National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science

Mount Rainier National Park Amphibian Inventory 2001-2003

Non-sensitive Version

Natural Resource Technical Report NPS/NCCN/NRTR—2013/696.N

ON THE COVER
Top left: *Ensatina eschscholtzii*; Top right: *Plethodon larselli*; Bottom left: *Pseudacris regilla*; Bottom right: *Ambystoma gracile*, Mount Rainier National Park
Photographs by: Michael Layes, Mount Rainier National Park

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Barbara Samora

National Park Service
North Coast and Cascades Network Inventory and Monitoring Program
Mount Rainier National Park
55210 238th Ave. E.
Ashford, WA 98304

Michael Layes

National Park Service
Mount Rainier National Park
55210 238th Ave. E.
Ashford, WA 98304

Rebecca Lofgren

National Park Service
North Coast and Cascades Network Inventory and Monitoring Program
Mount Rainier National Park
55210 238th Ave. E.
Ashford, WA 98304

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All manuscripts in the series receive the appropriate level of peer review to ensure that the information is scientifically credible, technically accurate, appropriately written for the intended audience, and designed and published in a professional manner. This report received informal peer review by subject-matter experts who were not directly involved in the collection, analysis, or reporting of the data.

This report is available from The North Coast and Cascades Network (http://science.nature.nps.gov/im/units/nccn/reportpubs.cfm) and the Natural Resource Publications Management website (http://www.nature.nps.gov/publications/nrpm/).

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This report has had confidential information regarding park-sensitive species locations removed.

Executive Summary

This document details the amphibian inventories conducted in Mount Rainier National Park primarily from 2001 to 2003 with a small amount of data collected in 2005. These inventories were part of a larger effort to document species presence at five North Coast and Cascade (NCCN) Parks: Mount Rainier National Park (MORA), Ebey's Landing National Historical Reserve (EBLA), Lewis and Clark National Historical Site (LEWI), Fort Vancouver National Historical Park (FOVA), and San Juan Island National Historical Park (SAJH). Four of these NCCN parks (EBLA, LEWI, FOVA, and SAJH) had incomplete lists based on limited or undocumented data. Our primary goal was to meet the National Park Service Inventory and Monitoring program goal to better assess the status of species listed as "expected" but not confirmed in the parks and to document, to the 90% verification level, amphibian species found in these parks. Prior to this inventory, MORA was at the 86% verification level, lacking documentation for only two species. Our primary goal for MORA was to search for the presence of these two species: Van Dyke's salamander (*Plethodon vandykei)* and Larch Mountain salamander (*Plethodon larselli*). In addition, we targeted western toad (*Anaxyrus boreas*), a special status species that park managers were concerned may have declined in the park over recent years, and Pacific giant salamanders (*Dicamptodon tenebrosus and D. copei*) in order to determine which species was present in the park. All amphibian species encountered were documented.

Inventories of reptiles were not targeted during this project; however they were documented when encountered. The northwestern garter snake (*Thamnophis ordinoides)* was documented in this inventory.

This report provides updated lists of amphibian species at MORA. The report describes the methods and results used, includes a summary of species documented at each survey site, information on species life stage and habitat, and maps showing the spatial distribution of species in the park. The Appendices include more details on information documented in the inventory. Also included with this report is a Microsoft Access database that provides records documenting sampling events, ArcMap GIS themes depicting locations, slide photographs of sites surveyed, and digital (and slide) voucher photos for new species documented. In addition, for MORA, there are separate databases included for Larch Mountain and Van Dyke's salamanders.

Voucher specimens were not collected for this project but photographs were taken to document species occurrence in these parks. Voucher specimens for amphibians and reptiles exist for many NCCN species in various park collections and other institutions. These collections, along with new data provided through this inventory, represent an historic amphibian collection for additional research in the future.

Updated Lists of Amphibian Species

We confirmed the presence of 14 species at MORA in this inventory, including one new species, Cope's giant salamander (*Dicamptodon copei*) (Table 1). We also documented additional locations for several federally listed Species of Concern.

Five new western toad breeding sites were documented in this survey, but we also confirmed no toad breeding at several historic sites. Consequently, the status of western toads at MORA remains a concern. The Cope's giant salamander was added to the park's amphibian list as confirmed through genetic analysis of larvae which are difficult to differentiate from coastal giant salamander (*Dicamptodon tenebrosus*) larvae. We recommend that additional tail clips be collected for DNA analysis to verify the presence of this species in other park watersheds. We documented several new sites for the two *Plethodon* Species of Concern, Larch Mountain and Van Dyke's salamanders. We did not detect the Cascade torrent salamander (*Rhyacotriton cascadae*) in this inventory, but recommend that searches of additional suitable habitat be conducted to confirm its absence from the park. Targeted inventories for reptiles were not conducted but we confirmed six garter snakes in aquatic habitat in several park watersheds.

Table 1. Amphibian species list for Mount Rainier National Park. No non-native species have been detected in the park to date. C = confirmed present before survey; *C = previously identified as "expected to occur" and confirmed present in this inventory; + = expected to occur but not confirmed in this inventory; ** = federal or state listed species of concern.

Genus and Species	Common Name	Code	Special Status Species	MORA
Terrestrial breeding species				
Caudata — salamanders				
Woodland Salamanders (Family Plethodontidae)				
Plethodon vehiculum	Western red-backed salamander	PLVE		*C*
Plethodon vandykei	Van Dyke's salamander	PLVA	**	*C*
Plethodon larselli	Larch Mountain salamander	PLLA	**	*C*
Ensatinas				
Ensatina eschscholtzii	Ensatina	ENES		*C*
Aquatic breeding species				
Anurans				
Tailed frogs (Family Ascaphidae)				
Ascaphus truei	Coastal tailed frog	ASTR	**	*C*
Brown frogs (Family Ranidae)				
Rana aurora	Northern red-legged frog	RAAU		*C*
Rana cascadae	Cascades frog	RACAS	**	*C*
Chorus frogs				
Pseudacris regilla	Pacific treefrog	PSRE		*C*
North American toads (Family Bufonidae)				
Anaxyrus boreas[1]	Western toad	BUBO	**	*C*

[1] Olson 2009 reported that molecular analyses have resulted in re-naming western toad from *Bufo boreas* to *Anaxyrus boreas* but this is being refuted and another proposal has been made that the new name be considered as a Subgenus classification. In this scheme western toad would be *Bufo Anaxyrus boreas*. Olson reports that this is a dynamic situation and more changes can be anticipated.

Table 1. Amphibian species list for Mount Rainier National Park. No non-native species have been detected in the park to date (continued). C = confirmed present before survey; *C = previously identified as "expected to occur" and confirmed present in this inventory; + = expected to occur but not confirmed in this inventory; ** = federal or state listed species of concern.

Genus and Species	Common Name	Code	Special Status Species	MORA
Caudata — salamanders				
Pacific Giant salamanders (Family Dicamptodontidae)				
Dicamptodon tenebrosus	Coastal giant salamander	DITE		*C*
Dicamptodon copei	Cope's giant salamander	DICO	**	**C*
Mole salamanders (Family Ambytomatidae)				
Ambystoma gracile	Northwestern salamander	AMGR		*C*
Ambystoma macrodactylum	Long-toed salamander	AMMA		*C*
Torrent salamanders (Family Rhyacotritonidae)				
Rhyacotriton cascadae	Cascade torrent salamander	RHCA		+
Pacific newts (Family Salamandridae)				
Taricha granulosa	Rough-skinned newt	TAGR		*C*

Species names have been verified and updated as needed based on Crother (2008).

Species absence is extremely difficult to determine and it is possible that some species recorded historically or occasionally, but not detected during our survey efforts, may still be present in the park. Additional surveys of targeted habitats and species should be conducted.

In addition to this inventory, a separate project was funded, as part of the NCCN amphibian inventories, to provide a network wide amphibian database (Galvan et al. 2005), including North Cascades and Olympic National Parks. We developed this database by consolidating existing network databases containing information relevant to amphibian distributions into one functional relational database, including data resulting from this inventory. The consolidated database describes the locations of amphibians in various life stages identified in pond, stream, and terrestrial surveys conducted within the NCCN. The database includes fields relevant to the study years, Park names, survey types, coordinates, elevations, scientific and common names, and life stages. The consolidated database includes records of 14 amphibian species from MORA and 11 databases for a total of 3092 records. The park Biologist and the NCCN data managers will assume maintenance responsibilities for the database, including updating it to ensure compliance with NPS data management mandates. Metadata for the database was also included.

Note: This report has had content redacted to protect sensitive information, pursuant to the National Parks Omnibus Management Act, Section 207, 16 U.S.C. 5937. Redacted content is indicated by brackets [ ].

This report has had confidential information regarding park-sensitive species locations removed.

Acknowledgments

Funding for this inventory was provided by the NPS Inventory and Monitoring Program and Mount Rainier National Park.

We thank Matt Grove, Brian Hasebe, Heather Moran, Aaron Talbot, Jim Arnett, James Poelstra, Kim Gagnon, Heath Bohlman, and Casey Dennehy for their field assistance. We thank Robert Hoffman and Mark Huff for their review of this document and comments made to improve it. We thank Mike Adams for his technical assistance in developing the amphibian protocols for the NCCN inventories. We also thank Natalya Antonova for assistance with maps and Lise Grace for assistance with formatting and editing.

This report has had confidential information regarding park-sensitive species locations removed.

Introduction

The status of amphibian populations has long been a concern in the Pacific Northwest. The Northwest Forest Plan (USDA Forest Service and DOI Bureau of Land Management 1994), for example, has identified several amphibian species as high priority, "survey and manage" species. Habitat requirements of amphibians in late-successional forests of the Pacific Northwest have received some attention by the U.S. Forest Service over the past 15 years, but further work is needed to better understand how habitat variation affects population viability. Because amphibian species are associated with riparian systems, understanding the relationships between riparian management and amphibian population dynamics is a high priority. In addition, further work is needed within the parks and regionally to better understand the population dynamics of rare and locally endemic species such as Van Dyke's (*Plethodon vandykei*) and Larch Mountain (*Plethodon larselli*) salamanders (USDA Forest Service and DOI Bureau of Land Management 1994).

Amphibians are important members of terrestrial and aquatic ecosystems because they occupy key trophic positions in food webs. As adults they can be top carnivores, and as eggs, larvae or juveniles, they may be the major food source of many species of birds, mammals, fish, and invertebrates. In some forest ecosystems, amphibians may comprise the major component of the vertebrate biomass (Burton and Likens 1975, Bury 1988). Moreover, amphibians are good "bioindicators" of environmental stress because of their complex life histories. Amphibian declines may be an early warning signal that other organisms also may be in danger of decline or extinction (Blaustein and Wake 1990, Bury et al. 1980, Phillips 1990, Wake 1991, Wyman 1990).

In 1994, Mount Rainier National Park (MORA), North Cascades National Park (NOCA), and Olympic National Park (OLYM) identified the lack of information on amphibian species distributions and abundances as the highest priority issue to address cooperatively with the newly created U.S. Geological Survey Biological Resources Division (BRD). The National Park Service (NPS) and BRD began inventories of aquatic breeding amphibians in these parks in 1996. The inventories continued through 1999 and resulted in the first published parkwide survey of amphibians for the park (Tyler et al. 2003). Recent Vital Signs workshops for several of the North Coast and Cascades Network (NCCN) parks identified amphibians as a high priority taxonomic group for long-term ecological monitoring.

Assessments of the status of amphibian populations in the Pacific Northwest have been difficult to complete because: 1) the number of long-term inventory and monitoring efforts has been limited; and 2) few if any comparable data sets are available (Olson and Leonard 1997). Yet human-related activities such as fish stocking, logging practices, and alteration of streams, wetlands, and riparian areas have disturbed many amphibian habitats and have had widespread impacts on amphibian communities (Fellers and Drost 1993, Blaustein and Wake 1995, Bury 1999).

The primary objective of this inventory was to document species presence at MORA. Our primary goal was to document, to the 90% verification level, amphibian species found in the park to meet the NPS Inventory and Monitoring program goal for vertebrates. MORA was at the 86% verification level for amphibian species, lacking documentation for only two species. The focus of this inventory was special status species: Van Dyke's salamander (*Plethodon vandykei);* Larch Mountain salamander (*Plethodon larselli*); Cascade torrent salamander (*Rhyacotriton cascadae*; and western toad (*Anaxyrus boreas*). In addition, Pacific giant salamanders (*Dicamptodon tenebrosus and D. copei*) were included in order to determine which species was present in the park. All amphibian species encountered in this inventory were documented regardless of their special status. Species of Concern amphibians expected to be present in MORA, in addition to those listed above, are: Cascades frog (*Rana cascadae*) and tailed frog (*Ascaphus truei)*. "Species of Concern" encompass both Federal and State of Washington species. The Federal designation refers to those species that might be in need of concentrated conservation actions. Such conservation actions vary depending on the health of the populations and degree and types of threats. The State of Washington list includes sensitive wildlife species native to the state of Washington that are vulnerable or declining and are likely to become endangered or threatened in a significant portion of their range within the state without cooperative management or removal of threats.

This survey was conducted from 2001 – 2003 with some additional DNA analysis for Cope's giant salamander (*Dicamptodon copei*) conducted in 2005.

Study Area

Mount Rainier National Park encompasses 235,625 ac on the west-side of the Cascade Range, and is located about 100 km (62 mi) southeast of the Seattle-Tacoma metropolitan area (Figure 1). At 4389 m (14,411 ft), Mount Rainier is the highest peak in the Cascade Range of Washington and dominates the landscape of a large part of the western section of the State. The mountain stands nearly three miles higher than the lowlands to the west and one and one-half miles higher than the adjacent mountains. It is an active volcano that last erupted approximately 150 years ago. Mount Rainier National Park is approximately 97% wilderness and 3% National Historic Landmark District and receives approximately two million visitors per year. The park is covered by 90.4 km^2 of glaciers, which exert a strong influence on aquatic ecosystems and represent a key geologic hazard feature.

The park is part of a complex mountain ecosystem. Vegetation is diverse, reflecting the varied climatic and environmental conditions encountered across the park's 3900 m (12,800 ft) elevation gradient. Approximately 58% of the park is forested, 23% is subalpine parkland, and the remainder is alpine, half of which is vegetated and the other half consists of permanent snow and ice. The park contains 26 named glaciers across 9 major watersheds, with over 400 lakes and ponds, 470 rivers and streams, and over 3000 ac of other wetland types.

This report has had confidential information regarding park-sensitive species locations removed.

