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

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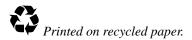
FINAL REPORT

Prepared for City of Seattle Watershed Management Division 19901 Cedar Falls Road S.E., North Bend, WA 98045

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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. Washington, Oregon, The 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

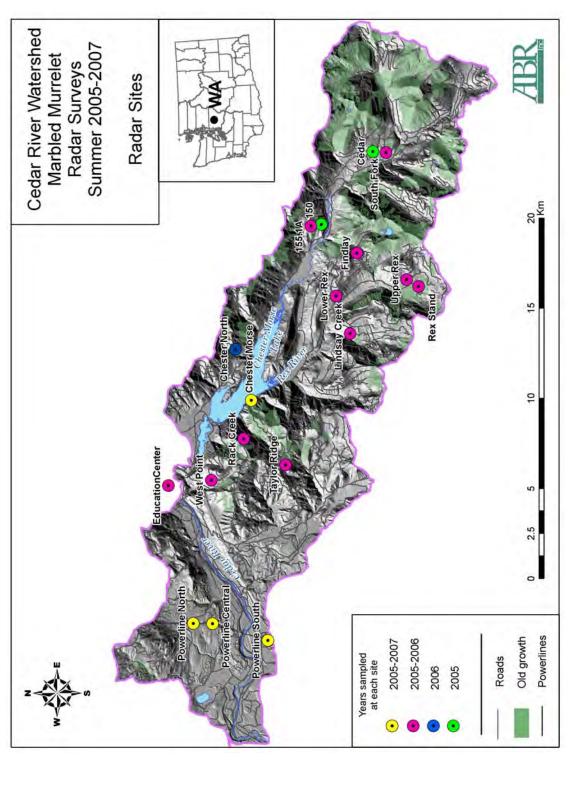
photo documented to help future observers compare suitability of the sites in the future with current suitability, in terms of the amount of screening of the radar view by nearby vegetation (Appendix 1). We also conducted audio-visual observations for murrelets at 10 sites within the CRMW (Figure 2,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



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

Site type/site name	UTM co	ordinates 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 SITE	ES				
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.	

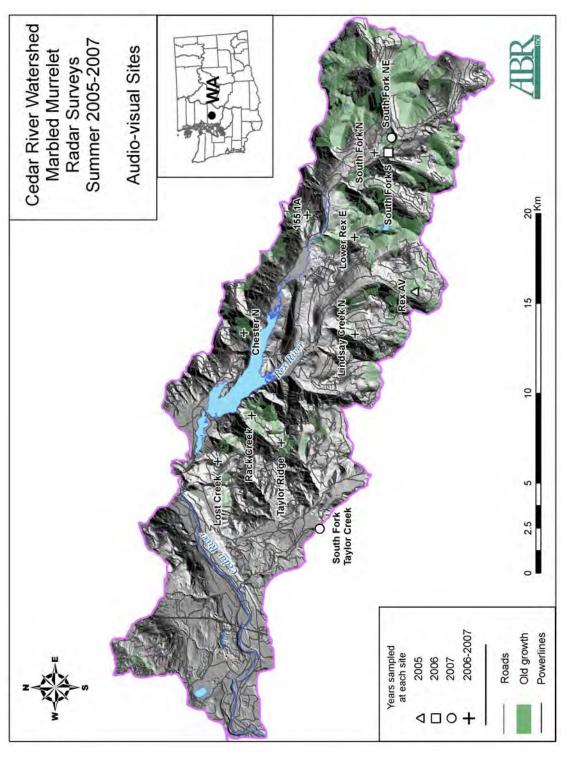
Table 1.Location of summer 2005, 2006, and 2007 radar sampling sites in the Cedar River Municipal
Watershed, Washington.

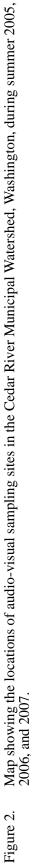
¹UTM Zone 10; ²Site only sampled in 2005; ³Site only sampled in 2006; ⁴Site only sampled in 2005 and 2006.

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





2005–2007 Marbled Murrelet Study

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Methods

Site	Station	UTM co	ordinates 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

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

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 µsec and the forward edge of the antenna elevated by ~15°. 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.

			Number of	Number of targets recorded on radar		
Date	Site	Sampling hours	Landward	Seaward	Other	
19 June	Chester Morse	0324–0624	0	3	0	
20 June	Powerline South	0325-0625	2	0	0	
21June	Powerline Central*	0325-0625*				
22June	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	

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.

* 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

Methods

			Survey	Number of	fdetections
Site	Station	Date	to protocol?	Presence	Occupied
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.Daily counts of Marbled Murrelets recorded during audio-visual surveys of the Cedar River
Municipal Watershed, Washington, during summer 2007.

			Survey	Number of detections	
Site	Station	Date	to protocol?	Presence	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
	3	27 July	Yes	0	0
South Fork Northeast	1	20 June	Yes	0	0
	1	29 June	Yes	0	0
	1	10 July	Yes	0	0
	1	17 July	Yes	0	0
	1	25 July	Yes	0	0
South Fork Taylor Creek	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

Table 4. Continued.

¹Murrelet 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

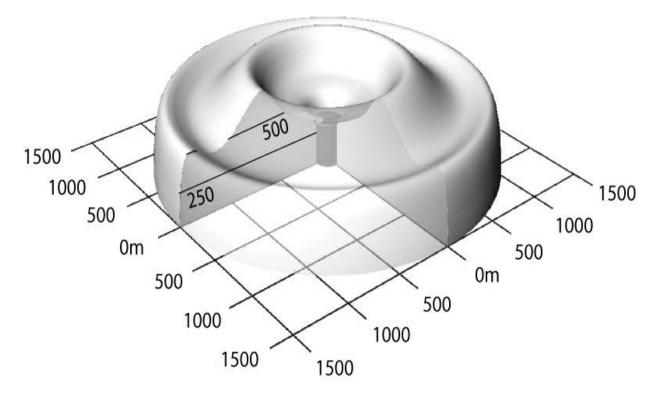


Figure 3. Approximate sampling airspace for the Furuno FR–1510 marine radar at the 1.5-km range setting, as determined by field trials with Rock Pigeons, which are similar in size to Marbled Murrelets. Note that the configuration of the radar beam within 250 m of the origin (i.e., the darkened area) 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 (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).

U						,	\mathcal{O}	
		Annual Increase						
Site	Years	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

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.

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).

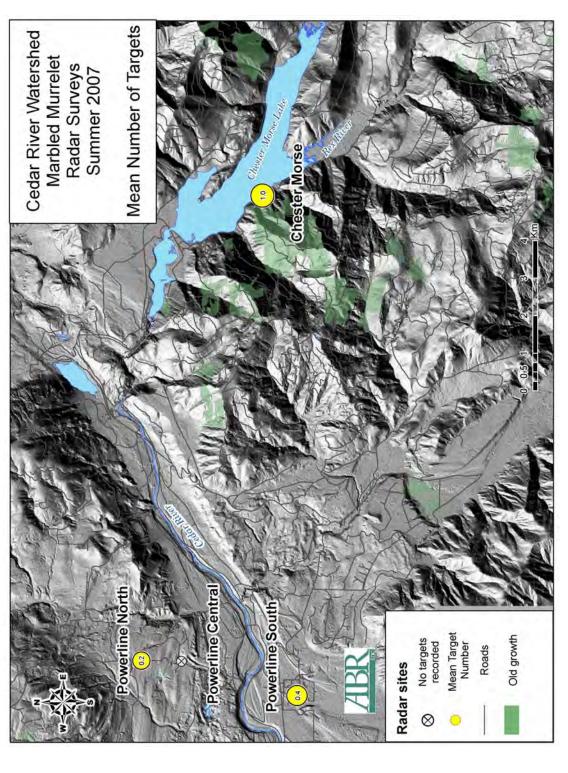
AUDIO-VISUAL SURVEYS

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

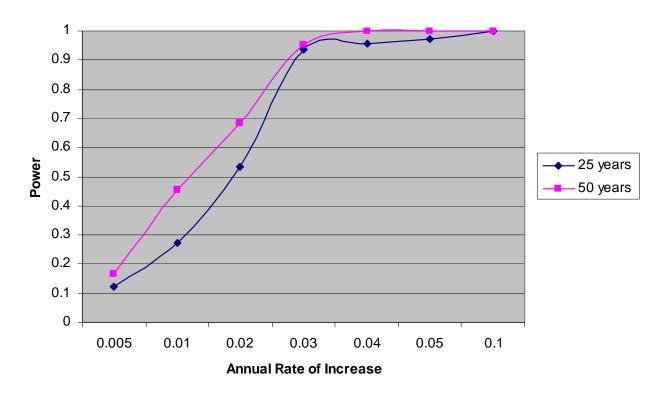
The CRMW is heavily forested and has very few natural or human-made openings, so there are few good radar sampling sites in the area.





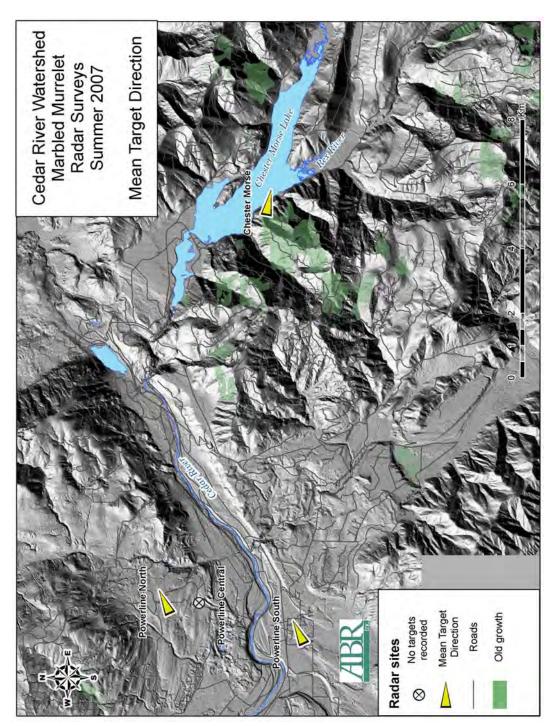
Mean number of targets recorded on radar			ed on radar		
		Landward-		Other	
Site	Year	flying	Seaward-flying	directions	n
LONG-TERM SITES					
Powerline North	2005	0.7 ± 0.7	0.0 ± 0.0	0.0 ± 0.0	3
	2006	0.7 ± 0.3	1.0 ± 0.6	1.0 ± 0.6	3
	2007	0.2 ± 0.2	0.4 ± 0.4	0.2 ± 0.2	5
Powerline Central	2005	1.0 ±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

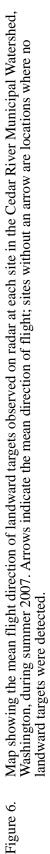
Table 7. Mean counts (targets or flocks/day ± 1 SE) of radar targets by flight direction at sites in the Cedar River Municipal Watershed, Washington, during summer 2005, 2006, and 2007. Table excludes data for days with high winds or persistent precipitation; counts only include targets recorded before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



- 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).

	Power to detect increase			
Annual 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		





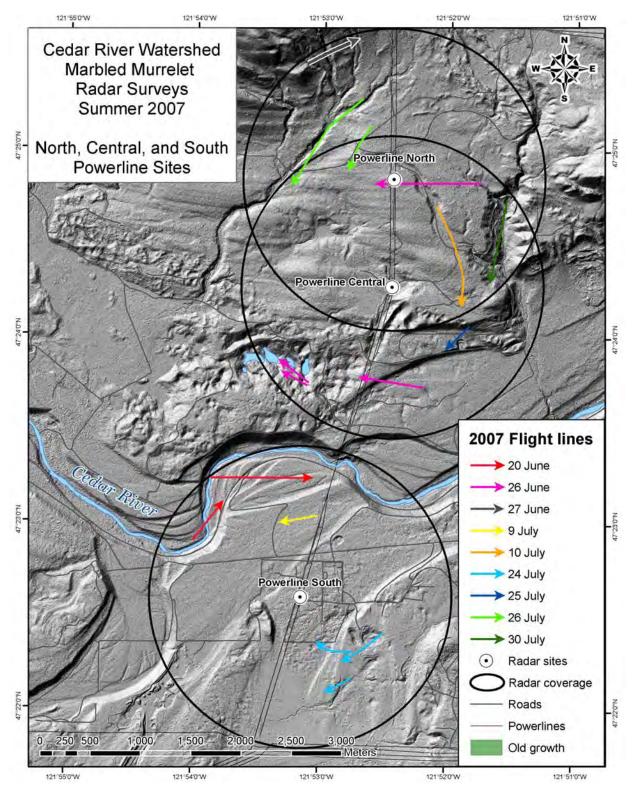


Figure 7. Map showing the flight paths of radar targets observed before sunrise at the Powerline North, Powerline Central, and Powerline South sites in the Cedar River Municipal Watershed, Washington, during summer 2007. Note that the 1.5-km ring denotes the maximal range of the radar, but there were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

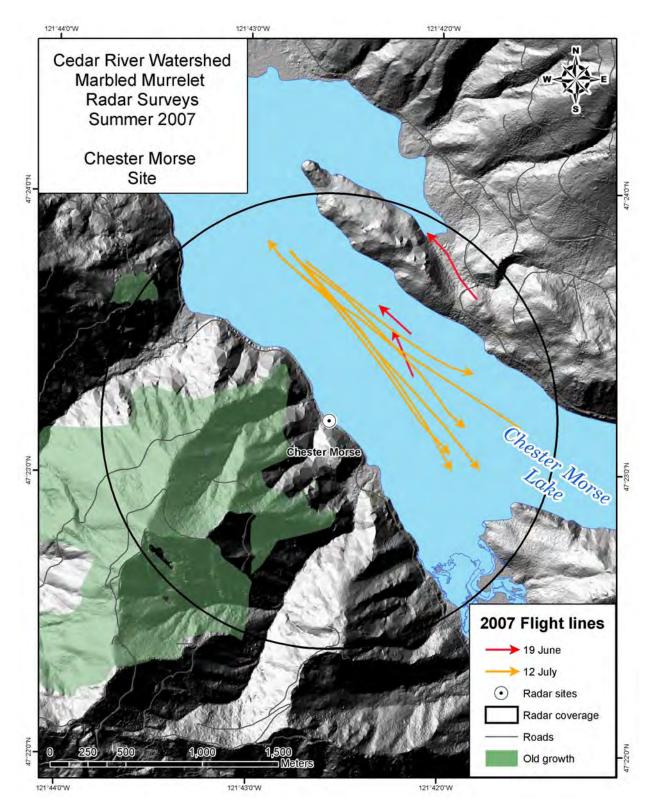


Figure 8. Map showing the flight paths of radar targets recorded before sunrise at the Chester Morse site in the Cedar River Municipal Watershed, Washington, during summer 2007. Note that the 1.5-km ring denotes maximal range of the radar, but there were gaps in radar coverage within that range because 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 CMRW 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 Gravbill 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 (≥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 vears. 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, Washingtion, 2007.View toward the east at the Powerline North site.



View toward the north at the Powerline North site.



Appendix 1. Continued.

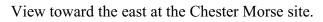


View toward the southeast at the Poweline Central site.

View toward the south at the Powerline South site.



Appendix 1. Continued.





View toward the east at the Chester Morse site.



View toward the northwest at the 155.1A site.

View toward the north at the South Fork site.



View toward the southwest at the Education Center site.



View toward the northwest at the West Point site.



View toward the northwest at the West Point site.

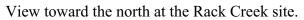




View toward the west at the Taylor Ridge site.

View toward the north at the Lindsay site.







View toward the north at the Rack Creek site.



View toward the northwest at the Chester North site.



View toward the southeast at the Chester North site.





View toward the west at the Upper Rex site.

View toward the southwest at the Lower Rex site.



View toward the west at the Rex Stand site.



View toward the east at the Rex Stand site.



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) 2 = Richard J. Blaha (RJB) 3 = Peter M. Sanzenbacher (PMS) 4 = Jeff Barna (JBB)	5 = Corey M. Grinnell (CMG) 6 = Jon H. Plissner (JHP) 7 = 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	6 = Southwest
2 = Northeast	7 = West
3 = East	8 = Northwest
4 = Southeast	9 = direction is variable or no wind
5 = South	

WIND SPEED (mph)

nown)
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	5 = 1001-2500 m
2 = 51-100 m	6 = 2501-5000 m
3 = 101-500 m	7 = >5000 m
4 = 501-1000 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/default6 = snow flurries0 = none6 = snow flurries1 = fog7 = light snowfall2 = drizzle (heavy mist)8 = heavy snowfall3 = light rain (continuous drops of rain)9 = sleet4 = heavy rain10 = hail5 = scattered showers

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	5 = Southern Transect
3 = Eastern 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				Survey	Visit to 1	Protocol		Page <u>1</u> of α
MARBLED MURR	ELET			(Y or N	I, initials)): y cn	6	Total Detections:
FOREST SURVEY	FORM			Specie	s of Cond	cern (ciro	ele one, o	details on last pg.): 🕥 or N
N A I]	Month _	Tune	Day / 2 Year 2007
Area Name: $\underline{Teda \ r} \underline{R}; \nu$ Station Location - $\underline{T} = \underline{J} \underline{J}$	er Watersho	Site Name	/ Numb	er:	aylor	R:dge	:	Station Number:
UTM zone: <u>10</u> E (x) coordinate:								
Observer (s) Name: Corey	M. Grinne	Initials: CA	<u>16</u>	Affiliatio	on: <u>A8</u>	Inc.	. <u></u> .	Phone: (503) 359 - 2525
Station Elevation: _/053 Ft Station Placement (circle one): Distance from Survey Site Boundar Station Canopy Cover (circle one):	side,) Outside y:	Units of M	easure f	or ALL	Horizonta	l Distanc	es:	
ENVIRONMENTAL CONDITIO			-					
Official Sunrise Time: 0570	_ Table	e: North Ban	d I	Begin St	rvey Tim	e: 042	<u>ح</u> ا	and Survey Time:
Temperature at Sunrise: 3	_ Temp	perature at End	of Surv	ey:	<u>4</u> 0	(circle or	ne) 🕜	or F revised: 2 / 2000
	1	AUDIBILITY	<u> </u>				ne) 🕜	
	HORIZ. VIS. Y TO 100 M		<u> </u>		TION			
	HORIZ. VIS. Y TO 100 M	AUDIBILITY TO	PR		TION		NOISE	NOTES
	HORIZ. VIS. Y TO 100 M	AUDIBILITY TO 200 M	PR RAIN	FOG	TION OTHER	WIND	NOISE	
TIME VERTICAL VIEWING CH CH CH CH	HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PR RAIN N	FOG	TION OTHER	WIND	NOISE	NOTES
TIME VERTICAL VIEWING CH CH CH CH	HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PR RAIN N	FOG	TION OTHER	WIND	NOISE	NOTES
TIME VERTICAL VIEWING CH CH CH CH	HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PR RAIN N	FOG	TION OTHER	WIND	NOISE	NOTES
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TIME VERTICAL VIEWING CE O C VISIBILIT TO 2 CANOPY	HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PR RAIN N	FOG	TION OTHER	WIND	NOISE	NOTES

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

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Probas Reversibilities	

M	HS.	UNIN C	STON	WASHINGTON MARBLED MURRELET FOREST	N D	URR	ELE	Ц Ц	ORI	EST S	SURVEY FORM	Ē. ,≺	ORI	5		Ă, D	stections -	This Side P	Detections - This Side Page Total: 0 Area Name: Cedar Kive, VethorAed	Derked	Pg. 2 of 2
Obsi	erver	r (s) 1	Observer (s) Initials: _	しんし					Moni	Month June	e Day		17	_Year _	2007	Sii	Site Name / No:	No: /4/	10- R. 49	0	
D	Ref	eren	ce Num	Data Reference Number (14 N 25	AL DA			Units of	of Mea	Measure (circle one):	rcle c	ne):	U.S. /	Metric		Station Number:	ber:			
Ins.		X Y	SURVEY ACYIVITY	Y:					й **	ote Signi	ificant V	Veath	ler Ct	**Note Significant Weather Changes on Page 1**	Page 1*						revised: 2 / 2000
STATUS	DETECTI		DETECTON TIME	N INITIAL DETECTION DIRECTION				AUD	AUDITORY		BIRDS SEEN	· · ·	BEHAVIC	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN		CLOSEST DIST. TO BIRDS	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION		NOTES Heard Only Dist. To Birds
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	ШË	H =	Heard O	TYPE: $H = Heard Only (no visual), S = Seen Only (silent), B = I ATDATADY Visual Science (Visualisations), W = VDEB calle C$	al), S =	= Seel	du du du	y (sile	ent), E	2 Haile -	Both Seen and Heard	h Herror	sard.	11- O	Thictle o	5 60 S	hie calle	Both Seen and Heard. $-C_{2,0,0,0}$ (alternate) colls: $\mathbf{O} = \mathbf{U}$ (bit of \mathbf{O} (a) colls: $\mathbf{U} = \mathbf{U}$ (bit control)		or N/A Ind	= None or N/A Indicate the vocal true
hear	d at	pot pot	the start	hered at both the start and end if calls grade between different type	alls gr	ade b	etwee	n difi	ferent	types di	uring the	e dete	iction	. Indicate	the nun	ber he	and 1-5 or	M = Multip	$e. \mathbf{OL} = Ove$	rlapping Voc	So the product of th
			$= \mathbf{U}$ men $\mathbf{F} = \mathbf{F}_{\mathbf{h}}$	BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy,	u sou nopy,		Jircle	wing Over	Canc	o, J = J. Ipy, T =	= Jet sound, T = Fly-Throw	rough fough		- = None of N/A. If oour are near a write w / J. ough At or Below Canopy (< 1.0), B = Circle At (anopy (are ne: ≤ 1.0),	B = Circle	× / J. ≎At or Belo	v Canopy (≤ 1	$(.0), \mathbf{L} = Seen$	= Jet Sound, $$ = None of IVA. It four are near white w/J. T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or
Dep	artin	ig Fr	om a l're	Departing From a Tree, $S = Stationary Calling (tixed-point multiple calls <100 m), U = Unknown$	nary C	alling	g (tixt	od-po	int m	ultiple c.	alis <10	Ű B O		Unknown.				(Cbec	k Keverse Sid	le When Usu	(Check Reverse Side When Using 2-Sided Forms)

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WASHINGTON			S	Survey '	Visit to F	rotocol		Page <u>1</u> of <u>2</u>
MARBLED MU	RRELET		(Y or N,	initials)	YK	5	Total Detections:
FOREST SURV	EY FORM		5	Species	of Conc	ern (circ	le one, c	letails on last pg.): 🕅 or N
Area Name: Kack Core	K-Watershed	Site Name /			<u>ick Ca</u>	eck –		Day <u>12</u> Year <u>2007</u> Station Number: <u>1</u>
Station Location - T - 72	<u> </u>	(circle one) E) or W	, s <u>- 24</u>	, Q	Q (1/16)	NW	_, of Q (1/4) <u>NE</u>
								Datum: <u>NADB</u> FOM:
Observer (s) Name: <u>Neil</u>	Eric Jensen	Initials: <u>NE</u>		ffiliation	1: <u>ABK</u>	, Inc.	I	Phone: (<u>53) 359-7525</u>
Station Elevation: <u>939</u> Station Placement (circle one) Distance from Survey Site Bo Station Canopy Cover (circle): Inside, Outside oundary: /0	Units of Me	asure fo	r ALL I	Horizonta	l Distance	es: <u>M</u> e	id 1/3, Upper 1/3, Ridgetop
ENVIRONMENTAL CONI		<u> </u>						
Official Sunrise Time:	<u>10</u> Table	North Ben	4 в	egin Su	rvey Time	: <u>042</u>	<u> </u>	nd Survey Time: <u>0625</u>
Temperature at Sunrise: 3,	<u>2</u> ¹ Temp	erature at End of	of Surve	y: <u>بک</u>	5°	(circle on	e) 🕜 (or F revised: 2/2000
<u> </u>	EWING HORIZ. VIS. SIBILITY TO 100 M TO 2 ANOPY	AUDIBILITY TO 200 M	PRE RAIN	FOG	OTHER	WIND	NOISE	NOTES
0425UL 0	YY	Y	N	L		1	B,A,C.	Regin Survey, fog over lake
OSIDULD.	Ý, Ý,	Y,	N	<u>L</u>		<u> </u>	<u>Ř</u> ÁL	Suncise for over lake,
0625010	Y Y	Y	N	L		1	B,A,C	End Survey, Fogover lake
								, J
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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: $\theta = 0\%$, 1 = 33%, 2 = 66%, 3 = 100%.

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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

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Data Reference Number Observer (s) Initials:

Area Name: Code Kitter tu ted Pg. 2 of Z

Units of Measure (circle one): U.S.	Month
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(circle o	Day
ne): U.	2 Y
N N	Year
Metric	2007
Station Number	Site Name / No:
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ber	No:
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SURVEY ACYIVITY:			T Note	Significant	weame	INOTE SIgnificant weather Changes on Page 1					revised: 2 / 2000
	INITIAL DETECTION	176E	AUDITORY	BIRI #	₩38	INITIAL FLIGHT	BIRD HEIGHT	CLOSEST DIST. TO	DEPART	FINAL	NOTES
	DIRECTION		ERIES	OTHER	E VIOR	0	SEEN Canopy=		z	DIRECTION	Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
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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).
 <u>AUDITORY - Other (Non-Vocal Sounds</u>): W = Wing Sound, J = Jet Sound, — = None or N/A. If both are heard write W / J.
 <u>BEHAVIOR</u>: 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 ; Common Loon

WASHINGTON		S	urvey	Visit to P	rotocol		Page <u>1</u> of
MARBLED MURRELET		C	Y or N,	initials):	Y 6-6	-	Total Detections:
FOREST SURVEY FORM		S	Species	of Conce	ern (circ	le one, d	etails on last pg.): Y or N
FOREST SURVETTORM			•				Day 12 Year 2007
Area Name: Cedar River Watershed	Site Name /]	Number	. L.	dsay	Cree 4		Station Number: 3
Station Location - $T \frac{\partial I N}{N}$, R $\frac{9}{10}$ (cir	rcle one) $\langle \hat{\mathbf{E}} \rangle$	or W	.s ½	′, Q(Q (1/16)	NW	, of Q (1/4) <u>SE</u>
10 EG martineter 601178	N (v) coord	in ste	524	5286	Source:	G45	Datum: NAD 85 FOM:
Observer (s) Name: <u>Alden J. Miller</u>	Initials: A	J/n A	ffiliatio	: Af	BR I	Λ <u>΄</u> Ε	Phone: (503) 359-7525
							\sim
Station Elevation: 849 Ft / M Position	on Slope (cir	cle one): Bott	om/plain,	Lower	1/3, (M	id 1/3, Upper 1/3, Ridgetop
Station Placement (circle one): Inside, Outside						10	lairc
Distance from Survey Site Boundary:	Units of Mea	asure fo	TALL	Horizontal	Distanc	es: <u>////</u>	<u>AU 5</u>
Station Canopy Cover (circle one): $1 = 0$ to 25%, 2	2 = 26 to 50%	%, 3 =	51 to 7	5%, 4=	76 to 10	0%	
ENVIRONMENTAL CONDITIONS:	N. H. Par	1			047	5 -	and Survey Time:0625
	North Den	ÓВ	egin Su '7	rvey Time	e: <u>- 7 -</u>	<u>~</u> E	or F revised: 2/2000
Temperature at Sunrise: 3.5 Tempera	ature at End o	of Surve	y: _>	· <u>></u> •	(circle or		or F Teviseu. 272000
						NOISE	
		PR	ECIPITA	TION	WIND	NOISE	NOTES
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Occurrence No Data Point No Sequence No Ret	rence No. <u>1997 - 1997</u>
Quad Code General Location	
	QC Date
	nical Status
Protocol Review Initials Highest Biol	

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Area Name: Cray Avy Myter

Pg 2 of 2

Matrix Units of Measure (circle one) U.S. / Meric Station Number 3 V **Note Significant Weather Changes on Fage 1** **Note Significant Weather Changes on Fage 1** Image: Note Significant Weather Changes on F	Obse	Ver	Observer (s) Initials:	AU/M	1	Month Ju	JUNE Day	12	Year 2007		Site Name / No:	Lnds	a. Creh	1
TWEE Significant Weather Changes on Page 1** O/1- SFLUALS AUDITORY DIFFECTION INFECTION INFECTION AUDITORY INFECTION # AUDITORY INFECTION # AUDITORY INFECTION Infection Infection Big Diffection Closest SENS SENS INFECTION Diffection Infection 0 (b (2) (2) (2) (2) (2) (2) (2) (Data	S	rence Numbe				asure (circle	one	U.S. /	\bigcirc	Station Num		3	
O/1* STLYLE O/1* STLYLE ADDTORY # RICLOBE OUTORY BRO DETECTON <	SUR	VEY	ACYIVITY			**Note Sign	ificant Wea	ther	Changes on Pa	ige 1**				revised: 2 / 2000
Oli- Woll Woll Image: Start End # Noll Image: Start End # Noll Image: Start End # Noll Image: Start End # Noll Image: Start End # Noll Image: Start End # Noll Image: Start End # Noll Image: Start End # Noll Image: Start End # Noll Image: Start End # Im	SUTATS	DETECT	DETECTON TIME			AUDITORY	BIRDS	BEHAVI	INITIAL FLIGHT DIRECTION	BIRD	CLOSEST DIST. TO RIRDS			NOTES
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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. Departing From a Tree, S = Stationary Calling (fixed-point multiple calls <100 m), U = Unknown. **BEHAVIOR:** $F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (<math>\leq 1.0$), **B** = Circle At or Below Canopy (≤ 1.0), **L** = Seen Landing in or

(Check Reverse Side When Using 2-Sided Forms)

WASHINGTON MARE FORE

WA	S	HI	NG	STC	N			5	Survey	Visit to P	rotocol		Page <u>1</u> of λ
MA	R	Bl	_EC) M	URRE	LET		(Y or N	, initials):	YC	E	Total Detections:
FO	R	ES	т 5	SUI	RVEY F	ORM			Species	of Conc	ern (circ	le one, d	letails on last pg.): Y or (N)
										N	Aonth _	lune	Day <u>/3</u> Year <u>2007</u>
Area	Nan	ne:	(eda	r	River Wat	eshed _	Site Name /	'Numbe	er: <u> </u>	,st (,	reeh		Station Number:
Static	n L	ocati	on -	Т	N, I	<u>د</u>	(circle one) E	or W	, S	, Q	Q (1/16)		_, of Q (1/4)
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													id 1/3, Upper 1/3, Ridgetop
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Tem	oera	ure	at Sur	nrise:	8,5	l Temp	erature at End	of Surv	ey:	9	(circle or	ne) 🕜 (or F revised: 2/2000
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Cciling: 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:** $\theta = 0\%$, 1 = 33%, 2 = 66%, 3 = 100%.

