 10, QQ (1/16) NW, of Q (1/4) SE

UTM zone: 10 E (x) coordinate: 611924 N (y) coordinate: 5241408 Source: GPS Datum: NAD83 FOM: -

Observer (s) Name: Alden J. Miller Initials: ASM Affiliation: ABR Inc. Phone: (503) 359-7525

Station Elevation: 801 Ft / **(M)** Position on Slope (circle one): Bottom/plain, **(Lower 1/3)** Mid 1/3, Upper 1/3, Ridgetop

Station Placement (circle one): **(Inside)** Outside

Distance from Survey Site Boundary: _____ Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25%, **(2 = 26 to 50%)**, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0527 Table: North Bend Begin Survey Time: 0440 End Survey Time: 0642

Temperature at Sunrise: 16.5 ° Temperature at End of Survey: 17.5 ° (circle one) **(C)** or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0440	HI	3	Y	Y	Y	N	N	N	1	N	Begin Survey
0527	HI	3	Y	Y	Y	N	N	N	1	N	Sunrise
0624	HI	2	Y	Y	Y	N	N	N	1	N	
0642	HI	2	Y	Y	Y	N	N	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤ 1.25 canopy height, U = Unknown.
 Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
 Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
 Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
 Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
 Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No. _____	Data Point No. _____	Sequence No. _____	Reference No. _____
Quad Code _____	Photo Code _____	General Location _____	
Data Entry Initials _____	Data Entry Date _____	Data QC Initials _____	Data QC Date _____
Protocol Review Initials _____	Review Date _____	Highest Biological Status _____	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): N cm

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

Month 07 Day 18 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Taylor Ridge Station Number: 3

Station Location - T 22 N, R 8 (circle one) (E) or W, S 26, 00(1/16) NE, of Q(1/4) NE

UTM zone: 10 E (x) coordinate: 594696 N (y) coordinate: 5947009 Source: GPS Datum: NAD83 FOM: 0

Observer (s) Name: Neil Eric Jensen Initials: NEJ Affiliation: ARR, Inc. Phone: (503) 359-7525

Station Elevation: 1063 Ft (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, Mid 1/3, (Upper 1/3) Ridgetop

Station Placement (circle one): (Inside) Outside

Distance from Survey Site Boundary: 0m Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, (4 = 76 to 100%)

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 5:28 Table: North Bend, WA Begin Survey Time: 0442 End Survey Time: _____

Temperature at Sunrise: 11.5 ° Temperature at End of Survey: 12.5 ° (circle one) (C) or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0442	LO	3	N	N	N	M	H	N	1	T	Begin Survey
0456	MID	3	N	N	N	M	H	N	1	T	
0501	MID	3	N	N	Y	N	H	N	1	N	
0518	MID	3	N	N	Y	L	H	N	1	N	
0522	MID	3	N	N	N	M	H	N	1	T	
0533	MID	3	N	N	Y	L	H	N	1	N	
0541	LO	3	N	N	Y	L	H	N	1	N	
0622	LO	3	N	N	Y	N	H	N	1	N	
0658	LO	3	N	N	Y	N	H	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤ 1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Data Point No.	Sequence No.	Reference No.
Quad Code	Photo Code	General Location	
Data Entry Initials	Data Entry Date	Data QC Initials	Data QC Date
Protocol Review Initials	Review Date	Highest Biological Status	

** WDFW DATABASE USE ONLY **

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total: 0
 Area Name: Cedar River Watershed
 Site Name / No: Taylor Ridge
 Station Number: 3

Observer (s) Initials: NEJ Month 07 Day 18 Year 2007
 Units of Measure (circle one): U.S. Metric

SURVEY ACTIVITY: **Note Significant Weather Changes on Page 1** revised: 2 / 2000

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY				# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS SEEN (<u>M</u> units)	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
					VOCAL SERIES		OTHER									
					Start	End	#	OL								
		0442														Begin Survey
		0451														KT RFL
		0455														KT HETH
		0458														KT VATH
		0501														KT AURO
		0509														KT NFWO
		0511														KT DEJU
		0513														KT WTWK
		0532														KT STJA
		0601														KT RCCH
		0626														KT RBNU
		0658														

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.
AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, --- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. **OL** = Overlapping Vocalizations (Y or N).
AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, --- = None or N/A. If both are heard write W/J.
BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.
 (Check Reverse Side When Using 2-Sided Forms)

