

Final Report 4/11/2007
Special Status Mollusk and Amphibian Species Purposive Surveys
Salem BLM, Cascades Resource Area

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Executive Summary

In FY 2006, through a contract, about 1,350 acres of purposive surveys were conducted in some of the most mature forest or wetland habitat in the north, middle, and southern portions of the Cascades Resource Area. The contractor provided all the services necessary to locate, collect and document six target species, using specifications contained in the contract and the Survey Protocol for Terrestrial Mollusk Species, Version 3.0. Surveys were conducted in two general habitat types: open wet meadows and adjacent forested habitat; and interior forest. Two complete visits to each survey area was the goal. The individual survey records (except for a few Evening fieldslug records that were waiting for voucher identification) have been entered into BLM's regional database (GeoBOB) for Special Status and Survey and Manage species. The Evening fieldslug records will be entered into GeoBOB later in 2007.

The Puget Oregonian snail was not detected in any of the Sandy River Basin survey areas. These survey areas represent the best BLM-managed habitat available in northern Clackamas and Multnomah Counties within the suspected range of this species. It appears that the Puget Oregonian does not inhabit BLM land. The same could be stated for Larch Mountain salamander. Although the best habitat was searched and the methodology should still have allowed adequate observation if present, the very intensive protocol for this species was not applied, thus the certainty of the lack of occurrence is not as strong.

Based on the frequency of detection (found at 44 sites, 120 individuals found during 254 survey hours) from this survey, Oregon slender salamander appears to be about as common at the northern extreme of its natural range as it is in the "heart of the range" in southern Clackamas, Marion, and northern Linn Counties. The detection rate (found at 9 sites, 10 animals found during 61 hours of survey effort) for the species was lower in the Molalla River Survey Area. Since this large block of habitat is the result of stand-replacement wildfires within the last 120 years which eliminated almost all large wood legacies, low detection was not unanticipated. Detection rates (found at 19 sites, 49 individuals found during 69 hours of survey effort) in the Santiam River Survey Areas, much of it true "old growth forest" with abundant large woody material, was much higher.

Although a significant number of new sites (10) have been established for Axe-tail slug (alternate common name: Salamander slug) through this survey effort, it may be that little new

specific habitat information can be teased from these locations. This species still appears to be associated primarily with “conifer leaf litter”, in which case, there remain large gaps in known distribution with little evidence to indicate the reason(s).

Deroceras species of some sort were detected at seven wet meadows. Six of those detections have been confirmed by taxa experts as new Evening fieldslug (*Deroceras hesperium*) locations. The seventh detection was a Meadow slug (*Deroceras laeve*). Since both native *Deroceras* slug species were unknown in the Cascades Resource Area, these new sites represent perhaps the most exciting finds of the purposive survey, providing the largest body of “new” habitat information for a species.

Five different species of tail droppers of the *Prophyaon* genus were encountered during this survey. None however were of the “spotted” variety. These results indicate most likely that the Spotted taildropper (*Prophyaon vanattae* var. *pardalis*) does not occur on BLM lands in the Cascades Resource Area.

Background

Approximately 112,900 acres (66 percent) of the Cascades Resource Area (CRA) are in protected Land Use Allocations (LUAs) such as LSR, Congressional Withdrawn Wilderness, District Designated Reserves (such as Areas of Critical Environmental Concern) and Riparian Reserves (GIS data as of 10/05/02). With the exception of some Riparian Reserve areas surveyed during pre-project clearances, very little of the reserve LUAs in the CRA had been surveyed, nor were they likely to be surveyed if not part of a management action. Consequently, very few data existed with which to compare frequency of occurrence and number of sites between reserves and matrix lands. Also, data gaps exist which could be misconstrued as gaps in distribution, especially for Oregon slender salamander (*Batrachoseps wrightorum*), a BLM Sensitive species. Last, some species now on BLM’s Special Status Species (SSS) list were not recorded during previous Survey and Manage (S&M) surveys, because they were not S&M species at that time.

Project Proposal

Purposive surveys were conducted for specific forest floor-associated mollusk and amphibian species which could be detected using essentially the same search protocol. Target species were selected from the Bureau SSS and S&M lists. The Survey and Manage Terrestrial Mollusk Survey Protocol (Version 3.0, 2003) was selected because the methodology permits comparison with previous purposive survey efforts, and the CRA had previously demonstrated success with the protocol in detecting terrestrial amphibians.