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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).

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Units of Measure (circle one). U.S. / Metricy Station Number: Particy Station Number: Provide Significant Wather Changes on Page 1** •••••••••••••••••••••••••••••	revised: 2/ FINAL NOTES DEFECTION Heard Only Dist. To Bin IL= Loud, M= Moderate, F= E. J. J. J. E. J. J. E. J. J. IL= Loud, M= Moderate, F= IL	IENAL FINAL NOTES DIRECTION Heard Only Dist. To Bit. Image: Direction By., J., S., J., S., S., S., S., S., S., S., S., S., S	Image: Second Structure Image: Second Structure DIRECTION Heard Only Dist. To Bit. DIRECTION (L= Loud, M= Moderate, F= E.L. K. W. S. E.L. K. W. S. B.S., K. S. E.L. K. W. S. B.S. K. S. B.S. S.	bservei	(s) Initials:	(メト		t ^e .	Moi	nth Jun	Day	13	_Year_	()	Area Name: Site Name /	รี่ไป	2.2	201404	
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Potential Predation : CORA 5734

WASHINGTON			S	urvey `	Visit to P	rotocol		Page <u>1</u> of <u>Z</u>
MARBLED MURREI	ET		(Y or N	initials):	y cm	-}	Total Detections:
FOREST SURVEY F			S	Species	of Conce	ern (circ	le one, d	etails on last pg.): Y or N
					N	Ionth 📿	Tune	Day 13 Year 2007
Area Name: <u>Cedar</u> River Station Location - T <u>27</u> N, H	Waterhod	Site Name /	Number	r: <u>F</u> -	1/e, (1	ree h		Station Number:
Station Location - T ∂I N, F	10	(circle one) (È) or W	, s <u>6</u>	, Q(Q (1/16)	Sw	, of Q (1/4) <u>NE</u>
LETM zone: 10 E (x) coordinate:	06326	$N(\mathbf{v}) \cos \theta$	dinate:	564	5160	Source:	ars	Datum: 10 9083 FOM:
Observer (s) Name: <u>Alden J</u>	Miller	Initials: <u>A</u>	JM A	ffiliatio	и <u>АВ</u>	R In	<u>۲۰ </u> ۲	Phone: (503) 359~7525
Station Elevation: 958 Ft /(D Dariet	on on Slong (a	irala one): Bott	om/nlain	Lower	1/3 M	id 1/3. Upper 1/3. Ridgetop
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Station Placement (circle one): Inside Distance from Survey Site Boundary:		Units of Me	easure fo	n ALL	Horizontal	Distanc	es: ME	Aers
Station Canopy Cover (circle one): (1	= 0 to 25%	2 = 26 to 50	%. 3 =	= 51 to 7	5%. 4=	76 to 10	0%	
ENVIRONMENTAL CONDITION	R.							
Official Sunrise Time: 0509	-∙ Table	North Be	end B	egin Su	rvey Time	<u>. 04</u>	24 E	nd Survey Time:0624
				-				
Temperature at Sunrise: $8 \cdot 5$	Temp	erature at End	of Surve	ey: <u>8</u>	9	(circle or	ne) (C)	or F revised: 2 / 2000
Temperature at Sunrise: <u>8.5</u>								or F revised: 2 / 2000 NOTES
Temperature at Sunrise: S TIME VERTICAL VIEWING	HORIZ. VIS.	AUDIBILITY TO	PRI	ECIPITA			ne) (C) NOISE	
Temperature at Sunrise: S TIME VERTICAL VIEWING	HORIZ.	AUDIBILITY						
Temperature at Sunrise: 8.5	HORIZ. VIS.	AUDIBILITY TO	PRI	ECIPITA	TION OTHER		NOISE	NOTES
Temperature at Sunrise: <u>8.5</u> TIME <u>VERTICAL VIEWING</u> <u>P</u> O O O <u>C</u> O O O O <u>C</u> O O O O <u>C</u> O O O O O <u>C</u> O O O O O O O <u>C</u> O O O O O O O O O O O O O O O O O O O	HORIZ. VIS.	AUDIBILITY TO	PRI	ECIPITA FOG N	TION OTHER		NOISE	NOTES
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Temperature at Sunrise: $3 \cdot 5$ TIMEVERTICAL VIEWING \square	HORIZ. VIS.	AUDIBILITY TO	PRI RAIN	FOG N N		WIND		
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Temperature at Sunrise: $3 \cdot 5$ TIMEVERTICAL VIEWING \bigcirc <	HORIZ. VIS.	AUDIBILITY TO 200 M Y Y Y Y Y		FOG N N N N N N	other ZZZ	WIND	NOISE ZZZZ	NOTES Begin Survey Sunfise
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Temperature at Sunrise: $3 \cdot 5$ TIMEVERTICAL VIEWING \bigcirc <td>HORIZ. VIS.</td> <td>AUDIBILITY TO 200 M Y Y Y Y Y</td> <td></td> <td>FOG N N N N N N</td> <td>other ZZZ</td> <td>WIND</td> <td>NOISE ZZZZ</td> <td>NOTES Begin Survey Sunfise</td>	HORIZ. VIS.	AUDIBILITY TO 200 M Y Y Y Y Y		FOG N N N N N N	other ZZZ	WIND	NOISE ZZZZ	NOTES Begin Survey Sunfise

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: $\theta = 0\%$, 1 = 33%, 2 = 66%, 3 = 100%.

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Audibility: N = Impaired (detections may be massed due to continuous), t = 0 initipaired (continuous and v for formatic 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: <math>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 & sin. 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 = 32-38mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

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Occurrence No.	Data Point No.
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Protocol Review Initials	Review Date Highest Biological Status WDFW DATABASE USE ONLY **

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AUVITURY - Unter [Non-Vocal Sounds]: W = Wing Sound, J = Jet Sound, --- = None or N/A. If both are heard write W / J.**BEHAVIOR:** $F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (<math>\leq 1.0$), 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 For

Area Name Find Con	∇ Pg C of C
JJM Month JUNE Day 13 Year 2007 Site Name / No:	
Data Reference Number: Units of Measure (circle one): U.S. / Metric Station Number: 1	
SURVEY ACYIVITY: **Note Significant Weather Changes on Page 1** revis	revised: 2 / 2000
에 DETECTON INITIAL 및 AUDITORY # 웹 INITIAL BIRD CLOSEST DEPART FINAL NO M TIME DETECTION M AUDITORY # 웹 INITIAL BIRD CLOSEST DEPART FINAL NO	N
DIRECTION SEEN BIRDS DIRECTION DIRECTION Canopy= ()	Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
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S S	Fad Carlin
TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard.	
alis, O = Whistle or Soft Que calls, U = Unknown, n. Indicate the number heard 1-5 or M = Multiple. OI	= None or N/A. Indicate the vocal type = Overlapping Vocalizations (Y or N).

WASHI	NGTO	N			S	urvey	Visit to P	rotocol		Page <u>1</u> of <u>7</u>
MARBL			ET		(Y or N	, initials):	YCA	-1	Total Detections:
FORES					2	Species	of Conc	ern (circ	le one, d	etails on last pg.): Y or 🕅
						•	. N	Aonth (06	Day /3 Year <u>2007</u>
Area Name	Calar	Cark 4	hterener	/ Site Name /	Numbe	r: C	peter 1	Vorth		Station Number:
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Station Elevat Station Placer Distance from	ion: nent (circle 1 Survey Sit	5 Ft / (one): (Inside e Boundary:)	N Position Outside	on on Slope (ci Units of Me	rcle one): B ott or ALL	om/plain, Horizonta	Lower	es: <u>M</u>	id 1/3) Upper 1/3, Ridgetop
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: Marsh Bend Begin Survey Time: 0424 End Survey Time: 0624										
Official Sunrise Time: 0509 Table: 00235 8 e-4 Begin Survey Time: 0424 End Survey Time: 0624 Temperature at Sunrise: 6.5 0 Temperature at End of Survey: 7.5 0 (circle one) 0 or F revised: 2/2000										
	at Shinrige	i a \	1 CIIID	erature at Lind	or pure	· · · · ·	<u></u>	(411 414		
Temperature	ut 5011130	<u> </u>								
Тіме	VERTICA		HORIZ			ECIPITA		WIND	NOISE	NOTES
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TIME 0424 0435 0437 0446 0507	VERTICA CLOUD CELLING HI 3 HI 3 HI 3	L VIEWING VISIBILITY TO 2	HORIZ. VIS.	AUDIBILITY TO	PR RAIN	ECIPITA	TION	WIND	NOISE C, R C, R C, R C, R C, R	NOTES Regin Survey Drizze Sunrise
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TIME 0 4 2 4 0 4 3 5 0 4 3 7 0 4 4 6 0 5 0 7 0 5 0 9 0 6 0 5	VERTICA CLOUD CEILING HI 3 HI 3 HI 3 HI 3 HI 3 HI 3 HI 3 HI 3	L VIEWING VISIBILITY TO 2	HORIZ. VIS.	AUDIBILITY TO		ECIPITA	TION	WIND 0 0 1 1 2	NOISE C, R C, R C, R C, R C, R C, R	NOTES Regin Survey Drizze Sunrise
TIME 0 4 2 4 0 4 3 5 0 4 3 7 0 4 4 6 0 5 0 7 0 5 0 7 0 5 0 9 0 6 0 5 0 6 2 4	VERTICA CLOUD HI 3 HI 3 HI 3 HI 3 HI 3 HI 3	L VIEWING VISIBILITY TO 2 CANOPY Y Y Y Y Y Y Y	HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PR RAIN N L N A N N			WIND 0 0 1 1 2 2	NOISE C, R C, R C, R C, R C, R C, R C, R C, R	NOTES Regin Survey Drizze Sunrise

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).

Audibility: N = Impaired (detections may be missed due to conditions), $\mathbf{x} = 0$ impaired (conditions arrow for remate 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 = 32-38mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

Occurrence No.	Data Point No Sequence No Reference No
Quad-Code	Photo Code
Data Entry Initials	Data Entry Date Data QC Initials Data QC Date 1
Protocol Review Initials	Réview 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: _ SURVEY ACYIVITY: Data Reference Number 🔰 👔 👔 18 4 011- SUTATS DETECTION # Ć С C 0 \mathbb{S} 0 \mathcal{O} 0 DETECTON 4 5 L Ť 5 TIME N ん 2 Z λ J 2 5 Ľ ~ 5 \overline{a} N DETECTION IT INITIAL захт Start VOCAL SERIES End AUDITORY # **Note Significant Weather Changes on Page 1** Units of Measure (circle one): U.S. Month 06 Day 13 P OTHER ۲.N BIRDS # ROIVAH38 INITIAL FLIGHT DIRECTION Year 2007 Metric Canopy= HEIGHT BIRD 1.0 Station Number: Site Name / No: C Area Name: Cardar CLOSEST DIST. TO BIRDS SEEN units DIRECTION DEPART DETECTION FINAL Sheed kt RB, 6 YNNISE (L= Loud, M= Moderate, F= Faint) Negin ILE. Heard Only Dist. To Birds KF ALL Willey SUNNO NOTES revised: 2 / 2000

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

Departing From a Tree, S = Stationary Calling (fixed-point multiple calls <100 m), U = Unknown. **BEHAVIOR:** $\mathbf{F} = \text{Flight Over Canopy}, \mathbf{C} = \text{Circle Over Canopy}, \mathbf{T} = \text{Fly-Through At or Below Canopy} (\le 1.0), \mathbf{B} = \text{Circle At or Below Canopy} (\le 1.0), \mathbf{L} = \text{Seen Landing in or}$ AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, -- = None or N/A. If both are heard write W / J. 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 - 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

.

(Check Reverse Side When Using 2-Sided Forms)

NASHINGTONSurvey Visit to ProtocolPage 1 of 2								
MARBLED MURR	ELET		(Y o	N, initials)	: <u> </u>	m6	Total Detections:	
FOREST SURVEY	FORM		Spec	ies of Conc	ærn (cit	cle one, c	letails on last pg.): Y or (N)	
Area Name: $\frac{\frac{2}{2}}{\frac{2}{2}}$ $\frac{2}{2}$ Station Location - T $\frac{2}{2}$ I UTM zone: 10 E (x) coordinate Observer (s) Name: $\frac{2}{2}$	N, R 8 594828 ensen	(circle one) (È N (y) coor Initials: <u>//</u>) or \mathbf{W} , \mathbf{S}_{L} dinate: \underline{SF}_{L}	Tay loc , 0 26, 0 1969 tion: <u>ARk</u>	<u>Ridge</u> Q (1/16 _ Source ?, <u>Ти</u> с	<u> N. I</u> <u>N. I</u> <u>G. P.J</u> 1	Day <u>/4</u> Year <u>2007</u> Station Number: <u>/</u> , of Q (1/4) <u>NE</u> Datum: <u>NAD83</u> FOM: <u>-</u> Phone: (<u>503</u>) <u>359-7525</u>	
	_ 🗸		ircle one): I	tottom/plain,	, Lowe	er 1/3, M	lid 1/3, Upper 1/3 Ridgetop	
Station Placement (circle one)		Units of M	easure for Al	L. Horizonta	d Distan	ces No	ter	
Station Canopy Cover (circle one)								
ENVIRONMENTAL CONDITI	ONS:		4					
Official Sunrise Time: 0509	Table	North Ben		-		-	Cnd Survey Time: <u>0624</u>	
Temperature at Sunrise: _6,5	⁰ Temp	erature at End	of Survey:	<u>&5</u> "	(circle o	one) 🕐	or F revised: 2/2000	
			PRECIP		WIND	NOISE	NOTES	
	VIS. TO 100 M	ТО 200 М	RAIN FO	G OTHER				
	Y							
0424HI3Y	Y	Y	NI	N	1	B,C	Regin Survey	
0521HI3Y	Ý	Ý	NL	N,	1	B,C	J /	
0533HI3Y	Y	Y	NA		1	R,C		
0541HI3Y		Ĭ.	NL		/	K,C		
0615HI3Y 0624HI3Y	<u>}</u>	<u></u>	N/L		/	R, G, A R / A	End Survey	
			NC		/	. <i>0, L, 7</i> .1	Luc survey	
					<u> </u>			
Wind: 0 = <1 mph (calm), 1 = 1-3 m motion), 4 = 13-18 mph (sm. branche mph (whole trees move), 8 = 39-46 m Noise: N = None, A = Aircraft, B = E (explain in Notes).	56%, $3 = 100\%$. tections may be m (detections may b) may be missed du ne, $L = Light$, $M = 100$ b) (leaves barely 1 s move), $5 = 19-2$ b) (wigs & sm. t	iissed due to com e missed due to co te to conditions), = Moderate, H = move), 2 = 4-7 m 4 mph (lg. branc oranches break). = Creek/water due No.	ditions), Y = 1 conditions), Y , Y = Unimpai Heavy. Othe oph (leaves rus hes & sm. tree rainage, M = N Se Ge	Inimpaired (co = Unimpaired red (condition r: H = Hail, S tle, sm. twigs s start to sway	onditions (conditic s allow fo = Snow. move), 3), 6 = 25 Rain/ha	allow for n ons allow for or reliable d Indicate in = 8-12 mpi -31 mph (Ig il, T = Tree	eliable detection), U = Unknown. or reliable detection), U = Unknown. letection). ntensity using same codes for rain & fog.	
Protocol Review initials			DATABASE	UŞE ONLY				

WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Observer (s) Initials:

Site Name / No: Detections - This Side Page Total: Area Name: the pg. 2 of 2

Units of Measure (circle one): U.S. /	Month 06
ure (circle one	Day/4
e): U.S. /	Year_
Metric	2007
Station Number:	Site Name / No: Tay be
~	Taylor

SURVEY ACYIVITY: **Note Significant Weather Changes on Page 1**			revised: 2 / 2000
	DEPART	FINAL	NOTES
VOCAL SERIES OTHER SEEN SEEN	DIRECTION	DIRECTION	Heard Only Dist. To Birds (L= Loud, M≖ Moderate, F= Faint)
Start End # OL W/J			
			Realing Conten let 14
			HADREI (+1/ATH
			KT NE IN I
			141 Mr 10
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			1+PF/P
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			C. Alle
			14 N E
			KH HAL
			Fall Surface
			La in an

BEHAVIOR : Cuter (Note: Vocal Sounds): W = W ing Sound, $J = Jet Sound, -- Invoice of N/A. It over are neared write <math>W \neq J$. **BEHAVIOR:** $F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (<math>\leq 1.0$), $B = Circle At or Below Canopy (<math>\leq 1.0$), 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 For(Check Reverse Side When Using 2-Sided Forms)

WASHINGTON		2	Survey	Visit to P	rotocol		Page <u>1</u> of 2		
MARBLED MURRELE	т	(Y or N	initials):	Ma	5	Total Detections:		
FOREST SURVEY FO			Species	of Conc	ern (circ	le one, d	etails on last pg.): Y or (N)		
				X	Jonth 7	in a	Don 14 Year 2007		
Area Name: TelatoRic Watesh	d Site Name	/ Numbe	er: /5	S. A			Station Number:		
Station Location - T <u>}</u> N, R	10 (circle one) (È) or W	, s <u>3</u>	0, Q	Q (1/16)	Sur	, of Q (1/4) <u>SF</u>		
UTM zone: <u>10</u> E (x) coordinate: <u>607</u>	568 N (y) coo	- ordinate:	5245	δγ3	Source:	GPS	Datum: NAD 83 FOM:		
Observer (s) Name: <u>Corey</u> <u>M</u> <u>Luin</u>	ell Initials: (76 A	filiatio	1: <u>ABR</u>	Inc.	I	Phone: (505) 559-7525		
Station Elevation: <u>%}5</u> Ft /M		circle on	e): Bott	om/plain,	Lower	1/3, M	id 1/3, Upper 1/3) Ridgetop		
Station Placement (circle one): (Inside)	Outside								
Distance from Survey Site Boundary:	Units of M	leasure f	or ALL	Horizonta	l Distanc	es: <u>m e</u>	7 °N		
Station Canopy Cover (circle one): $1 = 0$ to 25%, $(2 = 26 \text{ to } 50\%)$, $3 = 51$ to 75%, $4 = 76$ to 100%									
ENVIRONMENTAL CONDITIONS:									
Official Sunrise Time: 0509 Table: North Bond Begin Survey Time: 0424 End Survey Time: 0624									
Temperature at Sunrise: <u>\$, 5</u> Temperature at End of Survey: <u>5, 5</u> (circle one) O or F revised: 2/2000									
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		T	ECIPITA						
	IORIZ. AUDIBILITY VIS. TO	PF	ECIPITA						
	HORIZ: AUDIBILITY VIS. TO D 100 M 200 M	PF RAIN	FOG		WIND	NOISE	NOTES		
	HORIZ: AUDIBILITY VIS. TO 2 100 M 200 M	PF RAIN	FOG		WIND	NOISE	NOTES Beyon Survey-low Clarks		
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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: $\theta = 0\%$, 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), U = Unknown.

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 = 32-38mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

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Init of Measure (circle one): U.S. / (Merga) Station Number: 2 •*Note Significant Wether Changes on Page 1* •*Note Significant Wether Changes on Page 1* revised 1 •*Note Significant Wether Changes on Page 1* **Note Significant Wether Changes on Page 1* revised 1 •*Note Significant Wether Changes on Page 1* #*Note Significant Wether Changes on Page 1* revised 1 •*Note Significant Wether Changes on Page 1* ##*Note Significant Wether Changes on Page 1* revised 1 •*Occut series integration ##*Note Significant Wether Changes on Page 1* revised 1 •*Occut series integration ##*Note Significant Wether Changes on Page 1* revised 1 •*Occut series integration ##*Note Significant Wether Changes on Page 1* revised 1 •*Occut series integration ##*Note Significant Wether Changes on Page 1* revised 1 •*Occut series integration ##*Note Significant Wether Changes on Page 1* revised 1 •*Occut series integration ##*Note Significant Wether Changes on Page 1* revised 1 •*Occut series integration ##*Note Significant Wether Changes on Page 1* revised 1 •*Occut series integration ##*Note Significant Wether Changes on Page 1* revised 1 •*Occut series integratin ##*Note Significant Wether Changes on Page	That notes DETECTION Heard Only Dist. To Bit DIRECTION Heard Only Dist. To Bit Rep Ken Juney	Thval. revised: 2 / revi		Month June						-
Note Significant Wrather Changes on Page 1 INITIAL #* #* #* INITIAL ## # # INITIAL # #	revised: 2 / revised: 2 / Lettad DETECTION Heard Only Dist. To Bit DIRECTION Heard Only Dist. To Bit Repr Repr Repr F-4 Repr F-4 Repr F-4	Thval. notes DETECTION Heard Only Dist. To Bit DIRECTION Heard Only Dist. To Bit IL= Loud, M= Moderate, F= Ken Crue, Ken Crue, Ken Crue, Market Ken Crue,	li harana a	Units of	(circle one):	~		-		
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			opy. Ly Ca	$U = \text{Circle Uver Canopy, } I = r_{1}y_{-1}$ dling (fixed-point multiple calls <	Ihrough At or 100 m , $\mathbf{U} = \mathbf{U}$	Below Canopy nknown.	(≤ 1.0), B = Ci	rcle At or Below (Check	Canopy (< 1.0 Beverse Side	r Below Canopy (< 1.0), L = Seen Landing in or (Check Reverse Side When Using 2-Sided Forme)
Heard Only (no visual)	th the start and end if call	No. P. Cther (Non-Vocal S		ry Castanting South	TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen AUDITORY - Vocal Sounds): TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen AUDITORY - Vocal Sounds): TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen AUDITORY - Vocal Sounds): TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen AUDITORY - Vocal Sounds): TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen AUDITORY - Vocal Sounds): TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen AUDITORY - Vocal Sounds): TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen AUDITORY - Vocal Sounds): TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen AUDITORY - Vocal Sounds): TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen AUDITORY - Vocal Sounds): AUDITORY - Other (Non-Vocal Sounds): M = Wing Sounds, J = Jet Sounds): AUDITORY - Other (Non-Vocal Sounds): M = Wing Sounds, J = Jet Sounds): Departing From a Tree, S = Stationary Calling (fixed-point multiple calls < Non-Vocal Sounds):	S = Seen Only (silent), B = Both Seen and Heard. S = Seen Only (silent), B = Both Seen and Heard. S arade between different types during the detection. Sounds): W = Wing Sound, J = Jet Sound, - = None py, C = Circle Over Canopy, T = Fly-Through At or ty Calling (fixed-point multiple calls <100 m), U = U	Image: Second	 Second Second Second	S = Seen Only (silent), B = Both Seen and Heard. S = Seen Only (silent), B = Both Seen and Heard. S = State Structure (tree of Soft Que calls, U = Unknown strate between different types during the detection. Indicate the number heard 1.5 or M = Multiple Sounds): W = Wing Sound, J = Jet Sound, - = None or N/A. If both are heard write W / J.	

Potertial Predators : boughas Squirrel

It Decove Cathopy $(\leq 1, 0)$, L = Seen Landing in or (Check Reverse Side When Using 2-Sided Forms)

WASHINGTON	Survey Visit	to Protocol	Page <u>1</u> of <u>2</u>						
MARBLED MURRELET	(Y or N, init	ials): YCAL	Total Detections: 🖉						
EODEST SUBVEY FORM	Species of (Concern (circle one.	details on last pg.): Y or (\hat{N})						
Area Name: <u>Cedar River Watershe</u> dsin	Cantol L	Month June	Day 14 Year 2007						
Area Name: Cedar River Watershedsit	e Name / Number:	River North	Station Number:						
Station Location - $T \xrightarrow{\mathcal{J}} N$, $R \xrightarrow{\mathcal{I}}$ (circle	e one) (E) or W, S <u>10</u>	_, QQ (1/16) <u>//~</u>	_, of Q (1/4) _// ~						
UTM zone: 10 E (x) coordinate: 06113010 N	(v) coordinate: 524233	SZ Source: GPS	_ Datum: <u>NAU 83</u> FOM:						
Observer (s) Name: <u>Alden J. Miller</u> Ini	tials: <u>AJM</u> Affiliation: _/	4BR Inc.	Phone: (503 359-7525						
Station Elevation: 724 Ft / M Position on	Slave (sizela ana): Bottom/	Jain (Lowar 1/3)	Gid 1/3 Unner 1/3 Ridgeton						
	Stope (circle one). Bottony	tall, Lower 1/3, W	na 1/3, Oppor 1/3, Magolop						
Station Placement (circle one): Inside, Outside Distance from Survey Site Boundary: Ur	its of Massure for ALL Hori	zontal Distances: \mathcal{M}	eters						
Station Concert Course (circle one): 1 = 0 to 25% 2=	3 = 51 to 75%	4 = 76 to 100%							
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 7.0 6.5 7.0 6.5 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0 7.0									
Vis	IBILITY PRECIPITATION		NOTES						
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0474HI3YY	YNNr	V I N	Begin Survey						
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Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, M Cloud Cover: $\theta = 0\%$, $1 = 33\%$, $2 = 66\%$, $3 = 100\%$.	,								
Vertical Visibility: N = Impaired (detections may be missed of Horizontal Visibility: N = Impaired (detections may be missed	the to conditions), $\mathbf{Y} = \mathbf{U}$ nimpain d due to conditions) $\mathbf{Y} = \mathbf{U}$ nimp	ed (conditions allow for a aired (conditions allow for	reliable detection), U = Unknown. or reliable detection), U = Unknown.						
Audibilitys N = Impaired (detections may be missed due to ce	nditions). Y = Unimpaired (cond	litions allow for reliable of	detection).						
Precipitation - Rain & Fog: $N = None$, $L = Light$, $M = ModeWind: 0 = <1 mph (calm), 1 = 1-3 mph (leaves barely move),$	2 = 4-7 mph (leaves rustle, sm. t	wigs move), 3 = 8-12 mp	h (leaves & sm. twigs in constant						
motion), $4 = 13-18$ mph (sm. branches move), $5 = 19-24$ mph mph (whole trees move), $8 = 39-46$ mph (twigs & sm. branches	(ig. branches & sm. trees start to	sway), 6 = 25-31 mph (h	g. branches in constant motion), $7 = 32-38$						
Noise: N = None, \mathbf{A} = Aircraft, \mathbf{B} = Bird song/calls, \mathbf{C} = Creek	water drainage, M = Machiner	, P = Rain/hail, T = Tree	e drip, \mathbf{V} = Vehicle, \mathbf{W} = Wind, \mathbf{O} = Other						

Noise: $N = None, A = Alteran, B = Blitt song/calls, C = Cleek/water mainage, M = Machinery, T = Randrand, T = Recomp, V = Voluele, W = Water mainage, M = Machinery, T = Randrand, T = Recomp, V = Voluele, W = Water mainage, M = Machinery, T = Randrand, T = Recomp, V = Voluele, W = Voluele,$	
(explain in Notes).	

	Data Point No.	Sequence N		rence No.
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Data Entry Initials	🖓 🚽 Data Entry Data 🔜	🔄 🍐 🕴 Data QC Initi		QC Date
Protocol Review Initials	Re * IA	view Date DFW DATABASE USE ONL	Highest Biolo	gical Status <u>11</u>

 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.</td>

(Check Reverse Side When Using 2-Sided Forms)

WASHINGTON M.	ARBLED N	WASHINGTON MARBLED MURRELET FOREST SURVEY FORM	URVEY FORM	D	stections - T	Detections - This Side Page Total:	e Total:	D Pr. Z of Z
Observer (s) Initials:	AJM	Month June Day	Ne Day 14 Year 2007		Area Name: Leda Site Name / No: Sorth	edar RU	Area Name: Ledar Richarder Led.	Nors
Data Reference Number			Units of Measure (circle one): U.S. /	\mathcal{O}^{r}	Station Number:		2	
SURVEY ACYIVITY:		**Note Sign	**Note Significant Weather Changes on Page 1**	age 1**				revised: 2 / 2000
		AUDITORY	# # # INITIAL BIRDS ¥ FLIGHT	BIRD C		DEPART FLIGHT	FINAL	NOTES
0/I- S # NOIL:		VOCAL SERIES OTHER start End # OL W/J	NOIN NOIN	~	BIRDS SEEN			Heard Only Dist To Birds (L= Loud, M= Moderate, F= Faint)
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TYPE: H = Heard Only	(no visual), S	Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard	Seen and Heard.					
AUDITORY - Vocal Se heard at both the start and	ries (Vocalizat i end if calls gr	AUDITORY - Vocal Series (Vocalizations): $K = KEER$ calls, $G = Groan$ (alternate) calls, $O = Whistle or Soft Que calls, U = Unknown, heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple$	roan (alternate) calls, $\mathbf{O} = \mathbf{W}\mathbf{h}$	istle or Soft Q	ue calls, U = rd 1-5 nr M		= None of	= None or N/A. Indicate the vocal type OI. = Overlanning Vocalizations (V or N)
neard at both the start and	i end it calls gi	rade between different types du	ring the detection. Indicate the	e number hear	rd 1-5 or M		OI = Overla	mine Vacalizations (V or N)

WASHINGTON			(Survey	Visit to P	rotocol		Page <u>1</u> of <u>)</u>
MARBLED MURREL	LET		((Y or N	, initials)	NG	£	Total Detections:
FOREST SURVEY F	ORM			Species	s of Conc	ern (circ	le one, c	letails on last pg.): Y or (N)
								Day <u>15</u> Year <u>2007</u>
Area Name: Ledor River Wate	<i>crshed</i>	Site Name /	/ Numbe	er: <u> </u>	nd/eg	(1ee h	· · · · · · · · · · · · · · · · · · ·	Station Number:
Station Location - $T \rightarrow 1$ N, F	r	(circle one) (E) or W	, S	<u> </u>	Q (1/16)	ζw	_, of Q (1/4) $\frac{NE}{}$
UTM zone: <u>10</u> E (x) coordinate: $\frac{6}{6}$	06326	N (y) coor	dinate:	5243	160	Source:	<u>cps</u>	_ Datum: // AD & FOM:
Observer (s) Name: Lorey M. C	irinnell	Initials: <u>(/ </u>	14 A	ffiliatio	n: <u>AB/</u>	P In C	<u> </u>	Phone: (54) 359- 7525
Station Elevation: 958 Ft	Positi	on on Slone (c	ircle one	e): Bot	om/plain.	Lower	1/3, M	id 1/3, Upper 1/3, Ridgetop
Station Placement (circle one): Inside				-,	,			
Distance from Survey Site Boundary:			easure fo	or ALL	Horizonta	l Distanc	es: Me:	10-1
Station Canopy Cover (circle one):								
ENVIRONMENTAL CONDITIONS	S:							- () C
Official Sunrise Time: 0509	Table	North Be	d B	Begin St	rvey Tim	e: 092	У в	and Survey Time: 0628
Temperature at Sunrise: 7		erature at End						
			of Surv		7 o		ie) 🕜	or F revised: 2 / 2000
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Temperature at Sunrise: 7 TIME VERTICAL VIEWING COORD VISIBILITY TO 2 CANOPY O 7 2 4 7 H1 3 7	Temp HORIZ. VIS. TO 100 M Y Y	AUDIBILITY TO 200 M	of Surv PR RAIN	ey: FOG N		(circle or WIND 0	NOISE	NOTES NOTES Begin Sirvey (gin impuirs version is heavy rain impairs hearing
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Temperature at Sunrise: 7TIMEVERTICAL VIEWING $\bigcap_{M} O O$ VISIBILITY $O Y J Y H I$ J $O Y J J Y J H I$ J $O S O S H I$ Y $O S J Y H I$ J $O S J Y H I$ J $O S J Y L O$ J	Тетр HORIZ. VIS. TO 100 M У У У У У У	AUDIBILITY TO 200 M Y Y Y Y Y	of Surv RAIN L H L M	ey: FOG N N N N N N Y	TION OTHER N N N N N N N N	(circle or WIND 0 0 0 0	IP) C	NOTES NOTES Begin Sirvey rain impairs version is heavy rain impairs hearing rain no longer impairs moderate rain heavy rain impairing fog rolls in
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Temperature at Sunrise: 7TIMEVERTICAL VIEWING M O M	Тетр HORIZ. VIS. TO 100 M У У У У У У У У У У	AUDIBILITY TO 200 M Y Y Y Y Y Y N V	of Surv RAIN L M H L M H L M H H	ey: FOG N N N N N N Y	TION OTHER N N N N N N N N	O O O O O O O O O O O O O O O O O O O O O O O O	IP) C	NOTES NOTES Begin Survey rain impairs versical sis heavy rain impairs hearing rain no longer impairs moderate rain heavy rain impairing fog rolls in

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).