Potential predators: STJA

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y N C

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or N

Month July Day 18 Year 2007

Area Name: Cedar River watershed Site Name / Number: Rock Creek Station Number: 2

Station Location - T 22 N, R 8 (circle one) E or W, S 13, QQ (1/16) SW, of Q (1/4) SE

UTM zone: 10 E (x) coordinate: 596282 N (y) coordinate: 5248774 Source: GPS Datum: NAD 83 FOM: —

Observer (s) Name: Alden J. Miller Initials: AJM Affiliation: ABR Inc. Phone: (503) 359-7525

Station Elevation: 914 Ft M Position on Slope (circle one): Bottom/plain, Lower 1/3, Mid 1/3, Upper 1/3, Ridgetop

Station Placement (circle one): Inside Outside

Distance from Survey Site Boundary: — Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0528 Table: North Bend Begin Survey Time: 0443 End Survey Time: 0643

Temperature at Sunrise: 13 ° Temperature at End of Survey: 14 ° (circle one) C or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0443	L0	3	N	N	Y	L	M	N	1	N	Begin Survey
0500	L0	3	N	N	Y	N	M	N	2	N	
0520	L0	3	N	N	Y	L	M	N	1	N	
0528	L0	3	N	N	Y	L	M	N	1	N	Sunrise
0643	L0	3	N	N	Y	L	M	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Date/Point No.	Sequence No.	Reference No.
Check Code	Photo Code	General Location	
Date/Entry Initials	Date/Entry Date	Date/OC Initials	Date/OC Date
Protocol Review Initials	Review Date	Highes Biological Status	

WDC DATABASE USE ONLY

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y Car

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or N

Month July Day 19 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Rack Creek Station Number: 2

Station Location - T 22 N, R 8 (circle one) E or W, S 13, QQ (1/16) SW, of Q (1/4) SE

UTM zone: 10 E (x) coordinate: 596282 N (y) coordinate: 5248774 Source: GPS Datum: NAD 83 FOM: —

Observer (s) Name: Alden J. Miller Initials: AJM Affiliation: ABR Inc. Phone: (503) 359-7525

Station Elevation: 914 Ft / M Position on Slope (circle one): Bottom/plain, Lower 1/3, Mid 1/3, Upper 1/3, Ridgetop

Station Placement (circle one): Inside, Outside

Distance from Survey Site Boundary: — Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0529 Table: North Bend Begin Survey Time: 0438 End Survey Time: 0644

Temperature at Sunrise: 10 ° Temperature at End of Survey: 11 ° (circle one) C or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0438	H1	3	Y	Y	Y	N	N	N	Z	N	Begin Survey
0503	H1	2	Y	Y	Y	N	N	N	Z	N	
0529	H1	2	Y	Y	Y	N	N	N	Z	N	Sunrise
0644	H1	2	Y	Y	Y	N	N	N	Z	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤ 1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Data Point No.	Sequence No.	Reference No.
Cloud Code	Photo Code	General Location	
Date/Time Initials	Date/Time Date	Date/Time Initials	Date/Time Date
Protocol Review Initials	Review Date	Highest Biological Status	

WPR/W DATABASE USE ONLY

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y Low

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or N

Month 07 Day 19 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Taylor Ridge Station Number: 3

Station Location - T 22 N, R 8 (circle one) E or W, S 26, QQ (1/16) NE, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 594696 N (y) coordinate: 5947009 Source: GPS Datum: NAD83 FOM: 0

Observer (s) Name: Nat Eric Jensen Initials: NEJ Affiliation: ABR, Inc. Phone: (503) 359-7525

Station Elevation: 1063 Ft M Position on Slope (circle one): Bottom/plain, Lower 1/3, Mid 1/3, Upper 1/3, Ridgetop

Station Placement (circle one): Inside, Outside

Distance from Survey Site Boundary: 0m Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 5:29 Table: North Bend WA Begin Survey Time: 0444 End Survey Time: 0657