Based on the winning bid for the last mollusk contract awarded within the CRA, it was estimated that between 1,200 and 1,400 acres could be surveyed with two visits using the Survey Protocol for Survey and Manage Terrestrial Mollusk Species from the Northwest Forest Plan V3.0(2003).

Target Species

The following target species were selected:

<i>Species</i>	<i>SPCODE</i>	<i>Habitat</i>	<i>Microsite Features</i>	<i>Evidence</i>
<i>Deroceras hesperium</i> Evening fieldslug	<i>DEHE</i>	Moist forest types within 30 M of water.	Variety of low shrubs, leaf litter, debris and rocks.	Live animal
	Similar Species	<i>Deroceras laeve</i>		
<i>Cryptomastix devia</i> Puget Oregonian snail	<i>CRDE2</i>	Moist forests with hardwood component	Bigleaf maple, sword ferns, coarse woody debris	Live animal or empty shell
	Similar Species	<i>Cryptomastix hendersoni</i> , <i>Vespericola columbiana</i>		
<i>Gliabates oregonius</i> Axe-tail slug	<i>GLOR</i>	Moist forest types.	Snags, stumps, coarse woody debris.	Live animal
	Similar Species	Juvenile <i>Hemphillia malonei</i>		
<i>Prophysaon spp.</i> "spotted" taildropper slugs	<i>PROPHSP</i>	Moist forest types.	Snags, stumps, coarse woody debris, large sword ferns.	Live animal
	Similar Species	1 described and 1 undescribed <i>Prophysaon</i> species known		
<i>Batrachoseps wrightii</i> Oregon slender salamander	<i>BAWR</i>	Moist forest types.	Snags, stumps, coarse woody debris.	None required
	Similar Species	None		
<i>Plethodon larselii</i> Larch Mountain salamander	<i>PLLA</i>	Moist forest types.	Rocky substrate, coarse woody debris	Photo
	Similar Species	Any salamander species in the <i>Plethodon</i> genus		

Evening fieldslug (*Deroceras hesperium*) is a Survey and Manage Category B and Bureau Sensitive species. This poorly-known habitat specialist had been found in wet meadows in forested situations in a variety habitat features, including low vegetation, litter, debris, and rocks. No previous records were known from CRA lands, though suitable habitat had never been surveyed.

Puget Oregonian (*Cryptomastix devia*) is a Survey and Manage Category A and Bureau Sensitive snail species generally associated with mature bigleaf maple patches in conifer forest matrix near the Columbia River Gorge. No confirmed or suspected specimens had been found on CRA lands. Forest floor project clearance surveys had been conducted in suitable habitat in the suspected range for Puget Oregonian, though surveys were intended to locate terrestrial amphibians, and had occurred before the Survey and Manage component of the Forest Plan had been implemented. Mollusk species were not recorded during these surveys. Mollusk surveys had been conducted in timber sale project areas in northern Clackamas County with some big-

leaf maple, but no surveys had occurred in stands in which maple was a significant or dominant component, and no surveys had been conducted in Multnomah County at all.

Axe-tail slug or Salamander slug (*Gliabates oregonius*) is a Bureau Sensitive species which was confirmed from a handful of locations in the Northwest Forest Plan (NFP) area, including Coast Range and Cascade Range sites. Several sites had been confirmed in CRA, none of which were in late-seral forest. The habitat association for this species was very poorly known (“conifer leaf litter”). It was presumed that since the species was not on the S&M list, previous surveys had possibly detected, but misidentified the species, since adults bear a reasonable resemblance to juvenile specimens of the *Hemphilia* (jumping slug) genus.

Oregon slender salamander (*Batrachoseps wrightorum*) is a Bureau Sensitive species found under coarse woody debris, exfoliated bark of large Douglas-fir trees, and occasionally under rocks. CRA mollusk surveys had detected the species in almost every project area since 1991, though reserve land use allocations had not been surveyed.

Larch Mountain salamander (*Plethodon larselii*) is a Survey and Manage Category A and Bureau Sensitive species associated with talus and scree, known only from the Columbia River Gorge. No suspected or confirmed specimens had been found on CRA lands. The author of the Larch Mountain salamander survey protocol presumed the species would eventually be found south of the Columbia River Gorge, based on the discovery of range expansion that was verified well north into the central Washington Cascades. BLM project clearance surveys had never been conducted in habitat that included the primary habitat features. Due to the very high costs of implementing the survey protocol designed for this species, the survey project manager decided to include it as a target species only in the prospective survey area for the Puget Oregonian. The predicted range of the two species overlapped, and survey areas identified by GIS for the snail also contained soil types which included talus and scree.