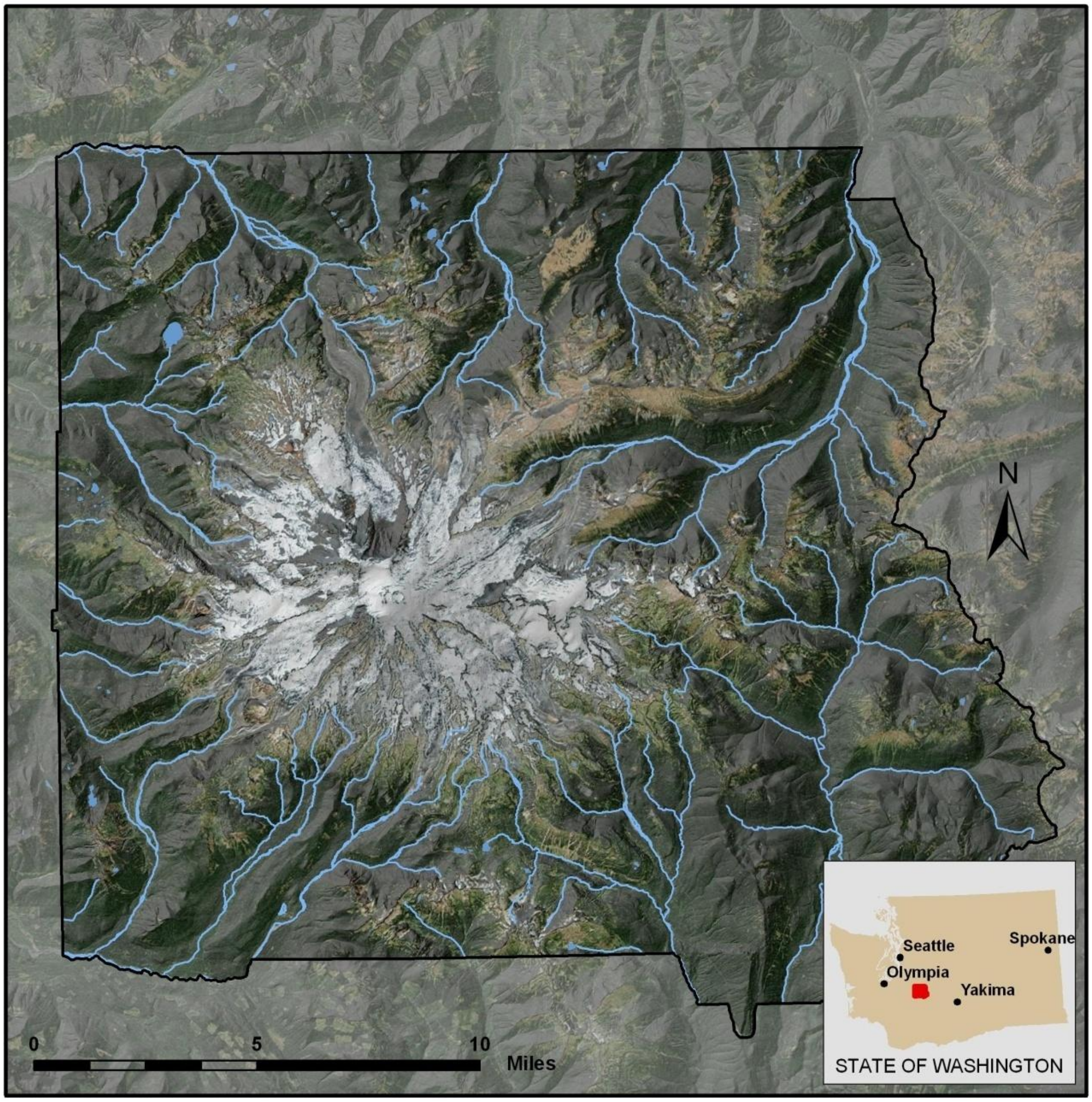

Figure 1. Map of Mount Rainier National Park.

The main emphasis of inventories in MORA has been to target specific habitats or geographic areas within the park that were likely to yield data on undocumented species, listed Species of Concern, and species of management concern, specifically, Larch Mountain salamander (*Plethodon larselli)*, Van Dyke's salamander (*P. vandykei)*, Cascade torrent salamander (*Rhyacotriton cascadae),* Cope's giant salamander *(Dicamptodon copei),* Coastal giant salamander (*D. tenebrosus),* and western toad (*Anaxyrus boreas)*. Target habitats in MORA were stratified by physical and ecological attributes based upon the species and habitats of interest. Survey site locations are displayed in Figure 2.

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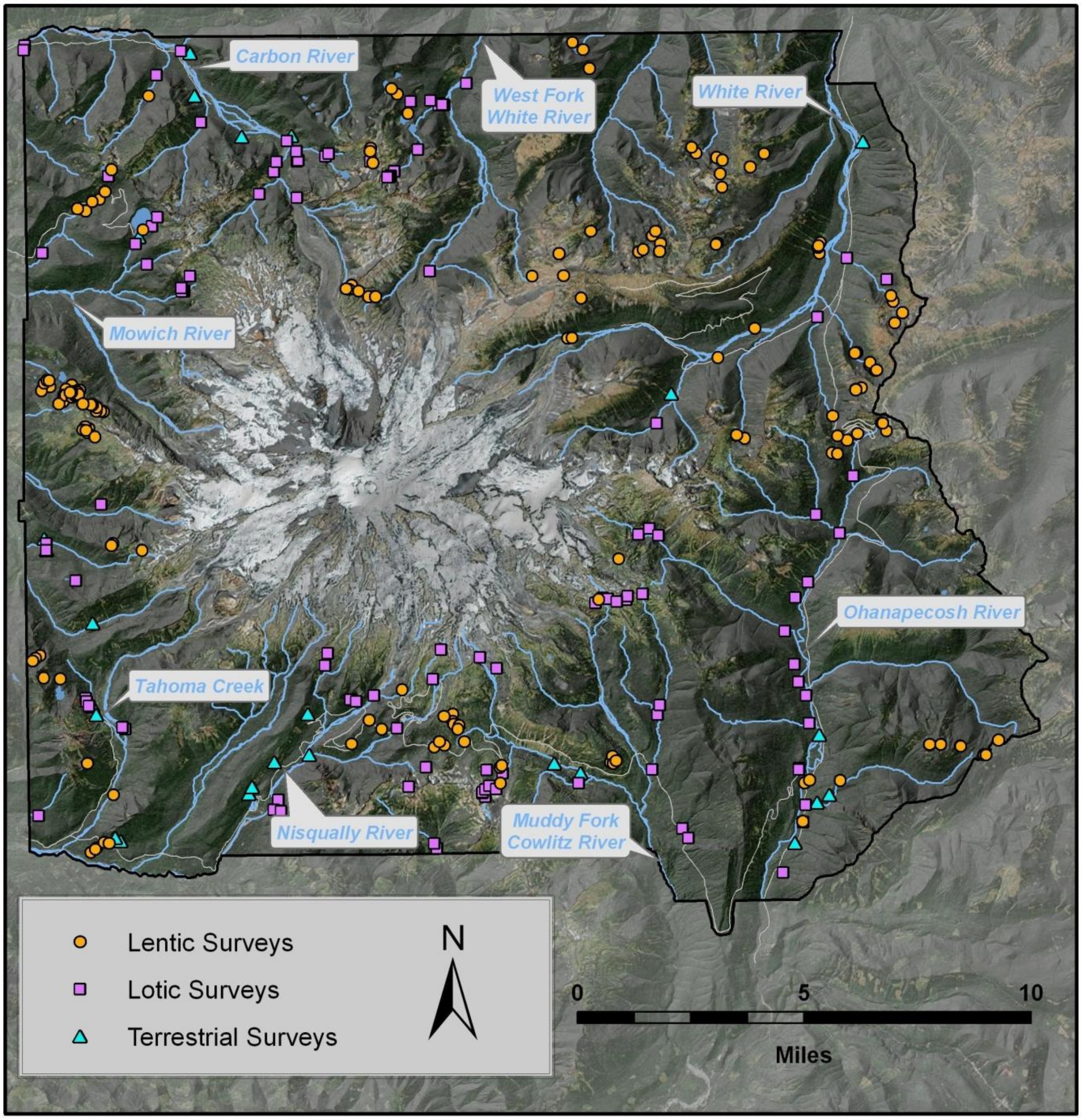

Figure 2. Mount Rainier National Park amphibian survey locations.

Methods

Lentic Surveys

Lentic habitats include ponds, lakes, tarns, springs, potholes, large meadows, and wetland complexes. In 2002 and 2003, lentic surveys were conducted to target western toads. In addition, all amphibian species encountered were documented. Potential habitat was identified in the five major drainages in the park, using the recently corrected park wetland coverage. All lacustrine and palustrine wetlands with depths of standing water over 0.5 m were identified within each drainage. An equal number of sites were selected from each drainage and stratified based on NWI Class (Cowardin et al. 1979), size, and elevation. Inaccessible and extremely remote sites were excluded. Surveys were initiated during the breeding season, from late May in lower elevations to July at higher elevations, depending on weather and timing of lake or pond ice-out, and continued through September.

Lentic habitats were surveyed with visual searches conducted according to Bury and Major (1997) and modified protocols, initially developed by Dr. Michael J. Adams, USGS-BRD, under the Amphibian Research and Monitoring Initiative (ARMI). Field habitat was documented through mapping and measurements including surrounding forest and understory cover, environmental zones (littoral, riparian, inlet/outlet stream channels, limnetic) and macrohabitat, air and water temperatures, water depth, aquatic vegetation, and substrate including coarse woody debris.

Lotic and Riparian Surveys

Lotic habitats include large rivers and their tributaries, rivulets, and seeps. In 2001 and 2002, lotic and riparian surveys were conducted to target Van Dyke's salamanders and Cascade torrent salamander. In addition, all amphibian species encountered were documented. Riparian areas include the wetted margins and shallow (<0.5 m) areas of streams. Survey locations were selected *a priori* based on the field experience of amphibian experts. Habitats that were most productive for detection of Van Dyke's salamanders were seeps, waterfalls, 1st order streams and associated splash zones, and elevations between 610 m (2000 ft) and 1524 m (5000 ft). Springs, seeps, headwater streams and splash zones were also targeted for Cascade torrent salamander surveys. Historic coastal giant salamander species sites were targeted for surveys and included small to mid-sized streams in forested habitats.

Surveys were conducted according to Jones (1999) and Bury and Corn (1991) for detecting Van Dyke's salamanders, coastal giant salamanders, and Cascade torrent salamanders. Field habitat measurements were documented including NWI classification, gradient, aspect, air and water temperatures, depth, flow, percent overstory vegetation, substrate, and instream cover. Measurements were taken for all amphibians captured and include total length, snout-vent length, life stage, and sex (when possible). The number of individuals observed was also recorded. Although amphibians were the focus of aquatic surveys, reptiles observed also were recorded.

Tail clips for DNA analysis were collected from giant salamanders (*Dicamptodon* spp.) to confirm species present in the park. No previous confirmed detections of Cope's giant salamanders had been made at MORA, but populations existed immediately outside of the park's southwestern boundary. Tail clips were collected from 47 larvae at 15 sites in six watersheds. In

2005, an additional 19 tail clips from individuals at four sites in two watersheds were collected and are included in this report (Table 2). DNA analysis was conducted by Dr. Andrew Storfer, School of Biological Sciences, Washington State University, Pullman, WA.

Table 2. 2002 and 2005 *Dicamptodon* spp. tail clip collections from Mount Rainier National Park.

Site Name/Description	GIS Stream Code	Watershed	UTM N (NAD27)	UTM E (NAD27)	Clip #	Date
Stream off Mt. Ararat (Tahoma Tributary)	n03-09a	Nisqually	5180702	586114	1	06-Sep-02
Falls Creek	o09-00a	Ohanapecosh	5179316	610054	2-4	09-Sep-02
Deer Creek	o16-14a	Ohanapecosh	5187664	611500	5	12-Sep-02
Boundary Creek	o16-06a	Ohanapecosh	5188310	610666	6-7	17-Sep-02
Ollalie Creek	o11-00a	Ohanapecosh	5180919	610422	8-12	17-Sep-02
Marjorie Lake outlet	f06-02b	West Fork	5202958	596263	13-14	20-Aug-02
Van Horn Falls	f06-00a	West Fork	5202833	597443	15-17	22-Aug-02
Ranger Creek	c06-00a	Carbon	5203889	587228	18-23	13-Aug-02
Ipsut Creek	c08-006	Carbon	5202216	588809	24-25	15-Aug-02
Mowich Lake	m05-01c	Mowich	5198853	587259	26	1-Aug-02
Meadow Creek	m02-***	Mowich	5197580	583169	27-30	10-Sep-02
Crater Creek	m05-01b	Mowich	5197906	586492	31-35	11-Sep-02
Eagle Peak Creek	n11-00a	Nisqually	5177835	591393	36-37	19-Sep-02
Butter Creek	z01-00b	Cowlitz	5176473	597188	38-41	25-Sep-02
Butter Creek Tributary	z01-02a	Cowlitz	5176643	597099	42-47	25-Sep-02
Tenas Creek	n02-00b	Nisqually	5177634	583044	48-51	02-Aug-05
Tahoma Tributary	n03-09a	Nisqually	5180765	586017	52-55	10-Aug-05
Eagle Peak Creek	n11-00a	Nisqually	5177791	591659	60-62	1-Sept-05
lp 19 lake outlet	p03-01b	Puyallup	5185960	584371	56-59	29-Aug-05
North Puyallup Tributary	p02-03a	Puyallup	5188676	585269	63-66	8-Sept-05

Terrestrial Surveys

In 2001-2003, terrestrial surveys were focused on locating Larch Mountain salamanders**.** Survey locations were selected *a priori* based on the field experience of amphibian experts. We used aerial photographs to identify patches of old growth forest bordered by talus or large rock outcroppings. Habitats that were most productive for detection of Larch Mountain salamanders were targeted and included rocky substrates (gravel dominated soil to scree), late seral stands (Western Hemlock Zone and Western Hemlock to Pacific Silver Fir transition zone) on slopes greater than 70%, various aged forest stands growing on gravel or cobble dominated soil, and elevations from 610 m (2000 ft) to 1219 m (4000 ft).

We used survey methods, which we modified, described by Crisafulli (1999). Survey sites were visited only once, and second belt transects were not used so that larger search areas could be covered. Typically, surveyors would identify a habitat patch, generally on a slope, and begin searching at the bottom of the patch, spread ten meters apart, and work up the slope surveying in a zigzag pattern. Surveyor's targeted habitat identified as preferred by Larch Mountain salamander, such as bark heaps and rock piles. Surveys were restricted to the limited periods of time during spring and fall when air temperatures are between 4 to14 °C and no freezing temperatures occurred within 72 hr of a survey. In the fall of 2002 and 2003, environmental conditions did not meet protocol requirements; therefore no surveys were conducted beyond mid-June of those years.

Opportunistic Surveys

Opportunistic surveys associated with other projects were conducted, especially surveys being conducted for compliance with the National Environmental Policy Act (NEPA). Amphibian species detected in these projects were entered into the inventory databases.

Results

Thirteen species of amphibians were detected at MORA, including one new species: northwestern salamander, long-toed salamander, coastal tailed frog, western toad, coastal giant salamander, Cope's giant salamander, Ensatina, Larch Mountain salamander, Van Dyke's salamander, western red-backed salamander, Pacific treefrog, northern red-legged frog, Cascades frog, and rough-skinned newt. Of these, Cope's giant salamander was a new addition to the park species list. Complete summaries of survey results are provided in Appendix B. Spatial distributions of amphibians documented are provided in Appendix C.

Lentic Surveys

One hundred and sixty seven lentic surveys were conducted at MORA (Appendix A, Table 1) during 43 days for a total of 292.2 search-hours.

Species Presence and Diversity

Northwestern salamanders (n = 3295), long-toed salamanders (n = 1187), western toads (n = 1587), Pacific treefrogs (n = 535), northern red-legged frogs (n = 247), Cascades frogs (n = 21,212), coastal tailed frogs (n = 4), and rough- skinned newts (n = 379) were detected during these surveys. Cascades frogs made up 75% of the species detected in lentic surveys (Figure 3).