Temperature at Sunrise: 9.5 ° Temperature at End of Survey: 10.0 ° (circle one) C or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0444	MID	3	N	Y	Y	N	M	N	0	N	Begin Survey
0452	HI	3	Y	Y	Y	N	L	N	0	N	
0503	HI	2	Y	Y	Y	N	L	N	0	N	
0514	HI	3	Y	Y	Y	N	L	N	0	N	very light fog
0529	HI	3	Y	Y	Y	N	N	N	0	N	Sunrise
0545	HI	3	Y	Y	Y	L	L	N	0	N	very light fog, very light rain
0551	HI	3	Y	Y	Y	N	L	N	0	N	
0559	HT	3	Y	Y	Y	N	N	N	0	N	
0608	HI	2	Y	Y	Y	N	N	N	1	N	
0657	HI	2	Y	Y	Y	N	N	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤ 1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = Noise, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Observer No.	Date/Point No.	Sequence No.	Remarks No.
Field Code	Photo Code	Ground Location	
Date/Time/Initials	Date/Time/Initials	Date/Time/Initials	Date/Time/Initials
Protocol Review Initials	Reviewer Date	Highest Biological Status	

WSPRWDN/DATABASE USE ONLY

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Observer (s) Initials: MEJ

Month 07 Day 19 Year 2007

Units of Measure (circle one): U.S. / Metric

Detections - This Side Page Total: 0
 Area Name: Cedar River Watershed
 Site Name / No: Taylor Ridge
 Station Number: 3

Date Reported: _____

SURVEY ACTIVITY:

Note Significant Weather Changes on Page 1

revised: 2 / 2000

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY			# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN	CLOSEST DIST. TO BIRDS SEEN (units)	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES (L = Loud, M = Moderate, F = Faint)
					VOCAL SERIES	Start	End								
		0444													Begin Survey
		0444													1st PRFL, 1st WATH
		0449													1st SWTH
		0444													1st HETH
		0456													1st AURO
		0510													1st BCHK
		0520													1st DEW
		0548													1st STJA, 1st PTO
		0556													1st RBW
		0620													1st PIWD
		0629													1st RECR
		0657													End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard

AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, --- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. OL = Overlapping Vocalizations (Y or N).

AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, --- = None or N/A. If both are heard write W / J.

BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (< 1.0), B = Circle At or Below Canopy (< 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.

Murrelet Redators: STJA (Steller's Jay) Species of Concern: PTO (Spotted Towhee), PIWD (Pileated Woodpecker)

(Check Reverse Side When Using 2-Sided Forms)

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): N (CM)

Total Detections: 0

Species of Concern (circle one, details on last pg.): (Y) or N

Month July Day 20 Year 2007

Area Name: Cedar River Watershed Site Name/Number: Lindsay creek Station Number: 1

Station Location - T 21 N, R 9 (circle one) (E) or W, S 4, QQ (1/16) SE, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 601172 N (y) coordinate: 5243187 Source: GPS Datum: NAD 83 FOM: ---

Observer (s) Name: Alden J. Miller Initials: AJM Affiliation: ABR Inc. Phone: (503) 359-7525

Station Elevation: 871 Ft. (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3) Upper 1/3, Ridgetop

Station Placement (circle one): (Inside) Outside

Distance from Survey Site Boundary: --- Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, (3 = 51 to 75%) 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0530 Table: North Bend Begin Survey Time: 0445 End Survey Time: 0715

Temperature at Sunrise: 11 ° Temperature at End of Survey: 12 ° (circle one) (C) or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0445	UL	0	Y	Y	Y	N	N	N	1	N	Begin Survey
0503	MID	2	N	Y	Y	N	M	N	1	N	
0522	HI	1	Y	Y	Y	N	L	N	1	N	
0530	HI	1	Y	Y	Y	N	N	N	1	N	Sunrise
0645	UL	0	Y	Y	Y	N	N	N	1	N	
0715	UL	0	Y	Y	Y	N	N	N	1	N	End Survey
											*Survey extended due to fog out.

Ceiling: UL = Unlimited (clear), HI =>2.0 canopy height, MID =>1.25 to <=2.0 canopy height, LO = <=1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Date/Point No.	Sequence No.	Reference No.
Effort Code	Photo Code	General Location	
Date-time initials	Date-time Date	Date of Initials	Date of Date
Protocol Review Initials	Review Date	Highest Biological Status	

WDFW DATABASE USE ONLY

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y [initials]

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or **(N)**

Month 07 Day 20 Year 2007

Area Name: Cedar River Watershed Site Name / Number: 155.1A Station Number: 2

Station Location - T 22 N, R 10 (circle one) **(E)** or W, S 30, QQ (1/16) SW, of Q (1/4) SE

UTM zone: 10 E (x) coordinate: 607568 N (y) coordinate: 5245843 Source: GPS Datum: NAD83FOM 0

Observer (s) Name: Neil Eric Jensen Initials: NEJ Affiliation: ARR, Inc. Phone: (503) 359-7525