Personal Review Dear

Š	ASH	WASHINGTON MARBLED MURRELET FORES	AARBLED	MU	JRRE	Е	P	RES	<u> </u>	SURVEY FORM	Б	RM			Detections Area Name	Detections - This Side Page Total: Area Name: دوهر الالكور	Page Tot:		0 Pg. 2	
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50 S	<u>NE</u>	SURVEY ACYIVITY	·:				*	*Note	Signifi	cant W _t	ather	Chang(**Note Significant Weather Changes on Page 1**	ge 1**					revised: 2	2 / 2000
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hear	d at t	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.	nd end if calls	grad	le betw	een d	iffere	aus, c	es durin	an (auter ng the d	nate) etecti	on. Ind	= whis icate the	tte or So number	II Que calis, heard 1-5 or	U = Unkno M = Multi		None or N = Overlapp	— = None or N/A. Indicate the vocal type OL = Overlapping Vocalizations (Y or N).	cal type (or N).
<u>BFF</u>		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 Canony C = Circle Over Canony T = Fly, Through At or Bolow Canony (7 1 0) B = Circle At	Non-Vocal Sc ht Over Canom		ځ ≋[2]	= Wit	ې مړ	und, J	[= Jet S T = ₽	tound, - Thruc	∠ ₹ {	fone or] t or Bold	N/A If	both are	heard write	W/J.	- 7		· · ·	
Dep	urting	Departing From a Tree, S = Stationary Calling (fixed-point multipl	S = Stationary	, Cal	lling (fi	xed-	oint	multi		y=100 ⊑	n n (r	$r = r_1y = 1.00 \text{ m}$, $U = Unknown$.	OW CALL	; リ ば		e AI OI BUI (Che	ow Lanop. ck Rever.	y (≤ 1.∪), 1 se Side WI	$r = r_1 y + t u u u u u u u u u u u u u u u u u u$	or F orms)

WASHINGTON			5	Survey	Visit to P	rotocol		Page <u>1</u> of <u>2</u>
MARBLED MURF	RELET		(Y or N	, initials):	No	4	Total Detections:
FOREST SURVE				Species	of Conc	ern (circ	le one, d	etails on last pg.): Y or (N)
		,			. N	Aonth (06	Day 15 Year 2007
Area Name: Cedar Crea	et Watershe	Site Name /	Numbe	r:	dsay	Creek		Station Number: /
Station Location - T 21	N. R 9	$(circle one) (\widehat{\mathbf{E}})$	or W	.s 4	′, Q	Q (1/16)	<u>SE</u>	_, of Q (1/4)
UTM zone: <u>10</u> E (x) coordinate	<u> </u>	N (y) coor	dinate: _	57731	87	Source:	GPS	Datum: NAD DJ FOM:
Observer (s) Name: Neil Je	nsen	Initials: <u>//</u>	EL A	ffiliatio	n: <u>AB</u> A	, Inc	I	Phone: (503) 359-7525
Station Elevation: 87/ F	rt / M Positi	on on Slone (ci	ircle one	e): Bott	om/plain.	Lower	1/3, M	id 1/3, Upper 1/3, Ridgetop
Station Placement (circle one)				,				
Distance from Survey Site Bound	arv: NA	Units of Me	easure fo	or ALL	Horizonta	Distanc	es: <u>Me</u>	ters
Station Canopy Cover (circle one): $1 = 0$ to 25%	2 = 26 to 50)%, 3=	= 51 to 7	5%, 4=	76 to 10	0%	
ENVIRONMENTAL CONDIT								
Official Sunrise Time: 0509	Table	North Bend						nd Survey Time: <u>0624</u>
Temperature at Sunrise: 8,5	⁰ Temp	erature at End	of Surv	ey: <u>///</u>	<u>) </u>	(circle or	1e) (Ĉ) (or F revised: 2 / 2000
Temperature at Sunrise: 8,5						(circle or WIND		or F revised: 2 / 2000 NOTES
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Colling: UL = Unlimited (clear), H1 = >2.0 canopy height, HCloud Cover: $\theta = 0\%$, 1 = 33%, 2 = 66%, 3 = 100%.

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WASHINGTON			S	urvey '	Visit to P	rotocol		Page <u>1</u> of \mathbb{Z}
MARBLED MURREI	FT		(Y or N,	initials):	Y CAL	F	Total Detections:
FOREST SURVEY F			e e	Species	of Conce	ern (circl	le one, d	etails on last pg.): (\mathbf{Y}) or \mathbf{N}
FUREST SURVETT				- 1	Ν	Ionth J	une	Day <u>15</u> Year <u>2007</u>
Area Name: Cedar River Wo	itershe	Site Name /	Numbe	r: Rac	K Cree	K		Station Number:
Station Location - T)1 N. I	. 8	circle one) E	or W	.s d'	t , qa	Q (1/16)	M	, of Q (1/4) <u>NE</u>
TITE (596 28X	N(y) coord	linate	5492	5777 -	Source:	GPS	Datum: / ///// FOM:
Observer (s) Name: <u>Alden J.</u>	Miller	Initials: A	<u>IM</u> A	ffiliation	1: ABA	? Ine	<u> </u>	Phone: (503) 359-7525
Station Elevation: <u>9/9</u> Ft /							~	`
N	1	on on Stope (ci		<i>.</i> . .	0110 prant,	Lower		
Station Placement (circle one): Inside Distance from Survey Site Boundary:		Units of Me	esure fo	· n ALL	Horizontal	Distance	es: Mł	eters
Station Canopy Cover (circle one): 1	= 0 to 25%	2 = 26 to 50	%. 3 =	= 51 to 7	5%, 4=	76 to 10	0%	
ENVIRONMENTAL CONDITION	ç.							1
Official Sunrise Time: 0509	Table	North Be	-/ _В	egin Su	rvey Time	<u>. 047</u>		nd Survey Time: <u>0628</u>
Temperature at Sunrise: <u>7.5</u>] Temp	erature at End	of Surve	ay: <u>7</u> ,	<u>5 </u>	(circle on		or F revised: 2 / 2000
	HORIZ.		PR	ECIPITA		WIND	NOISE	NOTES
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	TO 100 M	200 M	RAIN	FUG	OTHER			
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0421H13Y 0509H13Y	Υ Υ Υ	200 M	L -	2 2	ZZ.	0	N	Begin Survey Sunrise
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0421H13Y 0509H13Y 0517H13Y 0524H13Y 0527H13X	ТО 100 М	Y Y Y	エート	2222	ZZZZZ		ZZZZ	Begin Survey Sunrise End Survey
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	ТО 100 М	Y Y Y	エート	Z Z Z Z Z	22222		ZZZZZ	Sunrise

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).

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Data Service Data	
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SURVEY	ACYIVITY:	•	N**	nte Sionific	ant Weat	**Nute Significant Weather Changes on Dage 1**	nn Darro 1*1				
DETECTION #	DETECTON TIME	INITIAL DETECTION DIRECTION	AUDIT CAL SERI	OTHER. W/J	BIRDS SEEN	BEHAVIOR BEHAVIOR	L BIRD IT HEIGHT ION SEEN 10N Canopy= 1.0		DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	IEVISCU. 27 2000 NOTES Heard Only Dist. To Birds (L= Loud, M≃ Moderate, F= Faint)
											Besh Survey 9 Strix SP. Jury's Strix SP. Jury's Steller Jury's Connon Raven End Survey

6007 Spaces of concers Connor

WASHI	NGTO	N			5	Survey	Visit to P	rotocol		Page <u>1</u> of <u>2</u>
MARBL			LET		(Y or N	, initials)	YG	6	Total Detections:
FORES						Species	of Conc	ern (circ	le one, d	etails on last pg.): Y or N
				1			, N	Ionth _	06	Day <u>19</u> Year <u>2007</u>
Area Name:	Cedar	Kiver 1	Vatershe	Site Name /	Numbe		dsey	Ceek		Station Number: /
Station Locati	on - T	N, H	R	(circle one) E	or W	, S	, Q	Q (1/16)		_, of Q (1/4)
UTM zone:	<u>10</u> E (x) co	ordinate:		N (y) coor	dinate:		1.00	Source:		_ Datum: FOM:
Observer (s) N	Name: <u>1</u>	el Jense	<u>en</u>	Initials: <u>//</u>	<u>[]</u> A	ffiliatio	n: <u>AKK</u>	, Inc.	I	Phone: (<u>63) 359-7525</u>
Station Elevat Station Placer Distance from	nent (circle	one): (Inside Boundary:	•) Outside		easure fo	or ALL	Horizonta	l Distanc	es: <u>M</u> e	id 1/3, Upper 1/3, Ridgetop
ENVIRONM						51101				
Official Sunr			z. Table	K Nave	E	legin Su	rvey Tim	e: <u>042</u>	<u>4</u> E	and Survey Time: _0624
						_	~ T			or F revised: 2 / 2000
Temperature	at Sunrise: _	<u></u>	Temp	erature at End	of Surv	ey:/.	<u>0 </u>	(circle or	$\frac{10}{C}$	or F revised: 2 / 2000
Temperature								(circle or WIND		
Temperature TIME	VERTICAL		HORIZ. VIS.	AUDIBILITY TO 200 M		ey: <u>/</u>				
	VERTICAL	VIEWING VISIBILITY TO 2	HORIZ	AUDIBILITY TO	PR	ECIPITA	TION			
TIME	VERTICAL CLOUD CEILING	<u>VIEWING</u>	HORIZ. VIS.	AUDIBILITY TO	PR	ECIPITA	TION		NOISE	NOTES
TIME	VERTICAL CLOUD CEILING	VIEWING VISIBILITY TO 2	HORIZ. VIS.	AUDIBILITY TO		FOG			NOISE B,C	NOTES Begin Sulvey
TIME 0 4 2 4 0 5 0 7	VERTICAL CLOUD CEILING	VIEWING VISIBILITY TO 2	HORIZ. VIS.	AUDIBILITY TO	PR	ECIPITA	TION		NOISE	NOTES Regin Sulvey Suncise
TIME 0 4 2 4 0 5 0 7 0 6 0 6	VERTICAL CLOUD CEILING	VIEWING VISIBILITY TO 2	HORIZ. VIS.	AUDIBILITY TO		FOG			NOISE B,C B,C	NOTES Regin Survey Sumaise Very high clouds
TIME 0 4 2 4 0 5 0 7	VERTICAL CLOUD CEILING	VIEWING VISIBILITY TO 2	HORIZ. VIS.	AUDIBILITY TO		FOG			NOISE B,C	NOTES Regin Sulvey Suncise
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TIME 0 4 2 4 0 5 0 7 0 6 0 6	VERTICAL CLOUD CEILING	VIEWING VISIBILITY TO 2	HORIZ. VIS.	AUDIBILITY TO		FOG			NOISE B,C B,C	NOTES Regin Survey Sumaise Very high clouds
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Occurrence No.	Data Point No. Sequence No. Reference No.
Quad-Code	Photo Code
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Data Entry Initials	
Protocol Review Initials	Review Date Highest Biological Status
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WASHINGTON MARBLED MURRELET FOREST SURVEY FORM

Observer (s) Initials: NE

Data Reference Number ñ,

1000

Units of Measure (circle one): Month 06 Day 19 U.S. / Metric Year 2007

Area Name: (edu) Detections - This Side Page Total 10

Pg. 2 of 2

Station Number: Site Name / No: _

SURVEY ACYIVITY: O'L- SUTATS # NOILOBIE S 2 5 0 Ô $\overline{}$ Ó σ 0 \mathcal{D} 3 \supset 0 Б 0 DETECTON TIME 5 5 4 2 Ĺ 2 ÿ 2 ト 2 N 2 0 N \mathcal{C} 4 4 ろ ~ と 2 λ 2 2 -0 Š DETECTION INITIAL ЭЧΥТ Start VOCAL SERIES 펍 AUDITORY # ****Note Significant Weather Changes on Page 1**** ρ OTHER ۲.N BIRDS 4 **REHAVIOR** initial Flight Direction HEIGHT Canopy= 1.0 ~ CLOSEST FLIGHT DIRECTION DEPART FINAL DETECTION DIRECTION Heard Only Dist, To Birds (L≖ Loud, M≃ Moderate, F= Faint) 9 Keal SPTO F PLACE C RRM 6 TALLO MR Ś c gVIII VCP \mathcal{O} NOTES revised: 2 / 2000 2/2 ٩ 2 J

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

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

AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, -- = None or N/A. If both are heard write W / J. **BEHAVIOR:** $F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (<math>\leq 1.0$), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-S or M = Multiple. OL = Overlapping Vocalizations (Y or N) 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

(Check Reverse Side When Using 2-Sided Forms)

VVASHIN	GTO	N			S	Survey	Visit to P	rotocol		Page <u>1</u> of <u>2</u>
MARBLE			LET		(Y or N	initials)	YCA	۲	Total Detections:
FOREST			_		:	Species	of Conc	ern (circ	le one, d	letails on last pg.): Y or N
Area Name: <u>(</u> Station Location UTM zone: 10	edor - T <u></u>	<u>(ceek </u> 1N, F ordinate: 6	Vatershe 10 10 10 10 10 10 10 10 10 10	(circle one) $(\mathbf{E}$	or W	,s <u> </u>	ley C , Q	<u>(eek</u> Q (1/16) Source:	Sw GPJ	Day <u>20</u> Year <u>2007</u> Station Number: <u>1</u> , of Q (1/4) <u>NE</u> Datum: <u>NAV 83</u> FOM: <u>-</u> Phone: (503) 359-7525
	nt (circle o nrvey Site	Ft` (I one): Inside Boundary:	N Positi e, Outside λο	on on Slope (ci Units of Me	ircle one	e): B ott	om/plain, Horizonta	Lower	• 1/3, M es: <u>M</u> e	id 1/3, Upper 1/3, Ridgetop
ENVIRONME				201000	, , ,					
Official Sunrise				North Bend	В	egin Su	rvey Tim	e: <u>047</u>	<u> </u>	and Survey Time:
Temperature at S				erature at End	of Surve	ey:	0	(circle or	ne) 🕜 (or F revised: 2 / 2000
		VIEWING	HORIZ.	AUDIBILITY	PR	ECIPITA	TION	WIND	NOISE	NOTES
		VISIBILITY TO 2	VIS. TO 100 M	TO 200 M	RAIN	FOG	OTHER			
	585	CANOPY								:
	·		Y		1	N	N	2	RC	Reain Survey
04250			r_	- Y - Y	N N	N N	N N	2	B.C. R.G.A	Begin Survey
0425U 0510U			Y Y	Y Y Y	N N N	N N N	N N N	2222	В.С. R, С, А R, С, А	Begin Survey Sunrise End Survey
0425U 0510U			Y Y Y	Y Y Y	N N N	N N N	N N N	2 2 2	В,С В,С,А В,С,А	
0425U 0510U			Y Y Y	Y Y Y	N N N	N N N		2 2 2	В,С. В,С,А В,С,А	
0425U 0510U			Y Y Y	Y Y Y	N N N	N N N		2 2 2	В,С R,С,А В,С,А	
0425U 0510U			Y Y Y	Y Y Y				2	В,С В,С,А В,С,А	
0425U 0510U			Y Y Y	Y Y Y				2	R,C,A R,C,A R,C,A	
0425U 0510U			Y Y Y	Y Y 				2	R,C,A R,C,A R,C,A	

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

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ATVITY: **Non Significant Weather Changes on Page 1* Defection Mintal. Auonory # Mintal. Auonory The Defection Mintal. Auonory # Beneficiant Weather Changes on Page 1* Defection Mintal. Auonory Final # Defection Beneficiant Weather Changes on Page 1* Defection Mintal. Auonory Final # Defection Beneficiant Beneficiant Weather Changes on Page 1* Defection Mintal. Auonory Final # Defection Beneficiant Beneficiant Weather Changes on Page 1* Defection Beneficiant Beneficiant Weather Changes on Page 1* Defection Beneficiant Beneficiant Weather Changes on Page 1* Defection Defection Beneficiant Beneficiant Beneficiant Weather Changes on Page 1* Defection Beneficiant Beneficiant Beneficiant Weather Changes on Page 1* Defection Defection Beneficiant Be			Day Jure (circle	_Year_		ite Name / No: $\frac{F_{nd}}{P}$	1 Cleek	
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	DETECTON INITIAL TIME DETECTION DIRECTION	AUDIT VOCAL SERI	BIRDS SEEN				FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$							Regin Survey 14089 164 CONT 144 MTH. 164 Surth 124 MTH. 164 METT Sundise 164 MASU 164 MASU 16

WASHINGTON	Survey Visit to Protocol	Page <u>1</u> of $\frac{2}{2}$
MARBLED MURRELET	(Y or N, initials): Y (mb	Total Detections:
	Species of Concern (circle	one, details on last pg.): Y or N
Area Name: <u>Ceder River Watershed</u> Site Name / Num	South Fork Month JI	INC Day CO Year COD +
Area Name: <u>Ceder River Watershed</u> Site Name / Num	iber: <u>Cedar River N</u>	Brink & Station Number:
Station Location - $T \partial I = N R I^0$ (circle one) (E) or V	W, <u>S_7°</u> ,QQ(1/10) <u>7</u>	$V \to 0$, 01 Q (1/4) $V \to 0$
UTM zone: <u>10</u> E (x) coordinate: <u>$6//92Y$</u> N (y) coordinate Observer (s) Name: <u>Alden J. Miller</u> Initials: <u>AJM</u>	Source: C	$\frac{15}{100} Datum (77) 05 FOM$
Observer (s) Name: <u>Aloen J. Miller</u> Initials:	Affiliation: <u>1410</u> STC	Phone: (202)
Station Elevation: <u>Sol</u> Ft / D Position on Slope (circle of	one): Bottom/plain, (Lower 1/	A, Mid 1/3, Upper 1/3, Ridgetop
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Station Canopy Cover (circle one): $1 = 0$ to 25%, $2 = 26$ to 50%,	3 = 51 to 75%, $(4 = 76$ to 100%)	
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^q O	serve	Observer (s) Initials:	WICH				-	Month	June	IUNE Day	2		Year Cool	15	Area Name: Site Name / N	Area Name: <u>COOC KINK WATU</u> . Site Name / No. South For K Cedur River	KINK Fedar	Watelshe & River	~~
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	Ĕ	ORY - Other	AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, — = None or N/A. If both are heard write W/J	puno	: ≰ []	= Wi	ng S(ound,	J = Jet	Sound, -		lone or	N/A. If I	both are h	eard write W	/ J.			
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WASHINGTON		S	urvey V	Visit to P	rotocol		Page <u>1</u> of $\frac{1}{2}$
MARBLED MURRELET		C	Y or N,	initials):	YCM	6	Total Detections:
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Station Location - $I \underbrace{VV}$ N, $K \underbrace{I}$ (c) UTM zone: <u>10</u> E (x) coordinate: <u>60/269</u> Observer (s) Name: <u>Alden J. Miller</u>	Initials: <u>A</u>		ffiliation	1: <u>Al</u>	SR I	nc P	hone: (503)359-1575
Station Elevation: <u>977</u> Ft / M Position						· · · ·	<u> </u>
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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).

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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).

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<u>a ud</u> Beh		<u>IRY - Other</u> OR: F = Flig	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 Cannary C = Cirrle Over Canomy T = Fig. Through At or Below Concert (7, 1, 0), B - Cirrle Av	puno >	<u>is)</u> : W = Wing = Circle Ove	Sound, J	I= Jet S T = ₽	ound, — Thmur	= None	e or N/A. If	both are h	ard write W	·/J,			
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WASHINGTON MARBLED MURREL FOREST SURVEY F Area Name: <u>Cedar River (</u> Station Location - T <u>JJ</u> N, H UTM zone: <u>10</u> E (x) coordinate: Observer (s) Name: <u>Alden J. /</u>	ORM	Circle one) (E (circle one) (E N (y) coord Initials: <u>A</u>) 1	Y or N, Species	5.1A	ern (circ)	e one, d	Total Detections: $\underline{\bigcirc}$ etails on last pg.): Y or $\underline{\bigcirc}$ Day $\underline{\bigcirc} \underline{\bigcirc} \underline{\frown} \underline{\frown}$ Year $\underline{\frown} \underline{\frown} \underline{\frown} \overline{\frown} \overline{\frown}$
Station Elevation: <u>899</u> Ft / ft Station Placement (circle one): finside Distance from Survey Site Boundary: Station Canopy Cover (circle one): 1 <u>ENVIRONMENTAL CONDITION</u> Official Sunrise Time: <u>9</u>	Positio Out side = 0 to 25%, <u>S</u> : Table	on on Slope (ci Units of Me 2 = 26 to 50	easure for $3 = 2$ and B	e): B ott	om/plain, Horizontal 5%, 4 = rvey Time	Lower Distance 76 to 10 e: <u>047</u>	1/3, (M es: <u>M6</u> 0% <u>E</u>	id 1/3, Upper 1/3, Ridgetop ACTS nd Survey Time: 0655
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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), U = Unknown.

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0Þé	erver	Observer (s) Initials: _	AIM		Month	MML #	Whe Day 22	17	Year	2007	Area Name: ∠ Site Name / No:	No: 15	KWER WR	Wateshed
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IN IN		H = Heard On RY - Vocal S	TYPE: H = Heard Only (no visual), S AUDITORY - Vocal Series (Vocalizz heard at both the start and and it could	S = {	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, heard at both the start and is calls and it found to be calls.	= Both Si G = Gro	een and l m (alterr	Heard Late)	l calls, O = Whis	tie or Soft	Que calls, L] = Unknown		= None or N/A. Indicate the vocal type
5		RY - Other	Non-Vocal So		About the start and that it cans grade between different types <u>AUDITORY</u> - Other (Non-Vocal Sounds); W = Wing Sound, J =		ng the de ound, –	techi i Ž	during the detection. Indicate the number heard 1-5 or $M = Multiple$. Jet Sound, $$ = None or N/A. If both are heard write W / J.	s number h both are h	eard 1-5 or J sard write W	M = Multiple ' / J.		OL = Overlapping Vocalizations (\mathbf{Y} or \mathbf{N}).
	IT ing	UK: F = Flig From a Tree,	ht Over Canopy , S = Stationary	v Cal Cal	BEHAVIOK: F = Flight Over Canopy, C = Circle Over Canopy, T Departing From a Tree, S = Stationary Calling (fixed-point multiple		y-Throu ⊲100 m	ghAt), U₌	= Fly-Through At or Below Cano calls <100 m), U = Unknown.	(0.1 ≥) Yqu	, B = Circle	8	Canopy (≤ 1.0 Reverse Side	= Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or calls <100 m), U = Unknown. (Check Reverse Side When Using 2-Sided Forms)

WASHINGTON			S	urvey	Visit to P	rotocol		Page <u>1</u> of <u>2</u>
MARBLED MURRE	LET		(Y or N	, initials):	y cn	4	Total Detections:
FOREST SURVEY F			1	Species	of Conc	ern (circ	le one, d	letails on last pg.): Y or N
		t		-	Ņ	Ionth	06	Day <u>21</u> Year <u>2007</u>
Area Name: Cedar River 4	late she	Site Name /	Numbe	г: <u>Lo</u>	st Cle	ek		Station Number:
Station Location - T 22 N	2 8	(circle one) 🗲)or w	, s 🔄	′ , Q	Q (1/16)	_SW_	_, of Q (1/4)
UTM zone: <u>10</u> E (x) coordinate: <u></u>	99822	N (y) coor	dinate: _	525 03	0	Source:	GPS	_ Datum: <u>NA0\$3</u> FOM:
Observer (s) Name: Neil Jen		Initials: 📈	ELA	ffiliatio	n: <u>ARR</u>	, Inc.	I	Phone: (503) 359-7525
Station Elevation: 739 Ft /	Desitiv	on on Slone (ci	itele one		om/nlain	Lower	1/3 M	id 1/3, Upper 1/3, Ridgetop
Station Placement (circle one): Insid	+	on on Stope (o		<i>.).</i> 1 00	onv piani,	Done		, officially officially and the second secon
Distance from Survey Site Boundary:	Om	Units of Me	easure fo	or ALL	Horizonta	l Distanc	es: Me	ter
Station Canopy Cover (circle one): 1	= 0 to 25%	2 = 26 to 50	1%, 3=	= 51 to 7	/5%) 4 =	76 to 10	0%	
ENVIRONMENTAL CONDITION	-							
Official Sunrise Time: 05/0	– Table	North Ben	ο, w/4 · Β	egin Su	rvey Tim	e: <u>042</u>	<u> </u>	nd Survey Time: <u>625</u>
				-	-		· ~	
-		erature at End	of Surve	ey: <u>/</u>				
Temperature at Sunrise: 12,5	Temp	erature at End	of Surve	ey: /	<u>4,0_</u> º			
Temperature at Sunrise: <u>12,5</u>	HORIZ. VIS.	erature at End AUDIBILITY TO	of Surve PR	ey:/ ECIPITA	<u>4,0_</u> º	(circle or	1e) (C) (or F revised: 2 / 2000
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Noise: N = None, \mathbf{A} = Aircraft, \mathbf{B} = Bird song/calls, \mathbf{C} = Creek/water drainage, \mathbf{M} = Machinery, \mathbf{P} = Rain/hail, \mathbf{T} = Tree drip, \mathbf{V} = Vehicle, \mathbf{W} = Wind, \mathbf{O} = Other (explain in Notes).

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	Month <u><i>A</i></u> Day <u>2/</u> Uhits of Measure (circle one): **Note Significant Weather C series other BlRDs SERIES OTHER BlRDs SEEN 2010 A # 0L W/J 2/ BlRDs SEEN 2010 A # 0L W/J 2/ AUDITORY BLRDS	Day Day 2/ BERDS SEEN SEEN	Month Day Z/ Year 2002 Units of Measure (circle one): U.S. / Metric **Note Significant Weather Changes on Page 1** ORY # BIRDS ORY # BIRDS BIRDS DIRECTION SEEI OR W/J BIRDS DIRECTION SEEI OITHER OL W/J DIRECTION Canop 1.0	27 Site Name / No: efric Station Number: e 1** EIRD BIRD CLOSEST BIRD CLOSEST BIRD CLOSEST	1/No: <u>Lact</u> mber: /	Creek	
VACYIVITY: DETECTON INITIAL DETECTON INITIAL DIRECTION Add DIRECTION ADD D	**Note Signific.	BEHAVIOR	Aunges on Page 1 FLIGHT HE DIRECTION SI	oŦ			
DETECTON INITIAL DIFECTION INITIAL DIFECTION INITIAL DIFECTION ALL INE DIFECTION ALL INE CONCAL DIFECTION ALL INTERCONCAL DIFECTION ALL INTERCONCAL DIFECTION ALL INTERCON	OTORY ALL OL W/J			of			revised: 2 / 2000
<u>а</u>					DEPART FUGHT DIRECTION	FINAL DETECTION DIRECTION	
NUND-UUUW30				Canopy= (SEEN 1.0 units			(L= Loud, M= Moderate, F= Faint)
AMO-NAAM30							Real Culler
MO-UUUW 20							HLW/10P1
0-100000000000000000000000000000000000							KH LITLIR
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TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard. AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (altemate) calls, O = Whistle or Soft Que calls, U = Unknown,	ent), B = Both See R calls, G = Groan	n and Heard. 1 (alternate) cal	ls, O = Whistle c	r Soft Que calls,	U = Unknown	11	= 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. AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound 1 = let Sound = None or N/A 1f both are heard units ut / r	ferent types during Sound J = let So	g the detection.	Indicate the nur	nber heard 1-5 0 are heard units	r M = Multiple. W/ r	_	OL = Overlapping Vocalizations (\mathbf{Y} or \mathbf{N}).
BEHAVIOR: $F = Flight Over Canoby, C = Circle Over Canoby, T = V$	$\int \frac{\partial u}{\partial u} \frac{\partial u}{\partial u} = \frac{1}{2} \int \frac{\partial u}{\partial u} \frac{\partial u}{\partial u} \frac{\partial u}{\partial u} = \frac{1}{2} \int \frac{\partial u}{\partial u} $	urru, — – None Through At or	Jet sound, — – None of N/A. If DOM are neard write W / J. = Flv-Through At or Below Canomy (< 1 ∩) B = Circle At or Below Canomy (< 1 0) I = 511	are neard write	W / J.		