Five species were present at two sites on the south side of the park: northwestern salamander, long-toed salamander, western toad, Pacific treefrog, and rough-skinned newt. One garter snake was also observed. Only one species was detected at 58 sites; two species were detected at 51 sites; three species were detected at 38l sites; four species were detected at 11 sites; and five species were detected at two sites. Life stages and counts for Cascades frogs, northern red-legged frogs, Pacific treefrogs, northwestern salamanders, long-toed salamanders, and rough-skinned newts are provided in Figures 4 through 8.

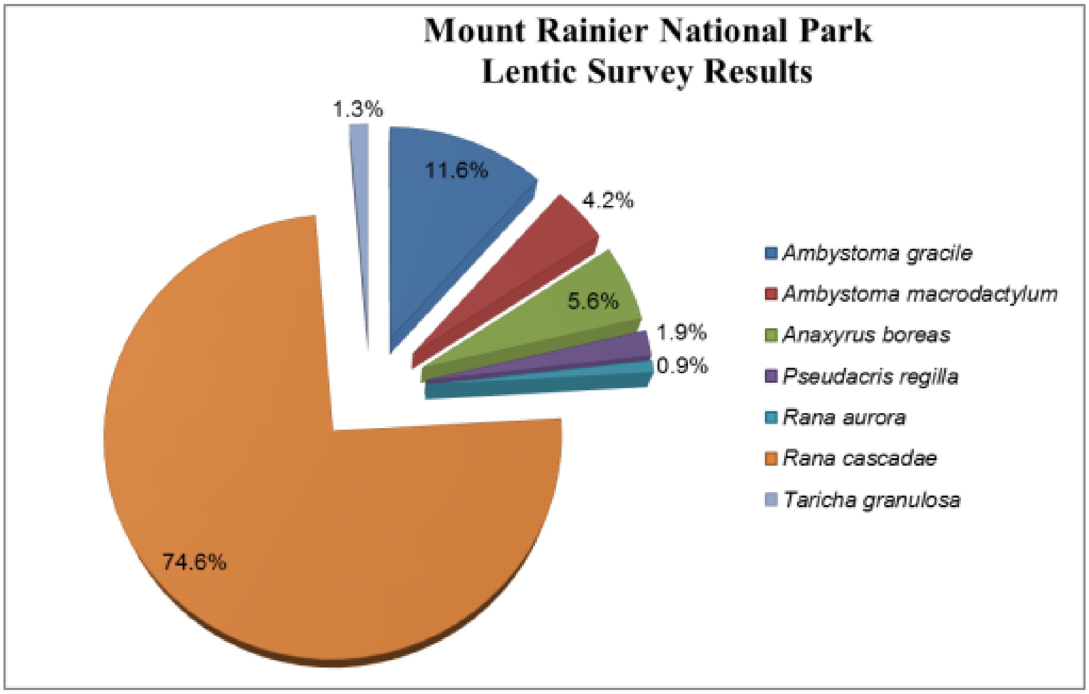

Figure 3. Amphibian species documented in Mount Rainier National Park lentic surveys (all life stages). *Ambystoma gracile* (northwest salamander), *Ambystoma macrodactylum* (long-toed salamander), *Anaxyrus boreas* (western toad), *Pseudacris regilla* (Pacific chorus frog), *Rana aurora* (northern red-legged frog), *Rana cascadae* (Cascades frog), *Taricha granulosa* (rough-skinned newt).

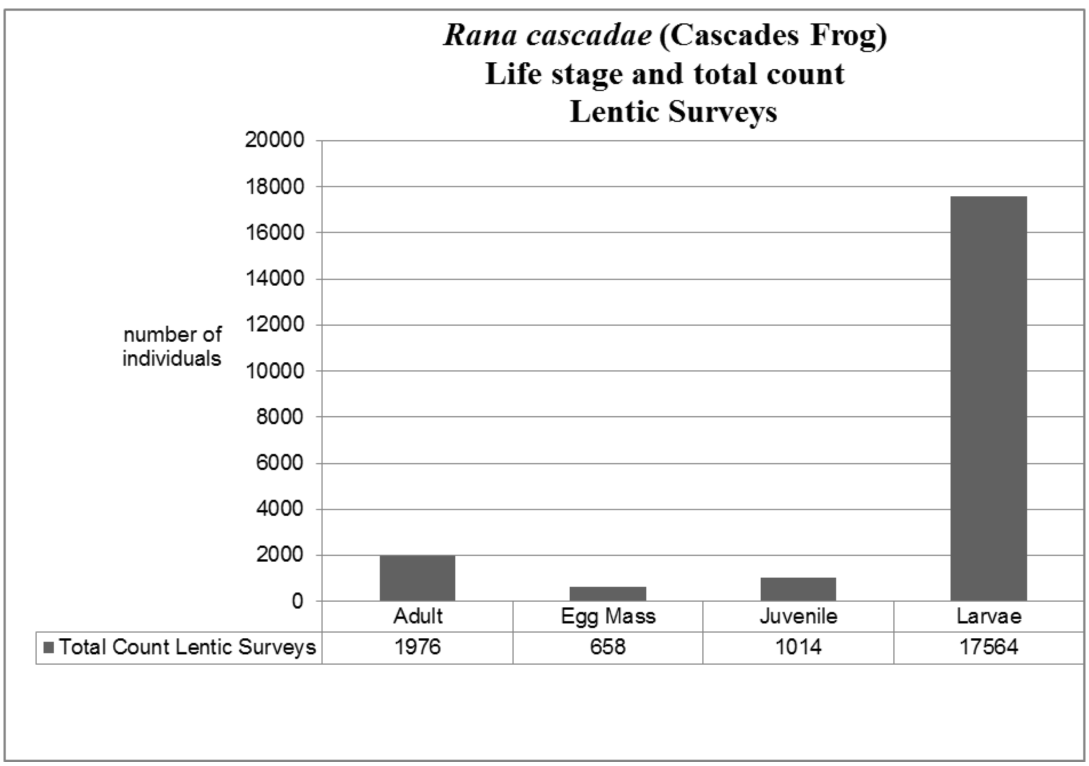

Figure 4. Total number and life stage of Cascades frogs (*Rana cascadae*) documented during lentic surveys.

This report has had confidential information regarding park-sensitive species locations removed.

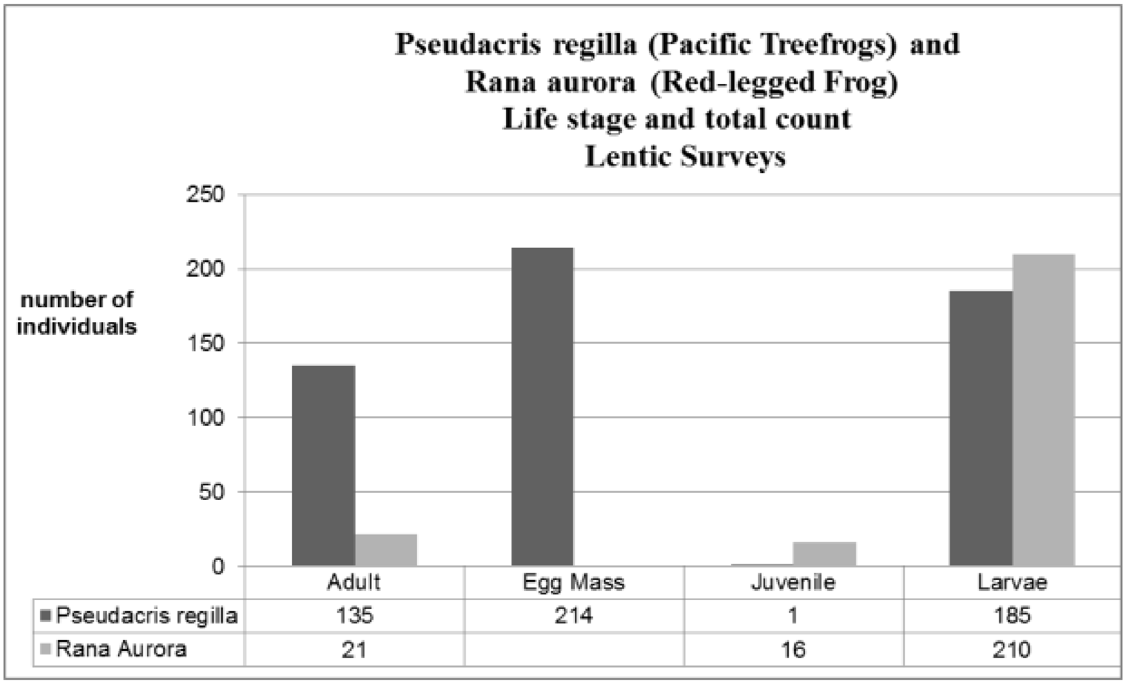

Figure 5. Total number and life stage of Pacific treefrogs (*Pseudacris regilla*) and northern red-legged frogs (*Rana aurora*) documented during lentic surveys.

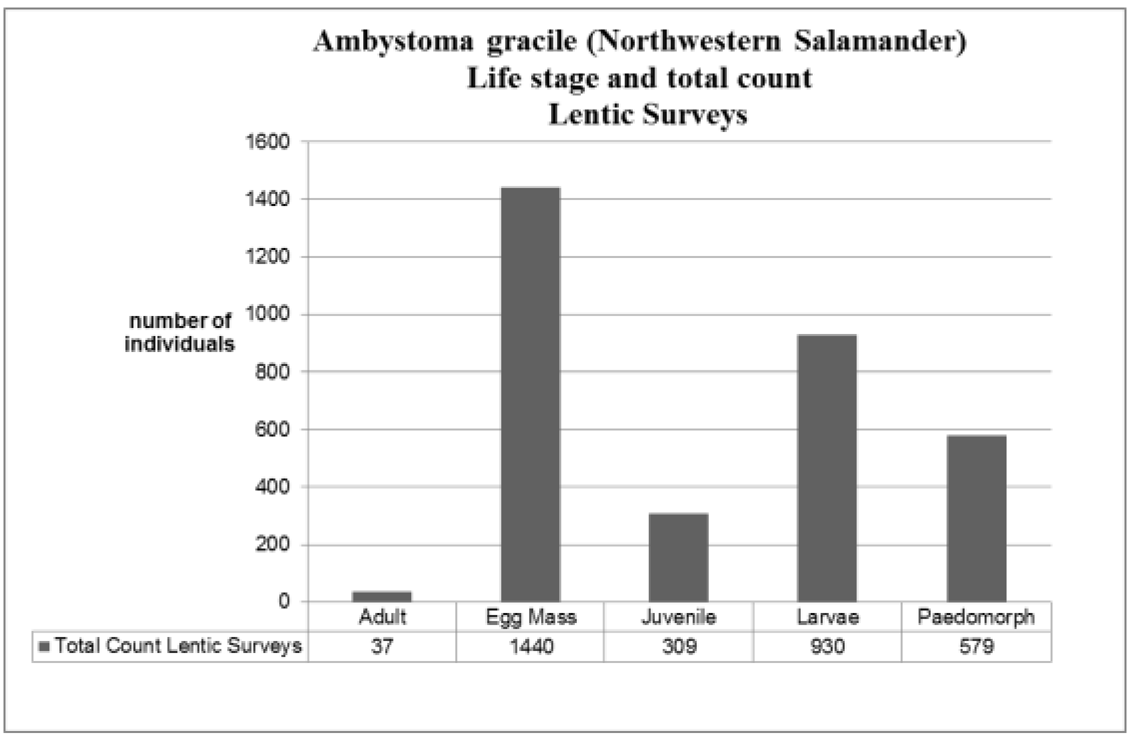

Figure 6. Total number and life stage of northwestern salamanders (*Ambystoma gracile*) documented during lentic surveys.

This report has had confidential information regarding park-sensitive species locations removed.

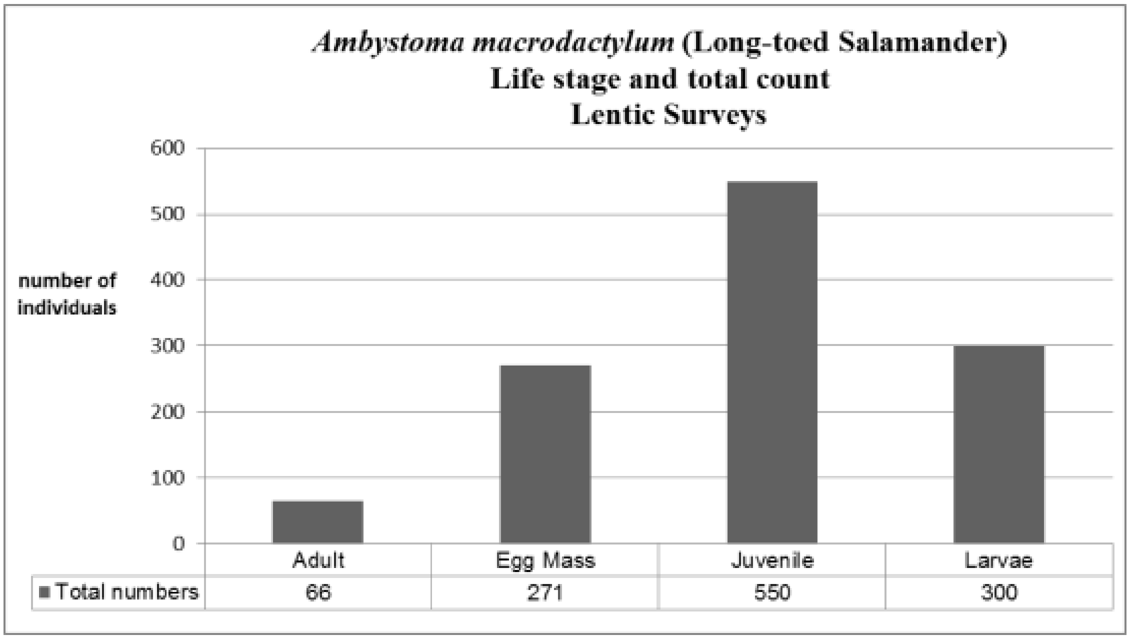

Figure 7. Total number and life stage of long-toed salamanders (*Ambystoma macrodactylum*) documented during lentic surveys.[2]

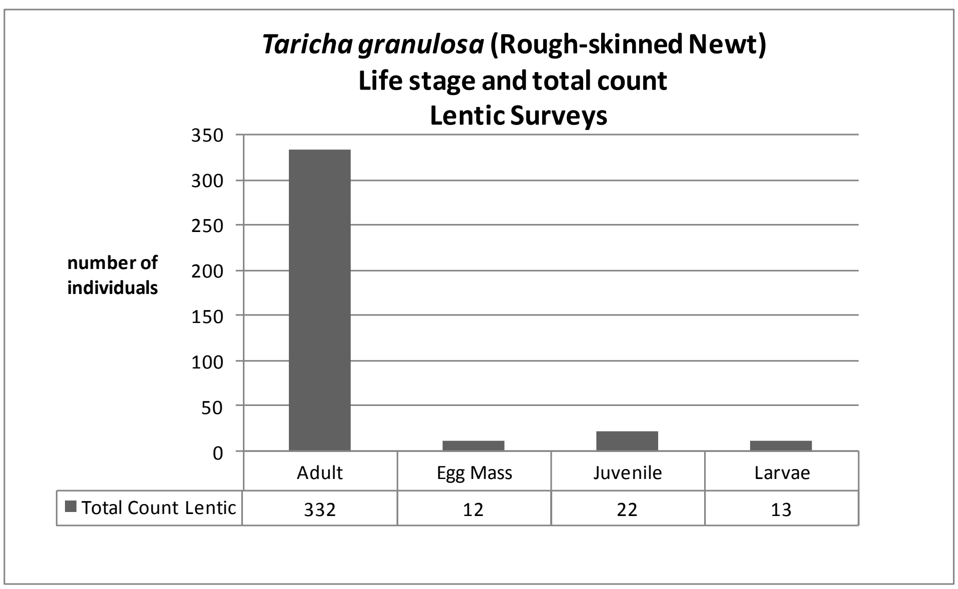

Figure 8. Total number and life stage of rough-skinned newts (*Taricha granulosa*) documented during lentic surveys.