“spotted” tailldropper specimens - Preserved specimens from the CRA had been tentatively identified as Spotted tailldropper (*Prophysaon vanatta* var. *pardalis*), a Bureau Sensitive species. These specimens were re-examined after the purposive survey project was first proposed, and the Mollusk Taxa Lead and the project manager determined that these specimens were in fact an undescribed “spotted” tailldropper species that was not consistent with *P. vanatta* *pardalis*. Although there was no longer any evidence that Spotted tailldropper was likely to be found in the CRA, the project manager decided to designate any “spotted” *Prophysaon* specimen as a target species.

Larch Mountain Salamander and the Puget Oregonian were target species in search areas in the northern third of CRA, within northern Clackamas County and Multnomah County. Evening fieldslug was a target species only in specific sites that included wet meadow margins within forested habitat. Axe-tailed slug, Oregon slender salamander, and “spotted” tailldroppers were target species in all forested habitat in all survey areas.

Oregon slender salamander
Photo/S. Dowlan



Axe-tail slug or Salamander slug
Photo/S. Dowlan



Larch Mountain salamander
Photo/G. Nafis (Calphotos)



“spotted” taildropper species
Photo/S. Dowlan



Puget Oregonian
Photo/S. Dowlan



Evening fieldslug
Photo/S. Dowlan



Survey Site Selection

Once the list of target species was finally determined, potential survey sites and areas were initially selected based on:

- Talus and bigleaf maple-dominated areas in Areas of Critical Environmental Concern (ACECs) in the Sandy River basin and Mount Hood Scenic Corridor. Six survey areas were identified using GIS data layers. The full mollusk survey protocol was employed at these sites (two plots searched for 20 minutes each, and 20 minutes of random search time per survey area).
- Wet meadows in all general survey areas. Meadows were surveyed for Evening fieldslug using the mollusk protocol (one hour of search time per 10 acres of search area), though all search time was “random” (no plots). Most Cascade Resource Area ACECs contain this habitat type.
- Sections in Late Seral Reserve (LSR) land use allocation (LUA) in the Molalla and South Santiam River basins for which no Oregon slender salamander sites had previously been established (approximately 120). Generally, these sections had never been surveyed for any forest floor-associated species. Initially, selection of sections was based on proximity to range gaps identified from a known site map. Since the habitat association for Axe-tail slug was known only as “conifer leaf-litter”, it was presumed that these Oregon slender salamander survey areas would also offer at least a reasonable prospect for detecting this species as well. The full mollusk survey protocol was employed at these sites.

In order to compare results of this project with previous purposive survey efforts, Interagency Special Status Species Program leads requested that some random selection technique be employed to establish survey areas so that the number of animals per hour of survey time could be compared to previous S&M efforts. Suitable habitat for Evening fieldslug was limited to a small number of specific discrete sites, and all potential habitats could easily be surveyed. Suitable habitat for Larch Mountain salamander and Puget Oregonian was also determined to be limited (by GIS screening) to six discrete survey areas of various sizes, and the project manager decided to survey all potential habitat. Therefore, no random site selection was employed for site selection for these three species.

Sections in LSR LUA in the Molalla and South Santiam River basins were suitable for some random element for site selection. For these areas, survey areas were configured as unbounded ten acre “plots”. The contractor was free to select these plots within (usually) discrete road-and-stream-defined stands of the oldest timber available. Although it was first presumed that the project budget would not permit all of the previously unsurveyed sections to be covered, the final bid was low enough that all potential sections could be surveyed. With this caveat, the only way to introduce some random element to site selection would be in the determination of the area within the section to be surveyed.

To accomplish this, random numbers were generated between 1 and 4, representing quarter section numbers (1-NE, 2-SE, 3-SW and 4-NW). Plots were placed in the approximate center of the oldest forested patch within the randomly determined quarter-section. If no mature habitat

(80+ years old) was in the quarter-section, a second (and so on) random number would be generated until the criteria were satisfied. This was further modified by concerns for accessibility (no more than a two mile walk in to the site) and safety (the contractor was granted the authority to refuse to survey sites for safety concerns).