WASHINGTON			Surve	y Visit to F	rotocol		Page <u>1</u> of <u>2</u> .
MARBLED MURRE	LET		(Y or	N, initials)	: Y Cri	5	Total Detections:
FOREST SURVEY	ORM		Spec	es of Conc	ern (circ	le one, c	letails on last pg.): Y or (N)
Area Name: $\frac{Ceclay}{River}$ $\frac{River}{N}$ Station Location - T 2/ N, UTM zone: 10 E (x) coordinate: $\frac{10}{2}$	<u>Vate ishe</u> R_10_0 S11251	(circle one) (E N (y) coor)or W , S dinate:2	outh Fo 10, Q 42146	Q (1/16) Source:	brRin SE 6 Pi	_, of Q (1/4) <u>NU/</u> _ Datum: <u>NAP 83</u>
Observer (s) Name: Neil Eac	Jensen	'Initials:	<u>حا</u> Affilia	ion: <u>ABR</u>	, Inc.	l	Phone: (563) 359-7525
Station Elevation: 728 Ft / Station Placement (circle one): Insid Distance from Survey Site Boundary: Station Canopy Cover (circle one):	Positio Outside m	on on Slope (ci Units of Me	ircle one): B easure for AL	ottom/plain, L Horizonta	Lower	1/3. M	id 1/3, Upper 1/3, Ridgetop
ENVIRONMENTAL CONDITION	<u>s</u> :					_	
Official Sunrise Time: 5/0			,		-	_	and Survey Time: <u>625</u>
Temperature at Sunrise: 8.5	¹ Temp	erature at End	of Survey:	<u>10.5 </u>	(circle or	ne) 🕐	or F revised: 2 / 2000
	HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPI RAIN FOC		DNIW	NOISE	NOTES
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ASH	INGTON I	WASHINGTON MARBLED MURRELET FOREST	MUF	RELET F	ORE		SURVEY FORM	Р. Гол	W		Detections - Area Name:	Detections - This Side Page Total: Area Name: Control North	ge Total:	0 PB. 2 of 2
erver Ref	Observer (s) Initials: <u> </u>	<u>NEJ</u>		Actor 1	Month Units of M	06 of Measu	Month <u>O6</u> Day <u>22</u> Units of Measure (circle one):	22 le one):	Vear Z	2007 Metric	Site Name / No: Station Number:	No: Jou 74 Der: 3	Forh Ceda	a Ris No As
SURVEY	Y ACYIVITY	Y:			**Note	signifi	cant We	ather (**Note Significant Weather Changes on Page 1**	Page]**				revised: 2 / 2000
DETEC	DETECTON TIME	INITIAL DETECTION	TYPE	AUDITORY	оку		# BIRDS	BÉHA	INITIAL FLIGHT	┝──┷	CLOSEST DIST. TO	DEPART FLIGHT		Ž
CTION #		DIRECTION		VOCAL SERIES Start End # 1	5	OTHER W/J	SEEN		DIRECTION			DIRECTION	DIRECTION	Heard Only Dist. To Birds (L= Loud, M≃ Moderate, F= Faint)
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at O H	H = Heard On RY - Vocal S oth the start a	TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard. <u>AUDITORY - Vocal Series (Vocalizations</u>): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, 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.	S = Se ations grade	en Only (silen): K = KEER between diffe	tt), B = calls, G rent ty _F	Both Sé 1 = Gros Des duri	een and an (alten ng the de	Heard. nate) c stection	alls, O = W1 1. Indicate t	nistle or Sof he number	In Seen and Heard. Groan (alternate) calls, $O = Whistle or Soft Que calls, U = Unknown,Juring the detection. Indicate the number heard 1-5 or M = Multiple.$) = Unknown Multiple	61	= None or N/A. Indicate the vocal type OL = Overlapping Vocalizations (Y or N).
<u>SI</u>	<u>RY - Other</u> OR: F = Flig	<u>AUDITORY - Other (Non-Vocal Sounds</u>): W = Wing Sound, J = Jet Sound, BEHAVIOR: F = Flight Over Canony C = Circle Over Canony T = Fly-Thr	(indis)	: W = Wing S Circle Over (ound, Janomy	J = Jet S T = Fi	ound, v-Throi	- = No	ne or N/A.	If both are I	= None or N/A. If both are heard write W / J.	/ / J. At or Below	(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). P = Circle At or Below Canopy. C = Circle Over Canop
ting	From a Tree,	Departing From a Tree, $S = Stationary Calling (fixed-point multiple calls <100 m), U = Unknown.$	Callin	ng (fixed-poin	t multi	ple calls	<100 n	ı), U =	Unknown.			(Check	Reverse Side	(Check Reverse Side When Using 2-Sided Forms)
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WASHINGTON			S	urvey	Visit to P	rotocol		Page <u>1</u> of <u>7</u>
MARBLED MURRE	LET		C	Y or N	, initials):	Y CA	-	Total Detections:
FOREST SURVEY F	ORM		S	Species	of Conc	ern (circ	le one, d	letails on last pg.): $(\mathbf{\overline{Y}})$ or N
Area Name: <u>Cedar River</u> Station Location - T <u>22</u> \hat{N} , B UTM zone: <u>10</u> E (x) coordinate: <u>S</u> Observer (s) Name: <u>Nevil Eric</u>	R <u>8</u> 196282	(circle one) (E N (y) coor	or w . dinate: _	s <u>2</u> s248	<u>ck Cr</u> 4, Q 114	<u>eek</u> Q (1/16) Source:	NW GPS	_, of Q (1/4) <u></u>
Station Elevation: <u>9/9</u> Ft / (Station Placement (circle one): Unsid Distance from Survey Site Boundary: Station Canopy Cover (circle one): G	M Positi Outside	on on Slope (c Units of Ma	ircle one) easure fo): Bott r ALL :	om/plain, Horizonta	Lower	1/3, M	id 1/3, Upper 1/3, Ridgetop
ENVIRONMENTAL CONDITION		2 - 2010 50	·/0, D =	51 10 7	J70, 4	10 10 10	070	
Official Sunrise Time: 0571		: North Box	ЦиАв	egin Su	rvey Time	e: 042	25 е	nd Survey Time: 0625
Temperature at Sunrise: 6.5								or F revised: 2 / 2000
TIME VERTICAL VIEWING	HORIZ. VIS. TO 100 M	AUDÍBILITY TO 200 M		FOG		WIND		NOTES
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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).

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2002 Site Name / No: Page 1** Station Number: Page 1** DEPA BIRD DIST. TO Isten Dist. IS Isten	WASH	HINGTON N	ARBLED	MUF	WASHINGTON MARBLED MURRELET FOREST		SURVEY FORM	FOR	W		Detections - Area Name	Detections - This Side Page Total: Area Name:	ge Total:	2. 1 PE 2. of 2
revised: FINAL DIRECTION FINAL DIRECTION HEATON HEATON HEATON HEATON HEATON HEATON HEATON HEATON HEATON HEATON HEATON HEATON HEATON HEATON HEATON HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HAND HA	Observe Data Re	sr (s) Initials:			Mon	th <u>O</u> 6 of Measu	Day ure (circl		Year	Metric Metric	Site Name / Station Num	Į٣Į .	Cleek m	0
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$\begin{array}{c c c c c c c c c c c c c c c c c c c $			INITIAL DETECTION DIRECTION	ТҮРЕ	AUDIT CAL SERII End #	OTHER W/J	BIRDS SEEN SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS SEEN (\swarrow)	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist To (L= Loud, M≔ Moderate,
= None or N/A. $OL = Overlapping$ Canony (< 1.0). L = 6		<u>2222222222222222222222222222222222222</u>												
	TYPE: AUDIT(heard at BEHAV	H = Heard Onl $ORY - Vocal S$ both the start at $ORY - Other ($ $ORY - Other ($ $IOR: F = Fligh$	y (no visual), { eries (Vocaliz, nd end if calls { <u>Non-Vocal So</u> it Over Canopy	S = St zations grade ounds)	een Only (silent), B 2): K = KEER calls, between different t by W = Wing Sound = Circle Over Canog	= Both Se G = Gros ypes durin L J = Jet S py, T = Fl	een and] m (altern ng the de ound, y-Throu	Heard nate) co tection = No	alls, O = Whi . Indicate th ne or N/A. Ii or Below Can	istle or Sofi e number h f both are h lopy (≤ 1.0	t Que calts, 1 teard 1-5 or } eard write W , B = Circle	J = Unknown M = Multiple / / J. At or Below	i o l	or N/A. Indicate the vocal type lapping Vocalizations (Y or N). 0), L = Seen Landing in or

Unknown. Use a lite, S = Stationary Calling (fixed-point multiple calls <100 m), U = Unknown. $<math>\int_{V} u_{i} v_{i} v_{i} + \int_{V} u_{i} v_{i} + \int_{V} \int_{V}$

(Check Reverse Side When Using 2-Sided Forms)

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MARBL			FΤ		(Y or N	initials):	7 10-	F]	Total Detections:
FORES	-				1	Species	of Conc	ern (circ	le one, d	letails on last pg.): Y or 🕅
						-	N	lonth i	N.	Day 77 Year 7007
Area Name	Codor	Rifer W	terched	Site Name /	Numbe	r: Ta	lor Ri	dae_		Station Number:
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UTM zone:	10 E(x)co	ordinate: 5	94828	N (y) coord	dinate: _	5247	069	Source:	GPS	_ Datum: <u>NAD 83</u> FOM:
Observer (s) N	Name:	JEGE.	Jensen	Initials: <u>M</u>	ELA	ffiliatio	1: <u>ARK</u>	, Inc.	I	Phone: (<u>(68)359-7525</u>
<u></u>										Fid 1/2 Upper 1/3 Bidgeton
Station Elevat			<	on on Slope (ci	rcle one	e): B ott	om/plain,	Lower	1/3, M	id 1/3, Upper 1/3, Ridgetop
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ENVIRONM		_		Id R	Jul	ogin Su	evev Tim	e [.] 042	Α Ε	End Survey Time: 0627
Official Sunr				erature at End						
Temperature	at Sunrise:	15.0	Temp						<u> </u>	
TIME			HORIZ. VIS.	AUDIBILITY TO	PR	ECIPITA	TION	WIND	NOISE	NOTES
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Ceiling: UL =	= Unlimited ((clear), $\mathbf{HI} = >2$	2.0 canopy he	ignt, MID = >1.3	∠⊃ 10 <u>≤</u> 2	.u canop	, neight, P	• - <u></u> 1.23	canopy u	vient, o onunon in

Cloud Cover: $\theta = 0\%$, 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, \mathbf{A} = Aircraft, \mathbf{B} = Bird song/calls, \mathbf{C} = Creek/water drainage, \mathbf{M} = Maclunery, \mathbf{P} = Rain/hail, \mathbf{T} = Tree drip, \mathbf{V} = Vehicle, \mathbf{W} = Wind, \mathbf{O} = Other (explain in Notes).

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PERECTON INTRA. AUDITORY # MITHAL BEER TON MITHAL MITHAL	VEY	ACYIVITY			**Note Sig	gnificant W	eather (Jhanges on Pa	tge 1**				1 01
216	DETECTION #	DETECTON	INITIAL DETECTION DIRECTION	ť	AUDITORY CAL SERIES End # OL	<u></u> Ш –		INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0		DEPART FUGHT DIRECTION		NOTES Heard Only Dist. To Bi (L= Loud, M= Moderate, F
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WASHINGTON			S	Survey	Visit to P	rotocol		Page <u>1</u> of \angle
MARBLED MURR	ELET		(Y or N	, initials):	y cr	F	Total Detections:
FOREST SURVEY			:	Species	of Conc	ern (circ	le one, d	letails on last pg.): Y or N
					N	10nth <u>I</u>	<u>une</u>	Day <u>28</u> Year <u>2007</u>
Area Name: Cedar River 1	vatershed	Site Name /	'Numbe	ar: <u>15</u>	5. IA			Station Number:
Area Name: \underline{CCUY} \underline{NUY} Station Location - \underline{T} \underline{JJN} \underline{F} UTM zone: $\underline{10}$ \underline{E} (x) coordinate:	, R 10	(circle one) (E) or W	, s <u> </u>	, Q	Q (1/16)	NE	_, of Q (1/4) <u>∫ W</u>
UTM zone: 10 E (x) coordinate:	607495	N (y) coor	, dinate: _	524	5965	Source:	GPS	_ Datum: <u>NAD 83</u> FOM:
Observer (s) Name: <u>Alden 5</u>	T. Miller	Initials: <u>A</u>	JM A	ffiliatio	n: <u>AB</u>	? In	<u>C.</u> I	Phone: (93) 359-7525
Station Elevation: 894 Ft		on on Slope (c	ircle one	a). Bott	om/nlain	Lower	1/ 3 . M	id 1/3. (Upper 1/3.) Ridgetop
Station Placement (circle one):	\cup			<i>.</i>	,		,	
Distance from Survey Site Bounda		Units of Me	easure fo	or ALL	Horizonta	l Distanc	es: Me	ters
Station Canopy Cover (circle one):	1 = 0 to 25%	2 = 26 to 50)%. (3 =	= 51 to 7	5%) 4=	76 to 10	0%	
ENVIRONMENTAL CONDITI	NS.							
Official Sunrise Time: 0512	Table	e: North Be	nd B	legin Su	rvey Time	e: 0 47	<u>27</u> e	nd Survey Time: 0657
Temperature at Sunrise: <u>11.5</u>	_ ^I Temp	erature at End	of Surve	ey: <u>1</u>	<u>0</u> "	(circle or	$re \gamma C/c$	or F revised: 2 / 2000
Temperature at Sunrise: <u>11.5</u>								
	HORIZ. VIS.	AUDIBILITY TO	PR	ECIPITA	TION		NOISE	
	HORIZ. VIS. Y TO 100 M *	AUDIBILITY						
	HORIZ. VIS. Y TO 100 M *	AUDIBILITY TO	PR	ECIPITA	TION			NOTES
TIME VERTICAL VIEWING C O O M O O VISIBILI TO 2 CANOP 0 4 Z 7 H1 3 Y	HORIZ. VIS. Y TO 100 M *	AUDIBILITY TO	pr Rain N	ECIPITA	TION	WIND	NOISE	NOTES
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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).

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Obs	erver	Observer (s) Initials:	AJM			Month JUNE Day 28	lune	Day	82	Year ZDO	4	Area Name: <u>/</u> Site Name / No:	No: 15	d d	Watershed
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10S	LVE	SURVEY ACYIVITY	(;			**Note Si	gnifican	it Weat	her C	ignificant Weather Changes on Page 1**	age 1**				revised: 2 / 2000
STATU		DETECTON	INITIAL DETECTION	TYPE		AUDITORY	ä	# BIRDS	ВЕНА	INITIAL FLIGHT	BIRD HEIGHT	CLOSEST DIST. TO	DEPART FLIGHT	FINAL DETECTION	NOTES
IS -1/0	CTION #		DIRECTION		VOCAL SERIES	× J	~	Z UU UU		DIRECTION	SEEN Canopy= 1.0	BIRDS SEEN (units)	DIRECTION	DIRECTION	Heard Only Dist. To Birds (L= Loud, M≃ Moderate, F≃ Faint)
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		H = Heard On	v (no visnal)] V	Seen Only	TVPE: H = Heard Only (no visual) S = Seen Only (eilent) B = Both Seen and Haard	vth Seen								
AU		NRY - Vocal S	ieries (Vocaliz	zatio	$\cos(\mathbf{K} = \mathbf{K})$	ADDITORY - Vocal Series (Vocalizations): $\mathbf{K} = \text{KEER calls, } \mathbf{G} = \text{Groan (alternate) calls, } \mathbf{O} = \text{Whistle or Soft One calls, } \mathbf{I} = I \text{indexivity}$	Groan (alterna	te) cal	lls_0 = Whi	stle or Soft	One calls I	T = I Introven		= None or N/A Indicate the wood type
lear	1 at b	noth the start a	nd end if calls	gra	ide between	heard at both the start and end if calls grade between different types during the detection.	durring 1	the detu	sction.	Indicate th	e number h	eard 1-5 or 1	Indicate the number heard $1-5$ or $M = Multiple$.		OL = Overlapping Vocalizations (Y or N).
<u>aui</u> Reh		AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, BEHA VIOB: F = Flight Over Canomy C = Circle Over Canomy	Non-Vocal So		<u>(ds)</u> : W = W <u> </u>	<u>AUDITORY - Other (Non-Vocal Sounds</u>): W = Wing Sound, J = Jet Sound, — = None or N/A. If both are heard write W / J BEHAVIOR: F = Flight Over Canomy C = Circle Over Canomy T = Fly, Through At an Balance Canomy C = Circle Over	Jet Sou	74	= Non	Jet Sound, — = None or N/A. If = Fly Through At or Bolow Can	f both are hear	eard write W	7/J.		

BEMAYIOK: $\mathbf{r} = \mathbf{r}$ ingut Over Canopy, $\mathbf{U} = \text{Circle Over Canopy}$, $\mathbf{T} = \mathbf{F}$ ly-Through At or Below Canopy (≤ 1.0), $\mathbf{B} = \text{Circle At or Below Canopy}$ (≤ 1.0), $\mathbf{L} = \text{Seen Landing in or Departing From a Tree, <math>\mathbf{S} = \text{Stationary Calling}$ (fixed-point multiple calls <100 m), $\mathbf{U} = \text{Unknown}$. (Check Reverse Side When Using 2-Sided Forms)

WASHINGTON			Survey	Visit to P	rotocol		Page <u>1</u> of <u>2</u>
MARBLED MURREL	ET		(Y or N	, initials):	y cn	4	Total Detections:
FOREST SURVEY F			Species	of Conc	ern (circ	le one, d	etails on last pg.): Y or N
Area Name: $\underline{Cedar River U}$ Station Location - T 21 N, R UTM zone: 10 E (x) coordinate: 6 Observer (s) Name: \underline{Neil} Eff.	1 dershed	circle one) Œ N (y) coord)or w , S _ <u>(</u> dinate: <u>5 } 7 3</u>	132 (<u>(eck</u> Q (1/16) Source:	54/ 671	, of Q (1/4) <u>NE</u> Datum: <u>N4D 13</u> FOM: <u>~</u>
Station Elevation: <u>\$76</u> Ft / Station Placement (circle one): Inside Distance from Survey Site Boundary: _ Station Canopy Cover (circle one): 1	Outside	Units of Me	easure for ALL	Horizonta	l Distanc	es: <u>N</u>	id 1/3) Upper 1/3, Ridgetop
ENVIRONMENTAL CONDITIONS		2 20 10 50	, , , ,	- / 4,			
Official Sunrise Time: $05/2$	- Table:	North Ren		nvey Tim	e: <u>042</u>	<u>7 </u>	nd Survey Time: <u>0627</u>
Temperature at Sunrise: 14,5		rature at End	of Survey: _/	<u>6.5</u> °	(circle or	1e) 🕜 (or F revised: 2 / 2000
TIME VERTICAL VIEWING	HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PRECIPITA RAIN FOG	TION OTHER	WIND	NOISE	NOTES
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		ARBLED I	MURI	WASHINGTON MARBLED MURRELET FOREST		SURVEY FORM	FOR	×		Detections - Area Name:	Detections - This Side Page Total: Area Name: Cerlor River 1	ge Total:	Partie 1	P.E. Z of Z
Observer (s) Initials: Data Reference Numbert,	nitials:	A/EJ			Month <u>O6</u> Day <u>28</u> Units of Measure (circle one):	Day 28	2 <i>8</i> : one):	Vear 22 U.S. $\langle \nabla \rangle$	2007 Metric	Site Name / No: Station Number:	ج 1 (م	sey Clea		
SURVEY ACYIVITY	XTIVIY:			'N**	ote Signifi	cant Wea	ther Ch	**Note Significant Weather Changes on Page 1**	1ge 1**					revised: 2 / 2000
DETECTION #	DETECTON TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY VOCAL SERIES Start End # OL	OTHER W/J	BIRDS SEEN	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS BIRDS SEEN ()	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION		「「「「」」「」「」」「」」「」」」」
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WASHINGTO)NI			Su	urvey V	/isit to P	rotocol		Page <u>1</u> of <u>2</u>
MARBLED		ET		(Y	ť or N,	initials):	Y CM	~}	Total Detections:
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							Ionth_	06	Day <u>29</u> Year <u>2007</u>
Area Name: Lecher	River Wat	teshed	Site Name /	Number:	: <u>S F</u>	t. Ceda	(Rive	NE	Station Number:
Station Location - T_									, of Q (1/4) <u>SE</u>
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Observer (s) Name: <u>Mana</u>	ell Eric	Jensen	Initials: <u>/</u>	E Af	Filiatior	: <u>AKK</u> ,	Inc.	I	Phone: (<u>503) 359-7525</u>
Station Elevation:		M) Positia	on on Slope (ci	ircle one)	: B otte	om/olain,	Lower	1/3, (M	id 1/3,) Upper 1/3, Ridgetop
Station Placement (circle		~	on on Stope (o.			· r ,			
Distance from Survey Si		_	Units of Me	easure for	ALL	Horizonta	l Distanc	es:	eters
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ENVIRONMENTAL (<u>S</u> :		1.					
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Temperature at Sunrise:	-12.0^{-1}	Temp				<u> </u>			1
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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), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), $\mathbf{x} = 0$ impaired (conditions and v for terms 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 = 32-38mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

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	a reard. Emate) calls, $O = Whistle or Soft Que calls, U = Unknown, —detection. Indicate the number heard 1-5 or M = Multiple. OL$	$\mathbf{P} \cdot \mathbf{H} = \mathbf{H} \text{eard Only} (no \text{ regions})$										
		al dout the start and end if ca (TOPV - Other (Nor Visco)	Lis grade	between different t	types during	the detecti	on. Indicate the	e number he	ard 1-5 or M	f = Multiple.	5	apping Vocalizations (Y or N).

WASHINGTON	Sur	rvey Visit to P	rotocol		Page <u>1</u> of \angle
MARBLED MURRELET	(Y	or N, initials):	Y CA	F]	Total Detections:
FOREST SURVEY FORM	Sp				etails on last pg.): Y or N
•••••		M	Ionth _	Sure	Day <u>29</u> Year <u>2007</u>
Area Name: Cedar River Watershedsin	e Name / Number:	Lost cre	ek_		Station Number:
Station Location - T 22 N. R 8 (circle	e one) (È or W, S	s // , QC) (1/16)	<u></u>	, of Q (1/4) <u><u></u></u>
UTM rope: $10 = F(x)$ coordinate: 594882 N	(v) coordinate: 52	250301	Source:	Grs	Datum: NAD 85 FOM:
Observer (s) Name: <u>Alden J. Miller</u> Ini	tials: AJM Affi	iliation: <u>AB</u>	K In	<u>C.</u> F	hone: (<u>503) 359 - 7503</u>
Station Elevation: <u>73</u> Ft / $(\widehat{\mathbf{M}})$ Position on	Slope (circle one):	Bottom/plain,	Lower	1/3, (M	id 1/3) Upper 1/3, Ridgetop
Station Placement (circle one): (inside) Outside Distance from Survey Site Boundary: 0 m Un	hits of Measure for A	ALL Horizontal	Distance	es: <u>M</u>	<u>eters</u>
Station Canopy Cover (circle one): $1 = 0$ to 25%, $2 =$	= 26 to 50%, 3 = 5	1 to 75%, 4 =	76 to 100	0%	
ENVIRONMENTAL CONDITIONS:					0678
Official Sunrise Time: 0513 Table Not	th Bend Beg	in Survey Time	<u>. 040</u>	≜ E	nd Survey Time: 0628
Temperature at Sunrise: 10.5 Temperatur	re at End of Survey:	<u> </u>	circle on	e)/ C/0	or F revised: 2 / 2000
			WIND	NOISE	NOTES
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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).

Automaty: N = 1 imparted (detections may be massed due to continuous), k = 0 continuous and not to transfer 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 & sin. 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 = 32-38mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

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	;		WASHINGTON MARBLED MURRELET FORES	B	RRE	LET T	FO.		SURVEY FORM	ΕYF	OR	5		Detections	Detections - This Side Page Total:	,	D Pr Z	ц Ч
Obse	IVer	Observer (s) Initials:	MIT	· 1			Mc	Month Jure Day	No Da		62	_Year_7	7002	Area Name: <u>C</u> Site Name / No:	No: LOS	S	watrsfield relk	
D	REFO	Data Reference Number		4			ΠŪ	Units of Me	Measure (circle one):	ircle c	ne):	U.S. /(Metrik	Station Number:		_		
SUR	VEY	SURVEY ACVIVITY:					[**	**Note Sigr	nificant	Weath	ter Ch	ignificant Weather Changes on Page 1**	Page 1**				revised: 2,	/ 2000
STATL	DETEC	DETECTON TIME	INITIAL DETECTION	TYPE		AU	AUDITORY	۲	# BIRDS		BEHA	INITIAL FLIGHT	BIRD HEIGHT		DEPART FUGHT	FINAL DETECTION		
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<u>AUD</u> heard	at bo	AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, heard at both the start and end if calls crade herview different times during the detection. Indicate the number hered 1 5 content of the start of	erries (Vocaliza d end if calle	ation	<u>s)</u> : K • hetw	= KEI	ER cal	ls, G = C t tynes di	iroan (al iring the	lternat a dated	e) cali	ls, 0 = WI Indicate t	histle or So.	ft Que calls,	U = Unknown		= None or N/A. Indicate the vocal type	al type
AUD	10	AUDITORY - Other (Non-Vocal Sounds): $W = Wing Sound, J = Jet Sound, = None or N/A. If both are heard vrite W/J.$	Non-Vocal So	spunds		= Win	g Soul	n cypcou nd, J = J _t	at Sound	i l = − l	None	or N/A.	If both are	heard write V	M = Munpie V / J.		$\mathbf{UL} = \mathbf{Uverlapping} \ \mathbf{Vocalizations} \ (\mathbf{Y} \ \mathbf{or} \ \mathbf{N}).$	or N).
BEH Depar	ting]	BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below C Departing From a Tree, S = Stationary Calling (fixed-point multiple calls <100 m), U = Unknown.	t Over Canopy S = Stationary	Call Call	= Circl ling (fi	le Ovi xed-p	er Can oint m	iopy, T = sultiple c	alls <10	nough 0 m),]	At or $U = U$	Below Ca Inknown.	mopy (≤ 1.()), B = Circle		Canopy (< 1 Reverse Sid	= Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or calls <100 m), U = Unknown. (Check Reverse Side When Using 2-Sided Forms)	or (ertins)

Predator: Stellers Jay

(Check Reverse Side When Using 2-Sided Forms)

WASHINGTON			S	urvey V	isit to P	rotocol		Page <u>1</u> of <u>Z</u>
MARBLED MURREL	FT		C	Y or N,	initials):	NIN	ন	Total Detections:
FOREST SURVEY FO			5	Species	of Conce	ern (circl	le one, d	etails on last pg.): Y or \mathbb{N}
					Ν	fonth <u>J</u>	une	Day <u>30</u> Year <u>2007</u>
Area Name: Cedor River Water	rshed	Site Name /	Number	r: <u>Fi</u>	Idley 1	Creek		Station Number:
Station I 7 / NR	10 0	circle one) 🗲	br W	. S	6 . 00) (1/16)	5W	, of Q (1/4) <u>NE</u>
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Observer (s) Name: <u>Alden J.</u>	Aller	Initials: / 1	$\frac{U/n_{A}}{N}$	ffiliation	1: <u>ABI</u>	(In	P	hone: (503 559-7325
Station Elevation: 958 Ft M) Positic	on on Slope (ci	rcle one): Bott	om/plain,	Lower	1/3, M	id 1/3. Upper 1/3, Ridgetop
Station Placement (circle one). Inside,	Outside							
Distance from Survey Site Boundary:	10	Units of Me	easure fo	or ALL	Horizontal	Distance	es: <u>M</u>	efers
Station Canopy Cover (circle one): 1 =	0 to 25%;	2 = 26 to 50	%, 3=	= 51 to 7	5%, 4=	76 to 10	0%	
ENVIRONMENTAL CONDITIONS:								- 0.678
Official Sunrise Time: 0513	Table	North Be	nd B	egin Su	rvey Time	= <u>094</u>		nd Survey Time: 0678
Temperature at Sunrise: 9.5	Temp	erature at End	of Surve	ey: <u>70</u>		(circle on	ie) (C) (or F revised: 2 / 2000
TIME VERTICAL VIEWING	HORIZ.	AUDIBILITY	PR	ECIPITA		WIND	NOISE	NOTES
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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), U = Unknown.

Audibility: N = Impaired (detections may be missed due to conditions), Y = 0 nimpaired (conditions and for relative 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 = 32-38mph (whole trees move), 8 = 39-46 mph (twigs & sm. branches break).

inpri (whole frees move), $\mathbf{o} = 59-40$ mpri (wigs & sin. orancies of ax). **Noise:** $\mathbf{N} = \text{None}$, $\mathbf{A} = \text{Aircraft}$, $\mathbf{B} = \text{Bird song/calls}$, $\mathbf{C} = \text{Creek/water drainage}$, $\mathbf{M} = \text{Machinery}$, $\mathbf{P} = \text{Rain/hail}$, $\mathbf{T} = \text{Tree drip}$, $\mathbf{V} = \text{Vehicle}$, $\mathbf{W} = \text{Wind}$, $\mathbf{O} = \text{Other}$ (explain in Notes).

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hearc	at bo	AUDITURY - VOCAI SERVES (VOCAUZATIONS): K = KEER calls, G = heard at both the start and end if calls grade between different types	erres (Vocaliz: d end if calls	ation grade	s): K = KEE between dif	AUDITION - VOCH SERVES (VOCHIZATIONS): $K = KEER$ calls, $G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, heard at both the start and end if calls grade between different tynes during the detection Indicate the number heard 1.5 or M = M. Hender,$	oan (alten ring the de	tection	Groan (alternate) calls, $\mathbf{O} = \mathbf{W}$ instle or Soft Que calls, $\mathbf{U} = \mathbf{U}n\mathbf{k}n\mathbf{o}\mathbf{w}$, during the detection Indicate the number based 1.5 or $\mathbf{M} = \mathbf{M}_{1}$, \mathbf{M}_{2} .	stle or Soft mumber he	Que calls, \mathbf{U}	I = Unknown	-	= = None or N/A. Indicate the vocal type
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	ting j	BEATAVIOK: F = Fight Uver Canopy, C = Circle Over Canopy, T Departing From a Tree, S = Stationary Calling (fixed-point multiple	it Uver Canopy S = Stationary	ς Ω	= Circle Ove. ling (fixed-po		Fly-Throu 1s <100 m	gh At ∕∐≣	= Fly-Through At or Below Cano calls <100 m) II = Unknown	ypy (≤ 1.0),	B = Circle	At or Below	Canopy (≤ 1.0)	= Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or calls <100 m) Ti = Trichown
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WASHINGTON	Survey Visit to Protocol		Page <u>1</u> of <u>2</u>
MARBLED MURRELET	(Y or N, initials): Y CA	· b	Total Detections:
FOREST SURVEY FORM	Species of Concern (circ	le one, de	etails on last pg.): Y or (N)
	Month	07	Day <u>06</u> Year <u>2007</u>
	mber: <u>155.1</u> A		Station Number:
Station Location - T 72 N, R /O (circle one) (E) or	w,s <u>30</u> , qq(1/16)	Nul	, of Q (1/4) <u>SE</u>
UTM zone: 10 E (x) coordinate: 607 495 N (y) coordinate	te: 524 5965 Source:	GPJ	Datum: <u>N4085</u> FOM:
Observer (s) Name: Ne, 1 Elic Jensen Initials: NE)	_ Affiliation: <u>ARR, Inc.</u>	P	hone: (563) 359-7525
Station Elevation: <u>899</u> Ft / D Position on Slope (circle	one): Bottom/plain. Lowe	r 1/3, M i	d 1/3, Upper 1/3, Ridgetop
Station Placement (circle one): Inside, Outside	(ind): 2000000 pre,	. ,	
Distance from Survey Site Boundary: Units of Measur	re for ALL Horizontal Distance	ces: <u>Ne</u>	ters
Station Canopy Cover (circle one): $1 = 0$ to 25%, $2 = 26$ to 50%,			
ENVIRONMENTAL CONDITIONS:			
Official Sunrise Time: 5/7 Table: North Bend, WA			nd Survey Time: <u>0632</u>
Temperature at Sunrise: <u>10.0</u> ¹ Temperature at End of Su	urvey: <u>12.0</u> (circle o	ne) (C) o	r F revised: 2 / 2000
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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).