[2] 500 of the 550 documented juvenile long-toed salamanders were detected at site #B62 (Shadow Lake).

Elevation

Elevation ranges for species detected in lentic surveys are presented in Figure 9. Pacific treefrogs were detected in the broadest elevation range during this inventory (665 m (2180 ft) to 2045 m (6710 ft)), followed by long-toed salamanders (665 m (2180 ft) to 1942 m (6370 ft)), and northwestern salamanders (662 m (2173 ft) to 1829 m (6000 ft)). Cascades frogs were the most dominant anuran at high elevations. Northern red-legged frogs were found only below 671 m (2200 ft) and rough-skinned newts were found between 933m (3060 ft) and 1621 m (5318 ft).

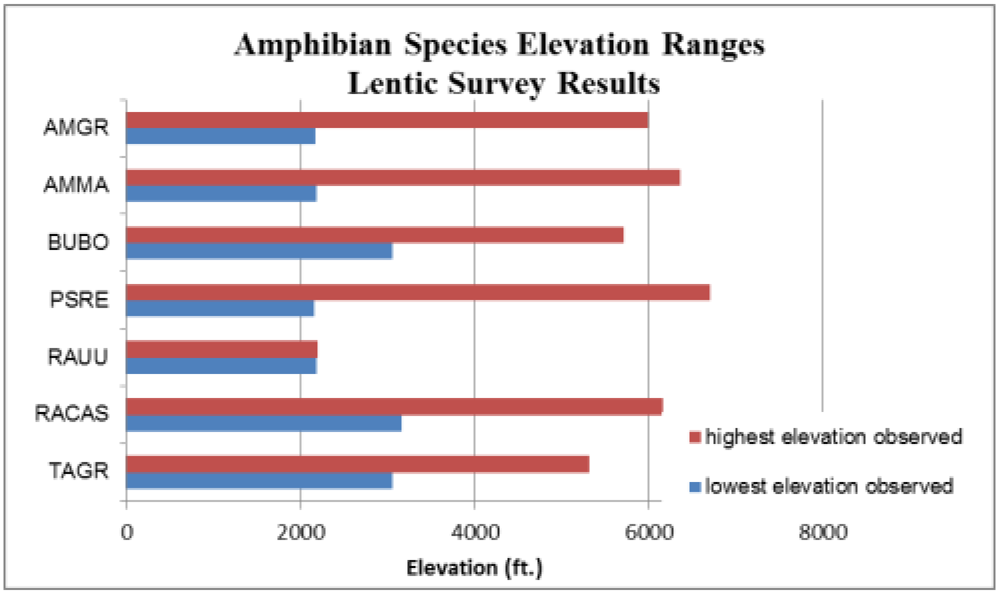

Figure 9. Elevation ranges for amphibian species observed during lentic surveys at Mount Rainier National Park. AMGR=*Ambystoma gracile* (northwest salamander), AMMA=*Ambystoma macrodactylum* (long-toed salamander), BUBO=*Anaxyrus boreas* (western toad), PSRE=*Pseudacris regilla* (Pacific chorus frog), RAUU=*Rana aurora* (northern red-legged frog), RACA=*Rana cascadae* (Cascades frog), TAGR=*Taricha granulosa* (rough-skinned newt).

Spatial distributions of northwestern and long-toed salamanders, Cascades frogs, northern red-legged frogs, Pacific treefrogs, and rough-skinned newts are presented in Appendix C. Results for western toad, the targeted species for lentic surveys, are presented below.

Western Toads

Although western toads were the target species of lentic surveys, they were detected at only about 6% of all sites surveyed. Fourteen breeding populations were detected (Table 3). Most individuals (96%) were observed as tadpoles with only 19 adults, five juveniles (toadlets), and 33 egg masses detected (see Figure 11). Western toad breeding sites ranged in elevation from just over 914 m (3000 ft) to 1740 m (5710 ft).

This report has had confidential information regarding park-sensitive species locations removed.

Figure 10. Photo of a juvenile western toad.

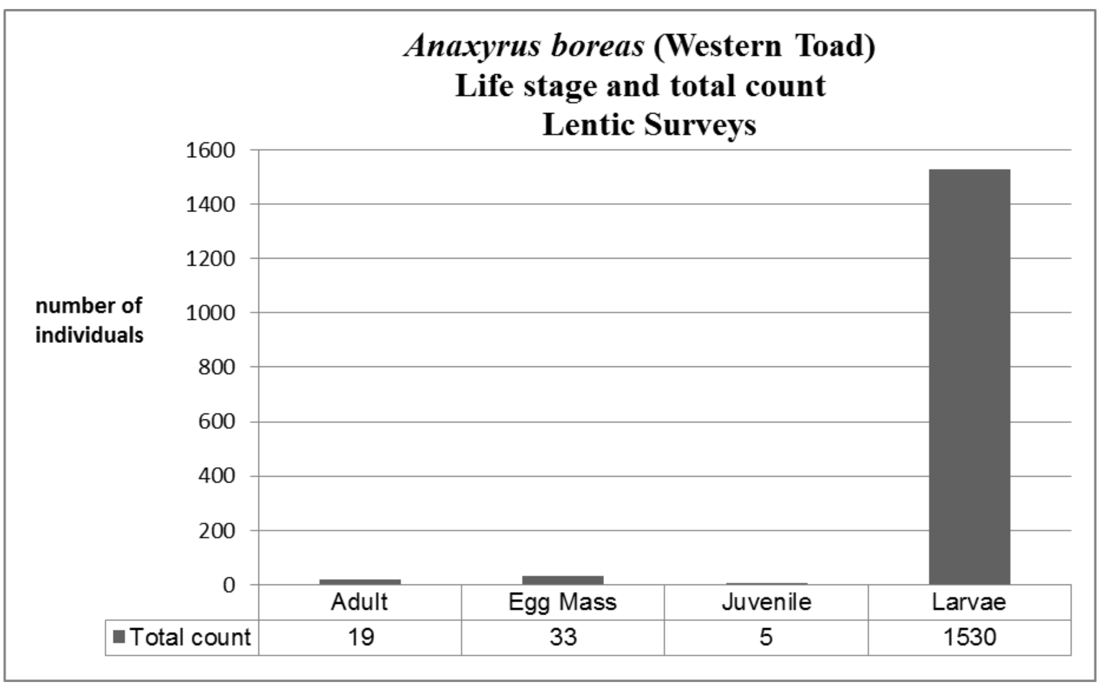

Figure 11. Total number and life stage of western toad (*Anaxyrus boreas*) detected during lentic surveys.

This report has had confidential information regarding park-sensitive species locations removed.

Table 3. Western toad sites, life stages, and numbers observed at Mount Rainier National Park, 2001-2003. Life Stages: A= adult, J=juvenile, L= larvae, EM= eggs. [* location removed].

Location *	Site ID *	MORA GIS Code *	Date	Species Code	Life Stage	Number observed
			15-May-02	BUBO	A	1
			10-Jun-02	BUBO	L	300
			01-Jul-02	BUBO	EM	25
			22-Jul-02	BUBO	A	1
			25-Jul-02	BUBO	A	1
			25-Jul-02	BUBO	J	1
			19-May-03	BUBO	A	1
			19-May-03	BUBO	J	2
			19-May-03	BUBO	EM	1
			19-May-03	BUBO	A	1
			02-Jun-03	BUBO	J	2
			02-Jun-03	BUBO	A	2
			24-Jun-03	BUBO	A	1
			24-Jun-03	BUBO	L	200
			01-Jul-03	BUBO	EM	7
			07-Jul-03	BUBO	A	11
			16-Jul-03	BUBO	L	1000
			30-Jul-03	BUBO	L	30

Western toads were only found in association with other species. They were detected with Cascades frogs in most sites (n = 10), followed by northwestern salamanders (n = 9) (Figure 12). No fish were observed at toad breeding sites.

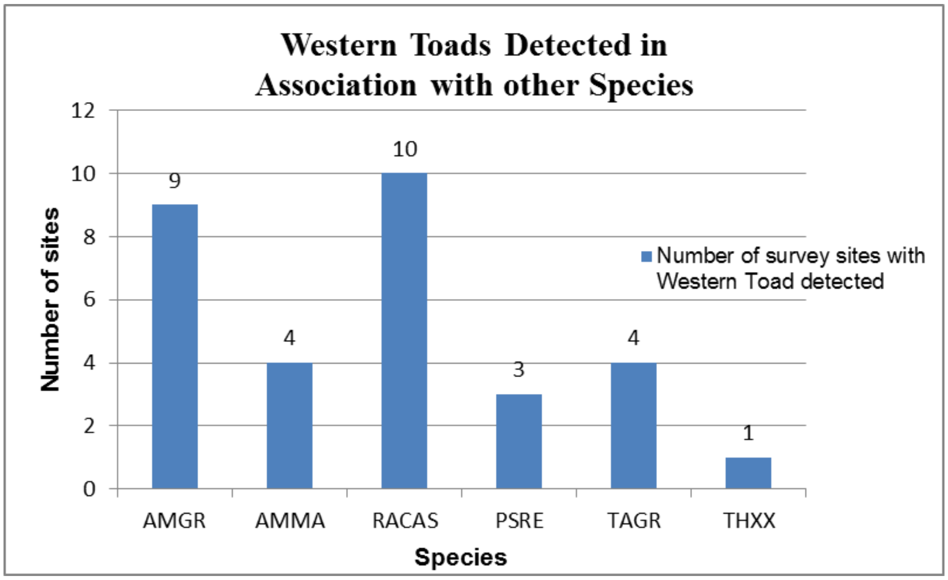

Figure 12. Species association with western toads. AMGR=*Ambystoma gracile* (northwest salamander), AMMA=*Ambystoma macrodactylum* (long-toed salamander), RACAS = *Rana Cascadae* (Cascades frog), PSRE=*Pseudacris regilla* (Pacific chorus frog), TAGR=*Taricha granulosa* (rough-skinned newt), THXX= unknown garter snake.

Environmental conditions at toad breeding sites are presented in Table 4. Size of breeding lakes and ponds ranged from 0.324 to 3.025 ha (0.8 to 7.47 ac). Maximum depth ranged from 0.5 to 3.5 m (1.64 to 11.48 ft). Water temperatures ranged from 4 to 26 °C (39.2 to 78.8 °F); air temperatures at time of survey ranged from 9 to 26 °C (48.2 to 78.8 °F).

This report has had confidential information regarding park-sensitive species locations removed.

Table 4. Western toad breeding sites. [* location removed].

Field Site ID	Date	Location Description	MORA GIS Code	Max Depth (m)	Area (ha)	Elevation (ft)	Shallow Area (%)	Weather	Wind	Air Temp (°C)	Water Temp (°C)
	2003-May-19			2	0.324	3697	50	Clear	Calm	9	16
	2003-Jul-16			3.5	1.9	5710	30	Overcast	Light	9	11
	2003-Jul-01			<1	0.933	5218	100	Clear	Calm	11	4
	2003-Jun-24			3.5	3.025	5248	10	Clear	Light	12	15
	2002-May-15			1-2	0.928	3035	70	Clear	Calm	12	12
	2002-Jun-10			2	0.324	3697	100	Clear	Calm	15	13
	2003-Jun-02			2.5	2.23	3947	10	Clear	Gusty	15	17
	2003-Jun-02			0.5	0.87	5963	100	Clear	Calm	16	17
	2002-Jul-01			3.2	0.642	3950	20	Clear	Calm	17	18
	2002-Jul-25			2	0.324	3697	95	Clear	Light	19	12
	2002-Jul-25			1-2	0.89	5336	50	Overcast	Gusty	19	23
	2002-Jul-22			3.5	0.875	5903	10	Clear	Light	23	22
	2003-Jul-30			3.5	1.68	4889	30	Clear	Calm	26	26

Area (ha), maximum depth (m), elevation (ft), site's shallow area (described as the percent of the total site with <0.5m depth), weather, wind, air temperature (in °C and measured in the shade about 1 m off of the ground), and water temperature (in °C measured near the surface, in the vicinity of amphibians present at the site).

This report has had confidential information regarding park-sensitive species locations removed.

Figure 13. Site locations of western toad (*Anaxyrus boreas*), 2002-2003. [map removed].

Lotic and Riparian Surveys

A summary of amphibian species documented in lotic and riparian habitats is presented in Figure 14. A total of 111 lotic surveys were conducted (Appendix A, Table 2) from 2001-2002. These surveys covered 20,730 m^2 in 253.5 search-hours over 43 days. Northwestern salamanders (n = 3), coastal tailed frogs (n = 472), Cascades frogs (n = 264), Van Dyke's salamanders (n = 21), and western red-backed salamanders (n = 4) were detected during these surveys. Targeted surveys for *Dicamptodon* spp. were conducted in 2005 at 11 sites. Results for all years surveyed found coastal giant salamanders (n = 156), and Cope's giant salamanders (n = 3). The Cascade torrent salamander was not detected at MORA.

This report has had confidential information regarding park-sensitive species locations removed.