Station Elevation: 825 Ft **(M)** Position on Slope (circle one): Bottom/plain, Lower 1/3, **(Mid 1/3)**, Upper 1/3, Ridgetop

Station Placement (circle one) **(Inside)** Outside

Distance from Survey Site Boundary: 0m Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): **(1 = 0 to 25%)**, 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0530 Table: North Bend, WA Begin Survey Time: 0444 End Survey Time: 0645

Temperature at Sunrise: 11.5 ° Temperature at End of Survey: 12.5 ° (circle one) **(C)** or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0444	HI	3	Y	Y	Y	N	N	N	2	N	Begin Survey, wind gusts to 3
0530	HI	3	Y	Y	Y	N	N	N	2	N	gusts to 3, Sunrise
0638	HI	2	Y	Y	Y	N	N	N	2	N	gusts to 3
0645	HI	2	Y	Y	Y	N	N	N	2	N	End Survey, gusts to 3

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.
Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. **Other:** H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Date Point No.	Sequence No.	Reference No.
Grid Code	Block Code	General Location	
Date Entry Initials	Date Entry Date	Date GC Initials	Date GC Date
Protocol/Review Initials	Review Date	Highest Biological Status	

WDFW DATABASE USE ONLY

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y [CMB]

Total Detections: 0

Species of Concern (circle one, details on last pg.): (Y) or N

Month July Day 25 Year 2007

Area Name: Cedar River watershed Site Name/Number: Lindsay creek Station Number: 1

Station Location - T 21 N, R 9 (circle one) (E) or W, S 4, QQ (1/16) SE, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 601172 N (y) coordinate: 5243187 Source: GPS Datum: NAD 83 FOM: —

Observer (s) Name: Alden J. Miller Initials: AJM Affiliation: ABR Inc. Phone: (503) 359-7525

Station Elevation: 871 Ft / (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3), Upper 1/3, Ridgetop

Station Placement (circle one): (Inside), Outside

Distance from Survey Site Boundary: — Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, (3 = 51 to 75%), 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0536 Table: North Bend Begin Survey Time: 0449 End Survey Time: 0651
 Temperature at Sunrise: 10 ° Temperature at End of Survey: 11 ° (circle one) (C) or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0449	UL	0	Y	Y	Y	N	N	N	0	N	Begin Survey
0513	HI	1	Y	Y	Y	N	N	N	0	N	
0520	HI	2	Y	Y	Y	N	N	N	0	N	
0536	HI	3	Y	Y	Y	N	N	N	0	N	Sunrise
0630	HI	2	Y	Y	Y	N	N	N	0	N	
0651	HI	2	Y	Y	Y	N	N	N	0	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.
Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. **Other:** H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Date Point No.	Sequence No.	Reference No.
Block Code	Protocol Code	General Location	
Date Entry Initials	Date Entry Date	Date of Initials	Date of Date
Project Review Initials	Review Date	Highest Biological Status	

WPA-WPA/WABASE USE ONLY

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y N

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or N

Month 07 Day 25 Year 2007

Area Name: Cedar River Watershed Site Name / Number: S Pr Cedar River NE Station Number: 1

Station Location - T 21 N, R 10 (circle one) E or W, S 10, QQ (1/16) NW, of Q (1/4) SE

UTM zone: 10 E (x) coordinate: 611924 N (y) coordinate: 5241408 Source: GPS Datum: NAD83 FOM:

Observer (s) Name: Nail Eric Jensen Initials: NEJ Affiliation: ARR, Inc Phone: (503) 359-7525

Station Elevation: 801 Ft M Position on Slope (circle one): Bottom/plain, Lower 1/3, Mid 1/3, Upper 1/3, Ridgetop

Station Placement (circle one) Inside, Outside

Distance from Survey Site Boundary: 0m Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0536 Table: North Bend, WA Begin Survey Time: 0451 End Survey Time: 0651

Temperature at Sunrise: 8.5 ° Temperature at End of Survey: 10.0 ° (circle one) C or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0451	UL	0	Y	Y	Y	N	L	N	0	N	Begin Survey
0536	UL	0	Y	Y	Y	N	L	N	0	N	Sunrise
0545	HI	2	Y	Y	Y	N	L	N	0	N	
0550	HI	3	Y	Y	Y	N	L	N	1	N	
0651	HI	3	Y	Y	Y	N	L	N	1	N	End Survey