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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).

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Sarting From a Tree, S = Stationary Calling (fixed-point multiple calls <100 m). U = Unknown.	<u>HAV</u>	<u>ORY - Other</u> 70 <u>R</u> : F = Flig	<u>(Non-Vocal So</u> ht Over Canopy	K.C∎): W = = Circle	Wing Over	Sound	$\int_{V} J = Jet$ w. $T = F$	Sound, lv-Throi	√ = − A dat	done or ♪ t or Belo	V/A. If I w Canor	both are $1 \text{ or } (< 1.0)$	neard write $\mathbf{R} = Circle$	W / J. e Ator Relo	ir Canomi (< 1	1 = Coon I andiur in an
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WASHINGTON MARBLED MURRELET FOREST SURVEY FORMSurvey Visit to ProtocolTage(Y or N, initials): Y [GetTotal Detections:Species of Concern (circle one, details on last pg.): Y or N ;Area Name: $Ledac$ $River$ $Watriched$ Site Name / Number: $Month_07_Day_08_Year_2007$ Area Name: $Ledac$ $River$ $Watriched$ Site Name / Number: $Month_07_Day_08_Year_2007$ Station Location - T_22_N, R_9_(circle one) E or W, S_1/6_, QQ (1/16) NE_{-} , of Q (1/4) $Station$ UTM zone:10 E (x) coordinate: 600.411_N (y) coordinate: $51.992.52_N$ Source: LPI Observer (s) Name: $Aei/Feric_hensen_Initials: A/E_1_Affiliation:ABR, IncPhone: (503).3(9-7525_N)Station Elevation:723_NFt / MStation Placement (circle one)InsideOutsideAffiliation: ABR, IncPhone: (503).3(9-7525_N)Station Placement (circle one)N (y) coordinate:Affiliation: ABR, IncPhone: (503).3(9-7525_N)$
FOREST SURVEY FORMSpecies of Concern (circle one, details on last pg.): (Y) or (N)Area Name: $Ledac$ $River$ $Waterched$ Site Name / Number: $Month_07_Day_08_Year_2007$ Area Name: $Ledac$ $River$ $Waterched$ Site Name / Number: $Month_07_Day_08_Year_2007$ Station Location - T_22_N, R_9_(circle one) E or W, S_/6, QQ (1/16) NE , of Q (1/4)UTM zone: 10 E (x) coordinate: 600 4//N (y) coordinate: 51 49252Source: CPI Observer (s) Name: $Aeil Eric_ensen$ Initials: NE_1 Affiliation: $ARR, Inc_{}$ Phone: (503) 3(9-7525)Station Elevation: $723_{}$ Ft / MPosition on Slope (circle one):Bottom/plain, Lower 1/3, (Mid 1/3,) Upper 1/3, RidgetopStation Placement (circle one):Inside, Outside u u
$\begin{array}{c} \text{Month } 07 \text{Day } 08 \text{Year } 2007 \\ \text{Area Name: } (\underline{Ledac \ River \ Waterched Site Name / Number: } (\underline{Leder \ North \ Station Number: }] \\ \text{Station Location - T } 22 N, R 9 (circle one) F \text{ or } W, S /6 , QQ (1/16) \underline{NE} , of Q (1/4) \underline{SU} \\ \text{UTM zone: } 10 E(x) \ coordinate: \underline{600\ 6/l} \qquad N(y) \ coordinate: \underline{5J\ 492\ 52} \qquad Source: \underline{LPI} Datum: \underline{MAD\ 53} \ FOM: _ \\ \text{Observer (s) Name: } \underline{Meil\ Eric \ Lensen \ Initials: } \underline{JEI} Affiliation: \underline{ARR, Inc. \ Phone: } (\underline{503}) \underline{359-7525} \\ \text{Station Elevation: } \underline{723} Ft \ / \ M Position \ on \ Slope \ (circle \ one): \ Bottom/plain, \ Lower 1/3, \ (Mid\ 1/3) \ Upper 1/3, \ Ridgetop \\ \text{Station Placement} \ (circle \ one) \ Inside \ Outside \ det \ $
Area Name: Ledac River Waterched Site Name / Number: Checker Math Station Number:
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UTM zone: <u>10</u> E (x) coordinate: <u>600 & 11</u> N (y) coordinate: <u>51 492 52</u> Source: <u>600</u> Datum: <u>MAD 80</u> FOM: <u>-</u> Observer (s) Name: <u>Meil Ecic Jensen</u> Initials: <u>A/E1</u> Affiliation: <u>ARR, Inc.</u> Phone: (<u>503</u>) <u>3(9-7525</u>) Station Elevation: <u>723</u> 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
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Station Elevation: <u>723</u> 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
Station Placement (circle one) Inside, Outside
Distance from Survey Site Boundary: Om 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: Abrth Read, W/A Begin Survey Time: 0434 End Survey Time: 0634
Temperature at Sunrise: // Temperature at End of Survey: /? (circle one) or F revised: 2 / 2000
TIME VERTICAL VIEWING HORIZ. AUDIBILITY PRECIPITATION WIND NOISE NOTES
CONTRACT VISIBILITY TO 100 M 200 M RAIN FOG OTHER
0434 HE 3 Y Y Y N N N O N Begin Survey, High Egg
0438 HI 3 Y Y Y N N N O N
OSOTHT3 Y Y Y N N BI N
0519HT 3 Y Y Y N N N Z N Sunrise
OS44HTZYYYNNN2N
0550HT 2 Y Y Y N N N 2 N Enducier
0634HIZYYY NNN ZN Enduciey
0634H22711NNN2N2N
0634H12 Y I I N N N Z N H12Y

Cloud Cover: $\theta = 0\%$, 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).

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SURVEY	SURVEY ACYIVITY:			**Note	Significant	Weath	**Note Significant Weather Changes on Page 1**	1ge 1**				revised:	ed: 2 / 2000
DETECTION # STATUS -1/O	DETECTON TIME	INITIAL DETECTION DIRECTION	TYPE	AUDITORY VOCAL SERIES C Start End # OL	# BIRDS OTHER SEEN W/J			BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS SEEN ()	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist To Birds (L= Loud, M= Moderate, F= Faint)	To Birds ate, F= F,
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MARBLED MURRELI	=т		C	Y or N,	initials):	YCA	7	Total Detections:
FOREST SURVEY FO			S	Species	of Conce	ern (circ	le one, d	etails on last pg.): Y or (N)
-					Ν	10nth(07	Day <u>09</u> Year <u>200</u> 7
Area Name: Cedar River Wate	ched	Site Name /	Number	r: <u>_</u>	<u>t Ca</u>	ek_		Station Number:
Station Location - T 72 N, R	8_(circle one) 🗡)or W	, s _/ /	/, Q0	Q (1/16) _	Sh/	, of Q (1/4) <u>Sh/</u>
UTM zone: 10 E (x) coordinate: 6.	20 8/1	N (y) coord	linate:	5249 8	252	Source:	695	Datum: <u>N40 93</u> FOM:
Observer (s) Name: Neil Ecic	ensen	Initials: <u>M</u>		ffiliation	1: <u>ABR</u>	, Inc	P	hone: (503) 359 - 7525
Station Elevation: Ft / 🕥							-	id 1/3.) Upper 1/3, Ridgetop
		n on stope (c		<i>)</i> . 1 000	one prant,	Lonor		
Station Placement (circle one): Inside, Distance from Survey Site Boundary:	-	Units of Me	asure fo	r ALL]	Horizontal	Distanc	es: N	eter
Station Canopy Cover (circle one): 1 =	0 to 25%.	$2 = 26 \text{ to } 50^{\circ}$	% 3=	51 to 7	5%,)4=	76 to 10	0%	-
ENVIRONMENTAL CONDITIONS:								
Official Sunrise Time: 0520	Table:	Ab Ah Ben	I,WAB	egin Su	rvey Time	e: <u>043</u>	<u> </u>	nd Survey Time:
Temperature at Sunrise: <u>13,5</u>		erature at End						
TIME VERTICAL VIEWING	HORIZ.	AUDIBILITY'	PR	ECIPITA	TION	WIND	NOISE	NOTES
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Celling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to \leq 2.0 canopy height, LO = \leq 1.25 canopy height, U = Unknown Cloud Cover: $\theta = 0\%$, 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).

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15	15	AUDI	TOR	tY - Vocal Se	eries (Vocaliza	ation	$\mathbf{x} = \mathbf{K} = \mathbf{K} \mathbf{E} \mathbf{R} \mathbf{K}$	calls G = Gross	an (altern	ate) c	alls $\mathbf{O} = \mathbf{W}$ hi	atle or Coff	Oue calle E	- I Inbaar		
		heard	at bo	th the start an	d end if calls ¿	grad	le between diffe,	rent types duri	ng the de	tectio	n. Indicate the	s number h	sard 1-5 or N	$\mathbf{M} = \mathbf{M}$ ultiple.	1 5	ar IN/A. Inducate the vocat anning Vocalizations (V or
	BEHAVIOR: F = Flight Over Canomy C = Circle Over Canomy T = Fly, Through At or Balow, Canomy (21 to 10 - Circle At a - Fried or Canomy C = Circle At a - Cir	AUDI	IOI	ty - Other 0	Non-Vocal So	pund	$s_{s} = w_{s} = w_{s}$	ound, $J = Jet S$	Sound –	N =	ine or N/A. If	both are he	ard write W	. / J.		n a) summing a Suida

or below canopy (≤ 1.0), L = Seen Landing in or(Check Reverse Side When Using 2-Sided Forms)

ŝ j 2 Departing From a Tree, S = Stationary Calling (fixed-point multiple calls <100 m), U = Unknown.

WASHINGTON

MARB	LED N	IURRE	LET			(Y or N	, initials)	· Y Cm	6	Total Detections: 🖉
FORES	ST SU	RVEY F	ORM			Specie	s of Conc	ern (ciro	cle one, o	letails on last pg.): (Y) or N
							ľ	Month	Tuly	Day 09 Year 2007
Area Name:	Cedar R	iver wate	rshed	Site Name	/ Numbe	er: <u>-50</u> w	16 Fork 6	edur Ri	Ver No.	rth Station Number:
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UTM zone:	<u>10</u> E (x) c	oordinate:	611067	N (y) coor	dinate:	574	2333	Source:	GPS	_ Datum: <u>MAP 83_</u> FOM:
Observer (s)	Name: <u>A</u>	Iden J. 1	Miller	Initials: <u>A</u>	TM A	ffiliatio	n: <u>AB</u>	R'In	د	Phone: (503) 359-7525
Station Eleva	tion: <u>6</u> 2	59 Ft /	M Positi	on on Slope (c	ircle on	e): Bot	tom/plain,	Lower	1/3, (M	lid 1/3, Upper 1/3, Ridgetop
Station Place										
Distance from	n Survey Si	te Boundary:	<u> 0 m</u>	Units of M	easure f	or ALL	Horizonta	l Distanc	es: <u>Me</u>	ters
Station Cano	py Cover (c	ircle one): 1	l = 0 to 25%	2 = 26 to 50)%, 3=	= 51 to	5%, 4 =	= 76 to 10	0%	
ENVIRONM	<u>IENTAL (</u>	ONDITION	<u>s</u> :	<i>d u</i> o	4			010	2	0675
Official Sunr										and Survey Time: 0635
Temperature	at Sunrise:	<u></u>	¹ Temp	erature at End	of Surv	ey: <u> </u> Z	<u>~0_</u> "	(circle or	1e) ('C	or F revised: 2 / 2000
TIME	VERTICA	L VIEWING	HORIZ.	AUDIBILITY	ΡŔ	ECIPITA	TION	WIND	NOISE	NOTES
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				:		1				ight, U = Unknown.

Survey Visit to Protocol

Page <u>1</u> of \angle

Cloud Cover: $\theta = 0\%$, 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).

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50 Ins	VEX	SURVEY ACYIVITY	TY:			π	**Note	Signific	ant We	uther (**Note Significant Weather Changes on Page 1**	ge 1**				revised: 2 / 2000	2000
STATI	DETE	DETECTON	DETECTION	TYPE Z	TYPE	AUDITORY	оку		# BIRDS	BEHA	INITIAL FLIGHT	BIRD HEIGHT	CLOSEST DIST. TO	DEPART FLIGHT	FINAL DETECTION	NOTES	
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AU	DITC	JRY - Voci	AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown,	ulizati	ions):	K = KEER	calls, G	; = Gros	ın (alter	nate) (calls, O = Whi	istle or Sof.	t Que calls, 1	U = Unknowr		= None or N/A. Indicate the vocal type	l type
heau A I I	d at t	both the star	heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or $M = Multiple$. AUDITODY - Other (Non-Vocal Sounds): $W = Wing Sound = 1 = 1 et Sound = = 5$ hous or N/A . If hoth are heard write $W / 1$	lls gr Sour	rade be	stween diffe V = Wing S	rent typ	bes during the $I = I_{ef} Sound$	ng the d	etectic ∎ N	detection. Indicate the number heard 1-5 or $M = \frac{1}{2} = N_{OMB} = r$ N/A If hoth are heard units W / T	ie number } ? hoth are h	ieard 1-5 or eard unite U	M = Multiple v / 1	, OL = Overl	$\mathbf{OL} = \mathbf{Overlapping Vocalizations} (\mathbf{Y} \text{ or } \mathbf{N}).$	Ž.
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Departing From a Tree, S = Stationary Caling (Excorpoint multiple calls <100 m), U = Unknown. Predators: Steller's Júy, Common Rayen Sorieive of conversion, Privato A 1.100 kon

(Uneck keverse stae when Using 2-staen Forms)

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FOREST SURVEY FOR	ORM			Specie	s of Conc	ern (circ	le one, c	letails on last pg.): Y or N
					N	Month I	uly	Day <u>10</u> Year <u>2007</u>
Area Name: <u>Cedar River Waters</u> Station Location - T <u>ZI</u> N, R	,hed	Site Name /	Numbe	er:	Findle	y Cre	<u>ett</u>	Station Number:)
Station Location - T N, R_	<u> 10 (</u>	circle one) (E) or W	, s(<u>o</u> ,Q	Q (1/16)	SW	_, of Q (1/4) <u>NE</u>
UTM zone: 10 E (x) coordinate: 60	6326	N (y) coor	dinate: _	524	360	Source:	GPS	_ Datum: <u>NH0 83</u> FOM:
Observer (s) Name: <u>Alden J. M</u>	1,11er	Initials: <u>A</u>	<u>7</u> A	ffiliatio	n: <u>AB</u> K	? Ine]	Phone: (573) 359-7525
Station Elevation: <u>958</u> Ft /M) Positio	on on Slope (ci	ircle one	e): Boti	om/plain.	Lower	1/3. M	id 1/3 Upper 1/3, Ridgetop
Station Placement (circle one): Inside, (,	,,		<u> </u>	
Distance from Survey Site Boundary:		Units of Me	easure fo	or ALL	Horizonta	l Distanc	es: <u>M</u> e	fers
Station Canopy Cover (circle one) 1 =								
ENVIRONMENTAL CONDITIONS:								
Official Sunrise Time: 0520	Table [.]	North Be	nd B	egin Su	rvev Tim	- DUS	5 в	nd Survey Time: 0635
Temperature at Sunrise: <u>12.5</u>		erature at End						
Temperature at Sunrise: 12.5			of Surve		·.0			
Temperature at Sunrise: 12,5 TIME VERTICAL VIEWING	Tempe HORIZ. VIS.	erature at End	of Surve	_{ey: 13}	·.0	(circle on	ie) (Ĉ) (or F revised: 2 / 2000
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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: $\theta = 0\%$, 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).

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Ň	NSH	INGTON 	WASHINGTON MARBLED MURRELET FOREST	Ŋ	RREL	ETF	ORES		SURVEY FORM	õ	RM		Detections -	Detections - This Side Page Total:	ge Total	1. D PE. Z of Z
Obs Des	erver s Ref	Observer (s) Initials: Data Reference Númik	Observer (s) Initials: AJM			- -	Month Units o	Month July Units of Measu	Month <u>July</u> Day <u>10</u> Units of Measure (circle one):	0 / 0	Year 2 U.S. /		Area Name: Site Name / No: Station Number:	No: Hip	TINdley C	Creek
5	KE.	SURVEY ACYIVITY					**Note	Signifi	cant We	ather	**Note Significant Weather Changes on Page 1**	ige 1**				revised: 2 / 2000
STAT		DETECTON	INITIAL DETECTION	TYPE		AUDITORY	оку		# BIRDS	BEHA	INJTIAL FLIGHT	BIRD HEIGHT	CLOSEST DIST. TO	DEPART FLIGHT	FINAL DETECTION	NOTES
US -1/0	CTION #				VOCA Start E	VOCAL SERIES	5	OTHER W/J	SEEN	VIOR	DIRECTION	SEEN Canopy= 1.0	BIRDS SEEN :() units	DIRECTION	DIRECTION	Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
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		H = Heard On	TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard ATDITODY Visual Society (Visualise 200), $V = VEED$ and $C = Constraints 200$	S = S	Seen On	y (siler Veen	11), B =	= Both S	een and	Hear	Soth Seen and Heard.	1 - C - C - C - C - C - C - C - C - C -	- 11-0	11		
hear	d at l	both the start	heard at both the start and end if calls grade between different types during the detection. Indicate the number heard $1-5$ or $M = Multiple$.	brag.	le betwei	an diffe	rent ty	pes duri	ing the d	etecti	on. Indicate th	e number l	reard 1-5 or	$\mathbf{M} = \mathbf{M}$ ultiple		$\mathbf{OL} = \mathbf{Overlapping Vocalizations (Y or N)}$.
	<u>IAV</u>	<u>IOR: F = Flig</u> From a Tree	BEHAVIOR: F = Flight Over Canopy, C = Circle Over Canopy, Departing From a Tree. S = Stationary Calling (fixed-point multip)	v, Cal Cal	lline (fix	ving : Over (ed-noin	sound, Canopy it multi	, T = F , T = F , nle call	sound - ly-Throu s <100 n	a BrA Bra	= Jet Sound, \rightarrow = None of N/A. If boln are neard write W / J. T = Fiy-Through At or Below Canopy (\leq 1.0), B = Circle At c le calle <100 m) If = Unknown	r bom are r topy (≤ 1.0), B = Circle	v / J. : At or Below (Check	Canopy (≤ 1. Reverse Sid	= Jet Sound, = None of N/A. If oom are neard write w / J. T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or le calls <100 m) If = Unknown
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WASHINGTON			1	Survey	Visit to F	rotocol		Page <u>1</u> of <u>2</u>
MARBLED MURREI	LET		((Y or N	, initials)	: y 6~	4	Total Detections:
FOREST SURVEY F	ORM			Specie	s of Conc	ern (circ	le one, c	letails on last pg.): Y or N
Area Name: $\underline{Codar} River W$ Station Location - T_Z/_N, R UTM zone: 10 E (x) coordinate:0 Observer (s) Name: <u>$Meil Eric$</u>	<u>10</u> () 611924	circle one) (E N (y) coor	Dor W dinate:	,s 524	uth For 0_, Q 1408	<u>k (eð</u> Q (1/16) Source:	ar Rive NW GPS	_, of Q (1/4) <u></u> _ Datum: <u>_//<i>A</i>[783</u> FOM:
Station Elevation: <u><u>80</u>/ Ft / (Station Placement (circle one) <u>Inside</u> Distance from Survey Site Boundary: Station Canopy Cover (circle one): <u>1</u></u>	1) Positio Dutside	on on Slope (c Units of Me	ircle one easure fo	e): Bot	tom/plain ₄ Horizonta	Lower	1/3) M es:	id 73, Upper 1/3, Ridgetop
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Official Sunrise Time: 0(20		North Re.	du/A B	legin Su	rvey Tim	e: <u>////?</u>	<u>/</u> E	ad Survey Time: 0635
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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).

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			DETECTION #		VOCAL Start En	ITORY IES OTHER # OL W/J	BIRDS SEEN	INITIAL FLIGHT DIRECTION BEHANOL	BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS SEEN	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist (L= Loud, M= Moder	To Birds ate, F= Faint
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WASHINGTON	Survey Visit to Protoc	ol	Page <u>1</u> of <u>2</u>
MARBLED MURRELET	(Y or N, initials):	[ميس	Total Detections:
FOREST SURVEY FORM	•		letails on last pg.): Y or N
	Month	July	Day <u>11</u> Year <u>2007</u>
Area Name: Cedar River WaterShed Site Name / Numi	iber: <u>Taylor R</u>	; dge	Station Number:
Station Location - $T \underline{ZZN} N, R \underline{SE}$ (circle one) E or V	w, s, QQ (1/1	6 <u>Xiv</u>	, of Q (1/4) <u>N</u>
UTM zone: <u>10</u> E (x) coordinate: <u>594878</u> N (y) coordinate	e: <u>529 7067</u> Source	e: <u>615</u>	_ Datum: <u>NAV 85</u> FOM:
Observer (s) Name: <u>Alden J. Miller</u> Initials: <u>AJM</u>	Affiliation: <u>ABK</u>	Inc. I	Phone: (203) 35 7 - 15 25
Station Elevation: 1053 Ft /M Position on Slope (circle o	one): Bottom/plain, Lov	ver 1/3, M	id 1/3, Upper 1/3 Ridgetop
Station Placement (circle one). (Inside) Outside			
Distance from Survey Site Boundary: Units of Measure	e for ALL Horizontal Dista	nces: <u>M</u>	eters
Station Canopy Cover (circle one): $1 = 0$ to 25%, $2 = 26$ to 50%) 3			
ENVIRONMENTAL CONDITIONS:	d	171	D621
			ind Survey Time: <u>0636</u>
Temperature at Sunrise: <u>22</u> Temperature at End of Sur	rvey: <u> </u>	one) (\mathbf{C})	or F revised: 2 / 2000
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Cloud Cover: $\theta = 0\%$, 1 = 33%, 2 = 66%, 3 = 100%.

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ΞS.	SURVEY	Y ACYIVITY	ry:			0N**	te Signific	ant Wea	ther (<pre>**Note Significant Weather Changes on Page 1**</pre>	age 1**				revised: 2 / 2000
STATU	DETEC	DETECTON	N INITIAL DETECTION	TYPE	7/27	AUDITORY		# BIRDS	BEHA	INITIAL FLIGHT	BIRD HEIGHT	CLOSEST DIST, TO	DEPART FLIGHT	FINAL	NOTES
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		H = Heard O	TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard ATTENTORY VISUAL Sector ATTENTION ($V = V + V + V + V + V + V + V + V + V + $	S =	= Seen O	nly (silent), B	= Both Se	ten and F	leard		2 7 7				
hear	d at l	both the start	A DITION - You SETTER (YOUT ALL OF A DIRECT ONLY, $G = COORT (ALL OF A) CALS, U = WINSTLE OF SOTT QUE CALS, U = UNKNOWN, heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple.$	s gra	ade betwi	= NELK Calls, sen different t	ypes durin	un (autern ug the de	tectio	calls, $\mathbf{U} = \mathbf{W}\mathbf{h}$ m. Indicate the	istle or Sof	t Que calis, I leard 1-5 or]	U == Unknown M = Multiple		m = None or N/A. Indicate the vocal type OL = Overlapping Vocalizations (Y or N).
<u>au</u>	<u>IAV</u>	$\frac{\mathbf{ORY} - \mathbf{Other}}{\mathbf{TOB} \cdot \mathbf{F} = \mathbf{FI}_{i}$	AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, — = None or N/A. If both are heard write W / J BEHAVTOB: F = Flinth Over Correct Original Over Correct T = Fly: Theorem A = Polymon Correct (2,10) = -Ciril A	E S	- A:(Spi	= Wing Sound	. J = Jet S T – Eh	ound, –	ž :	one or N/A. I	f both are h	eard write W	V/J.		
D D	artin	g From a Tre	Departing From a Tree, S = Stationary Calling (fixed-point multiple calls <100 m), $U = Unknown$.	ς Υ Δ	alling (fi	xed-point mul	tiple calls	-100 m		ul below Cal = Unknown.	upy (S 1.0), b = Uncle	AT OT BELOW (Check	Lanopy (≤ 1 Reverse Sid	$\mathbf{r} = r_1 \mathbf{y} \cdot m$ ought At the below Cartopy (≤ 1.0), $\mathbf{B} = Cucke At of Below Cartopy (\leq 1.0), \mathbf{L} = Seen Landing in of the calls <100 m), \mathbf{U} = Unknown.$

WASH	INGTO	ON			ŝ	Survey	Visit to I	Protocol		Page <u>1</u> of <u>2</u>
		IURRE	LET		((Y or N	, initials)	: <u> </u>	4	Total Detections:
		RVEY F				Species	s of Conc	ern (circ	ele one, d	letails on last pg.): (Y) or N
Area Name: Station Locat UTM zone: _	<i>Cedar</i> ion - T _ 10_E(x) c	<i>River w</i> <u>22</u> N, 1 coordinate:	latersher R 196282	N (y) coor	or W	,s_1 524	<u>xk (</u> 3_, 0 8774	<u>cek</u> Q (1/16) Source:	Sw/ GPS	Day _// Year <u>2007</u> Station Number: <u>2</u> , of Q (1/4) <u>SE</u> Datum: <u>NAD83</u> FOM: <u>0</u> Phone: (<u>63) 359-7525</u>
Station Place Distance fror	ment (circle n Survey Si	e one): Insid te Boundary:	e) Outside	on on Slope (c Units of M 2 = 26 to 50	easure fo	or ALL	Horizonta	l Distanc	es: <u>M</u> a	id 1/3, Upper 1/3. Ridgetop
ENVIRONN Official Sum	IENTAL (rise Time: {	CONDITION	<u>S</u> : Table		d, WAB	legin Su	ırvey Tim	e: <u>043</u>	<u>6 </u> в	End Survey Time: <u>0636</u> or F revised: 2/2000
TIME		VISIBILITY TO 2 CANOPY	HORIZ. VIS. TO 100 M	AUDIBILITY TO 200 M	PR RAIN	ECIPITA FOG	TION OTHER	WIND	NOISE	NOTES
0436	UL 0 UL 0 UL 0	Y Y Y	Y Y Y	Y Y Y						Begin Survey Sumrice End Survey
Cloud Cover Vertical Visil Horizontal V Audibility: N Precipitation Wind: 0 = <1	: 0 = 0%, 1 = bility: N = Ir isibility: N = = Impaired - Rain & Fe mob (calm)	33%, $2 = 66%npaired (detectiImpaired (detections may(detections mayog: N = None, l1 = 1.3$ mph (, $3 = 100\%$. ions may be m ections may be y be missed du L = Light, M = leaves barely t	issed due to con e missed due to e to conditions) = Moderate, H = nove), 2 = 4-7 p	iditions), condition , Y = Uni Heavy. nph (leav.	Y = Units s), $Y = UimpairedOther: Ies rustle$.	mpaired (co Jnimpaired (condition II = Hail, S sm. twigs	onditions a (condition s allow for = Snow. move), 3 =	allow for n ns allow for reliable d Indicate in = 8-12 mpl	cight, U = Unknown. eliable detection), U = Unknown. or reliable detection), U = Unknown. letection). ntensity using same codes for rain & fog. h (leaves & sm. twigs in constant g, branches in constant motion), 7 = 32-38

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 = 32-36 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).