Survey Contract Requirements

The contract was written such that the contractor was paid a fixed amount for each survey-hour which was pre-assigned for each survey area or quarter-section. For more information, the contract is available in CRA files for review. This was done so that the contractor would not have to be responsible for determining and applying the protocol survey time requirements to unbounded survey areas. The contractor’s bid price for each survey area included travel time (by vehicle and by foot), documentation requirements, and specimen collection and delivery time. Bid items were broken-down by general area. The breakdown of survey time (both visits) required to fulfill contract requirements for assigned survey areas consisted of:

Wetland area surveys	36 hours
Plot surveys – Sandy River Basin	110 hours
Plot surveys – Santiam River Basin	80 hours
Plot surveys – Molalla River Basin	94 hours

Table 1: Wet meadow survey areas in Clackamas and Linn Counties	
Survey Areas varied in size. One visit in spring, and one in fall was required (with flexibility for early/late snowfall or freeze). If Evening fieldslug was detected on the first visit, a second visit was not required. Survey hours are for each visit.	
Township – Range – Section – Site Name	Survey Hours
T2S – R7E – Sec. 31 - Wildwood Beaver Pond	2
T5S – R4E – Sec. 36 - Helen’s Lake	2
T6S – R4E – Sec. 1 - Soosap Meadow	2
T7S – R4E – Sec. 15 - Aquila Vista Marsh	1
T7S – R5E – Sec. 4 - Lost Creek Meadow	2
T7S – R5E – Sec. 18 - Shovel Lake	1
T 11S – R3E – Sec. 16 - Mud Dog Lake	3
T 11S – R2E – Sec. 9 - Snow Peak Meadow Complex	2
T 11S – R3E – Sec. 19 - White Rock Fen	3
Total Survey Hours	18

Table 2: Survey areas in the Sandy River basin	
Survey Areas varied from 15 to 200 acres, requiring 1½ to 20 hours of search time for each visit (one in spring, one in fall). Required survey hours are for each visit. It was expected that different plots are established and surveyed for each visit.	
Township – Range – Section – Site Name	Survey Hours
T1S – R4E – Sec. 24 - Sandy River Gorge ACEC	53
T2S – R6E – Sec. 15- Mount Hood Corridor 1	17
T2S – R7E – Sec. 31- Wildwood Recreation Site	40
T2S – R6E – Sec. 25 - Mount Hood Corridor 2	5
T2S – R6E – Sec. 29 - Alder Creek	9
Total Survey Hours	124

Survey Areas in the Santiam River basin and Molalla River basin were configured as unbounded 10 acre sites within a common timber type within predetermined legal sections. The contractor was expected to survey two plots and conduct 20 minutes of random search effort around a site center for each visit. Some of the Molalla River basin survey areas are within the Table Rock Wilderness, and required walk-ins of up to two miles from the nearest road. It was expected that different plots are established and surveyed for each visit. Locations are:

- T6S – R4E – Sections 1, 2, 9, 10, 11, 12, 33, 34
- T7S – R3E – Sections 13, 25
- T7S – R4E – Sections 4, 5, 7, 9, 10, 15, 16, 17, 18, 19, 21, 22, 23, 24, 25, 26, 27, 28, 29, 35, 36
- T7S – R5E – Sections 4, 5, 6, 7, 8, 9, 17, 19, 30, 31
- T11S – R3E – Sections 7, 8, 9, 10, 12, 14, 15, 16, 17, 18, 20, 23, 25, 26, 28, 29, 30, 32, 34, 35, 36
- T11S – R4E – Sections 4, 7, 8, 9, 17, 18, 19, 20, 21, 28, 29, 30, 31, 32
- T12S – R3E – Sections 1, 2, 3, 10, 11

Survey Documentation

All mollusk and amphibian species detected in each discrete survey plot (or survey area, for Evening fieldslug) was recorded on a GeoBOB Fauna Survey Form. For each detection of a target species, a GeoBOB Observation Form – Fauna was completed (multiple target species at one site would require separate forms), including all required habitat data. Target species locations were recorded by use of commercially-available GPS units capable of +/- 150 ft. estimated precision error (EPS). Survey Area Detail Maps were completed for each visit in each Survey Area which would detail the approximate survey route and approximate location of the target species detections.

Voucher Requirements

Collections of all specimens were required for all mollusk target species. Photos were required of any *Plethodontid* salamander suspected to be Larch Mountain salamander. No evidence was required for Oregon slender salamander, since the species is distinct in appearance, and is unlikely to be confused with any other terrestrial salamander.