Ceiling: UL = Unlimited (clear), HI =>2.0 canopy height, MID =>1.25 to <= 2.0 canopy height, LO = <=1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Project No.	Date/Point No.	Sequence No.	Reference No.
Site Code	Photo Code	General Location	
Date/Time/Initials	Date/Time/Date	Date/Time/Initials	Date/Time/Date
Photo/Review Initials	Reviewer Initials	Highest Biological Status	

WORLDWIDE/BIOLBASE USE ONLY

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Observer (s) Initials: ME

Month 07 Day 25 Year 2007

Units of Measure (circle one): U.S. / Metric

Detections - This Side Page Total: 0
 Area Name: Cedar River Watershed
 Site Name / No: 5 Ek Cedar River site
 Station Number: 1

SURVEY ACTIVITY:

Note Significant Weather Changes on Page 1

revised: 2 / 2000

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY			# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN	CLOSEST DIST. TO BIRDS SEEN (M)	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES
					VOCAL SERIES	Start	End								
		04511													
		04513													Begin Survey, HCOUL
		04514													1st VATH, 1st AURO
		04515													1st OSF
		0506													1st HETH
		0508													1st WILUR
		0510													1st SPID
		0536													1st WITWA
		0554													Sunrise
		0558													1st STDA
		0608													1st Townsend's Chipping
		0611													1st CRCH
		0616													1st PIWO
		0637													1st CORA, 1st RBUL
		0651													1st DELU
															End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.

AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, — = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. OL = Overlapping Vocalizations (Y or N).

BEHAVIOR - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, — = None or N/A. If both are heard write W / J.
 BEHAVIOR - F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (< 100 m), B = Circle At or Below Canopy (< 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.
 (Check Reverse Side When Using 2-Sided Forms)

Murrelet Predators: Steller's Jay, Common Raven, Townsend's Chipping
 Species of Concern: Spotted Towhee, Pileated.

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y [initials]

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

Month July Day 26 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Findley Creek Station Number: *2 (visual)
 Station Location - T 21 N, R 10 (circle one) (E) or W, S 6, QQ (1/16) SW, of Q (1/4) NW
 UTM zone: 10 E (x) coordinate: 606438 N (y) coordinate: 5243247 Source: GPS Datum: NAD 83 FOM: —
 Observer (s) Name: Alden J. Miller Initials: AJM Affiliation: ABR Inc. Phone: (503) 359-7525

Station Elevation: 832 Ft (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3) Upper 1/3, Ridgetop

Station Placement (circle one) (Inside) Outside

Distance from Survey Site Boundary: — Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, (4 = 76 to 100%)

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0537 Table: North Bend Begin Survey Time: 0450 End Survey Time: 0652
 Temperature at Sunrise: 10 ° Temperature at End of Survey: 9.5 ° (circle one) (C) or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0450	UL	0	Y	Y	N	N	N	N	1	C	Begin Survey
0537	UL	0	Y	Y	N	N	N	N	1	C	Sunrise
0652	UL	0	Y	Y	N	N	N	N	1	C	End Survey
											*Tandem Survey with NEJ @ Station 2 (audio)

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Date/Point No.	Sequence No.	Retention No.
Cloud Code	Photo Code	General Location	
Date Entry Initials	Date Entry Date	Date of Initials	Date of Initials
Photo/Review Initials	Review Date	Highest Biological Status	

WDFW/DATA/PLEASE USE ONLY

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y CMF

Total Detections: 0

Species of Concern (circle one, details on last pg.): (Y) or (N)

Month 07 Day 26 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Findley Creek Station Number: 2a

Station Location - T 21 N, R 10 (circle one) (E) or W, S 6, QQ (1/16) SW, of Q (1/4) NW

UTM zone: 10 E (x) coordinate: 606438 N (y) coordinate: 5243200 Source: GPS Datum: NAD83 FOM

Observer (s) Name: Neil Eric Jensen Initials: NEJ Affiliation: ARR, Inc. Phone: (503) 359-7525

Station Elevation: 897 Ft (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3), Upper 1/3, Ridgetop

Station Placement (circle one): (Inside) Outside

Distance from Survey Site Boundary: 0m Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, (4 = 76 to 100%)

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0537 Table: Ab. 4th Bend, WA Begin Survey Time: 0452 End Survey Time: 0652