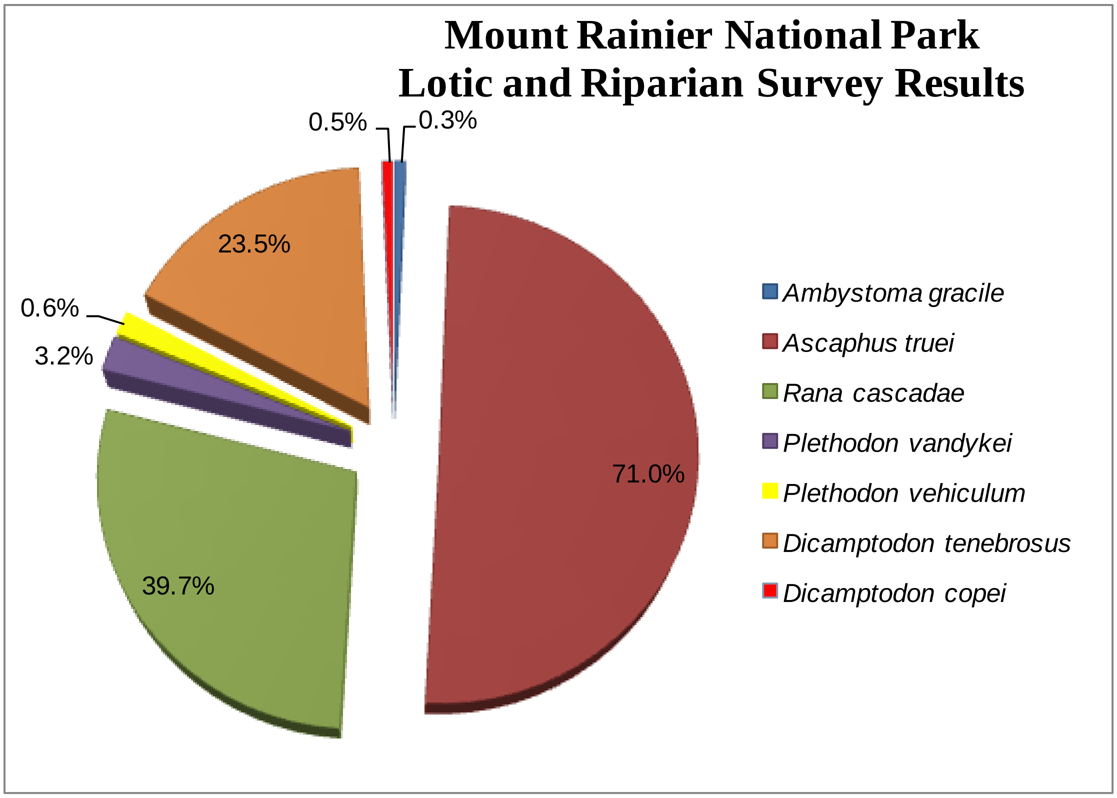

Figure 14. Amphibian species documented in Mount Rainier National Park lotic and riparian surveys (all life stages). *Ambystoma gracile* (northwest salamander), *Ascaphus truei* (coastal tailed frog), *Rana cascadae* (Cascades frog), *Plethodon vandykei* (Van Dyke's salamander), *Plethodon vehiculum* (western red-backed salamander), *Dicamptodon tenebrosus* (coastal giant salamander), *Dicamptodon copei* (Cope's giant salamander).

Species diversity was highest at [location removed] where five amphibian species were detected (northwestern salamander, coastal tailed frog, Ensatina, Van Dyke's salamander, and western red-backed salamander). Four species were detected at the [location removed] site (northwest salamander, coastal tailed frog, western red-backed salamander, and Cascades frog). Three species were detected at [location removed] (coastal giant salamander, coastal tailed frog, Cascades frog). Two percent of sites (n = 2) had three species present, 29% (n = 26) had two species present, 58% (n = 51) had only one species present, and 10% (n = 9) of all sites surveyed had no amphibian species present.

Elevation ranges varied for each species (Figure 15). Van Dyke's salamanders were found in the broadest elevation range, followed by Cascades frogs and northwestern salamanders.

Life stage and total counts for coastal tailed frogs, Cascades frogs, northwestern salamanders, and western red-backed salamanders are presented in Figures 16 through 18.

This report has had confidential information regarding park-sensitive species locations removed.

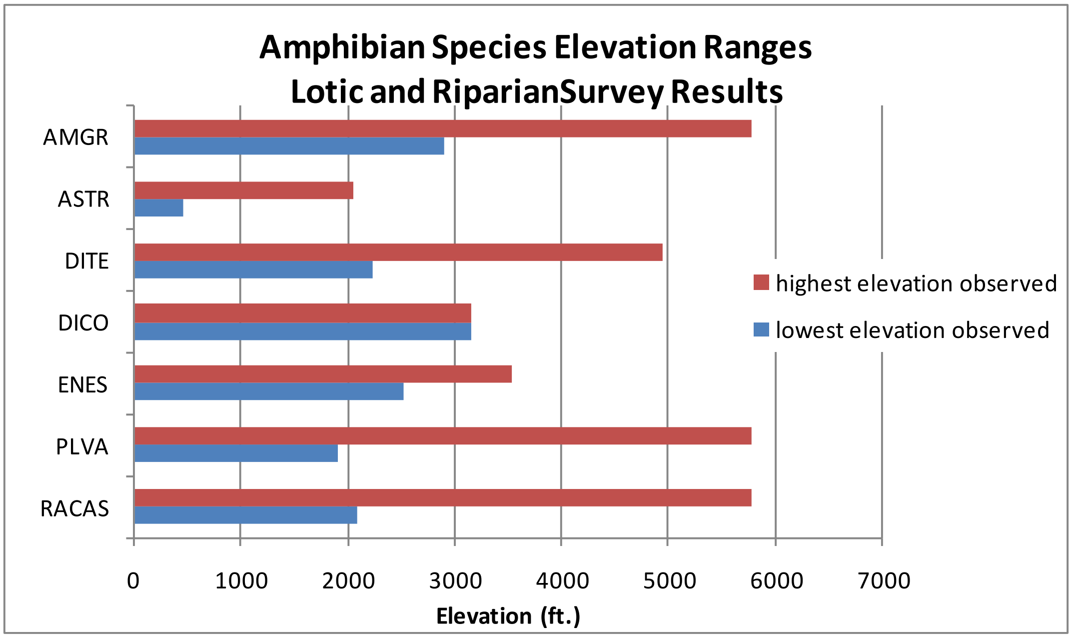

Figure 15. Elevation ranges for species observed in lotic and riparian surveys at Mount Rainier National Park. AMGR=*Ambystoma gracile* (northwest salamander), ASTR=*Ascaphus truei* (coastal tailed frog), DITE=*Dicamptodon tenebrosus* (coastal giant salamander), DICO=*Dicamptodon copei* (Cope's giant salamander), ENES=*Ensatina eschscholtzii* (Ensatina), PLVA=*Plethodon vandykei* (Van Dyke's salamander), RACAS=*Rana cascadae* (Cascades frog).

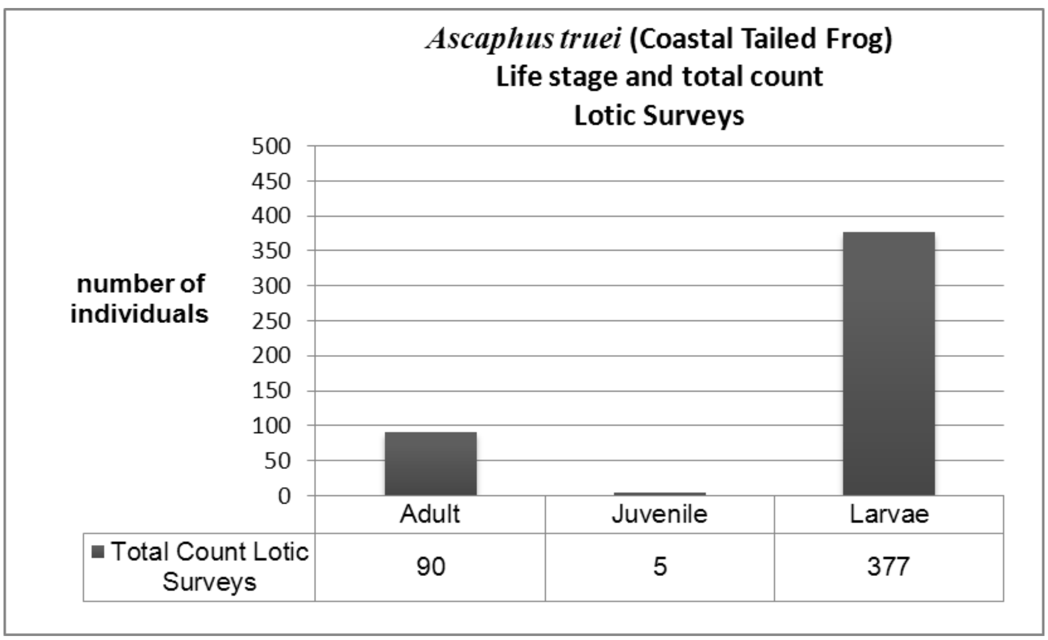

Figure 16. Total number and life stage of coastal tailed frogs (Ascaphus truei) documented during lotic and riparian surveys.[3]

[3] Actual coastal tailed frog counts are documented in the comments section of database records.

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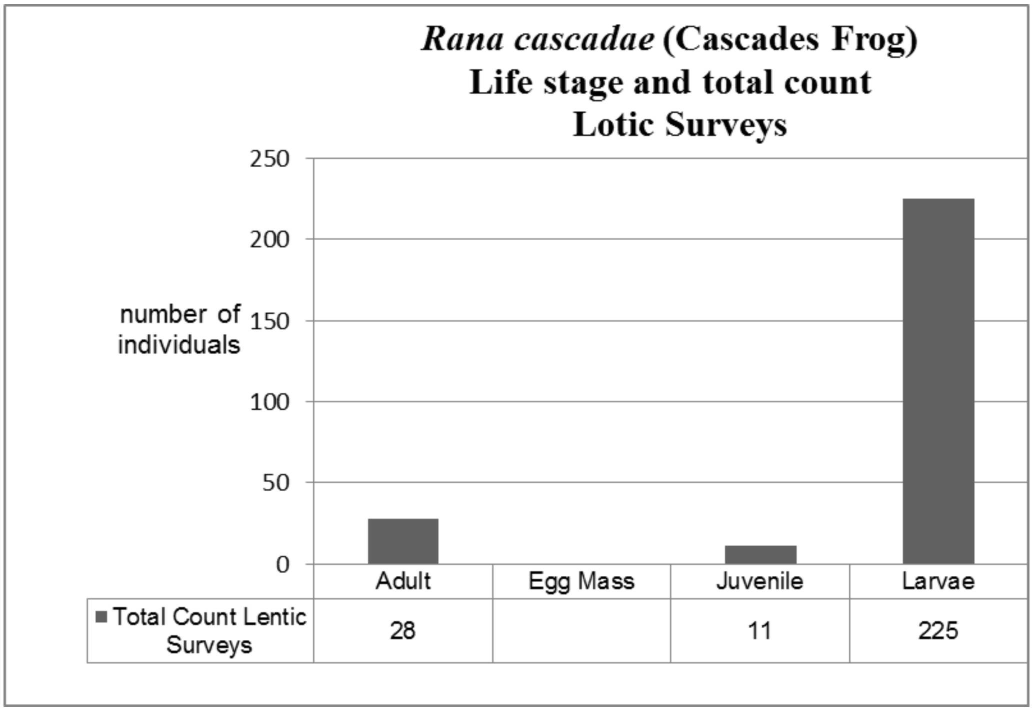


Figure 17. Total number and life stage of Cascades frogs (*Rana cascadae*) documented during lotic and riparian surveys.

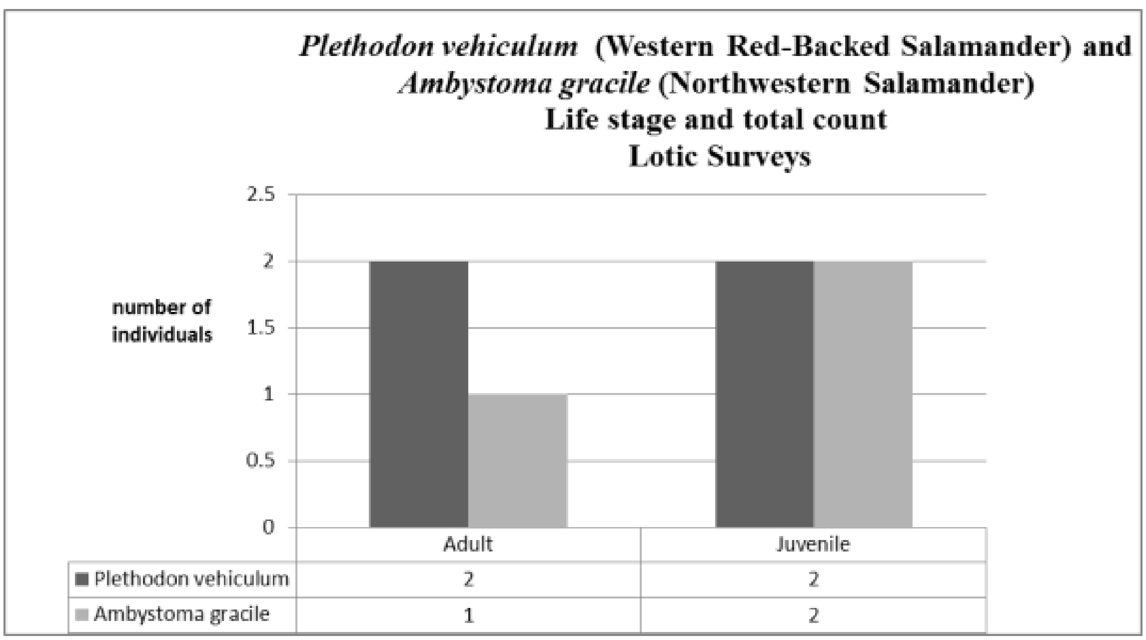


Figure 18. Total count and life stage of western-red-backed *(Plethodon vehiculum*) and northwestern (*Ambystoma gracile*) salamanders documented during lotic and riparian surveys.

Dicamptodon Species

Tail clips for DNA analysis were collected to confirm species of *Dicamptodon*. Tail clips from 47 animals were collected from 15 sites in six watersheds. In 2005, an additional 19 tail clips from five sites in two watersheds were collected; however, no habitat data or environmental conditions were documented for these sites. Three tail clips were identified as being from Cope's giant salamanders; all samples were from [location removed]. No previous confirmed detections of Cope's giant salamanders had been made at MORA. All other tail clips were identified as being from coastal giant salamanders (Figure 19).

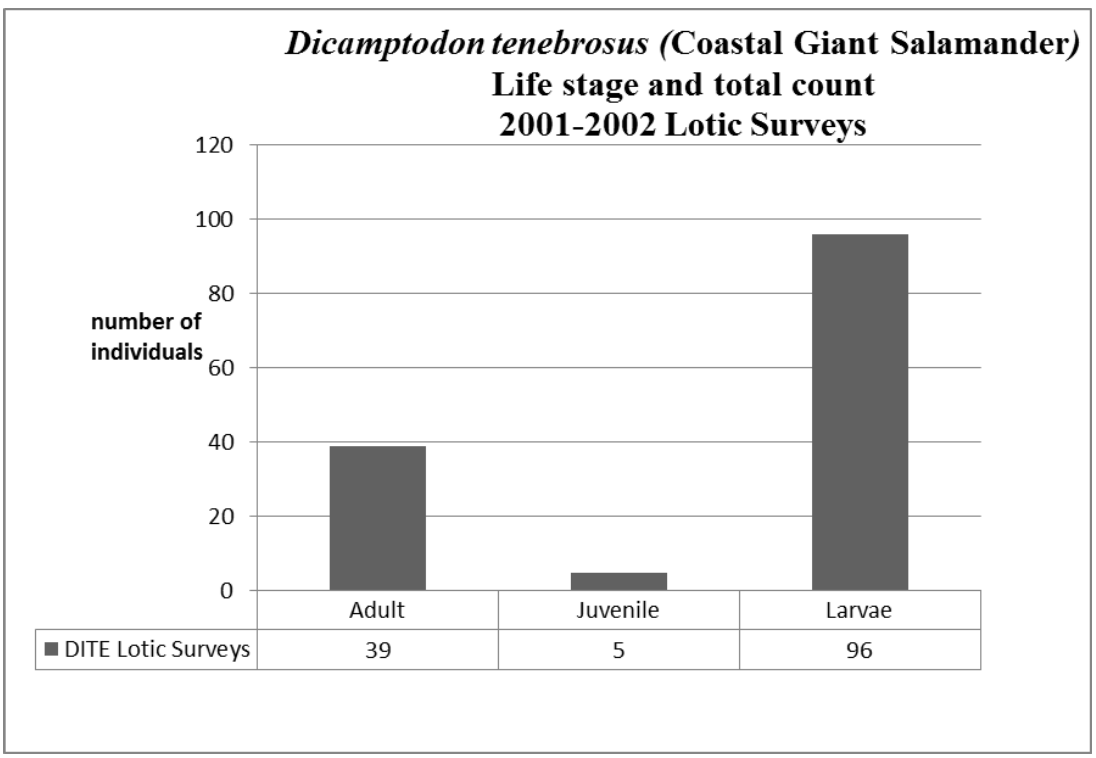
Results of DNA analysis are presented in Table 5. Life stages and counts are presented in Figures 20 through 21. Spatial distribution of *Dicamptodon* spp. observed in our surveys is presented in Figure 22.