Survey Results

Survey Limitations

Survey area accomplishments fell short of assignments due to:

- early season snow and freezing conditions ending the fall/winter survey period in 2005;
- late winter snow hampering access for 2006 spring surveys, and;
- hot, dry conditions ending the spring/summer survey season in 2006.

This was not unanticipated, as these conditions may occur during any year in the western Cascade Mountains. Despite these limitations:

- all wet meadows were surveyed twice (if necessary);
- all Sandy River Basin areas were surveyed twice;
- only one Santiam River Basin survey area that was surveyed once was not surveyed a second time;
- sixty-nine percent of Molalla River Basin sites were surveyed twice

One assigned Molalla River Basin site was not surveyed at all due to access/safety concerns. The Survey Project Manager authorized surveys to end in early July, 2006, when the contractor reported that conditions had become extremely hot and dry, detections had declined significantly, and walking within and between sites in steep country had become unsafe due to extreme heat.

Observations

The Puget Oregonian snail was not detected in any of the Sandy River Basin survey areas. These survey areas represent the best BLM-managed habitat available in northern Clackamas and Multnomah Counties within the suspected range of this species. It appears that the Puget Oregonian does not inhabit BLM land. The same could be stated for Larch Mountain salamander. Although the best habitat was searched and the methodology should still have allowed adequate observation if present, the very intensive protocol for this species was not applied, thus the certainty of the lack of occurrence is not as strong.

Based on the frequency of detection (found at 44 sites, 120 individuals found during 254 survey hours) from this survey, Oregon slender salamander appears to be about as common at the northern extreme of its natural range as it is in the “heart of the range” in southern Clackamas, Marion, and northern Linn Counties. The detection rate (found at 9 sites, 10 animals found during 61 hours of survey effort) for the species was lower in the Molalla River Survey Area. Since this large block of habitat is the result of stand-replacement wildfires within the last 120 years which eliminated almost all large wood legacies, low detection was not unanticipated. Detection rates (found at 19 sites, 49 individuals found during 69 hours of survey effort) in the

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Five different species of tail droppers of the *Prophysaon* genus were encountered during this survey. None however were of the “spotted” variety. These results indicate most likely that the Spotted tailedropper (*Prophysaon vanattae* var. *pardalis*) does not occur on BLM lands in the Cascades Resource Area.

The following tables summarize survey results for each general forest survey area and the wet meadow surveys. These tables do not address stand age or habitat characteristics in relation to species detections. For more details, see the Excel spreadsheet accompanying this report.

Table 3 - Wet Meadows Surveyed				
Site Name	Survey Hours Assigned	Survey Hours Completed	<i>Deroceras</i> sp. detected?	<i>Deroceras hesperium</i> confirmed?
Wildwood Beaver Pond	2	2	Y	Y
Helen’s Lake	2	2	Y	Y
Soosap Meadow	2	2	N	N
Aquila Vista Marsh	1	1	N	N
Lost Creek Meadow	2	2	Y	Y
Shovel Lake	1	1	Y	N (<i>D. laeve</i>)
Mud Dog Lake	3	1.5	Y	Y
Snow Peak Meadow Complex	2	2	Y	Y
White Rock Fen	3	3	Y	Y
Total Survey Hours	18	16.5		

Table 4 - Evening Fieldslug (<i>Deroceras hesperium</i>) Confirmed Detections From Voucher Specimens					
*Voucher Tracking No.	Site ID	Site Name	Species	Observation Date	Collector
SAL05-005	DLR045	Mud Dog Lake	<i>Deroceras hesperium</i>	10/24/05	D. Lysgaard-Rutz
SAL06-001	DLR164	Wildwood Wetland	<i>Deroceras hesperium</i>	4/14/2006	D. Lysgaard-Rutz
SAL06-002	DLR256	Wildwood Wetland	<i>Deroceras hesperium</i>	5/7/2006	D. Lysgaard-Rutz
SAL06-011	DLR375-1	Snow Peak Meadow	<i>Deroceras hesperium</i>	6/28/2006	D. Lysgaard-Rutz
SAL06-012	DLR375-2	Snow Peak Meadow	<i>Deroceras hesperium</i>	6/28/2006	D. Lysgaard-Rutz
SAL06-013	DLR376	Helens Lake	<i>Deroceras hesperium</i>	7/9/2006	D. Lysgaard-Rutz
SAL06-014	DLR377	Helens Lake	<i>Deroceras hesperium</i>	7/9/2006	D. Lysgaard-Rutz
SAL06-015	DLR378	Lost Creek	<i>Deroceras hesperium</i>	7/9/2006	D. Lysgaard-Rutz
SAL06-016	DLR380	White Rock Fen	<i>Deroceras hesperium</i>	7/10/2006	D. Lysgaard-Rutz
SAL06-017	DLR381	White Rock Fen	<i>Deroceras hesperium</i>	7/10/2006	D. Lysgaard-Rutz
*All voucher specimens were confirmed by Dr. Paul Hohenlohe, Malacologist. The voucher tracking number was assigned by him.					