Temperature at Sunrise: 10.0 ° Temperature at End of Survey: 9.5 ° (circle one) (C) or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0449	UL	0	Y	Y	Y	N	N	N	1	0	Begin Survey
0529	UL	0	Y	Y	Y	N	N	N	2	0	
0537	UL	0	Y	Y	Y	N	N	N	2	0	Sunrise
0652	UL	0	Y	Y	Y	N	N	N	2	0	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤ 1.25 canopy height, U = Unknown.
 Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
 Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
 Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
 Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
 Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Observer No.	Date/Point No.	Sequence No.	Reference No.
Cloud Code	Photo Code	General Location	
Date Entry Initial	Date Entry Date	Date of Initial	Date of Date
Protocol/Review Initials	Review Date	Highest Biological Status	
WPS/WDA/WABASE USE ONLY			

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total: 2

Observer (s) Initials: MSJ

Month 07 Day 26 Year 2007

Area Name: Cedar River Watershed

Units of Measure (circle one): U.S. / Metric

Station Number: 2a

Site Name / No: Fadley Creek

SURVEY ACTIVITY:

Note Significant Weather Changes on Page 1

revised: 2 / 2000

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY		# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN	CLOSEST DIST. TO BIRDS SEEN (M)	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES
					VOCAL SERIES	OTHER								
		0449												
		0452												Begin Survey, H/W/A
		0511												H/W/A
		0516												H/W/A
		0522												H/W/A
		0529												H/W/A
		0537												H/W/A
		0550												sunrise
		0612												1st SWTH
		0627												1st DELV
		0652												1st SPTD
														End Survey

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.
 AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, --- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. OL = Overlapping Vocalizations (Y or N).
 AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, --- = None or N/A. If both are heard write W / J.
 BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < 100 m), U = Unknown.
 (Check Reverse Side When Using 2-Sided Forms)

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y Low

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or N

Month 07 Day 27 Year 2007

Area Name: Cedar River Watershed Site Name / Number: 1551A Station Number: 2

Station Location - T 22 N, R 10 (circle one) E or W, S 30, QQ (1/16) SW, of Q (1/4) SE

UTM zone: 10 E (x) coordinate: 607568 N (y) coordinate: 5245843 Source: GPS Datum: NAD83 FOM: 0

Observer (s) Name: Neil Eric Jensen Initials: NEJ Affiliation: ABR, Inc. Phone: (509) 359-7525

Station Elevation: 825 Ft (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3), Upper 1/3, Ridgetop

Station Placement (circle one) (Inside) Outside

Distance from Survey Site Boundary: Own Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, (3 = 51 to 75%), 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0539 Table: North Bend, WA Begin Survey Time: 0454 End Survey Time: 0654

Temperature at Sunrise: 9.5 ° Temperature at End of Survey: 10.0 ° (circle one) (C) or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0454	HI	3	Y	Y	Y	N	N	N	0	N	Begin Survey
0539	HI	3	Y	Y	Y	N	N	N	0	N	Sunrise
0654	HI	3	Y	Y	Y	N	N	N	0	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.
 Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
 Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
 Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
 Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
 Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Plot Point No.	Sequence No.	Reference No.
Site Code	Photo Code	Central Location	
Date/Time Initials	Date/Time Date	Date of Initials	Date of Date
Printed/Review Initials	Reviewed By	Elmer's Biological Status	

WDFW DATABASE USE ONLY

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Detections - This Side Page Total: 2

Observer (s) Initials: MEJ

Month 07 Day 27 Year 2007

Area Name: Cedar River Watershed

Station Number: 2

Units of Measure (circle one): U.S. / Metric

Site Name / No: KC14

SURVEY ACTIVITY:

Note Significant Weather Changes on Page 1

revised: 2 / 2000

STATUS - I/O	DETECTION #	DETECTION TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY			# BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN	CLOSEST DIST. TO BIRDS SEEN (units)	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES
					Start	End	OTHER								
		04574													
		04579													
		05118													
		05221													
		05229													
		05327													
		05339													
		05444													
		05554													
		06115													
		06411													
		06554													

TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard

AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, --- = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. OL = Overlapping Vocalizations (Y or N).

AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, --- = None or N/A. If both are heard write W / J.

BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (<1.0), B = Circle At or Below Canopy (<1.0), L = Seen Landing in or

Departing From a Tree, S = Stationary Calling (fixed-point multiple calls <100 m), U = Unknown.