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Entry Pater Distance Bana	

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No: A.K. DEPART DEPART FLIGHT DIRECTION DIRECTION DIRECTION DIRECTION DIRECTION DIRECTION DIRECTION A for Below (Check I	WASI	HINGTON A	WASHINGTON MARBLED MURRELET FOREST	AURREL	ET FORE		SURVEY FORM	RORM	_		Detections -	This Si		2. 1 Pg. 2. of 2
Page 1** Page 1** Page 1** BIRD Instruction BIRD SEEN BIRD Instruction BIRD Instructin BIRD Instructi	Observi Data Re	er (s) Initials:		1	Mont	h of Measu	_ Day _ re (circle			\land	Area Name: Site Name / Station Num	No: Rack	Licek	, ,
N BIRD SEEN SEEN SEEN Canopy= () () () () () () () () () () () () () () ()	SURVE				0N**	te Signific	ant Weal	her Cha	inges on Pa					revised: 2 / 20
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		-0504								•				1ct when
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 . .		63												End Survey
. </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>•</td> <td></td> <td></td> <td></td> <td></td>										•				
Image: Second state stat	el inte									•				
\cdot	a antific				1					•				
The formula probability $\mathbf{U} = \mathbf{U}$ where $\mathbf{U} = \mathbf{U}$ is the number heard 1-5 or $\mathbf{M} = \mathbf{M}$ while \mathbf{U} is the number heard $\mathbf{U} = \mathbf{U}$ or $\mathbf{M} = \mathbf{M}$ with \mathbf{U} . If both are heard write \mathbf{W} / J . The number $\mathbf{U} = \mathbf{U}$ is a specific or $\mathbf{U} = \mathbf{U}$ of $\mathbf{U} = \mathbf{U}$ is the transformed of transfo										•				
Abistle or Soft Que calls, $U = Unknown$, the number heard 1-5 or $M = Multiple.$ If both are heard write W / J . (Check R	1. J. J.													
/histle or Soft Que calls, $\mathbf{U} = \mathbf{U}nknown$, the number heard 1-5 or $\mathbf{M} = \mathbf{M}ultiple$. If both are heard write \mathbf{W} / J . (anopy (≤ 1.0), $\mathbf{B} = Circle At$ or Below C										•				
the number heard 1-5 or M = I If both are heard write W / J. anopy (≤ 1.0), B = Circle At or	YPE:	H = Heard Onl ORY - Vocal S	y (no visual), S eries (Vocalizat	= Seen Onl hons): K =	y (silent), B KEER calls,	= Both Se G = Groa	en and H n (altemé	eard. tte) calls	s, 0 = Whi	stle or Soft	Que calls, I	J = Unknown		or N/A. Indicate the vocal ty
	UDIT	ORY - Other J JOR: F = Fligt	Non-Vocal Sou 11 Over Canopy.	$\frac{mds}{C} = Circle$	Wing Sound, Over Canon	$\mathbf{J} = \mathbf{J} \mathbf{e} \mathbf{f} \mathbf{S}$ $\mathbf{V}, \mathbf{T} = \mathbf{F} \mathbf{V}$	ound, — ·-Throuel	= None At or I	or N/A. If Selow Can	both are h (< 1.0)	eard write W B = Circle	vi = Murupie 7 / J. At or Below	Canony (< 14	apping Vocalizations (Y or N)) I = Seen I anding in or
	epartin	ig From a Tree,	S = Stationary (Calling (fixe	ed-point mul	tiple calls	<100 m)	U = U	uknown.	().1 () (do		Check	Reverse Side)), L – Seen Langing III of When Using 2-Sided Form

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Species of Corcan : MASE (010

WASHINGTON		:	Survey	Visit to I	Protocol		Page <u>1</u> of <u>2</u>		
MARBLED MURRELET			(Y or N	(, initials)	: y es	1 ^b	Total Detections:		
FOREST SURVEY FORM	ł		Specie	s of Cond	ern (cire	cle one, o	ietails on last pg.): 🕅 or N		
				. 1	Month	07	Day <u>12</u> Year <u>2007</u>		
Area Name: Codar River Watershe	Site Name	/ Numbe	er: <u></u>	dey (Jeek.		Station Number: 3		
Station Location - T 2/ N, R 9	_ (circle one) (H	or w	, S	<u>4</u> , q	Q (1/16)	NW	_, of Q (1/4) <u>SE</u>		
UTM zone: 10 E (x) coordinate: 60/199	5N (y) coor	dinate:	524	13286	Source:	GPS			
Observer (s) Name: <u>Meil Eric Jensen</u>	<u>nitials:</u>	<u>el</u> a	filiatio	n: <u>AB</u>	<u>, Inc</u>		Phone: (<u>63) 3(9-7(25</u>		
Station Elevation: <u>849</u> Ft / M Pos	ition on Slope (c	ircle one	e): Bot	tom/plain,	Lower	r 1/3, M	lid 1/3 Upper 1/3, Ridgetop		
Station Placement (circle one): Inside, Outside									
Distance from Survey Site Boundary:	Units of M	easure fo	or ALL	Horizonta	l Distanc	ces: <u>Me</u>	tels_		
Station Canopy Cover (circle one): $(1 = 0 \text{ to } 25)$	2 = 26 to 50 $\frac{1}{2}$)%, 3=	= 51 to 7	5%, 4 =	= 76 to 10	0%	······································		
ENVIRONMENTAL CONDITIONS:	(10					·			
		,				_	and Survey Time: <u>0637</u>		
Temperature at Sunrise: <u>/4.0</u> Tem	nperature at End	of Surv	ey:/	<u>۳ _ ۲.۲</u>	(circle o	ne) (C)	or F revised: 2/2000		
TIME VERTICAL VIEWING HORIZ	AUDIBILITY	PR	ECIPITA	TION	WIND	NOISE	NOTES		
	то 200 м	RAIN	FOG	OTHER					
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							PILL		
0437 <u>UL0Y</u> 0443UL0Y			N		7	\overline{N}	Regin Survey		
04450L0YY	Y	N		N	·		Suncise.		
0522ULOYYY NNNIN Endsurvey									
		- /				//			
				· · ·					
Ceiling: UL = Unlimited (clear), HI = >2.0 canopy H	scight, MID = >1.2	25 to ≤ 2 .	0 canopy	height, L	0 = <u>≤</u> 1.25	canopy ho	cight, U = Unknown.		
Cloud Cover: $0 = 0\%$, $1 = 33\%$, $2 = 66\%$, $3 = 100\%$. Vertical Visibility: N = Impaired (detections may be	missed due to con	ditions),	Y = Unit	mpaired (co	nditions a	illow for r	eligible detection), $\mathbf{U} = \mathbf{U}\mathbf{n}\mathbf{k}\mathbf{n}\mathbf{o}\mathbf{w}\mathbf{n}$		
Horizontal Visibility: N = Impaired (detections may Audibility: N = Impaired (detections may be missed	tue to conditions).	. Y = Uni	mpaired	(condition	s allow for	reliable d	etection).		
Precipitation - Rain & Fog: N = None, L = Light, N Wind: $0 = <1$ mph (calm), $1 = 1-3$ mph (leaves bareh	/ move), 2 ≈ 4-7 π	iph (leave	es πistle.	sm. twigs :	move), 3 =	= 8-12 mpl	h (leaves & sm. twigs in constant		
motion), $4 = 13-18$ mph (sm. branches move), $5 = 19$.	24 mph (lg. branc	hes & su	t trees st	art to sway), 6 = 25-3	31 mph (lg	branches in constant motion), $7 = 32-38$		
mph (whole trees move), $8 = 39-46$ mph (twigs & sm Noise: N = None, A = Aircraft, B = Bird song/calls, C	C = Creek/water di	ainage, N	I = Mac	hinery, P =	Rain/hail	, T = Tree	drip, V = Vehicle, W = Wind, O = Other		
(explain in Notes).						where a stream party in the			

Occurrence No Data Point No Sequence No Reference No
Quad. Code General Location
Data Entry Initials Data Entry Date Data QC Initials Data QC Date
Protocol Review Initials Highest Biological Status
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Note Significant Weather Changes on Page 1 AUDITORY A	rver (: Refer	Observer (s) Initials: Data Reference Number	Observer (s) Initials: <u>AE</u> Data Reference Number	Month <u>07</u> Day <u>/2</u> Units of Measure (circle one):	Day sure (circl	/ 2 e one)	U.S.	2007	Area Name: 💪 Site Name / No: Station Number:	No: Lindley no: Lindley	iver water	(hed
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$	SURVEY.	ACYIVITY		**Note Sign	ficant We	ather	Changes on Pa	3e 1**				revised: 2 / 2000
$ \begin{array}{c} \forall \ \exists \$		DETECTON TIME	INITIAL DETECTION DIRECTION	AUDITORY CAL SERIES End # OL		BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS SEEN (\varkappa)	DEPART FLIGHT DIRECTION		NOTES Heard Only Dist. To Birds (L= Loud, M≕ Moderate, F= Faint)
$\begin{array}{c} 4 \\ 4 \\ 4 \\ 4 \\ 3 \\ 4 \\ 4 \\ 4 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5 \\ 5$	$\left \begin{array}{c} - \\ + \\ + \\ + \\ + \\ + \\ + \\ + \\ + \\ + \\$	2 2 2						•••				Regin Succes 157 M
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WASHINGTON			5	Survey	Visit to P	rotocol		Page <u>1</u> of <u></u>
MARBLED MURRE	LET		(Y or N	, initials)	: 76	4	Total Detections:
FOREST SURVEY				Specie	s of Conc	ern (circ	le one, c	letails on last pg.): Y or N
	•••			•	N	Month	July	Day 12 Year 2007
Area Name: Cedar River INa	trshed	Site Name /	/ Numbe	r:	hester	Nor	th	Station Number: Z
Station Location - T ZL_N,	R 9	(circle one) 🗲	$r \mathbf{w}$,s	<u>(e_</u> , Q	Q (1/16)	<u>SE</u>	_, of Q (1/4) <u>N</u> 巨
UTM zone: 10 E (x) coordinate:	601264	N (y) coor	dinate:	524	19531	Source:	<u>GP></u>	_ Datum: <u>NAP 85</u> FOM:
Observer (s) Name: <u>Alden =</u>	. Miller	Initials: <u>A</u>	JM A	ffiliatio	n: <u>A</u> E	RI	<u>nc.</u> 1	Phone: (503) 359 · 7525
Station Elevation: 977 Ft /	Desiti	on on Slope (c	ircle one	a) Bot	om/nlain	Lower	1/3 M	id 1/3 Unper 1/3. Ridgetop
Station Placement (circle one) Insid	<u> </u>			<i>.).</i> ().	one pranti,	Lower		
Distance from Survey Site Boundary:		Units of Me	easure fo	or ALL	Horizonta	l Distanc	es: Ml	ters
Station Canopy Cover (circle one):	l = 0 to 25%	2 = 26 to 50)%, (3=	= 51 to 3	5% 4=	76 to 10	0%	
ENVIRONMENTAL CONDITION	C.							
Official Sunrise Time: 0522	– Table	: North B	end B	egin Su	rvey Tim	e: _047	32 E	and Survey Time: 0637
Temperature at Sunrise: 16	Temp	erature at End	of Surv	ey:	6	(circle or	1e) (Ĉ)	or F revised: 2 / 2000
TIME VERTICAL VIEWING	HORIZ	AUDIBILITY	PR	ECIPITA	TION	WIND	NOISE	NOTES
	VIS. TO 100 M	TO 200 M	RAIN	FOG	OTHER			
			10					
0432UL 0 Y	Ŷ	<u> </u>	N	N	N	D	N	Begin Survey
0522ULO Y	I Y I	I Y I	N	N	N	0	N	Sunrise
	57	1						
0637UL0Y	Ý	Ý	Ν	N	N	0	N	End survey
063711L0Y	Ŷ	Ý	N	N	N	0	N	End survey
0637UL 0 Y	Ŷ	Ý	N		N	0	N	End survey
0637UL 0 Y	Ŷ	Ý	Z	N	N	0		End survey
06370L0Y	Ý	Ý	Z	N		0	2	End survey
	Ŷ	¥	2	N				End survey
	Ŷ	Ŷ						End survey

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), 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.

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).

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ŝ	ASH	WASHINGTON MARBLED MURRELET FOREST	ł mari	BLED	MU	IRRELE	ET FO	REST	SUF	SURVEY FORM	FOR	N		а	etections -	This Side I		ϕ	P. 2 of 2
Obs	erver	Observer (s) Initials:		AJM	·		M	Month Ju 1 Day	الا الم	Day	2		Year 2007	-	Area Name:	Area Name: <u>Cerlar Kiyer</u> Site Name / No: Chester		Werth	Wat Shed North
ð	aRie	Data Ruiciel Soumber	uter [200	2 C.H.		ñ	_ nits of]	Measur	e (circl	e one).	Units of Measure (circle one): U.S. / Metric	Men	\cap	Station Number:	nber.	И		
SU	SURVEY	Y ACYIVITY	:YT				*	**Note S	ignifica	ant We;	uther (ignificant Weather Changes on Page 1**	ו Page 1						revised: 2 / 2000
STATI		DETECTON		INITIAL DETECTION	TYPE		AUDITORY	RY		# BIRDS	BEHA	INITIAL FLIGHT	₽₽	BIRD HEIGHT	CLOSEST DIST. TO	DEPART FLIGHT	FINAL DETECTION	NO	NOTES
JS -1/0	CTION #		DIRE	EC TION		VÖCAL-S	* ERIES		HER (/ J	SEEN	VIOR	DIRECTION		SEEN Canopy= (1.0	BIRDS SEEN (units)	DIRECTION			Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
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E		TYPE: H = Heard Only (no visual), S = Seen Only (silent). B = Both Seen and Heard	Only (no	visual).	S = S	Seen Only	(silent)	B = B	oth Sec	n and l	Jeard.								
N	E	AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown,	al Series	Vocali	zation	<u>18)</u> : K = I	CEER ca	uls, G -	= Groa	ı (alten	nate) c	alls, $0 = \mathbf{V}$	Whistle o	r Soft (Que calls, 1	U = Unknov		ne or N/A. Inc	= None or N/A. Indicate the vocal type
hear	d at h	heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or $M = Multiple$.	rt and enc	l if calls	s grad	le betweel ->- <u>**</u> - v	n differe	nt type	s durinį	g the de	tection	1. Indicat	e the nun	ber he	ard 1-5 or	$\mathbf{M} = \mathbf{M}$ ultip	Б	verlapping Vo	OL = Overlapping Vocalizations (\mathbf{Y} or \mathbf{N}).
		AUDITORI : Quer (NOR-VOCAL SQUADS): $W = WING SOUND, J = Jet SOUND, = NONE OF N/A. If both are heard write W/J. RFHAVIOD: F = Flight Over Canony, C = Circle Over Canony, T = Fly, Theorem A for Polony Canony, C = Circle A for$	EL UNDI-			N = N = S		יי האמיי			2:	ne or N/A		are he	ard write V $= 2^{1-1}$	V / J. ** Deler	ζ		
	arting	Departing From a Tree, $S = Stationary Calling (fixed-point multiple calls <100 m), U = Unknown$	ee, S = S	tational	v Gal∕	ling (fixe	d-point	multiply	e calls -	<pre>-100 m</pre>		Unknown	uauupy (I.	ίλ: Γ		ALUT DELUT	ע Canupy כ k Reverse S	s I.u), L = See Side When Usi	$r = r_1y - t_1u_0ugu At ut below Canopy (\leq 1.0), \mathbf{B} = Cuccle At or Below Canopy (\leq 1.0), \mathbf{L} = Seen Landing in or ecalls <100 m), \mathbf{U} = Unknown.$

Predutor: Gray Jay

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WASHI MARBI FORES Area Name: Station Locati UTM zone: Observer (s) N	_ED M ST SUF Cedar k ion - T	URREI RVEY F	ORM	(circle one) (E N (y) coor	(Numbe Oor w dinate: _	Y or N Species or: $\int F$, S _ / $\int 24$	N <u>k Cedar</u> Q, Q 2146	ern (circ Aonth <u>A</u> <i>River</i> Q (1/16) Source:	le one, d 07 1/ 1/w/ GPS	Page <u>1</u> of <u>7</u> Total Detections: <u>7</u> etails on last pg.): (Y) or N Day <u>17</u> Year <u>2007</u> Station Number: <u>3</u> , of Q (1/4) <u>1/17</u> Datum: <u>1/4D83</u> FOM: <u>0</u> Phone: (<u>63) 3(9-7525</u>)
Station Elevat Station Placer Distance from	tion: ment (circle n Survey Sit py Cover (ci IENTAL C	28 Ft (1 one): Inside e Boundary: rcle one): 1 ONDITIONS	Positio Outside On = 0 to 25%, S: Table	On on Slope (ci Units of Ma 2 = 26 to 50 \therefore Mo Ah Read	ircle one easure for $3 = 1$	e): B ott or ALL = 51 to 7	om/plain, Horizonta 5%, 4 = rvey Tim	Lower 1 Distance 76 to 10 e: 043	1/3, M es: <u>M</u> 0%	id 1/3, Upper 1/3, Ridgetop <u>Jers</u> nd Survey Time: <u>06 44</u>
Temperature			Temp	AUDIBILITY	Γ	ecipita		(circle on		or F revised: 2 / 2000 NOTES
	CLOUD COVER CEILING	VISIBILITY TO 2 CANOPY	VIS. TO 100 M	ТО 200 М	RAIN	FOG	OTHER			
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0518	HI I	Y	<u> </u>	<u> </u>		N	N	0	л/	
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0545	HI 2		[L.A	N	N	δ	N	Pain entrat 604-610
0559	HT 2 HT 3				M	N	N			
0612	HIS	-/ V			 		N	0	N	
06/8	H_{L} 2 H_{T} 2	Y		+ N	<u> </u>	N	N	0	Ň	Rain becomes Light 631
0644	HIZ	Y	Y	Y	L	N	N	0	N	End Survey
Cloud Cover: Vertical Visib Horizontal Vi	0 = 0%, 1 =)ility: N = Im sibility: N =	33%, $2 = 66%paired (detectiImpaired (detections may$	3 = 100% ons may be m actions may be be missed on	issed due to con missed due to (e to conditions).	ditions), condition Y = Uni	Y = Unit s), Y = U innaired	npaired (co nimpaired (condition)	onditions a (condition s allow for	llow for re is allow fo reliable d	tight, U = Unknown. cliable detection), U = Unknown. r reliable detection), U = Unknown. etection). ttensity using same codes for rain & fog.

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).

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

Month D1 D1 J3 Ven 2001 Station Name/rol Station Name/rol **Not Significant Venture (strict core) U.S. / Wintki Station Name/rol Station Name/rol Station Name/rol **Not Significant Venture (strict core) U.S. / Wintki Station Name/rol Station Name/rol **Not Significant Venture (strict core) U.S. / Wintki Station Name/rol Station Name/rol **Not Significant Venture (strict core) U.S. / Wintki Station Name/rol Station Name/rol Station Static Station Name/rol Station Name/rol Station Name/rol Station Name/rol Number Station Name/rol Station Name/rol Station Name/rol Station Name/rol Station Name/rol Number Statin Ead # OL Wintki Station Name/rol Station Name/rol Station Name/rol Number Statin Ead # OL Wintki Station Name/rol Station Name/rol Station Name/rol Number Statin Ead # Number Statin Name/rol Statin Name/rol Station Name/rol Number Statin Ead # Number Statin Name/rol Statin Name/rol Statin Name/rol Number Statin Ead # Number Statin Name/rol	(a) Initial: Month: Day Z Veature (circle one) U.S. Veature (circle one) U.S. Veature (circle one) U.S. Month: C.S. Month: C.S. Month: Month: <th< th=""><th>Month_O_ Thits of Me Thits of Me **Note Sign **Note Sign **</th><th>Vear 20 U.S. / Whanges on Page INITIAL FLIGHT DIRECTION</th><th>Station Numb Nation Numb Nation Numb Nation Station Numb Nation Station Numb</th><th>SFR EINAL LIGHT DETECTION ECTION DIRECTION</th><th>Heard Only Dist. To P NOTES Heard Only Dist. To P = Loud, M= Moderate, 1 HETH, 147/471 HETH, 147/471 HETH, 147/471 HETH, 147/471 HETH, 147/471 HETH, 147/471 HETH, 147/471</th></th<>	Month_O_ Thits of Me Thits of Me **Note Sign **Note Sign **	Vear 20 U.S. / Whanges on Page INITIAL FLIGHT DIRECTION	Station Numb Nation Numb Nation Numb Nation Station Numb Nation Station Numb	SFR EINAL LIGHT DETECTION ECTION DIRECTION	Heard Only Dist. To P NOTES Heard Only Dist. To P = Loud, M= Moderate, 1 HETH, 147/471 HETH, 147/471 HETH, 147/471 HETH, 147/471 HETH, 147/471 HETH, 147/471 HETH, 147/471
***********************************	Ificant Weather Changes on Page 1**	**Note Sign PETECTION DETECTION DIRECTION Start End # OL W/J Start End # OL W/J	C T Changes on Page DIRECTION UNTAL			revised: 2/200 NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint (L= Loud, M= Moderate, F= Faint <i>Rear Survey, Ict Sul</i> <i>kt NATH</i> <i>kt UT UR</i> <i>kt UT UR</i>
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PIUS Potenty Durlie (139 Species of loncers

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. $p_{T}u_{O}$ (Check Reverse Side When Using 2-Sided Forms)

WASHIN	GTON			1	Survey	Visit to F	rotocol		Page <u>1</u> of <u>Z</u>
	D MURRE	LET		((Y or N	, initials)	: y 🗸	4	Total Detections:
FOREST	SURVEY	FORM			Specie				letails on last pg.): \mathbf{Y} or \mathbf{N}
	<u>^</u>					N	Month _	July	Day <u>13</u> Year <u>2007</u>
Area Name:	edar River V	vatershee	Site Name	/ Numbe	er: <u> </u>	55. I A		2	Station Number: Z
Station Location	- т <u>22</u> N,	R 10	(circle one)	for w	, S	<u>30</u> , q	Q (1/16)	<u> 5W</u>	_, of Q (1/4) <u>SE</u>
UTM zone: 10	E (x) coordinate:	607568	N (y) coor	dinate:	524	5843	Source:	<u>685</u>	_ Datum: <u>NAD & S</u> FOM:
Observer (s) Nam	ne: <u>Alden J.</u>	Miller	Initials: <u>A</u>	JMA	ffiliatio	n: <u>Al</u>	BR I	he.	Phone: (<u>503) 359-7525</u>
Station Elevation	815 Ft A	M Positi	on on Slope (c	ircle one	e): Bot	om/plain,	Lower	1/3, M	id 1/3. Upper 1/3, Ridgetop
Station Placemen	t (circle one): (Insid	le.) Outside	;					-	· · · · ·
Distance from Su	rvey Site Boundary:		Units of M	easure fo	or ALL	Horizonta	l Distanc	es: M	eters
Station Canopy C	Cover (circle one):	1 = 0 to 25%	2 = 26 to 50	1%, 3=	= 51 to 1	5% 4 =	76 to 10	0%	
	TAL CONDITION	<u>15</u> :		1			~117	27	07.00
Official Sunrise	Time: <u>0525</u>	Tabie	North B	ende	legin Su	rvey Tim	e: <u>04</u> 2	בכ ו	End Survey Time: 07-08
								\sim	
Temperature at S	1	⁰ Temp	erature at End	of Surv	ey: _/		(circle or	ne) 🕜	or F revised: 2 / 2000
Temperature at S	1	Temp	erature at End			<u>5_</u>			or F revised: 2 / 2000 NOTES
Temperature at S	unrise: 15 /ERTICAL VIEWING	I				<u>5_</u>	(circle or		
Temperature at S	unrise: 15 /ERTICAL VIEWING	HORIZ. VIS.	AUDIBILITY TO	PR	ECIPITA	5_¤ tion	(circle or		
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Temperature at S TIME V CHI D 4 3 3 H D 5 2 3 H D 6 2 6 H D 6 3 2 H D 6 3 9 H	unrise: 15 VERTICAL VIEWING VISIBILITY TO 2 CANOPY 1 1 Y 1 2 Y 1 3 Y 1 3 Y 1 3 Y 0 3 N 0 3 N 0 3 N	HORIZ. VIS. TO 100 M Y Y Y Y Y Y	AUDIBILITY TO	PR RAIN N			(circle or WIND		NOTES Begin Survey Sunrise * survey extended

Cciling: 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: $\theta = 0\%$, 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).

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WA	SHI	INGTON	WASHINGTON MARBLED MURRELET FOREST SURVEY FORM	ž	URRE	ILET	FOR	EST S	URVE	ĭ≺ Fi	ORM			Ð	etections	This	Page Total:	Ø	Pr. 2 of 6
Obse	Iver	Observer (s) Initials: _	AJM			·	Month	H Ju	Tuly Day 13	W.	3	Year	7002	,	Area Name: <u> </u>	No: /	SS. 14	MARKSM	RO
Data	Refe	Data Reference Number 1	eri 3 C.T.				Unit	s of Me:	Units of Measure (circle one):	ircle o		U.S. /	Metric	\wedge	Station Number	nber:	7		
SUR	SURVEY	(ACYIVITY	Y:				ŭ X**	ote Sign	ificant /	Veath	er Ché	**Note Significant Weather Changes on Page 1**	Page 1*	÷					revised: 2 / 2000
STATU	DETEC	DETECTON	U INITIAL DETECTION	TYPE	D/07	AUE	AUDITORY		# BIRDS	BEHA ଡୁ	DELLA	INITIAL FLIGHT	Ē		closest Dist. To	DEPART FLIGHT	FINAL	NO	NOTES
JS -1/0	CTION #		DIRECTION		VO Start		RIES # OL	OTHER W/J				RECTION		<u> </u>	BIRDS SEEN	DIRECTION			Heard Only Dist. To Birds (L= Loud, M≃ Moderate, F= Faint)
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		I = Heard Oi	TYPE: H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard	S I	= Seen (Jnly (sil	ent), B	= Both	Seen ar	nd He	, Fid.								
heard	atb	oth the start	ΔD and $\Delta T = V C = C = C = C = C = C = C = C = C =$	s gra	ade betv	veen dif	r caus ferent (, שייים types di	roan (au rring the	ternau: detec	e) call tion.	s, U = w Indícate	the num	r Soff (ber he	le calls, and the cal	U = Unkno [.] M = Multir	_	one or N/A. In verlapping Vo	= None or N/A. Indicate the vocal type OL = Overlapping Vocalizations (Y or N).
AUD	D	RY - Other	AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound,	<u>ы</u>	<u>त्र</u> (जी	= Wing	Sound	t, J = Je	t Sound	", 	None	or N/A.	If both	are he:	= None or N/A. If both are heard write W/J .	V/J.	1)	
Depar	Ting	From a Tree	BEMANION: $\mathbf{r} = \mathbf{r} \log \mathbf{U}$ OVET CANOPY, $\mathbf{U} = \operatorname{Circle} \operatorname{OVET} \operatorname{Canopy}$, $\mathbf{T} = \mathbf{r} \log \mathbf{r}$ Afor Below C Departing From a Tree, $\mathbf{S} = \operatorname{Stationary} \operatorname{Calling} (fixed-point multiple calls <100 m), \mathbf{U} = \operatorname{Unknown}.$	Ω Ω	C = Cir alling (1	cle Ove fixed-pc	r Cano int mu	py, T = ltiple c:	Fly-Th ulls <10(i (m D m), l	At or $U = U_0$	Below C nknown.	anopy (≤1.0)	B = Circle	:At or Belo (Chen	w Canopy (k Reverse (≤ 1.0), L = See Side When Us	EXMAVION: $\mathbf{F} = \mathbf{F}$ ught OVET Canopy, $\mathbf{U} = \text{Circle OVET}$ Canopy, $\mathbf{T} = \mathbf{F}$ iy-Through At or Below Canopy (≤ 1.0), $\mathbf{B} = \text{Circle At or Below Canopy}$ (≤ 1.0), $\mathbf{L} = \text{Seen Landing in or Departure From a Tree, \mathbf{S} = \text{Stationary Calling (fixed-point multiple calls < 100 m), } \mathbf{U} = \text{Unknown.}$

WASHINGTON	Survey Visit to P	rotocol		Page <u>1</u> of \overline{Z}
MARBLED MURRELET	(Y or N, initials)	y Cal	-	Total Detections:
FOREST SURVEY FORM				letails on last pg.): Y or N
	South Fork N	Aonth	July	Day <u>17</u> Year <u>2007</u>
Area Name: Cedar River water Shed site Name / Num	mber: <u>Cedar River</u>	North	reast	Station Number:
Station Location - T <u>ZI</u> N, R <u>IO</u> (circle one) (F) or	w, s / 0, Q	Q (1/16)	NW	_, of Q (1/4) SE
UTM zone: <u>10</u> E (x) coordinate: <u>611974</u> N (y) coordinate	ute: <u>5241408</u>	Source:	GPS	Datum: NAD 85 FOM:
Observer (s) Name: <u>Alden J. Miller</u> Initials: <u>AJM</u>	Affiliation: <u>AB</u>	<u>k</u> In	<u>د</u> I	Phone: $(5^{0}3)$ 357-7503
Station Elevation: <u>801</u> Ft (M) Position on Slope (circle	e one): Bottom/plain,	Lower	1/3) M	id 1/3, Upper 1/3, Ridgetop
Station Placement (circle one). Inside, Outside				1
Distance from Survey Site Boundary: Units of Measur	re for ALL Horizonta	l Distance	es:	eters
Station Canopy Cover (circle one): $1 = 0$ to 25% $2 = 26$ to 50%,	3 = 51 to 75%, 4 =	76 to 10	0%	
ENVIRONMENTAL CONDITIONS:	ı	ыIJ	10 -	- 0647
Official Sunrise Time: 0527 Temperature at Sunrise: 16.5 Temperature at End of Su		e: <u>09</u>	$\frac{40}{10}$ E	and Survey Time: 0642
Tomperature at Suprise: 110.7 ^u Temperature at End of Si	Survey: 17 2	(circle on	e) (C) (or F revised: 2 / 2000
Temperature at Sunrise: 16.5 Temperature at End of Su				
	PRECIPITATION	WIND	NOISE	NOTES
TIME VERTICAL VIEWING HORIZ, AUDIBILITY	PRECIPITATION			
TIME VERTICAL VIEWING HORIZ, AUDIBILITY	PRECIPITATION			
TIME VERTICAL VIEWING HORIZ, AUDIBILITY O O O VISIBILITY TO 100 M 200 M RAI	PRECIPITATION		NOISE	NOTES
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TIME VERTICAL VIEWING HORIZ. AUDIBILITY Provide Provide VISIBILITY TO VISIBILITY TO 2 TO 100 M 200 M VISIBILITY TO 2 CANOPY TO 100 M O 4 4 0 H1 3 Y Y Y O 5 2 7 H1 3 Y Y Y O 6 2 4 H1 Z Y Y	PRECIPITATION AIN FOG OTHER V N N V N N V N N			NOTES
TIME VERTICAL VIEWING HORIZ. AUDIBILITY Provide Provide VISIBILITY TO VISIBILITY TO 2 TO 100 M 200 M VISIBILITY TO 2 CANOPY TO 100 M O 4 4 0 H1 3 Y Y Y O 5 2 7 H1 3 Y Y Y O 6 2 4 H1 Z Y Y	PRECIPITATION AIN FOG OTHER V N N V N N V N N			NOTES
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Ceiling: UL = Unlimited (clear), HI = >2.0 canopy height, MID = >1.25 to \leq 2.0 canopy height, LO = \leq 1.25 canopy height, U = Unknown. Cloud Cover: $\theta = 0\%$, 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).

Ň	ASH	INGTON P	WASHINGTON MARBLED MURRELET FOREST SURVEY FORM	ML	JRREL	ETFC	RES'	r sui	RVEY	FOF	W			Detections	- This Side P	age Total: _	Ø	Pg. 2 of 2
Obi	erver	Observer (s) Initials: _	AJM			4	fonth _	Jul	Month July Day_	Ψ	Year	Year 200	\mathcal{A}	Area Name Site Name	No: Sturth	r Kill	i Rier	Area Name: Uld ar Kiver workes hed Site Name / No: South Park Cleber River Northeast
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STAT			INITIAL DETECTION	TYPE		AUDITORY	лкү		# BIRDS	BEHA	INITIAL FLIGHT		BIRD HEIGHT	CLOSEST DIST. TO	DEPART FLIGHT	FINAL	Z	NOTES
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hear	d at b	outh the start a	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.	grad	de betwee	n differ	ans, c ant type	s durin	n (atten g the de	nate) c stection	aus, u = n. Indica	whistic the the n	e or sor umber h	r Que calis, leard 1-5 or	$\mathbf{U} = Unknow$ $\mathbf{M} = Multiple$		ne or N/A. I rerlapping V.	= None or N/A. Indicate the vocal type OL = Overlapping Vocalizations (Y or N).
AU BE		<u>IOR F = Flig</u>	<u>AUDITORY - Other (Non-Vocal Sounds)</u> : W = Wing Sound, J = Jet Sound, — = None or N/A. If both are heard write W / J BRHAVIOR F = Flight Over Canomy C = Circle Over Canomy T = Fly, Through At or Below Canomy (7 1 0) B - Circle At		ر = M :(<u>st</u> (=) =) =)	Wing Sc) und, J	= Jet S. T = Elv	ound, – "Throu	Z = 4	ne or N/. St Below	A. If be	oth are h	eard write	W/J.			
D	arting	From a Tree,	Departing From a Tree, $S = Stationary Calling (fixed-point multiple calls <100 m), U = Unknown.$	v Ca	uling (fixe	sd-point	multipl	e calls		۲. ۱), U =	Unknow	E.	i ゴリン		e Al of Belov (Checi	v Lanopy (< k Reverse S	1.0, $L = 50ide When U$	$\mathbf{x} = r_1 \mathbf{y} \cdot r_1$ or using the property of the property

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MARBI			LET		(Y or N	, initials)	: W 4	*	Total Detections:
FORES					;	Specie:	s of Conc	ern (circ	le one, d	letails on last pg.): Y or N
			,	1			N	Month	07	Day /8 Year 2007
Area Name:	Cedar	River	Watersh	Site Name	/ Numbe	r: Tay	lor Ru	dae_	<u></u>	Station Number: 3
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				Initials:						Phone: (63) 359-7525
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Temperature	at Sunrise:	_ <u></u> "	Temp	erature at End	of Surve	зу: <u>1</u>2	<u>2,5 °</u>	(circle or	1e) 🕜	or F revised: 2 / 2000
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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).