Table 5. Results of DNA analysis for *Dicamptodon* spp. tail clips collected in Mount Rainier National Park. [* location removed].

Clip #	Year Collected	Site Name	Stream Code	Watershed	Genetic ID
1	2002	Tahoma Tributary	n03-09a	Nisqually	*D. tenebrosus*
2-4	2002	Falls Creek	o09-00a	Ohanapecosh	*D. tenebrosus*
5	2002	Deer Creek	o16-14a	Ohanapecosh	*D. tenebrosus*
6-7	2002	Boundary Creek	o16-06a	Ohanapecosh	*D. tenebrosus*
8-12	2002	Ollalie Creek	o11-00a	Ohanapecosh	*D. tenebrosus*
13-14	2002	Marjorie Lake outlet	f06-02b	West Fork	*D. tenebrosus*
15-17	2002	Van Horn Falls	f06-00a	West Fork	*D. tenebrosus*
18-23	2002	Ranger Creek	c06-00a	Carbon	*D. tenebrosus*
24-25	2002	Ipsut Creek	c08-006	Carbon	*D. tenebrosus*
26	2002	Mowich Lake	m05-01c	Mowich	*D. tenebrosus*
27-30	2002	Meadow Creek	m02-***	Mowich	*D. tenebrosus*
31-35	2002	Crater Creek	m05-01b	Mowich	*D. tenebrosus*
36-37	2002	Eagle Peak Creek	n11-00a	Nisqually	*D. tenebrosus*
38-41	2002	Butter Creek	z01-00b	Cowlitz	*D. tenebrosus*
42-47	2002	Butter Creek Tributary	z01-02a	Cowlitz	*D. tenebrosus*
48	2005	*	*	*	*D. copei*
49	2005	Tenas Creek	n02-00b	Nisqually	*D. tenebrosus*
50	2005	*	*	*	*D. copei*
51	2005	*	*	*	*D. copei*
52-55	2005	Tahoma Tributary	n03-09a	Nisqually	*D. tenebrosus*
60-62	2005	Eagle Peak Creek	n11-00a	Nisqually	*D. tenebrosus*
56-59	2005	LP 19 lake outlet	p03-01b	Puyallup	*D. tenebrosus*
63-66	2005	North Puyallup Tributary	p02-03a	Puyallup	*D. tenebrosus*

This report has had confidential information regarding park-sensitive species locations removed.

Figure 19. *Dicamptodon tenebrosus* captured in a Tahoma Creek tributary, n03-09a (tail clip #54).



	Adult	Juvenile	Larvae
DITE Lotic Surveys	39	5	96

Figure 20. Total count and life stage of coastal giant salamanders (*Dicamptodon tenebrosus*).

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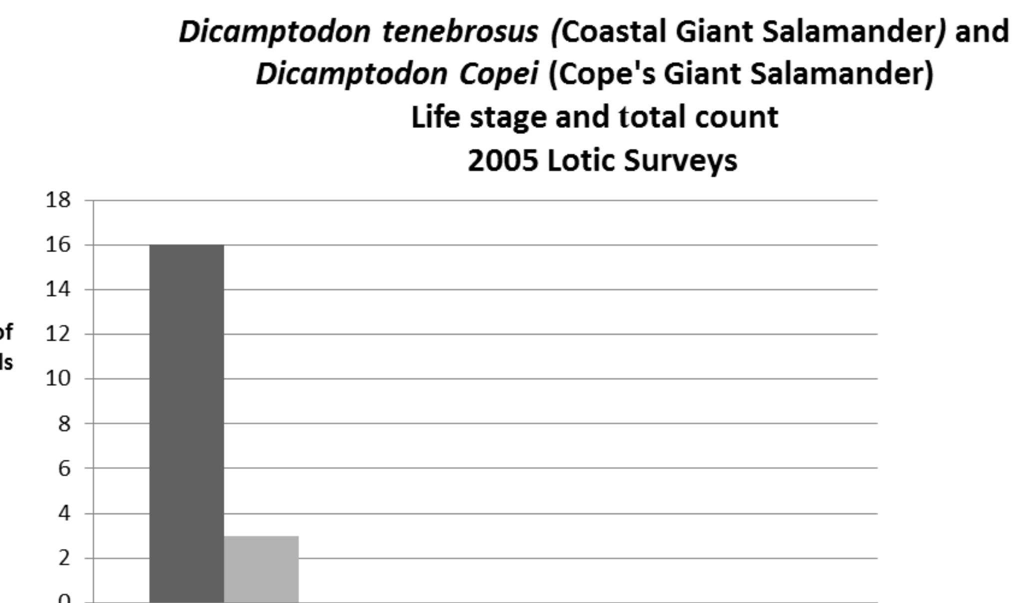

	Larvae	Adult	Juvenile
DITE	16	0	0
DICO	3	0	0

Figure 21. Total count and life stage of *Dicamptodon* species identified by DNA analysis, 2005.

This report has had confidential information regarding park-sensitive species locations removed.

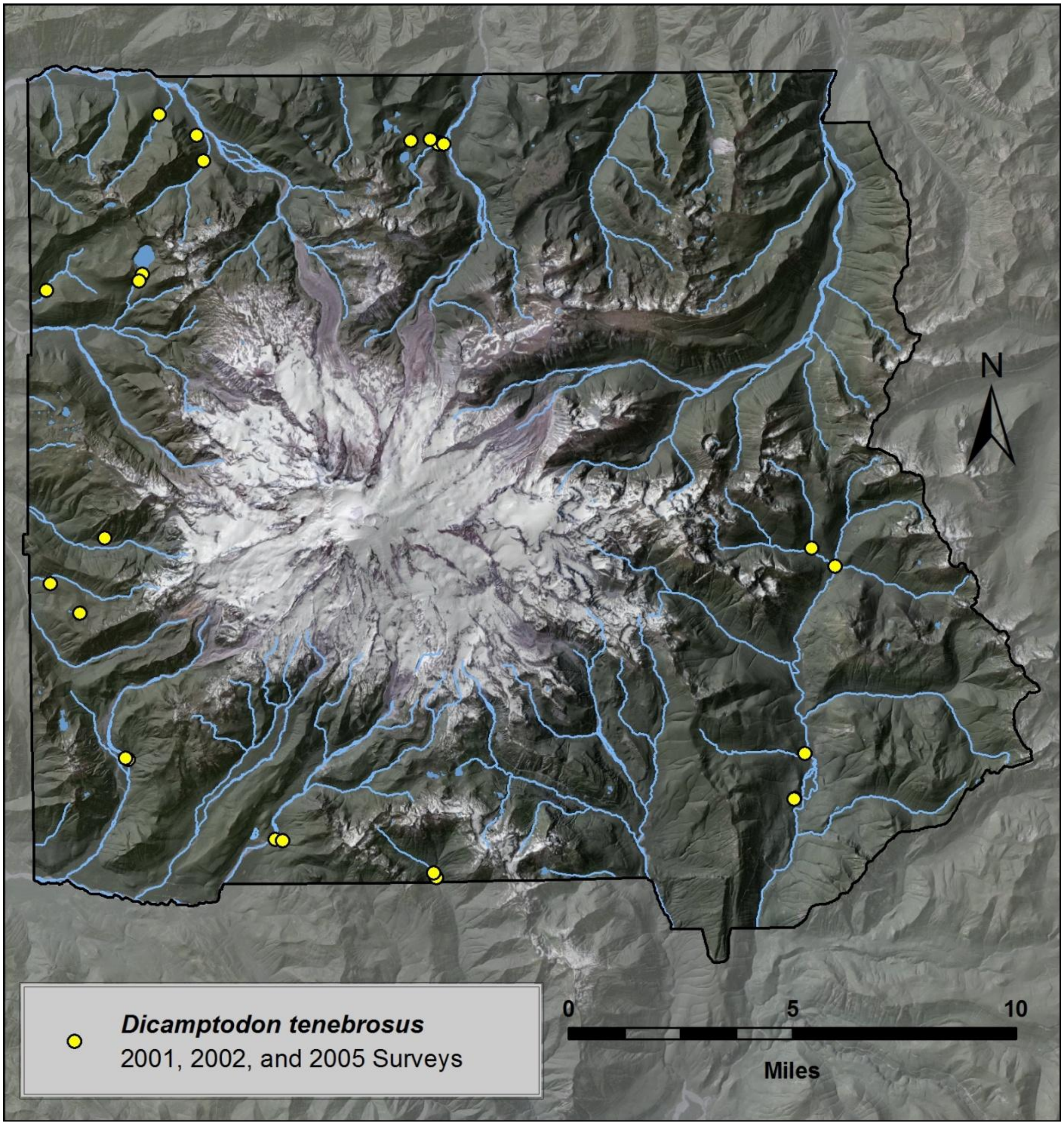

Figure 22. Site locations of Cope's giant salamander (*Dicamptodon copei* (2005 surveys) and coastal giant salamander (*Dicamptodon tenebrosus* (2001-2002, 2005) surveys. [* locations removed].

Van Dyke's Salamander

Van Dyke's salamanders were detected at 11 sites in 2001-2002 (Table 6). Detailed tables on environmental and habitat conditions are presented in Appendix D, Table 1. Elevation at Van Dyke's salamander sites ranged from 768 m (2520 ft) to 1625 m (5330 ft). Air temperatures from capture sites ranged from 12 to 19°C (54 to 66°F). Soil temperatures ranged from 8 to 12°C (46 to 54°F). Twenty-one individuals were detected ranging in size from 38 mm (1.5 in) to 120 mm (4.7 in) with snout-vent lengths ranging from 22 mm (0.9 in) to 65 mm (2.6 in). Seventy one percent of animals detected were adults (Figure 23). Rock was the predominant cover object with only one animal detected under wood at Chinook Creek Falls. The predominant habitat type for all Van Dyke's salamander sites was seeps (53%) and waterfalls (28%) followed by streams (14%), with one talus /cave site. Sixty-seven percent of all rock sites were categorized as wet; 29% were categorized as moist. One site was categorized as moist wood. Spatial distribution of Van Dyke's salamanders observed in our surveys is presented in Figure 25.

Table 6. Van Dyke's salamander sites documented in 2001 to 2002 in Mount Rainier National Park. [* location removed].

Site Name *	Site Description	Date	Elevation (ft)	Stream Code *	MORA Wetland GIS number
	Large bedrock falls with large splash zone.	24-Jul-01,	3250		2621
	Large Spray zone over bedrock cliff with talus slopes	25-Jul-01, 11-Sep-02	4850		3113
	Seep just below falls and stream section downstream of trail	25-Jul-01, 11-Sep-02	4960		3113
	Creek-top falls from pass	05-Aug-02	3680		4009
	Falls splash zone	13-Jul-01	3530		2
	*	10-May-01	2520		SEEP#6
	seep on the cirque, 2 seep zone combined into one.	19-Jul-01	5300		c
	Seep in the cirque bowl	19-Jul-01	5330		b
		19-Jul-01	5320		d
	Bedrock with seep flowing	25-Jul-01	4800		
	Large bedrock falls	02-Aug-01	3000		5576

This report has had confidential information regarding park-sensitive species locations removed.

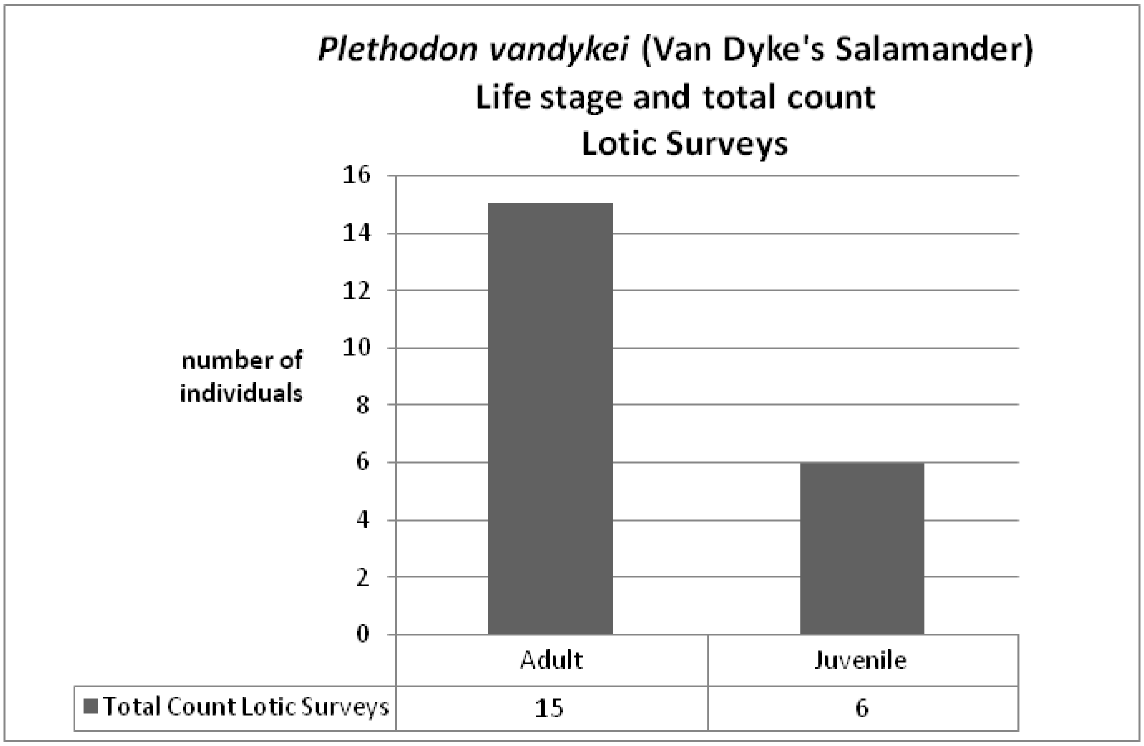

Figure 23. Total count and life stage of Van Dyke's salamanders (*Plethodon vandykei*) documented during lotic and riparian surveys.

Figure 24. Van Dyke's salamander documented at [location removed], 2001.

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Figure 25. Distribution of Van Dyke's Salamanders (*Plethodon vandykei*) documented during lotic and riparian surveys, 2001-2002. [map removed].

Terrestrial Surveys

Targeted terrestrial surveys focused on identifying new populations of Larch Mountain salamanders (*Plethodon larselli*). The most common amphibian detected during terrestrial surveys was the western red-backed salamander (n = 24), followed by Larch Mountain salamanders (n = 19) and Ensatina (n = 19). Other species included the coastal giant salamander (n = 2), coastal tailed frog (n = 1), and rough-skinned newt (n = 1) (Figure 26). Twenty seven surveys were conducted covering 135,000 m^2 and 53.9 search-hours over 30 days (Appendix A, Table 3). Life stages and total counts are presented in Figures 27 and 28.