Table 5 - Sandy River Basin Survey Area				
Site Name	Survey Hours Assigned	Survey Hours Completed	Target species detected	Individuals/Survey Hour
Alder Creek	9	9	BAWR	4/9
Sandy River ACEC	53	53	BAWR	14/52
Mt Hood Corridor 1	17	17	BAWR	30/34
Mt Hood Corridor 2	5	5	BAWR	10/18
Wildwood Rec. Site	40	40	BAWR	13/22
Survey Time Totals	124	124		
Total Individuals/Survey Hours			GLOR	0/124
Total Individuals/Survey Hours			BAWR	61/124

Table 6 - Molalla Basin Survey Area				
Site Name	Survey Hours Assigned	Survey Hours Completed	Target species detected	Individuals/Survey Hour
6 - 4E Sec 1	2	2		
6 - 4E Sec 2	2	2		
6 - 4E Sec 9	2	2		
6 - 4E Sec 10	2	2		
6 - 4E Sec 11	2	2		
6 - 4E Sec 12	2	1	BAWR	1/1
6 - 4E Sec 33	2	2		
6 - 5E Sec 06	2	2		
6 - 5E Sec 08	2	1		
6 - 5E Sec 18	2	1		
6 - 5E Sec 20	2	1		
6 - 5E Sec 30	2	1		
6 - 5E Sec 32	2	0		
6 - 5E Sec 33	2	1		
7 - 3E Sec. 13	2	1		
7 - 3E Sec. 25	2	1	GLOR	1/2
			BAWR	0/2
7 - 4E Sec. 4	2	2	BAWR	1/2
7 - 4E Sec. 5	2	1		
7 - 4E Sec. 7	2	2	BAWR	1/2
7 - 4E Sec. 9	2	2	GLOR	1/2
			BAWR	1/2
7 - 4E Sec. 15	2	2		
7 - 4E Sec. 16	2	2		
7 - 4E Sec. 17	2	2	BAWR	2/2
			GLOR	2/2
7 - 4E Sec. 18	2	1	BAWR	1/2
7 - 4E Sec. 19	2	1	BAWR	1/2
7 - 4E Sec. 21	2	2	GLOR	1/2
			BAWR	0/1
7 - 4E Sec. 22	2	2		
7 - 4E Sec. 23	2	2		
7 - 4E Sec. 25	2	1		
7 - 4E Sec. 26	2	1		
7 - 4E Sec. 27	2	1		
7 - 4E Sec. 28	2	2		
7 - 4E Sec. 29	2	2	BAWR	1/2
			GLOR	1/2
7 - 5E Sec. 5	2	1	BAWR	0/2

Table 6 - Molalla Basin Survey Area				
Site Name	Survey Hours Assigned	Survey Hours Completed	Target species detected	Individuals/Survey Hour
7 - 5E Sec. 6	2	1		
7 - 5E Sec. 7	2	1		
7 - 5E Sec. 8	2	1		
7 - 5E Sec. 9	2	1		
7 - 5E Sec. 17	2	1		
7 - 5E Sec. 19	2	1		
7 - 5E Sec. 30	2	1		
8 - 4E Sec. 1	2	1	BAWR	1/1
8 - 4E Sec. 2	2	1		
8 - 5E Sec. 6	2	1		
Survey Time Totals	88	61		
Total Individuals/Survey Hours			GLOR	6/61
Total Individuals/Survey Hours			BAWR	10/61