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	So th Seen and Heard. = Groan (alternate) calls, O = Whistle or Soft Que calls, U = Unknown, = None or N/A. s during the detection. Indicate the number heard 1-5 or M = Multiple. OL = Overlapping = Jet Sound, = None or N/A. If both are heard write W / J. T = Fly-Through At or Below Canopy (≤ 1.0), B = Circle At or Below Canopy (≤ 1.0), L =								•				
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Potential Predoptu : JJJA

WASHI	NGT	ON			S	Survey	Visit to P	rotocol		Page <u>1</u> of <u>Z</u>
MARBI			LET		(Y or N	, initials):	NLm	4	Total Detections: 🖉
		RVEY F			I	Species				etails on last pg.): Y or N
							~ N	Ionth	July_	Day 18 Year 2007
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Observer (s) 1	Name:	Alden 2	T. Miller	Initials: <u>A</u>	JMA	ffiliatio	n: <u>AC</u>	R I	∿€ - F	Phone: (503) 359-7525
Station Eleva	tion:	14 Ft /	M Positi	on on Slope (ci	rcle one	e): Bott	om/plain,	Lower	1/3, 🕅	id 1/3> Upper 1/3, Ridgetop
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				2 = 26 to 50	%, 3=	= 51 to 7	5%, 4=	76 to 10)%	
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Colling: 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: $\theta = 0\%$, 1 = 33%, 2 = 66%, 3 = 100%.

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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), U = Unknown.

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).

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IS.	Ĩ	SURVEY ACYIVITY:	••	ŀ	**Note Sign	ificant Wea	ather	**Note Significant Weather Changes on Page 1**	ge [**				revised: 2 / 2000
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Area Name:	Cedar	River W	attrshed	Site Name /	'Numbe	r: <u> </u>	aek l	reer	<u>z</u> J	Station Number: Z
Station Locat	ion - T	ZZ N, 1	28	(circle one) (E	Dr W	,s <u>l</u>	<u>3</u> , q	Q (1/16)	SW	, of Q (1/4) <u>SE</u>
UTM zone:	$10 E(x) \alpha$	oordinate:	596782	- N (y) coor	dinate:	524	8774	Source:	GPS	Datum: <u>NAD 83</u> FOM:
Observer (s) l	Name: <u>A</u>	Iden J.	Miller	Initials: <u>A</u>	J/n A	ffiliatio	n: <u>AB</u>	R In	<u> </u>	Phone: (503) 359-7525
Station Eleva	tion: 91	4 Ft /	Positi	on on Slope (c	ircle one	e): Bott	om/plain,	Lower	1/3, M	id 1/3 Upper 1/3, Ridgetop
Station Place										
Distance from					easure fo	or ALL	Horizonta	l Distanc	es: /ħ£	eters
				2 = 26 to 50						
ENVIRONM			8.							OUT11
Official Sunr	rise Time: _	0529								and Survey Time: <u>0644</u>
			Tamp	orature at End	of Surv	ev:) a	(circle or	ne) (\mathbf{C})	r F revised: 2/2000
Temperature	at Sunrise:	<u> </u>	Temp	erature at End	01.001.0		<u> </u>	(0		
			HORIZ.			ECIPITA		WIND		NOTES
	VERTICA	LVIEWING								
	VERTICA	L VIEWING VISIBILITY TO 2	HOŘIZ. VIS.		PR	ECIPITA	TION			
	VERTICA CLOUD CEILING	L VIEWING VISIBILITY TO 2 CANOPY	HOŘIZ. VIS.		PR RAIN	ECIPITA FOG	TION OTHER	WIND	NOISE	NOTES
	VERTICA CLOUD CEILING	L VIEWING VISIBILITY TO 2	HOŘIZ. VIS.		PR RAIN	ECIPITA FOG N	TION OTHER	WIND Z	NOISE	
	VERTICA CLOUD CEILING HI 3 Z	L VIEWING VISIBILITY TO 2 CANOPY	HOŘIZ. VIS.			FOG N	TION OTHER N	WIND Z Z		NOTES Begin Survey
TIME 0438 0503 0529	VERTICA CELLING HI 3 HI 2 HI 2	L VIEWING VISIBILITY TO 2 CANOPY	HOŘIZ. VIS.					WIND Z Z Z		NOTES Begin Survey
	VERTICA CELLING HI 3 HI 2 HI 2	L VIEWING VISIBILITY TO 2 CANOPY	HOŘIZ. VIS.			FOG N	TION OTHER N	WIND Z Z		NOTES
TIME 0438 0503 0529	VERTICA CELLING HI 3 HI 2 HI 2	L VIEWING VISIBILITY TO 2 CANOPY	HOŘIZ. VIS.					WIND Z Z Z		NOTES Begin Survey
TIME 0438 0503 0529	VERTICA CELLING HI 3 HI 2 HI 2	L VIEWING VISIBILITY TO 2 CANOPY	HOŘIZ. VIS.					WIND Z Z Z		NOTES Begin Survey
TIME 0438 0503 0529	VERTICA CELLING HI 3 HI 2 HI 2	L VIEWING VISIBILITY TO 2 CANOPY	HOŘIZ. VIS.					WIND Z Z Z		NOTES Begin Survey
TIME 0438 0503 0529	VERTICA CELLING HI 3 HI 2 HI 2	L VIEWING VISIBILITY TO 2 CANOPY	HOŘIZ. VIS.					WIND Z Z Z		NOTES Begin Survey
TIME 0438 0503 0529	VERTICA CELLING HI 3 HI 2 HI 2	L VIEWING VISIBILITY TO 2 CANOPY	HOŘIZ. VIS.					WIND Z Z Z		NOTES Begin 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: $\theta = 0\%$, 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 Icarchient in Nehicit.

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Š	SHI	INGTON N	ARBLED #	WASHINGTON MARBLED MURRELET FOREST SURVEY FORM	RVEY FO	NRM	: 	Detections -	. #K		Pg. Z of 2
Obs Date	erver	Observer (s) Initials: Data Rerefence Numbe	Observer (s) Initials: <u>AJM</u>	Month $\frac{\int u \langle y \rangle}{\int Day \frac{1}{2}}$ Units of Measure (circle one):	$\frac{1}{10}$ Day $\frac{1}{10}$ Ire (circle or	Vear Z	to to	Area Name: Site Name / No: Station Number:	No: Ro		Creek
SUB	VEY	SURVEY ACYIVITY:	•••	**Note Signifi	cant Weathe	**Note Significant Weather Changes on Page 1**	ge 1**				revised: 2 / 2000
TATS	DETE	DETECTON			BIRDS #	INITIAL FLIGHT	BIRD	CLOSEST DIST. TO	DEPART FLIGHT	FINAL	NOTES
0/1- SI	# NOILC		DIRECTION	VOCAL SERIES OTHER Start End # OL W/J	NOIA	DIRECTION	SEEN Canopy≖ 1.0		4	DIRECTION	Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
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ar X Str		0644									End Survey
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긻	۲. F	= Heard Only	v (no visual) S	= Seen Only (cilent) B = Both Se	and Uran						
AUDIT AUDIT heard at	I at b	I = Heard Oni RY - Vocal Si oth the start ar RY - Other (y (no visual), S eries (Vocaliza nd end if calls g Non-Vocal Soi	<u>A UDITORY - Vocal Series (Vocalizations)</u> : 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 / I	Both Seen and Heard = Groan (alternate) c es during the detectio I = Jet Sound. — = Nc	rd.) calls, O = Whis iion. Indicate the None or N/A. If	tle or Soft number he both are he	Que calls, U ard 1-5 or N ard write W	alls, U = Unknown, -5 or M = Multiple rite W / I	= None o OL = Overla	= None or N/A. Indicate the vocal type OL = Overlapping Vocalizations (Y or N).
BEH Depa	AVI arting	BEHAVIOR: F = Fligh Departing From a Tree,	ht Over Canopy S = Stationary	Flight Over Canopy, $\mathbf{C} = \text{Circle Over Canopy}$, $\mathbf{T} = \text{Fly-Through At or Below Canopy}$ (≤ 1.0), $\mathbf{B} = \text{Free}$, $\mathbf{S} = \text{Stationary Calling (fixed-point multiple calls <100 m)}$, $\mathbf{U} = \text{Unknown}$.	y-Through / s <100 m), U	At or Below Canc I = Unknown.)py (≤ 1.0),	$\mathbf{B} = Circle$		∑anopy (≤ 1.0) Veverse Side	Circle At or Below Canopy (< 1.0), L = Seen Landing in or (Check Reverse Side When Using 2-Sided Forms)
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	(- 57	5			

WASHINGTON			1	Survey	Visit to P	rotocol		Page <u>1</u> of <u>2</u>
MARBLED MURRE	LET		I	(Y or N	, initials)	: [Y [m	•	Total Detections:
FOREST SURVEY	FORM			Species	of Conc	ern (circ	le one, c	letails on last pg.): (Y) or N
	(1)							Day <u>/9</u> Year <u>2007</u>
Area Name: Codar River Wa	tershed	Site Name	Numbe	er: <u>Ta</u>	ilor Ri	dge_		Station Number:
Station Location - T <u>22</u> N,	R_ <u>8</u> _	(circle one) (E	br W	, S	<u>26_</u> ,Q	Q (1/16)	NE	_, of Q (1/4) <u>NF</u>
UTM zone: <u>10</u> E (x) coordinate:		N (y) coor	dinate:	594	009	Source:	GPS	_ Datum: <u>1/4//85</u> FOM:
Observer (s) Name: Neil Eric	Jensen	Initials: <u>A/</u>		Affiliatio	n: <u>ABK,</u>	Lac.]	Phone: (53)359-7525
Station Elevation: <u>1063</u> Ft /	M) Positi	on on Slope (c	ircle on	e): Bott	om/plain,	Lower	1/ 3, M	tid 1/3, Upper 1/3, Ridgetop
Station Placement (circle one). Insi	e, Outside							1 I
Distance from Survey Site Boundary	Om	Units of M	easure f	or ALL	Horizonta	I Distanc	es:	eters
Station Canopy Cover (circle one):	1 = 0 to 25%	2 = 26 to 50)%,) 3:	= 51 to 7	5%, 4=	76 to 10	0%	
ENVIRONMENTAL CONDITION		(10 1		· ·	13.			
Official Sunrise Time: <u>29</u>			-					End Survey Time: 1 0 (0000
Temperature at Sunrise: <u>9,5</u>	⁰ Temp	erature at End	of Surv	ey: _/(), <u>O_</u> ".	(circle or	ne) (' C) (or F revised: 2 / 2000
TIME VERTICAL VIEWING	HOŘIZ. VIS.		PF	RECIPITA	TION	WIND	NOISE	NOTES
	TO 100 M	200 M	RAIN	FOG	OTHER			
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04C2HI3Y	Y	Y	N	4	N	0	N	
0503 HI 2 Y	Y	K.	N	14	N	0	N	
0514HI3Y	Y	Y	N	<u> </u>	N	0	\mathcal{N}	very light ton
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			<u> / /</u>		_N	0	N	
OKK9HT3Y	· ·		<u>_//</u>	N	\mathcal{N}_{-}	$\nu_{}$		
OKORHT 2 Y	Y	Y	11		1/	1	\mathcal{N}	

Colling: 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: $\theta = 0\%$, 1 = 33%, 2 = 66%, 3 = 100%.

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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).

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Mure let Redators: STUA (Steller's Lay **<u>BEHAVIOR</u>:** $F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (<math>\leq 1.0$), **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) AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, --= None or N/A. If both are heard write W / J. 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) **TYPE:** H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard. SURVEY ACYIVITY: Observer (s) Initials: WASHINGTON MARBLED MURRELET FOREST SURVEY FORM OIL- SUTATS DETECTION # 0 Q \mathcal{O} Ś DETECTON C 44 ł ß C C TIME 91419 44 L 2 þ Ċ DETECTION ALE INITIAL TYPE Start VOCAL SERIES End AUDITORY # ******Note Significant Weather Changes on Page 1** Month 07 Units of Measure (circle one): ρ OTHER ۲/M BIRDS * REHAVIOR 6 INITIAL FLIGHT DIRECTION U.S. / Metric _ Year 2007 Canopy= 1.0 HEIGHT Station Number; Site Name / No: /ay /a Area Name: Ledar Detections - This Side Page Total: CLOSEST DIST. TO BIRDS SEEN SEEN FLIGHT DIRECTION DEPART DETECTION FINAL Terched Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint) no wive 3 PIWD PE RRM ANKO $\hat{\epsilon}$ RICH F NOTES Pg. 2 of 2 we revised: 2 / 2000 J Old

species of Concern: SPTO (Spotted Towhee), PIWO (Pileated Woodpecker)

WASHINGTON	Survey Visit to Proto	ocol	Page <u>1</u> of <u>Z</u>
MARBLED MURRELET	(Y or N, initials): 🖟	/ (m)	Total Detections:
FOREST SURVEY FORM	Species of Concern	(circle one, d	etails on last pg.): (\mathbf{Y}) or \mathbf{N}
	Mon	nth July	Day 20 Year 2007
Area Name: <u>Cedar River Watershed</u> Site Name/N Station Location - T_ <u>ZI_N, R_9</u> (circle one) (E)	lumber: Lindsay (creekl	Station Number:
Station Location - T_Z/N, R_9_ (circle one) (E)	br w, s_4_, QQ (1	1/16) <u>SE</u>	, of Q (1/4) <u>NE</u>
IIIII (rome: 10 E(x)) coordinate: $601/22$ N(x) coordin	nate: 5243187 Soi	urce GPS	Datum: NAX & FOM:
Observer (s) Name: <u>Alden J. Miller</u> Initials: <u>AJ</u>	MAffiliation: <u>ABR</u> .	<u>Inc</u> p	hone: (573) 359- 1525
Station Elevation: 871 Ft M Position on Slope (circl	te one): Bottom/plain, L	.ower 1/3, Mi	d 1/3 Upper 1/3, Ridgetop
Station Placement (circle one). Inside, Outside			
Distance from Survey Site Boundary: Units of Meas	sure for ALL Horizontal Di	istances: <u>Me</u>	Aers
Station Canopy Cover (circle one): $1 = 0$ to 25%, $2 = 26$ to 50%,	3 = 51 to 75% $4 = 76$	to 100%	·····
ENVIRONMENTAL CONDITIONS:		1616	0710
			nd Survey Time: 0715
Temperature at Company II Temperature at End of	E Survey: Lor (circ	ala ana) (C) a	r F revised: 2 / 2000
Temperature at Sunrise: Temperature at End of	(ch		1 F 1641560. 27 2000
	1		NOTES
TIME VERTICAL VIEWING HORIZ AUDIBILITY			
TIME VERTICAL VIEWING HORIZ AUDIBILITY	PRECIPITATION		
TIME VERTICAL VIEWING HORIZ. AUDIBILITY VIS. TO VISIBILITY TO 100 M 200 M R VISIBILITY TO 100 M 200 M R CANOPY	PRECIPITATION W	IND NOISE	NOTES
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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: $\theta = 0\%$, 1 = 33%, 2 = 66%, 3 = 100%.

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ու չուն։ Հայաստանի հայտարին է հա Անդրուն է հայտարին է հա
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WAS	HINGTON M	ARBLED	WASHINGTON MARBLED MURRELET FOREST SURVEY FORM	EST SURVE	FORM		Detections -	TI:			ρ J
Observ	Observer (s) Initials:	AJM	. '	Month July Day 20	To Year	1000	Area Name:	No: Lin	2	week.	
Data Ri	Data Reference Number			Units of Measure (circle one):	cle one): U.S.	. / Metric	Station Number:	ıber:	14		
SURVI	SURVEY ACYIVITY:	••	**Nc	**Note Significant Weather Changes on Page 1**	eather Change	s on Page 1**				revised: 2	2/2000
ITAT2		INITIAL DETECTION		BIRDS		HAL BIRD			FINAL	NOTES	
		DIRECTION	VOCAL SERIES	OTHER	VIOR D			DIRECTION	DIRECTION	Heard Only Dist. To Birds (L≃ Loud, M= Moderate, F= Faint)	Birds F= Faint)
-	# 1		Start End # OL	L / W	 	Canopy= 1.0	y= () units				
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TYPE: AUDIT	H = Heard Only ORY - Vocal St	y (no visual), S eries (Vocaliz	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 and if calls are the vocal type that the start and and if calls are the vocal type to the vocal type of the start and and if calls are the vocal type to the vocal type of the start and and if calls are the vocal type of the vocal	= Both Seen and Heard. G = Groan (alternate) c	Heard mate) calls, O	= Whistle or S	oft Que calls, I	J = Unknown,	= None or	r N/A. Indicate the vo	cal type
heard at	both the start ar ORY - Other (nd end if calls Non-Vocal So	heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or $M = AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, = None or N/A. If both are heard write W / J.$	ypes during the $(J = \text{Jet Sound}, J = Jet S$	tetection. Indi	cate the numb VA. If both ar	er heard 1-5 or) e heard write W	-5 or M = Multiple rite W / J	OL = Overla	$\mathbf{OL} = \mathbf{Overlapping Vocalizations (Y or N)}$	Y or N).
Departir	ng From a Tree,	S = Stationary	Departing From a Tree, S = Stationary Calling (fixed-point multiple calls <100 m), $U = Unknown$.	py, $\mathbf{I} = Fly-1$ hro ltiple calls <100	ugh At or Belo m), U = Unkno	w Canopy (≤ wn.	1.0), B = Circle	At or Below C (Check F	anopy (≤ 1.0) keverse Side \	Circle At or Below Canopy (< 1.0), L = Seen Landing in or (Check Reverse Side When Using 2-Sided Forms)	forms)
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WASHINGTON			Surv	ey Visit to I	Protocol		Page <u>1</u> of <u>Z</u>	
MARBLED MURREL	ET		(Y or	N, initials)	: y m	-	Total Detections:	
FOREST SURVEY F	ORM		Spec	ies of Conc	ern (circ	le one, o	letails on last pg.): Y or N	
-		Month 07 Day 20 Year 2007						
Area Name: Cedar River h	atersho	Site Name /	Number:	155.1A		<u> </u>	Station Number:	
Station Location - T_22_N, R	<u> 10 </u>	(circle one) 🕑	or w, S_	30,0	Q (1/16)	SW/	_, of Q (1/4) <u></u>	
UTM zone: <u>10</u> E (x) coordinate: <u>607568</u> N (y) coordinate: <u>5245847</u> Source: <u>6PS</u> Datum: <u>AADB</u> FOM: <u>O</u>								
Observer (s) Name: Neil Eac	ensen	Initials: <u>AF</u>	Affilia	tion: <u>ARK</u>	Inc.	1	Phone: (<u>103) ?(9-7525</u>	
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				•		~		
Distance from Survey Site Boundary:	<u>Om</u>	Units of Me	easure for AI	L Horizonta	l Distanc	es:/	leters_	
Station Canopy Cover (circle one): (1								
ENVIRONMENTAL CONDITIONS	<u></u>			an er star e		.	· · · · · · · · ·	
Official Sunrise Time: 0530							and Survey Time:	
Temperature at Sunrise:0	Temp	erature at End	of Survey:	<u>/2.5_"</u>	(circle or	ie) (C)	or F revised: 2 / 2000	
		AUDIBILITY	PRECIPITATION		WIND	NOISE	NOTES	
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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: $\theta = 0\%$, 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).

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Departing From a Tree, S = Stationary Caling (fixed-point multiple calls <100 m), U = Unknown. AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, -- = None or N/A. If both are heard write W / J. **BEHAVIOR:** $F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (<math>\leq 1.0$), 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) 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 - 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 **TYPE:** H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard. SURVEY ACYIVITY: Observer (s) Initials: WASHINGTON MARBLED MURRELET FOREST SURVEY FORM Dala References Vimbely 5.00 OVI- SUTATS DETECTION # 0 D DETECTON 4 TIME 4 $\overline{\mathbf{v}}$ 4 2 DETECTION Ĩ INITIAL **ERYPE** Start VOCAL SERIES End AUDITORY # Month 07 ******Note Significant Weather Changes on Page 1** Units of Measure (circle one): U.S. / Metric ρ OTHER ₹/S BIRDS Day # 20 Year 2007 REHAVIOR INITIAL FLIGHT DIRECTION Canopy= HEIGHT SEEN . 0 Station Number: Site Name / No. Area Name: Ledal Detections - This Side Page Total: DIST. TO BIRDS SEEN CLOSEST nik K DIRECTION DEPART FLIGHT 165-1 Firler DETECTION DIRECTION FINAL Bearin t-ac Munise (L= Loud, M= Moderate, F= Faint) Heard Only Dist. To Birds SULVE unter NOTES Pg. 2 of 2 revised: 2 / 2000

WASHINGTON			S	Survey	Visit to P	rotocol		Page <u>1</u> of <u>2</u>
MARBLED MURREL	ET		(Y or N	, initials):	YIC	.	Total Detections:
FOREST SURVEY F			:	Species	of Conc	ern (circ	le one, d	letails on last pg.): 🕥 or N
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Observer (s) Name: <u>Alden</u> J.	Miller	Initials: <u>/</u>	JA A	ffiliatio	1: <u>AB</u>	RI	n I	Phone: (503) 359-7525
Station Elevation: 871 Ft / 6	D Positio	on on Slope (ci	ircle one	e): B ott	om/plain,	Lower	1/3, 🕅	id 1/3, Upper 1/3, Ridgetop
Station Placement (circle one)	Outside							· ·
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Colling: 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: $\theta = 0\%$, 1 = 33%, 2 = 66%, 3 = 100%.

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WASHINGTON	Survey Visit to Protoco	1	Page <u>1</u> of <u>2</u>
MARBLED MURRELET	(Y or N, initials):	nr	Total Detections:
FOREST SURVEY FORM			letails on last pg.): Y or N
	Number: S. F. Co. Lar Rive		Day <u>2</u> Year <u>2007</u> Station Number: <u>/</u>
Station Location - $T 2/$ N, R //2 (circle one) E o			
UTM zone: <u>10</u> E (x) coordinate: <u>$6/1924$</u> N (y) coordin	nate: (74/4/28 Sourc	= GPS	Datum: 1/AD83FOM:
Observer (s) Name: Neil Eric Jensen Initials: NE	J Affiliation: ARR, Inc		Phone: (503) 359-7525
	:le one): Bottom/plain, Low	er 1/3, M	id 1/3, Upper 1/3, Ridgetop
Station Placement (circle one) Inside, Outside			1 a
Distance from Survey Site Boundary: Om Units of Meas	sure for ALL Horizontal Dista	nces: <u>////</u>	elets_
Station Canopy Cover (circle one): $(1 = 0 \text{ to } 25\%)$, $2 = 26 \text{ to } 50\%$.	3 = 51 to 75%, 4 = 76 to	100%	
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Temperature at Sumpley O	Survey //// Circle	onel LLZC	or \mathbf{F} revised: $2/2000$
Temperature at Sunrise: <u><u><u>R</u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>	f Survey: <u>//. //</u> (circle		
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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

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Departing From a Tree, S = Stationary Calling (fixed-point multiple calls <100 m), U = Unknown. Murrelet Predators: Stellers Jay, Common Raven, Townsend's Chipmunk O Priced O. J. J. Margarian Margarian Stranger **BEHAVIOR:** $F = Flight Over Canopy, C = Circle Over Canopy, T = Fly-Through At or Below Canopy (<math>\leq 1.0$), **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) AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, --= None or N/A. If both are heard write W / J. AUDITORY - Vocal Series (Vocalizations): K = KEER calls, G = Groan (alternate) calls, O = Whistle or Soft Que calls, <math>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-S or M = Multiple. OL = Overlapping Vocalizations (Y or N). **TYPE:** H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard. SURVEY ACYIVITY: Observer (s) Initials: DataReletence/Nimbels WASHINGTON MARBLED MURRELET FOREST SURVEY FORM OVI- SUTATS DELECTION # DETECTON TIME \mathcal{O} \circ Ó 4 C C 0 0 INITIAL DETECTION DIRECTION IF түре Start VOCAL SERIES Ē AUDITORY * Month 07 Day 25 Year 2007 **Note Significant Weather Changes on Page 1** Units of Measure (circle one): U.S. / (Metric p OTHER W/J BIRDS SEEN ROIVAHER INITIAL FLIGHT DIRECTION HEIGHT Салору= 5 Station Number: Site Name / No: S Detections - This Side Page Total: CLOSEST DIST. TO BIRDS SEEN SEEN Units Area Name: Cedar DEPART FLIGHT DIRECTION River Watershed DETECTION DIRECTION edal Kiter NE FINAL A Seain Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint) Suntise PIWO 8 CORA (PID DE CRCH lownsends WIWR HE) WIW VHIVEY NOTES Wer, Pg. 2 of 2 ÷ revised: 2 / 2000 ST KKNIL AMRO RTCON TIMON DIA

Species of Concern: Spotted Torker Pillerted,

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MARBL			LET		((Y or N	(, initials)	y n		Total Detections:
FORES						Specie	s of Conc	ern (circ	le one, c	letails on last pg.): Y or N
				٨			1	Month -	July	Day 76 Year 200+
Area Name: _	Ceda	r River	Watershe	Site Name	/ Numbe	r: <u>Fr</u>	ndley	cre	<u>K</u>	Station Number # Z(Visual)
Station Locati	on - T_	<u>21</u> N, 1	r_ <u>10</u> _	(circle one))or W	, S	<u>6</u> , 0	Q (1/16)	SW	_, of Q (1/4) <u>NW</u>
UTM zone:	<u>10</u> E (x) c	oordinate: _	06438	N (y) coor	dinate:	524	<u>3247</u>	Source:	GPS	Datum: <u>NAØ 83</u> FOM: Phone: (503) 359 - 7525
Observer (s) N	lame: 🦯	4 lden J	. Mille	/ Initials: /	JMA	ffiliatio	n: <u>AB</u>	<u>R In</u>	<u>vc.</u> 1	Phone: (503) 359 - 1525
Station Elevat	ion' &	32 Ft /	A Positi	on on Slope (c	ircle one	e): Bot	tom/plain,	Lower	1/3, M	id 1/3 Upper 1/3, Ridgetop
Station Placan	nant (circle	ona) Insid								
Distance from	Survey Si	te Boundary:		Units of M	easure fo	or ALL	Horizonta	I Distanc	es:	eters
Station Canop	y Cover (c	ircle one):	l = 0 to 25%	2 = 26 to 50)%, 3=	= 51 to 7	75%, (4=	76 to 10	0%)	
ENVIRONM			ç.							
Official Sunri	ise Time	0537	Tahia	a North Be	мд _В	legin Su	urvey Tim	$e V \Psi$	>0 r	and Survey Time: 065Z
Official Summe		<u>v - / (</u>	Lavn		_					······
Temperature a			Temp	perature at End	of Surv	ey:	<u>1.5</u> "	(circle or	(c)	or F revised: 2 / 2000
	at Sunrise:		¹ Тетр нопіz.	erature at End	of Surv		<u>1.5</u> ¤	(circle or		or F revised: 2 / 2000 NOTES
Temperature a	t Sunrise: VERTIC/	10	Temp	erature at End	of Surv	ey:	<u>1.5</u> ¤	(circle or	(c)	or F revised: 2 / 2000
Temperature a	t Sunrise: VERTIC/		Temp HORIZ. VIS.	AUDIBILITY TO	of Surv PR	ey:	1.5 I	(circle or	(c)	or F revised: 2 / 2000
Temperature a	VERTIC/ CCCCC COLOUNER	L VIEWING VISIBILITY TO 2	Temp HORIZ. VIS.	AUDIBILITY TO 200 M	of Surve PR RAIN	ey: ECIPITA FOG	TION OTHER	(circle on	(c)	or F revised: 2 / 2000 NOTES
Temperature a	VERTIC/ CELUNG UL/ O	L VIEWING VISIBILITY TO 2	Temp HORIZ. VIS.	AUDIBILITY TO 200 M	of Surve PR RAIN	ey: ECIPITA FOG	TION OTHER	(circle or	(c)	NOTES BODIN SUNVEY
Temperature a TIME 0450 0537	UL O	L VIEWING VISIBILITY TO 2	Temp HORIZ. VIS.	AUDIBILITY TO 200 M	PR RAIN N	ey: ECIPITA FOG N	TION OTHER N	(circle on	(c)	NOTES NOTES Begin Survey Sunrise
Temperature a TIME 0450 0537	VERTIC/ CELUNG UL/ O	L VIEWING VISIBILITY TO 2	Temp HORIZ. VIS.	AUDIBILITY TO 200 M	of Surve PR RAIN	ey: ECIPITA FOG	TION OTHER	(circle on	(c)	NOTES BODIN SUNVEY
Temperature a TIME 0450 0537	UL O	L VIEWING VISIBILITY TO 2	Temp HORIZ. VIS.	AUDIBILITY TO 200 M	PR RAIN N	ey: FOG N	TION OTHER N	(circle on	(c)	NOTES NOTES Begin Survey Sunrise
Temperature a TIME 0450 0537	UL O	L VIEWING VISIBILITY TO 2	Temp HORIZ. VIS.	AUDIBILITY TO 200 M	PR RAIN N	ey: FOG N	TION OTHER N	(circle on	(c)	NOTES NOTES Begin Survey Sunrise
Temperature a TIME 0450 0537	UL O	L VIEWING VISIBILITY TO 2	Temp HORIZ. VIS.	AUDIBILITY TO 200 M	PR RAIN N	ey: FOG N	TION OTHER N	(circle on	(c)	Regin Survey Sunrise End Survey
Temperature a TIME 0450 0537	UL O	L VIEWING VISIBILITY TO 2	Temp HORIZ. VIS.	AUDIBILITY TO 200 M	PR RAIN N	ey: FOG N	TION OTHER N	(circle on	(c)	NOTES NOTES Begin Survey Sunrise End Survey * Tanden Survey
Temperature a TIME 0450 0537	UL O	L VIEWING VISIBILITY TO 2	Temp HORIZ. VIS.	AUDIBILITY TO 200 M	PR RAIN N	ey: FOG N	TION OTHER N	(circle on	(c)	NOTES NOTES Begin Survey Sunrise End Survey X Tanden Survey With NEJ @ Station

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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), U = Unknown.