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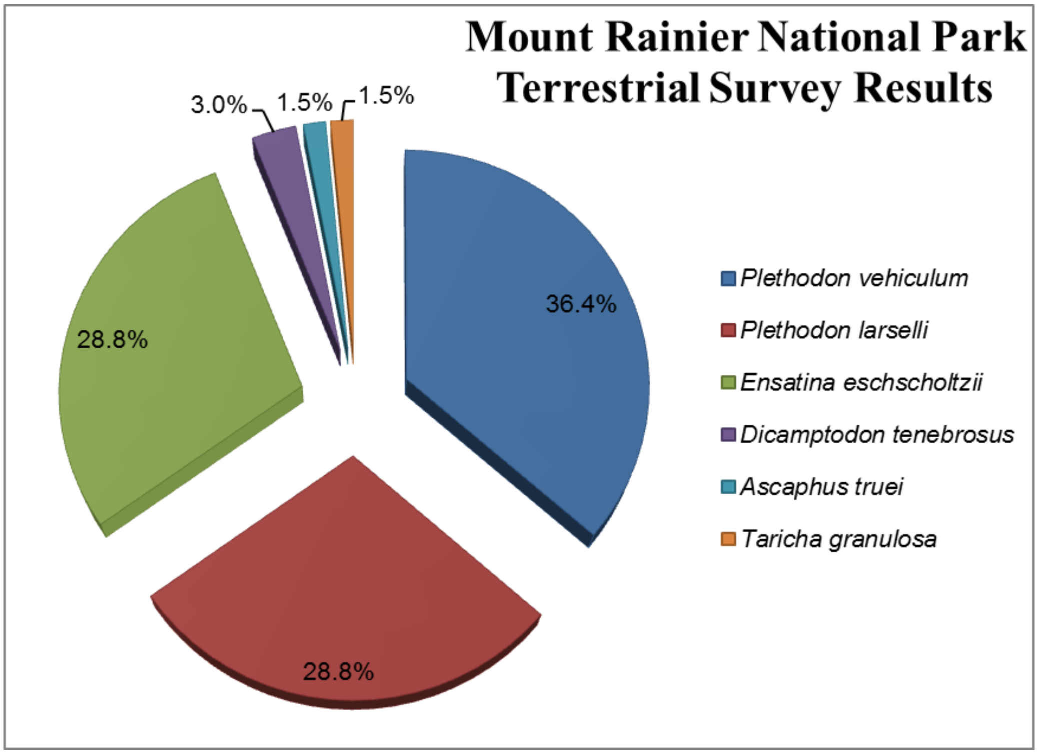

Figure 26. Amphibian species documented during terrestrial surveys at Mount Rainier National Park (adults and juveniles). *Plethodon vehiculum* (western red-backed salamander), *Plethodon larselli* (Larch Mountain salamander), *Ensatina eschscholtzii* (Ensatina), *Dicamptodon tenebrosus* (coastal giant salamander), *Ascaphus truei* (coastal tailed frog), *Taricha granulosa* (rough-skinned newt).

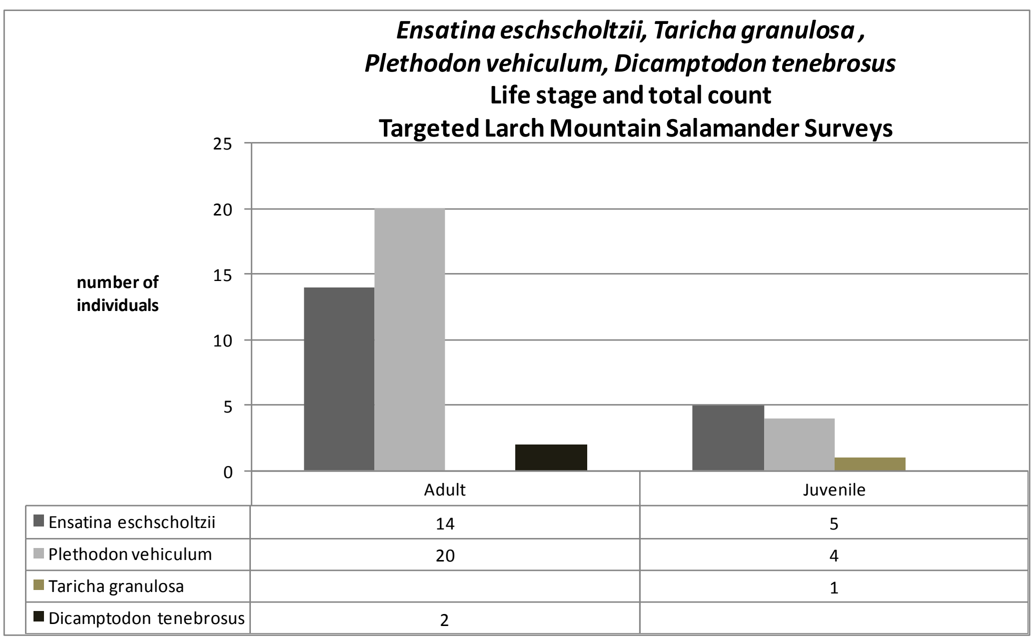

Figure 27. Total count and life stage of Ensatina, rough-skinned newts, and western red-backed and coastal giant salamanders documented during terrestrial surveys. *Ensatina eschscholtzii* (Ensatina), *Plethodon vehiculum* (western red-backed salamander), *Taricha granulosa* (rough-skinned newt), *Dicamptodon tenebrosus* (coastal giant salamander).

Larch Mountain Salamander

Larch Mountain salamanders were detected at 12 sites (Table 7). Most animals were adults (Figure 28) found on the south side of the park. One site was documented in [location removed] on the north side of the park, and one on the west side in [location removed]. Spatial distribution of Larch Mountain salamanders documented in this inventory is presented in Figure 29 [map removed].

Table 7. Larch Mountain salamander sites documented in 2001 - 2002 terrestrial surveys at Mount Rainier National Park. [* location removed].

Date	Site Name *	UTM E *	UTM N *	Watershed	Elevation (ft)
7/10/2001				Nisqually	2900
5/15/2002				Ohanapecosh	2825
6/12/2002				Carbon	3400
4/29/2003				Nisqually	2550
4/29/2003				Nisqually	2580
5/29/2002				Ohanapecosh	2400
5/1/2003				Nisqually	2890
5/29/2002				Ohanapecosh	2000
6/4/2001				Cowlitz	2840
6/5/2001				Cowlitz	3000
5/19/2002				Ohanapecosh	2340
6/15/2001				Puyallup	3814

This report has had confidential information regarding park-sensitive species locations removed.

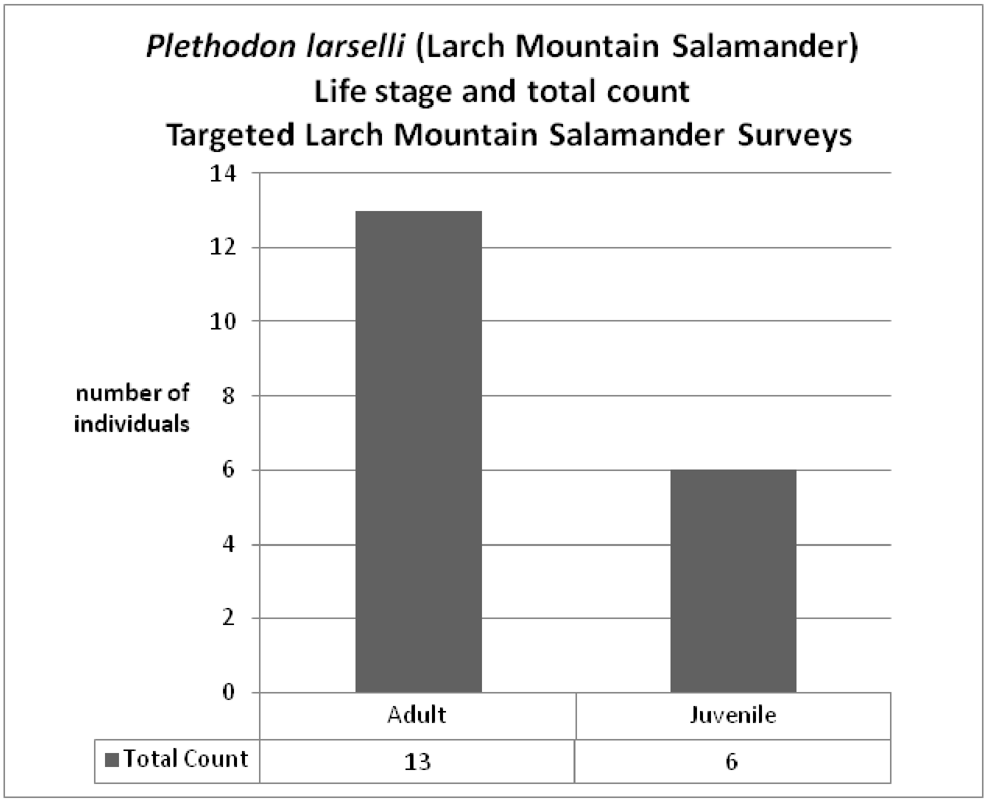

Figure 28. Total count and life stage of Larch Mountain salamanders (*Plethodon larselli*) documented during terrestrial surveys.

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Figure 29. Spatial distribution of Larch Mountain salamanders (*Plethodon larselli*) at Mount Rainier National Park. [map removed].

Elevations of Larch Mountain salamander sites ranged from 2000 ft (610 m) to 3814 ft (1163 m). Individuals were found mostly in macrohabitats defined as “cliff” (48%) followed by “talus” (37%) and “conifer” (15%).

Figure 30 presents macro- and microhabitats described for Larch Mountain salamander sites. Microhabitats and cover objects for “cliff” macrohabitat were categorized as rock outcrops with cover <10 cm dia, cobble (the predominant habitat type) rock piles with bark, and wood in the 11-25 cm dia size category. Microhabitats and cover objects for ‘conifer” macrohabitat included rock piles with wood in the 11 - 25 cm size category, one site categorized as bark heap with cobble cover, and “rock pile” in the 11 – 25 cm category. Microhabitats and cover objects for “talus” macrohabitat included rock outcrops with cobble cover, rock piles with cobble cover, and wood in the small (<10 cm) to large (>100 cm) diameter categories. Talus with rock outcrop and rock pile cobble designations were the second most documented habitat type for Larch Mountain salamander sites.

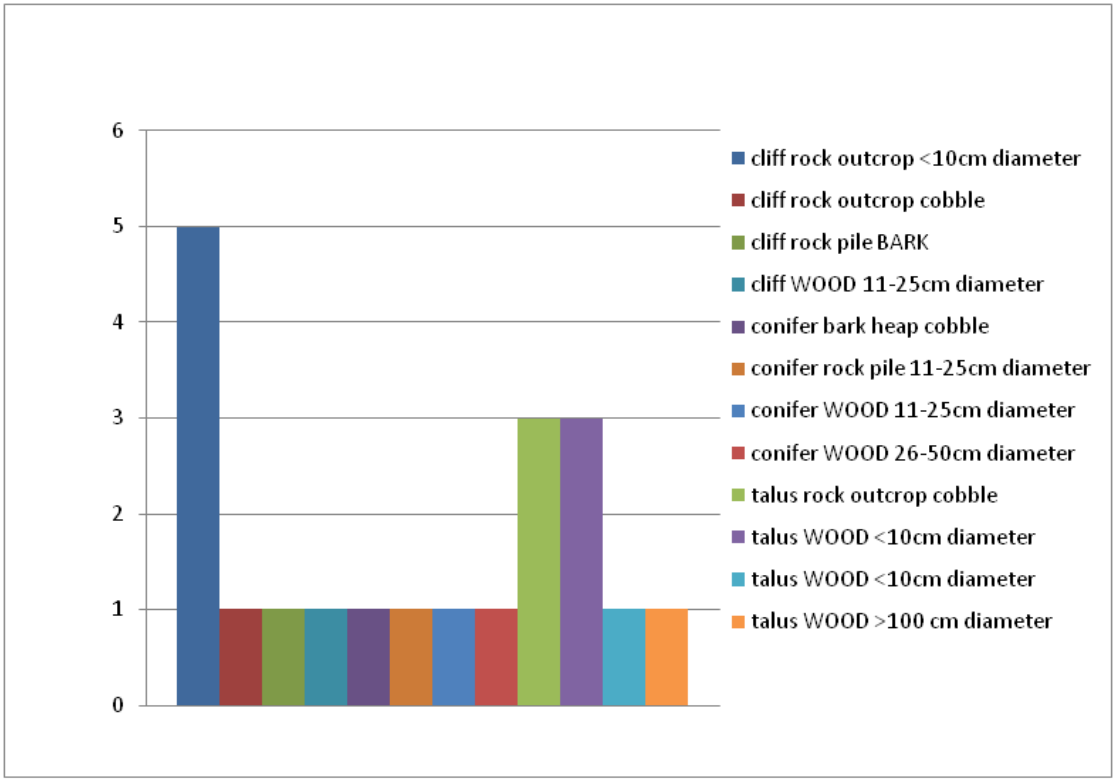

Figure 30. Larch Mountain salamander macro- and microhabitats.

Larch Mountain salamanders were found in association with other species at very few survey sites (Figure 31). Ensatina were detected at four Larch Mountain salamander sites; western red-backed salamanders were detected at two sites; rough-skinned newts were found at one site. Larch Mountain salamanders were the only species detected at the majority of targeted sites surveyed.

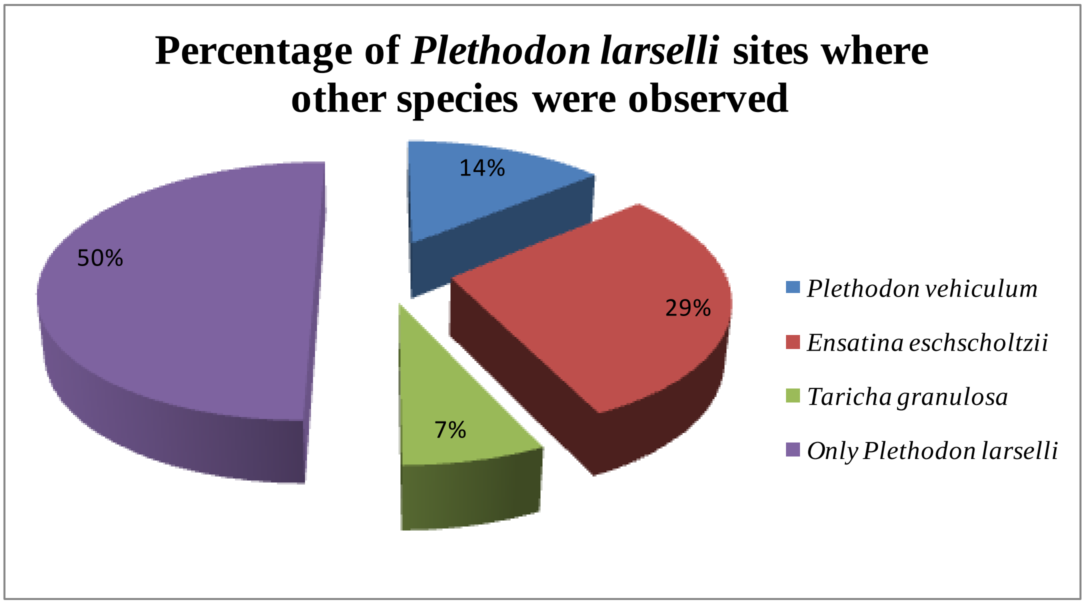

Figure 31. Species associations with Larch Mountain salamander. *Plethodon vehiculum* (western red-backed salamander), *Ensatina eschscholtzii* (Ensatina), *Taricha granulosa* (rough-skinned newt), *Plethodon larselli* (Larch Mountain salamander).