(Check Reverse Side When Using 2-Sided Forms)

Murrelet Predators: Douglas Tree Squirrel

Species of Concern: Pileated Woodpecker

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y CM

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

South Fork Month July Day 27 Year 2007

Area Name: Cedar River watershed Site Name / Number: Cedar River North Station Number: 3

Station Location - T 21 N, R 10 (circle one) (E) or W, S 10, QQ (1/16) NW, of Q (1/4) NW

UTM zone: 10 E (x) coordinate: 611251 N (y) coordinate: 5242146 Source: GPS Datum: NAD83 FOM: —

Observer (s) Name: Alden J. Miller Initials: ATM Affiliation: ABR Inc. Phone: (503) 359-7525

Station Elevation: 728 Ft / (M) Position on Slope (circle one): Bottom/plain, (Lower 1/3) Mid 1/3, Upper 1/3, Ridgetop

Station Placement (circle one): (Inside) Outside

Distance from Survey Site Boundary: — Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): (1 = 0 to 25%) 2 = 26 to 50%, 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0539 Table: North Bend Begin Survey Time: 0450 End Survey Time: 0654

Temperature at Sunrise: 11 ° Temperature at End of Survey: 11 ° (circle one) (C) or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0450	HI	3	Y	Y	Y	N	N	N	0	N	Begin Survey
0539	HI	3	Y	Y	Y	N	N	N	0	N	Sunrise
0621	HI	2	Y	Y	Y	N	N	N	0	N	
0654	HI	2	Y	Y	Y	N	N	N	0	N	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.

Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.

Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).

Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.

Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Date Point No.	Sequence No.	Reference No.
Quadrant Code	Photo Code	General Location	
Date Entry Initials	Date Entry Date	Date QC Initials	Date QC Date
Protocol Review Initials	Review Date	Highest Biological Status	

WFO W DATABASE USE ONLY

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): y GM

Total Detections: 0

Species of Concern (circle one, details on last pg.): (Y) or N

Month July Day 28 Year 2007

Area Name: Cedar River watershed Site Name / Number: Chester North Station Number: 2

Station Location - T 22 N, R 9 (circle one) (E) or W, S 16, QQ (1/16) SE, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 601264 N (y) coordinate: 5249531 Source: GPS Datum: NAD 83 FOM: —

Observer (s) Name: Alden J. Miller Initials: AJM Affiliation: ABR Inc. Phone: (503) 359-7525

Station Elevation: 977 Ft / (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3) Upper 1/3, Ridgetop

Station Placement (circle one): (Inside) Outside

Distance from Survey Site Boundary: — Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25%, (2 = 26 to 50%) 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0540 Table: North Bend Begin Survey Time: 0452 End Survey Time: 0655

Temperature at Sunrise: 13.5 ° Temperature at End of Survey: 12.5 ° (circle one) (C) or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	COVER	CLOUD			RAIN	FOG	OTHER			
0452	UL	0	Y	Y	Y	N	N	N	0	0	Begin Survey
0540	UL	0	Y	Y	Y	N	N	N	0	0	Sunrise
0655	UL	0	Y	Y	Y	N	N	N	0	0	End Survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.
 Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
 Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
 Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
 Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
 Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Data Point No.	Sequence No.	Reference No.
Quadrant Code	Photo Code	General Location	
Date Entry Initials	Date Entry Date	Date of Initials	Date of Data
Protocol Review Initials	Review Date	Higher Biological Status	

WJ-W/DATABASE USE ONLY

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y CM

Total Detections: 0

Species of Concern (circle one, details on last pg.): Y or (N)

Month July Day 29 Year 2007

Area Name: Cedar River Watershed Site Name / Number: Lost Creek Station Number: 1

Station Location - T 22 N, R 8 (circle one) (E) or W, S 14, QQ (1/16) NE, of Q (1/4) NE

UTM zone: 10 E (x) coordinate: 594882 N (y) coordinate: 5250301 Source: GPS Datum: NAD 83 FOM: —

Observer (s) Name: Aiden J. Miller Initials: AJM Affiliation: ABR Inc. Phone: (503) 359-7525

Station Elevation: 739 Ft (M) Position on Slope (circle one): Bottom/plain, Lower 1/3, (Mid 1/3), Upper 1/3, Ridgetop

Station Placement (circle one): (Inside), Outside

Distance from Survey Site Boundary: _____ Units of Measure for ALL Horizontal Distances: meters

Station Canopy Cover (circle one): 1 = 0 to 25%, (2 = 26 to 50%), 3 = 51 to 75%, 4 = 76 to 100%

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0541 Table: North Bend Begin Survey Time: 0450 End Survey Time: 0726