Table 7 - Santiam Basin Survey Area				
Site Name	Survey Hours Assigned	Survey Hours Completed	Target species detected	Individuals/Survey Hour
11 - 3E Sec. 7	2	2		
11 - 3E Sec. 8	2	2		
11 - 3E Sec. 9	2	2		
11 - 3E Sec. 10	2	2		
11 - 3E Sec. 12	2	2	BAWR	3/2
11 - 3E Sec. 14	2	2		
11 - 3E Sec.15	2	2	BAWR	1/2
11 - 3E Sec. 16	2	2		
11 - 3E Sec. 17	2	2	GLOR BAWR	2/1 0/2
11 - 3E Sec. 18	2	2	BAWR	1/2
11 - 3E Sec. 20	2	2		
11 - 3E Sec. 23	2	2	BAWR	8/2
11 - 3E Sec. 25	2	2	BAWR	9/2
11 - 3E Sec. 26	2	2	BAWR	2/1
11 - 3E Sec. 28	2	2	BAWR	2/2
11 - 3E Sec. 29	2	2		
11 - 3E Sec. 30	2	2		
11 - 3E Sec. 32	2	2		

Table 7 - Santiam Basin Survey Area				
Site Name	Survey Hours Assigned	Survey Hours Completed	Target species detected	Individuals/Survey Hour
11 - 3E Sec. 34	2	2	BAWR	7/2
11 - 4E Sec. 4	2	2	BAWR	1/2
11 - 4E Sec. 7	2	2	BAWR	1/2
11 - 4E Sec. 8	2	1	BAWR GLOR	4/1 1/1
11 - 4E Sec. 9	2	2		
11 - 4E Sec. 17	2	1	BAWR GLOR	1/1 1/1
11 - 4E Sec. 18	2	1	GLOR	1/1
11 - 4E Sec. 19	2	2		
11 - 4E Sec. 20	2	2	BAWR	1/2
11 - 4E Sec. 29	2	2	BAWR	1/2
11 - 4E Sec. 30	2	2		
11 - 4E Sec. 31	2	2	BAWR	1/2
11 - 4E Sec. 32	2	2	BAWR	1/2
12 - 3E Sec. 1	2	2	BAWR GLOR	3/2 1/2
12 - 3E Sec. 2	2	2	BAWR	1/2
12 - 3E Sec. 3	2	2	BAWR	1/2
12 - 3E Sec. 10	2	2		
12 - 3E Sec. 11	2	2		
Survey Time Totals	72	69		
Total Individuals/Survey Hours			GLOR	6/69
Total Individuals/Survey Hours			BAWR	49/69

In addition to the target species, the following amphibians and mollusks were recorded during surveys:

Table 8 - Other Mollusk and Amphibian species reported. (see Excel Spreadsheet for survey details)		
Species	Species Code	Number of Detection Sites
Amphibians		
<i>Ambystoma gracile</i> – Northwestern salamander	AMGR	3
<i>Ambystoma maculatum</i> – Long-toed salamander	AMMA	1
<i>Aneides fereus</i> – Clouded salamander	ANFE	7
<i>Ensatina eschscholzii</i> – Oregon ensatina	ENES	28
<i>Dicamptodon tenebrosus</i> – Pacific giant salamander	DITE	3
<i>Plethodon dunni</i> – Dunn’s salamander	PLDU	8
<i>Plethodon vehiculum</i> – Western red-backed salamander	PLVE	18
<i>Pseudacris regilla</i> – Pacific treefrog	PSRE	2
<i>Rana cascadae</i> - Cascades frog	RACA	1
<i>Taricha granulose</i> – Rough-skinned newt	TAGR	9
Mollusks (common names not listed)		
<i>Allogona townsendiana</i>	ALTO	3
<i>Ariolimax columbiana</i>	ARCO	21
<i>Cryptomastix germana</i>	CRGE	5
<i>Haplotrema vancouverense/Ancotrema sportella</i>	HA/AN	72
<i>Hemphilia dromedarius</i>	HEDR	19
<i>Hemphilia malonei</i>	HEMA	17
<i>Monadenia fidelis fidelis</i>	MOFIFI	5
<i>Prophysaon andersoni</i>	PRAN	19
<i>Prophysaon coeruleum</i>	PRCO	16
<i>Prophysaon dubium</i>	PRDU	10
<i>Prophysaon foliolatum</i>	PRFO	17
<i>Prophysaon vanatta</i>	PRVA	41
<i>Prophysaon vanatta obscurum</i>	PRVAOB	1
<i>Pristiloma lansingi</i>	PRLA	9
“Ryan lake slug” (un-described species)	RyanLk	5
<i>Vespericola columbiana</i>	VECO	49
<i>Zonitoides arboreus</i>	ZOAR	3