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

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Š	ASH	INGTON N	IARBLED	MU	WASHINGTON MARBLED MURRELET FOREST SURVEY FORM	URVEY	õ	RM	7	Detections -	Detections - This Side Page Jotal	S 1. 1.	Pg. Z of Z
Obs	erver	Observer (s) Initials: AJ	AJM		Month July Day 26	LIN Day	2	Year	<i>)</i> (Area Name:		<u>' 1</u> 2 r	Creek
SUI	RVEN	SURVEY ACYIVITY:				ificant Weat	ther	hanges on P					7 revised: 2 / 2000
ITAT2	DETE	DETECTON TIME	INITIAL	TYPE	AUDITORY	BIRDS	венч		BIRD	CLOSEST DIST. TO		FINAL	NOTES
0/1- SI	# NOILC		DIRECTION		VOCAL SERIES OTHER Start End # OL W/J	2 SEEN	ИОК	DIRECTION	SEEN Canopy= 1.0	BIRDS SEEN Units	DIRECTION	DIRECTION	Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
	$\overline{\ }$	0450							·				Regin Survey
	$\overline{\ }$	2590					Щ						End Survey
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<u>TYPE:</u> AUDIT	PE: H	H = Heard Only RY - Vocal S	y (no visual), : eries (Vocaliz	S = S	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 One calls, II = Indroven	Seen and H	leard	nalle N = Whie	tle or Soft	nue calle T	= I Inknown		
hear	d at b	oth the start ar	nd end if calls	grade	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.	uring the det	ectic	on. Indicate the	e number h	leard 1-5 or M	A = Multiple.		OL = Overlapping Vocalizations (Y or N).
BEI	<u>IAN</u>	OR: $\mathbf{F} = Flight$	<u>Non-Vocal Sc</u> ut Over Canon		AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, = None or N/A BEHAVIOR: F = Flight Over Canony C = Circle Over Canony T = Fly-Through At or Below C	fly_Thming	⊦∎ ₽⊻	one or N/A. If	both are h	If both are heard write W / J. hanner (< 1.0) $\mathbf{R} = Circle \Delta t = C$	/J.	1	
Dep	arting	From a Tree,	S = Stationary	Call	Departing From a Tree, S = Stationary Calling (fixed-point multiple calls <100 m), U = Unknown. (Check Reverse Side When Using 2-Sided For Check Reverse Si	try-1110سع الله <100 m)	ר קייי גיי	- Unknown.	JPY (2 1.0)	i, b – Clicie .	(Check)	Canopy (S 1.0 Reverse Side	(Check Reverse Side When Using 2-Sided Forms)

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WASHINGTON		Survey Visit t	o Protocol		Page <u>1</u> of <u>Z</u>
MARBLED MURREL	.ET	(Y or N, initia	ls): y (M	6	Total Detections:
FOREST SURVEY F	ORM	Species of Co	ncern (circ	le one, c	letails on last pg.): (Y) or (N)
Area Name: $\underline{Codar} R_1' \underline{Ver} W_2$ Station Location - T 2/ N, R UTM zone: 10 E (x) coordinate: \underline{C}	<u> 10</u> (circle one) (E 06438 N (y) coor	Dor w , S <u>6</u> , rdinate: <u>24320</u>	QQ (1/16) 2_Source:	SW GPS	_, of Q (1/4) <u>////</u> _ Datum: <u>//AD83</u> FOM:_ <u>Ø</u>
Observer (s) Name: Neil Elic J	ensen Initials: 1/1	Affiliation: <u>A</u>	K, Inc.]	Phone: ((03) 359-7525
Station Elevation: Ft / (M Station Placement (circle one): Distance from Survey Site Boundary: Station Canopy Cover (circle one):	Outside	easure for ALL Horizo	ntal Distance	es: <u>M</u>	lid 1/3, Upper 1/3, Ridgetop
ENVIRONMENTAL CONDITIONS			······		
Official Sunrise Time: _0537_	· · · ·	·		_	and Survey Time:652_
Temperature at Sunrise:0,00	Temperature at End	of Survey: <u>9,5</u>	^[] (circle on	ie) 🕐	or F revised: 2 / 2000
	HOŘIZ. AUDIBILITY VIS. TO TO 100 M 200 M	PRECIPITATION RAIN FOG OTHE	WIND	NOISE	NOTES
0449UL 0 Y 0529UL 0 Y 0537UL 0 Y	Y Y Y Y Y Y	N N N N N N N N N	1 2 2	000	Begin Survey
065ZULOY	Y Y	N N N	2	0	End Survey
	·			· · · · · · · · · · · · · · · · · · ·	

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).

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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 increasing in Floring.

Apple Sales	

[14] A. M. Martin, M. M. Martin, and M. M. Martin, Phys. Rev. Lett. 74, 1000 (1996).

WASHINGTON MARBL		RELET F	OREST SURVEY FOR Month <u>07</u> Day <u>26</u> Units of Measure (circle one):	Year U.S.	Metric S	Detections - Thi Area Name:	Detections - This Side Page Total Area Name: <u>Cedar River</u> Site Name / No: <u>Fradley</u> (Station Number: <u>2a</u>	erotal: yes water	Pg. 2 of 2
SURVEY ACYIVITY:		**Note Signi	ficant Weather	**Note Significant Weather Changes on Page 1**	;e]**				revised: 2 / 2000
NOIDERECTION #		AUDITORY VOCAL SERIES Start End # OL W/J	BEHAVIOR	INITIAL FLIGHT DIRECTION	BIRD HEIGHT SEEN Canopy= 1.0	CLOSEST DIST. TO BIRDS SEEN SEEN ()	DEPART FUGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
+ 0 449 -					• •				Begin Survey, kt VATO
-1120-					•				KtcBcH'
-9150-									IN DSFL
									15th Julk
- 212/0-									Suntise
- 02.20 -					•				lst SwTH
- 7 / 90 -									KEUEJU
<u>- 0627 -</u>									KH SPTO
- 0652-									Endliner
					•				/
					•				
					•				
					•				
					•				
					•				
╢									
TYPE: H = Heard Only (no visual), S AUDITORY - Vocal Series (Vocalizz heard at both the start and end if calls <u>E</u> AUDITORY - Other (Non-Vocal So BEHAVIOR: F = Flight Over Canopy Departing From a Tree, S = Stationary	Heard Only (no visual), S = '- Vocal Series (Vocalizatio the start and end if calls gra '- Other (Non-Vocal Sound : F = Flight Over Canopy, C om a Tree, S = Stationary Ca	Seen Only (silent), B = <u>ms</u>): K = KEER calls, G de between different typ <u>ts</u>): W = Wing Sound, J C = Circle Over Canopy dling (fixed-point multi	Both Seen and Heard = Groan (alternate) c ses during the detection I = Jet Sound, = No , T = Fly-Through At the ple calls <100 m), U =		tle or Soft (number he both are he: py (≤ 1.0),		5 <u>–</u> – – – – – – – – – – – – – – – – – –	= None o OL = Overla ∂anopy (≤ 1.0 leverse Side	calls, U = Unknown, → = None or N/A. Indicate the vocal type I-S or M = Multiple. OL = Overlapping Vocalizations (Y or N). vrite W / J. Circle At or Below Canopy (≤ 1.0), L = Seen Landing in or (Check Reverse Side When Using 2-Sided Forms)
		· · · · · · · · · · · · · · · · · · ·							(

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WASHINGTON	Survey Visit to Proto	col Page <u>1</u> of <u>2</u>
MARBLED MURRELET	(Y or N , initials): $\boxed{\mathbf{Y}}$	Total Detections:
FOREST SURVEY FORM	Species of Concern (circle one, details on last pg.): (Y) or N
	Mont	h_ <u>07</u> _Day_ <u>27</u> _Year_ <u>2007</u>
Area Name: Cedar River Watershed Sit	e Name / Number:	Station Number:
Station Location - T 22 N, R //) (circle	e one) (E) or W, S <u>30</u> , QQ (1/	16) $\leq \mu$, of Q (1/4) $\leq E$
UTM zone: 10_E (x) coordinate: 607.568 N	(y) coordinate: <u>5245843</u> Sou	rce: <u>6R</u> Datum: <u>NADR</u> FOM: <u>6</u>
Observer (s) Name: Neil Eric Jensen Ini	tials: <u>NE</u> Affiliation: <u>ABR, 7</u>	ис- Phone: (503)359-7525
Station Elevation: <u>825</u> Ft (M) Position on	Slone (circle one) Bottom/plain, Lo	wer 1/3, (Mid 1/3,) Upper 1/3, Ridgetop
Station Placement (circle one) Inside Outside		
Distance from Survey Site Boundary: Ur	its of Measure for ALL Horizontal Dis	ances: <u>Meter</u>
Station Canopy Cover (circle one): $1 = 0$ to 25%, $2 =$	26 to 50%, $(3 = 51 \text{ to } 75\%) 4 = 76 \text{ t}$	0 100%
ENVIRONMENTAL CONDITIONS:		· · · ·
Official Sunrise Time: 0539 Table: 1/2		<u>9454</u> End Survey Time: <u>0654</u>
Temperature at Sunrise: <u>9.5</u> Temperatur	e at End of Survey: /0.0 ⁰ (circ	e one) C or F revised: 2 / 2000
TIME VERTICAL VIEWING HORIZ, AUC	IBILITY PRECIPITATION WI	
VIS.	TO 00 M RAIN FOG OTHER	
		1/ B SI SI
0454423 7 7		N Begin Survey
	NNNO	N Sunrise
0654HI3 Y Y	$\sim N N N 0$	_ 1. LNA SULVEY

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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), U = Unknown.

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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 textulin in Notice.

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	2		MANDLED	M	WASHINGI ON MARBLED MURRELET FOREST SURVET FORM		ORM		Detections - This Side Page Total: Area Name: Cedar Killer 1	This Side Pag	re Total:	iddaed Pg. Lof 2
0b	erver	Observer (s) Initials:			Month 07	Day	Day 27 Year 2007	,	Site Name / No:	No. KC	4	
		SUBVEV ACVIVITY.										
TAT2	DETE	DETECTON TIME	INITIAL	TYPE	AUDITORY			HFIGHT		DEPART	FINAL	NOTES
/1- sr	NOITO		DIRECTION			SEEN		SEEN	BIRDS	Z	DIRECTION	Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
0,	#				Start End # OL W/J	;	- 	1.0	units)			
	T	0454										~ 8
		0459										1/4////TU
rene ByB		000						-				L+RFI
	\	0(721)						•				kt Mutic on (ind)
i Mariji	-	0<29										1. A. TIM
		0 12 7										H Dan Jos Tra C Sug
	-	0539										
	_	$0 \subseteq 4 \mid 4 \mid$										14 11/11/
	+	0554										N V DV/N
	1	0618										KI DTI.M
		0641										14 Jungo
		0654						•				Fad Sinner
	-							•				
					-			•				
								•				
								•			-	
								•				
								•				
TYPE:	Ë: F	H = Heard Only	y (no visual), S	S 	H = Heard Only (no visual), $S =$ Seen Only (silent), $B =$ Both	B = Both Seen and Heard	ard					
<u>AU</u> hean	d at b	oth the start ar	eries (Vocaliz nd end if calls)	<u>atior</u> grad	AUDITURY - Vocal Series (Vocalizations): $K = KEER$ calls, $G = Groan$ (alternate) calls, $O = Whistle or Soft Que calls, U = Unknown, heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-S or M = Multiple$	oan (alternat	e) calls, O = Whis ction. Indicate the	le or Soft number h	Que calls, U eard 1-5 or N	= Unknown, I = Multiple	$\mathbf{OF} = \mathbf{None} 0$	AUDITUKY - Vocal Series (Vocalizations): $K = KEER$ calls, $G = Groan$ (alternate) calls, $O = Whistle or Soft Que calls, U = Unknown, = None or N/A. Indicate the vocal type heard at both the start and end if calls grade between different types during the detection. Indicate the number heard 1-5 or M = Multiple. OL = Overlapping Vocalizations (V or N)$

 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</td>

 Departing From a Tree, S = Stationary Calling (fixed-point multiple calls <100 m), U = Unknown.</td>
 (Check Reverse Side When Using 2-Sided Forms)

 Murelet Nedators - Douglas Tree, S = Stationary Calling (fixed-point multiple calls <100 m), U = Unknown.</td>
 (Check Reverse Side When Using 2-Sided Forms)

WASHI	NGTC	N			S	Survey	Visit to P	rotocol		Page <u>1</u> of <u>2</u>
MARBI			_ET		(Y or N	, initials):	y cri	-	Total Detections:
FORES					ł					etails on last pg.): Y or (N)
				1		Saul	h Foska	1onth 🚄	<u>Suly</u>	Day <u>27</u> Year <u>2007</u>
Area Name:	Cedar	River u	<u>jatershe</u>	^C Site Name /	Numbe	r <u>Cec</u>	lar Ri	Ver N	brik	Station Number: 3
Station Locati	ion - T_	<u>21_</u> n, f	<u></u>	(circle one) (E) or W	,s <u>/</u>	<u>0</u> , Q	Q (1/16)	NW	, of Q (1/4) <u>NW</u>
UTM zone:	<u>10</u> E (x) α	ordinate:	11251	N (y) coor	dinate: 4	574	<u>246</u>	Source:	65	Datum: NAD 83FOM:
Observer (s) 1	Name:	flden J.	Mille	Initials: <u>A</u>		ffiliatio	n: <u>AB</u>	<u>K II</u>	<u>v </u>	Phone: (503 359-7525
Station Eleva	tion: 72	8 Ft /6	D Positio	on on Slope (ci	ircle one	e): B ott	om/plain,	Lower	1/3 M	id 1/3, Upper 1/3, Ridgetop
Station Place										
Distance from		~		Units of Me	easure fo	ALL	Horizontal	Distance	es: <u>M</u>	eters
Station Canor	by Cover (ci	rcle one): 🚹	= 0 to 25%,	2 = 26 to 50						
ENVIRONM			<u>S:</u>	1 1 2	. 1 -	- - A	э.	רות:	-	Noll
Official Sunr	ise Time:									nd Survey Time: 0654
Temperature	at Sunrise: _	<u> </u>	Temp	erature at End	of Surve	ey:	יי יי <u>ן</u>	(circle on	e) (C	r F revised: 2 / 2000
тіме	VERTICA		HORIZ.	AUDIBILITY	PR	ECIPÍTA	TION	WIND	NOISE	NOTES
	aha		VIS. TO 100 M	TO 200 M	RAIN	FOG				
1	ЩÖС	VISIBILITY	10 100 M	200 141	RAIN	FUG	OTHER			
	CLOUD COVER CEILING	VISIBILITY TO 2 CANOPY		200 M	RAIN	POG George	OTHER	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		
	47	TO 2	V	200 M		ga a s		0	Z	Besin Survey
0450	H1 3	TO 2	<u>Y</u>	<u>- Y</u>	2 2	Z	N N	0	22	Begin survey Sunrise
0450 0539	н 113 143	TO 2	Υ Υ Υ	200 M	2	22	N	0000		Begin survey Sunrise
0539 0621	H13 H13 H12	TO 2			22	Z	22	0	N	Begin survey Sunrise End Survey
0450 0539 0621 0654	H13 H13 H12	TO 2			2 2 2	Z Z Z	222	0 0	N N	
0539 0621	H13 H13 H12	TO 2	Υ Υ Υ Υ		2 2 2	Z Z Z	222	0 0	N N	
0539 0621	H13 H13 H12	TO 2	Υ Υ Υ Υ		2 2 2	Z Z Z	222	0 0	N N	
0539 0621	H13 H13 H12	TO 2			2 2 2	Z Z Z	222	0 0	N N	
0539 0621	H13 H13 H12	TO 2			2 2 2	Z Z Z	222	0 0	N N	

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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 touristic in Normal.

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WAS Observ	WASHINGTON MARBLED MURRELET FOREST SURVEY FORMObserver (s) Initials: $AJTM$ Month $\overline{Ju ly}$ Day ZT Data Reference NumberUnits of Measure (circle one):	MARBLED MUR		LET FOR Mor Unit	OREST SURVEY FOR Month <u>July</u> Day <u>Z7</u> Units of Measure (circle one):	RVEY F	Year 2	Ment -	Detections - This Area Name:	Detections - This Side Page Total: Area Name: <u>Clcl & K. V</u> Site Name / No: South For K. Station Number: <u>3</u>		er watershed Pg Z of Z Cedar River North
SURV	SURVEY ACYIVITY:	••		N**	ote Signífic	ant Weath	**Note Significant Weather Changes on Page I**	age I**				revised: 2 / 2000
- SUTATS		INITIAL DETECTION DIRECTION	TYPE S	AUDITORY	OTHER	SEEN #		BIRD HEIGHT SEEN	CLOSEST DIST. TO BIRDS	DEPART FLIGHT DIRECTION	FINAL DETECTION DIRECTION	NOTES Heard Only Dist. To Birds
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TYPE:	H = Heard Only (no visual), S = Seen Only (silent), B = Both Seen and Heard	y (no visual), S	= Seen Or	ıly (silent), E	s = Both Se	en and He	ard.					
AUDI1 heard a	AUDITORY - Vocal Series (Vocalizations): $K = KEER$ calls, $G = Groan$ (alternate) calls, $O = Whistle or Soft Que heard at both the start and end if calls grade between different types during the detection. Indicate the number heard$	eries (Vocaliza nd end if calls g	rade betwe	 KEER calls en different 	s, G = Groz types durin	n (alternat g the dete	e) calls, O = Wh ction. Indicate the second seco	istle or Soft 1e number h	Que calls, U eard 1-5 or N	calls, U = Unknown, 1-5 or M = Multiple.		= None or N/A. Indicate the vocal type OL = Overlapping Vocalizations (Y or N)
AUDI) BEHA	<u>AUDITORY - Other (Non-Vocal Sounds</u>): $W = Wing Sound, J = Jet Sound, = None or N/A. If both are heard write W / J. BEHAVIOR: F = Flight Over Canony C = Circle Over Canony T = Fly-Through At or Below Canony (< 10) B = Circle At a$	<u>Non-Vocal So</u> ht Over Canony	C = Circl	• Wing Sound	d, J = Jet So mv T = Flv	ound, =	None or N/A. I	f both are he		/ J.		nggang roomaanaa (roomaa)
Departi	Departing From a Tree, S = Stationary Calling (fixed-point multiple calls <100 m), U = Unknown.	S = Stationary	Calling (fi	Ked-point mu	ultiple calls	<100 m),	U = Unknown.	iopy (St.v)		(Check)	Reverse Side	(Check Reverse Side When Using 2-Sided Forms)
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WASHINGTON	Survey Visit to Protocol	Page <u>1</u> of $\frac{7}{2}$
MARBLED MURRELET	(Y or N, initials): y lat	
FOREST SURVEY FORM	Species of Concern (circl	e one, details on last pg.): (Y) or N
	Month $\underline{\mathcal{D}}$	Uly Day 28 Year 2007
Area Name: <u>Cedar River</u> Watershed Site Name / Num	mber: <u>Chester Noru</u>	1 Station Number: 2
Station Location - Low N. R. 7 IULUE UNCLEAVE		,
UTM zone: 10 E (x) coordinate: 601264 N (y) coordinate	te: 54753 Source: d	215 Datum: 1047 25 FOM:
Observer (s) Name: <u>Alden J. Miller</u> Initials: <u>AJM</u>	Affiliation: <u>ABK JW</u>	Phone: (573) 359 - 45 25
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	re for ALL Horizontal Distance	s: <u>meters</u>
Station Canopy Cover (circle one): $1 = 0$ to 25%, $2 = 26$ to 50%.	3 = 51 to 75%, 4 = 76 to 100	%
ENVIRONMENTAL CONDITIONS:		
		End Survey Time: 06 55
Temperature at Sunrise: 13.5 Temperature at End of Su	urvey: 12.5 Circle one	e) (\vec{C}) or \vec{F} revised: 2/2000
	PRECIPITATION WIND	51-
	PRECIPITATION	51-
	PRECIPITATION	51-
TIME VERTICAL VIEWING HORIZ AUDIBILITY OF CONTROL VISIBILITY OF CONTROL VISIBILITY TO 100 M 200 M RAIL CANOPY	PRECIPITATION WIND	NOISE NOTES
TIME VERTICAL VIEWING HORIZ AUDIBILITY O O O VISIBILITY TO VISIBILITY TO 2 TO 100 M 200 M CANOPY O Y Y	PRECIPITATION WIND NIN FOG OTHER N N N	NOISE NOTES
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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).

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er (i) Initials: // // / / / / / / / / / / / / / / / /	WASHINGTON M	ARBLED	MURRELET FOREST SI		ORM	~ 11	Detections - Area Name:	This Side Pag	re Total:	SheA Pg. 2 of 2
This of Measure (circle one): U.S. / (Merric.) Station Number: 2 **Note Significant Weather Changes on Page 1** **Note Significant Weather Changes on Page 1** Inversion Number (incle one): U.S. / (Merric.) Station Number: 2 Inversion Number (incle one): U.S. / (Merric.) Station Number: 2 Z Inversion Station Number: 1 Station Number: 1 Station Number: 1 Z Inversion Station Number: 1 Station Number: 1 Station Number: 1 Z Inversion Station Number: 1 Station Number: 1 Station Number: 1 Z Inversion Station Number: 1 Station Number: 1 Station Number: 1 Z Inversion Station Number: 1 Station Number: 1 Station Number: 1 Z Inversion Station Number: 1 Station Number: 1 Z Station Number: 1 Z Inversion Station Number: 1 Station Number: 1 Station Number: 1 Z Station Number: 1 Z Inversion Station Number: 1 Station Number: 1 Station Number: 1 Z Station Number: 1 Z Inversion Station Number: 1 St	Observer (s) Initials:	AJM	Month Jul	_Day_	Year	T	Site Name / 1	No. Che		onth
Vote Significant Weather Changes on Page 1 Protocol NUTTAL Aubitory ## NUTTAL BitDo Closest Depart of the page Image OFFECTION Relight Stant End Image Image <td>Data Reaction Number</td> <td></td> <td></td> <td>sure (circle or</td> <td>U.S. / (</td> <td>\mathbb{N}</td> <td>Station Num</td> <td>ber:</td> <td>2</td> <td></td>	Data Reaction Number			sure (circle or	U.S. / (\mathbb{N}	Station Num	ber:	2	
Image: Second perfection Image: Second p	SURVEY ACYIVITY:		**Note Signi	ficant Weathe	r Changes on Pa	ge 1**				revised: 2 / 2000
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alls, $0 = \mathbf{W}$ histle or Soft Que calls, $\mathbf{U} = \mathbf{U}$ nknown, n Indicate the number heard 1-5 or $\mathbf{M} = \mathbf{M}$ olticle	AUDITORY - Vocal Sentered at both the start and	ries (Vocaliza f end if calls p	$\underline{\text{thions}}$: $\mathbf{K} = \text{KEER calls}, \mathbf{G} = \text{Gr}$	ioan (alternate	tion Indicate the	the or Soft	Que calls, U	l = Unknown, A = Multiple		r N/A. Indicate the vocal type
AUDITORY - Other (Non-Vocal Sounds): W = Wing Sound, J = Jet Sound, = None or N/A. If both are heard write W / J.	AUDITORY - Other ()	Von-Vocal Sol	<u>unds</u>): $W = Wing Sound, J = Jet$	1 Sound,=	None or N/A. If	both are he	eard write W	/ J.		
BEHAVIUE: $\mathbf{F} = \text{Flight Uver Canopy}$, $\mathbf{U} = \text{Circle Uver Canopy}$, $\mathbf{T} = \text{Fly-Through At or Below Canopy}$ (≤ 1.0), $\mathbf{B} = \text{Circle At or Below Canopy}$ (≤ 1.0), $\mathbf{L} = \text{Seen Landing in or}$ Departing From a Tree, $\mathbf{S} = \text{Stationary Calling}$ (fixed-point multiple calls <100 m), $\mathbf{U} = \text{Unknown}$. (Check Reverse Side When Using 2-Sided Forme)	Departing From a Tree, S	Uver Canopy = Stationary	C = Circle Over Canopy, T = 1 Calling (fixed-point multiple cal	Fly-Through . lls <100 m), U	At or Below Canc J = Unknown.)py (≤ 1.0)	, B = Circle	At or Below ((Check)	Canopy (≤ 1.0 Reverse Side), L = Seen Landing in or When Using 2-Sided Forme)
Concern: Common loop	species of	Concern	· Common loop					,		

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MARBI			LET		(Y or N	initials):	Y Cab		Total Detections:
FORES					1	Species	of Conce	ern (circl	le one, d	etails on last pg.): Y or (N)
							N	1onth I	<u>uly</u>	Day <u>29</u> Year <u>200</u>
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Station Locat	ion - T	7.2. N. F	2 X ((circle one)	or W	.s /	4,0	Q (1/16)	NE	, of $Q(1/4)$ <u>NE</u>
A version of	10 0 0 .	- and in star	MUXX/	N (y) coor	dinate [.]	シルシリ	וסכנ	Source:		Datum VIII 67 FOM:
Observer (s) l	Name:	Jiden J	T. Miller	Initials: A	JM A	ffiliatio	1: <u>AB</u>	K J	<u>^</u> I	Phone: (503) 359-7525
										id 1/3, Upper 1/3, Ridgetop
			Konik							
Distance from	n Survey Si	e Boundary:		Units of Me	easure fo	or ALL	Horizonta	Distance	es: <u>M</u>	eters
Station Canor	by Cover (c	ircle one): 1	= 0 to 25%,	2 = 26 to 50	», 3=	= 51 to 7	5%, 4=	76 to 10	0%	
ENVIRONM			ç.							N771
Official Sum	rise Time: _	0541		North B	end B	legin Su	rvey Tim	e: 04	<u>50</u> e	nd Survey Time: 0776
Temperature	at Sunrise:	<u>14.0</u>	⁾ Temp	erature at End	of Surve	ey: <u>13</u>	<u>.5</u> "	(circle on	e) (C) (or F revised: 2 / 2000
	Ref. Contraction of the local data								1	
TIME	VERTICA	LVIEWING	HORIZ.	AUDIBILITY	PR	ECIPITA	TION	WIND	NOISE	NOTES
TIME			HORIZ. VIS. TO 100 M	TO 200 M	PR RAIN	ECIPITA FOG	TION OTHER	WIND	NOISÈ	NOTES
TIME		L VIEWING VISIBILITY TO 2 CANOPY	VIS.	то				WIND	NOISE	NOTES
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WASHINGI ON MARBLED MURRELET FOREST SURVEY FORM	URRELET FOREST SU	EVEY FORM	Detections - This Side Page Total:	atristed Pg. 2 of (
Observer (s) Initials: <u>AJM</u>	Month July Day	1 Day 29 Year 2007	No: LO	<u>reek</u>
Data Reference Number		Units of Measure (circle one): U.S. / Metric	V.	
SURVEY ACYIVITY:	** Note Significant Weather	ant Weather Changes on Page 1**		revised: 2 / 2000
가 전 DETECTON INITIAL 것	AUDI	INITIAL FLIGHT	4° -0	NOTES
NOIT	VOCAL SERIES OTHER	NO DIRECTION	BIRDS DIRECTION	Heard Only Dist. To Birds (L= Loud, M= Moderate, F= Faint)
	Start End # OL W/J	Lanopy- 1.0	Dy= ()	
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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 Oue calls. U = Unknown	Seen Only (silent), B = Both Seen): K = KEER calls, G = Groat	n and Heard. (alternate) calls, O = Whistle or		
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. <u>AUDITORY - Other (Non-Vocal Sounds)</u> : W = Wing Sound, J = Jet Sound, — = None or N/A. If both are heard write W / J.	<u>Juss</u> : $\mathbf{K} = \mathbf{K} = \mathbf{L} + \mathbf{K} \times \mathbf{C} = \mathbf{G} + \mathbf{G} + \mathbf{G}$ de between different types during de): $\mathbf{W} = \mathbf{W} + \mathbf{M} + \mathbf{G}$ Sound, $\mathbf{J} = \mathbf{J} + \mathbf{C} + \mathbf{G}$	t (alternate) calls, $\mathbf{O} = \mathbf{W}$ histle or t the detection. Indicate the numb und, $=$ None or N/A. If both a	Jnknown, Multiple	= None or N/A. Indicate the vocal type OL = Overlapping Vocalizations (Y or N).
BEHAVIUK: $\mathbf{F} = \text{Flight Over Canopy, } \mathbf{C} = \text{Circle Over Canopy, } \mathbf{T} = \text{Fly-Through At or Below Canopy (< 1.0), } \mathbf{B} = \text{Departing From a Tree, } \mathbf{S} = \text{Stationary Calling (fixed-point multiple calls <100 m), } \mathbf{U} = \text{Unknown.}$	C = Circle Over Canopy, T = Fly alling (fixed-point multiple calls	Through At or Below Canopy (< (100 m), U = Unknown.	1.0), $\mathbf{B} = \text{Circle At or Below Canopy}$ (≤ 1.0), $\mathbf{L} = \text{Seen Landing in or}$ (Check Reverse Side When Using 2-Sided Forms)	0), L = Seen Landing in or e When Using 2-Sided Forms)
Predator; St	Services Jan			

WASH	INGTO	ON				Survey	Visit to]	Protocol		Page <u>1</u> of <u>2</u>
MARB	LED N	IURRE	LET			(Y or N	I, initials)	: Y CM	6	Total Detections:
FORES	ST SU	RVEY I	FORM			Specie	s of Conc	ern (cire	cle one,	details on last pg.): (\mathbf{Y}) or \mathbf{N}
UTM zone: _	<u>10 </u> E (x) c	oordinate:	POLOUT	N (y) coor	dinate:	<u></u>		Source:	<u>GT></u>	Day <u>30</u> Year <u>7007</u> Station Number: <u>1</u> , of $Q(1/4)$ <u>5 E</u> Datum: <u>NAD 83</u> FOM: <u>1</u>
Observer (s)				Initials:/~1.	<u> </u>	Affiliatio	n: <u>7713</u>	n Ju	<u>l</u> .	Phone: (503) 359 - 7525
Station Eleva Station Place			-		ircle on	e) Bot	tom/plain,	Cower	1/3, M	lid 1/3, Upper 1/3, Ridgetop
Distance from					easure f	or ALL	Horizonta	l Distanc	es: Mr	eters
Station Cano	py Cover (c	ircle one):	l = 0 to 25%	2 = 26 to 50)%, 3	= 51 to '	75%, 4=	76 to 10	0%)	· · · · · · · · · · · · · · · · · · ·
ENVIRON				North Be	A1 _			hЦС	<u> </u>	and Survey Time:
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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 templatin in Notati

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