Temperature at Sunrise: 14.0 ° Temperature at End of Survey: 13.5 ° (circle one) (C) or F revised: 2/2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0450	HI	3	Y	Y	Y	N	N	N	0	N	Begin Survey
0541	HI	3	Y	Y	Y	N	N	N	0	N	SUNRISE
0726	HI	3	Y	Y	Y	N	N	N	0	N	End Survey
											* survey extended 30 min. due to clouds

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤ 2.0 canopy height, LO = ≤ 1.25 canopy height, U = Unknown.
 Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
 Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
 Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
 Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
 Noise: N = Noise, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Date Point No.	Sequence No.	Reference No.
Quad Code	Photo Code	General Location	
Data Entry Initials	Data Entry Date	Data QC Initials	Data QC Date
Protocol Review Initials	Review Date	Highest Biological Status	

WOW DATABASE USE ONLY

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Survey Visit to Protocol

Page 1 of 2

(Y or N, initials): Y CM

Total Detections: 0

Species of Concern (circle one, details on last pg.): (Y) or N

Area Name: Cedar River Watershed

Site Name / Number: South Fork Taylor Creek

Month July Day 30 Year 2007
Station Number: 1

Station Location - T 22 N, R 8 (circle one) (E) or W, S 32, QQ (1/16) NW, of Q (1/4) SE

UTM zone: 10 E (x) coordinate: 589807

N (y) coordinate: 5744497 Source: GPS Datum: NAD83 FOM: —

Observer (s) Name: Alden J. Miller

Initials: ASJM Affiliation: ABR Inc. Phone: (503) 359-7525

Station Elevation: 434 Ft / (M) Position on Slope (circle one) (Bottom/plain), Lower 1/3, Mid 1/3, Upper 1/3, Ridgetop

Station Placement (circle one): (Inside) Outside

Distance from Survey Site Boundary: _____ Units of Measure for ALL Horizontal Distances: Meters

Station Canopy Cover (circle one): 1 = 0 to 25%, 2 = 26 to 50%, 3 = 51 to 75%, (4 = 76 to 100%)

ENVIRONMENTAL CONDITIONS:

Official Sunrise Time: 0542

Table: North Bend Begin Survey Time: 0457 End Survey Time: 0657

Temperature at Sunrise: 9 °

Temperature at End of Survey: 9 ° (circle one) (C) or F revised: 2 / 2000

TIME	VERTICAL VIEWING			HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITATION			WIND	NOISE	NOTES
	CEILING	CLOUD COVER	VISIBILITY TO 2 CANOPY			RAIN	FOG	OTHER			
0457	HI	3	Y	Y	Y	N	N	N	0	N	Begin survey
0542	HI	3	Y	Y	Y	N	N	N	0	N	Sunrise
0610	HI	2	Y	Y	Y	N	N	N	0	N	
0617	HI	1	Y	Y	Y	N	N	N	0	N	
0644	HI	2	Y	Y	Y	N	N	N	0	N	
0657	HI	2	Y	Y	Y	N	N	N	0	N	End survey

Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to ≤2.0 canopy height, LO = ≤1.25 canopy height, U = Unknown.
 Cloud Cover: 0 = 0%, 1 = 33%, 2 = 66%, 3 = 100%.
 Vertical Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Horizontal Visibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection), U = Unknown.
 Audibility: N = Impaired (detections may be missed due to conditions), Y = Unimpaired (conditions allow for reliable detection).
 Precipitation - Rain & Fog: N = None, L = Light, M = Moderate, H = Heavy. Other: H = Hail, S = Snow. Indicate intensity using same codes for rain & fog.
 Wind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move), 2 = 4-7 mph (leaves rustle, sm. twigs move), 3 = 8-12 mph (leaves & sm. twigs in constant motion), 4 = 13-18 mph (sm. branches move), 5 = 19-24 mph (lg. branches & sm. trees start to sway), 6 = 25-31 mph (lg. branches in constant motion), 7 = 32-38 mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).
 Noise: N = None, A = Aircraft, B = Bird song/calls, C = Creek/water drainage, M = Machinery, P = Rain/hail, T = Tree drip, V = Vehicle, W = Wind, O = Other (explain in Notes).

Occurrence No.	Date/Point No.	Sequence No.	Reference No.
Site Code	Photo/Spot	General Location	
Date/Field Initials	Date/Field Date	Date/OC Initials	Date/OC Date
Project/Review Initials	Review Date	Field Biologist Status	

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