Environmental and habitat conditions of sites varied (See Appendix D, Table 2). Air temperatures for sites where Larch Mountain salamanders were captured ranged from 7 to 25 °C (44.6 to 77 °F).

Figure 32. Larch Mountain salamander (left) and habitat at site [location removed] (right).

Reptiles

Reptiles were recorded incidental to the amphibian survey**.** Six garter snakes (species unknown) were detected in the Cowlitz, Nisqually, and White River watersheds. Two northwestern garter snakes (*Thamnophis ordinoides*) were documented at Louise Lake in the Cowlitz watershed (Table 8, Figure 33).

Table 8. Reptile species observed during the amphibian inventory conducted in Mount Rainier National Park and location coordinates (UTM E, UTM N). THXX= unknown garter snake, THOR= Northwestern garter snake. Life stage A= adult.

Field Site ID	Site Location	Project	Species Code	Date	Life Stage	Count	UTM E	UTM N
B7	Small Marsh Lakes	ARMI Lentic Surveys	THXX	7/1/2002	A	2	603442	5179480
B11	Small wetland near Tahoma Creek and Nisqually River confluence	ARMI Lentic Surveys	THXX	7/3/2002	A	1	584902	5176326
B12	Large Wetland near Tahoma Creek and Nisqually River confluence	ARMI Lentic Surveys	THXX	7/3/2002	A	1	585106	5176488
B165	Louise Lake	ARMI Lentic Surveys	THOR	8/23/2003	A	4	598153	5180259
LM11	Fryingpan Creek	Larch Mountain Salamander Surveys	THXX	6/10/2002	A	2	605513	5192592

Project Data

Survey data and observation records (2001-2003) reside in three separate Microsoft Access databases. In addition, Galvan et al. (2005) contains a database of all records included in this inventory. The 2005 coastal giant salamander tail clips are not included in these databases since survey data was not collected with the tail clips.

Photographic slides of sites visited are filed in the MORA amphibian archives with a subset of these slides in digitized format. ArcMap GIS shape files are also filed in the MORA amphibian archives.

This report has had confidential information regarding park-sensitive species locations removed.

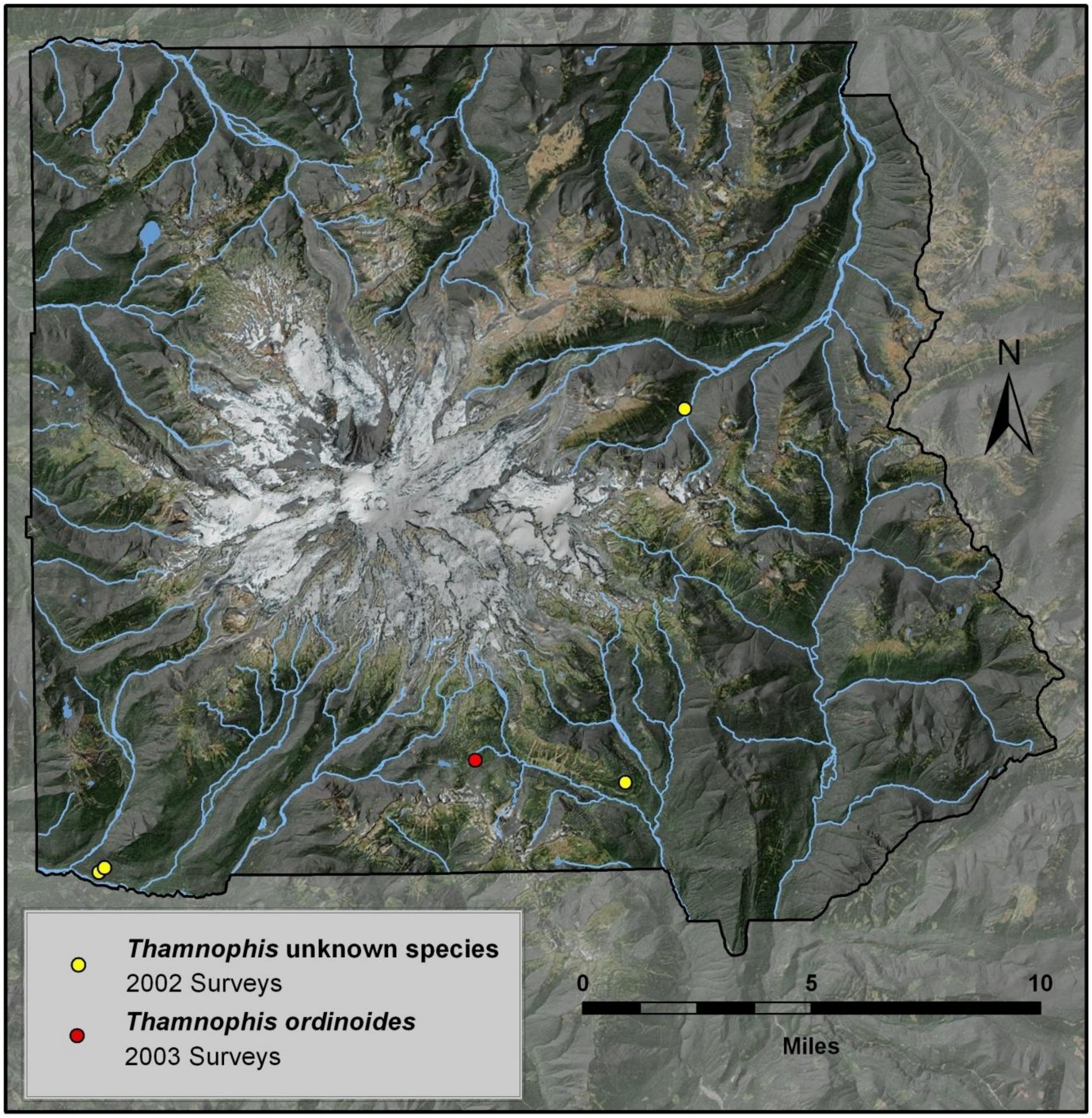

Figure 33. Spatial distribution of garter snakes observed in the amphibian inventory at Mount Rainier National Park.

Discussion

Voucher Specimens
Amphibians and reptiles were not captured as voucher specimens because the project was intended to be a low-impact inventory and voucher specimens already exist for all but two species present in the park (Appendix E). Cope's giant salamander was documented in only one location in the park and was identified through DNA analysis. Larch Mountain salamander is a federally listed Species of Concern. Photographic vouchers were taken of this species. Color voucher photos were taken on slide film and provided to the NCCN data managers along with data sheets and the database associated with this study.

Some taxonomic name changes have occurred since some of the MORA vouchers were collected (e.g., *Ensatina*), and one voucher collected as *Ambystoma tigrinum* (tiger salamander) is thought to be misidentified because the Washington distribution of this species is documented as the Columbia Plateau of eastern Washington (Nussbaum et al. 1983, Hallock 2005) and no records exist for high montane areas in the state. Slater (1955) reported that *A. tigrinum* occurred only in counties east of the Cascade Range divide.

Western Toad
The western toad *(Anaxyrus boreas)* was rare in MORA lentic surveys, detected in only 6% of all sites surveyed. Toad observations consisted of 18 individual adults (one dead) at six different survey sites, 33 egg masses at three sites, five juveniles at three sites, and large aggregations of tadpoles (n = 1530) at four sites. Historically, this species was distributed throughout western North America and found in all but the driest portions of Washington. The western toad is now uncommon in the Puget Sound lowlands of western Washington and the North Cascades (Tyler et al. 2003), and has disappeared from several sites in Washington (Hallock and McAllister 2005c). The western toad is currently considered a federal Species of Concern and a candidate species to the Washington State threatened and endangered species list.

Western toads have been observed breeding in shallow ponds, lakes and palustrine herbaceous and riverine wetlands in forested and subalpine areas of the park, at elevations as high as 1742 m (5715 ft). They breed in the shallow portions of these water bodies, laying their eggs in water, generally less than 0.5 m deep (Corkran and Thoms 2006). Outside of the park, western toads have been documented breeding in stillwater off-channel habitats of rivers (Hallock and McAllister 2005c). The high gradient glacial streams in the park may not provide suitable habitat for toad breeding, but additional searches should be made to confirm this.

Breeding generally occurs immediately after ice-out. Anecdotal information suggests that toads return to the same egg laying location every year (Hallock and McAllister 2005c). Egg and tadpole development is temperature dependent; in high, cold locations in the Rocky Mountains, development from hatching to metamorphosis for the Boreal Toad (*Anaxyrus boreas boreas*) can take 75 days (USFWS 2004). Nussbaum et al. (1983) reported that when toadlets emerge from a lake, the shores become littered with hundreds of them and they tend to disperse along moist areas leading away from the lake. They also suggested that mortality between egg laying and return of adults two or three years later is well over 99%. Western toads become sexually mature at four to six years (Carey 1976, Carey et al. 2001).

Western toads spend most of their life in terrestrial habitats, hibernating over the winter. Overwintering habitat has not been described for Washington (Hallock and McAllister 2005c); however, Campbell (1970a) documented most toads over-wintered within 900 m (3000 ft) of their summer habitat in the Front Range of Colorado. Campbell (1970b) found western toads hibernating beneath or near large boulders along a spring-fed brook supplemented by extensive snow accumulation to maintain the flow of groundwater.

A study at Tipsoo Lake (Chelgren et al. 2008) in the northeast portion of the park found that after a failed breeding season, adult toads did not return to open water to hydrate. Forty-nine percent of individuals were located in animal burrows during radio-telemetry tracking. Only 6% of toads were found within 50 m of paved surfaces, including roads and parking lots, whereas 64% were located within 50 m of a foot trail. Toads tended to make infrequent long-distance moves (> 50 m). Between long-distance movements, toads tended to remain in the vicinity of a central burrow or system of burrows or large rock cover. Toads with transmitters could frequently be seen just inside the burrow or partially buried in loose dirt near the burrow entrance (Figure 34). The frequency of long-distance moves decreased after mid-August, when toads remained in the vicinity of burrow clusters or entirely within burrows and made periodic short movements at night presumably to feed. Rarely during the day were toads found actively moving. Long-distance movements and foraging seemed to be done only at night. Toads selected forb-dominated south facing slopes and rarely resided in forested areas.

Figure 34. Small mammal burrows used by western toads.

Western toad populations in MORA were more extensive historically then they appear to be now. Slater (1955) reported this species at Mazama Ridge, Mowich Lake, and Mountain Meadows. We have been unable to locate western toads in these areas of the park today. Schlegel et al. (1992) conducted a limited survey of amphibians in the park, and documented western toads at five sites. Of these sites, we were only able to locate three of these breeding populations during this survey. During the 1996-1999 parkwide surveys (Tyler et al. 2003) we were only able to locate four western toad breeding sites, three of which were previously identified by Schlegel et al. (1992). This NCCN inventory gave us the opportunity to focus on locating western toad breeding sites as a priority. Consequently we were able to document five new breeding sites and also confirmed no western toad breeding at several historic sites.

Once the most widespread and abundant member of the family Bufonidae in western North America, western toads are now candidates for federal listing in Colorado and Wyoming, may be extirpated from New Mexico, and have declined sharply in parts of Montana (Corn 2000). Severe declines and extirpations of many populations have occurred in areas where western toads were once abundant (Leonard et al. 1993, Carey et al. 2003, AmphibiWeb 2009). Inventory and Monitoring efforts conducted in Pacific Northwest National Parks since the 1990's have highlighted concerns for western toads at Mount Rainier and Olympic National Parks (Bury and Adams 2000, Tyler et al. 2003), and at Crater Lake National Park (Farner and Kezer 1953, C. Pearl, USGS, unpubl. data). These Inventory and Monitoring efforts have been successful in bringing to our attention lower rates of occupancy of breeding ponds than were anticipated and may be indicative of historic or ongoing declines. In MORA, anecdotal evidence and a few historic park records suggest that western toads were more numerous throughout the 300 lakes and ponds within the park, yet surveys conducted during the past 20 years (1991-1992, Schlegel et al. 1992, 1996-1999, Tyler et al. 2003), and data presented in this inventory detected western toads at only a small number of sites. Available data warrant great concern for western toad declines throughout their range, and justify immediate action to understand the causes.

Amphibian chytridiomycosis (chytrid fungus) is a recently described disease caused by infection by the fungus *Batrachochytrium dendrobatidis (B.d.)*. Chytrids, fungi in the phylum Chytridiomycota, live in water and soil and are considered to be ubiquitous. There are many genera and species of chytrid fungus, most of which are beneficial saprobes. *B.d*, cultured, identified, and named by Longcore et al. (1999), is the first member of this phylum to be described as a parasite or pathogen of a vertebrate species. *B.d.* has been described as an introduced, lethal infectious disease to which amphibian populations have no resistance and which has been associated with population declines in several species including western and boreal toads (Green et al. 2002).

Some studies have implicated ultraviolet radiation in western toad declines (Blaustein et al. 1994); however, other studies have suggested that most amphibians are naturally protected from ultraviolet-b radiation by dissolved organic matter that is present in the water. Interactions among pathogens, UVB radiation, atmospheric pollutants, and climate change, however, are complex and appear to be contributing to amphibian population declines (Olson 2009).

Significant avian predation on breeding adult western toads in the Oregon Cascades Range and southern Rocky Mountains of Colorado has also been reported (Olson 1989, Corn 1993). Olson and Corn report that ravens (*Corvus corax*) eviscerate toads and leave them partially eaten, presumably to avoid the toxins in the skin. Beiswenger (1981) reported tadpole predation by gray jays (*Perisoreus canadensis*), with no indication that the birds found the tadpoles to be distasteful. Corvid predation is of concern given their increased presence in high recreational use areas of the park (Seckel 2011).

It is unclear how the presence of introduced fish affects western toad populations. Kagarise-Sherman and Morton (1993) noted that fish predation, among a number of other factors, may have contributed to declines of the Yosemite toad (*Anaxyrus canorus*) in the 1980s. Knapp (2005), however, found that populations of the Yosemite toad were unrelated to the presence of non-native trout. Introduced predators had substantial impacts on the sizes of extant populations of arroyo toads (*Anaxyrus californicus)* and may have contributed to regional extinctions (Hayes and Jennings 1986). Sweet (1992) found that introduced fish (including trout species) prey on arroyo toad tadpoles and have been observed inducing high larval mortality in breeding pools. Effects of fish on toad populations have also been studied in lab experiments. Watt et al. (1997) found that tadpoles of *Bufo bufo* (European toad) had a predator avoidance function in the presence of fish by increasing aggregation, thereby benefitting from being in a larger group. Additional observations are needed to assess how the presence of introduced fish affects western toads at MORA. Although breeding has been observed in MORA lakes with fish, the effects on tadpole survival to metamorphosis has not been studied.

Studies strongly suggest that numerous factors such as habitat destruction, global environmental change (including increasing ultraviolet radiation), pollution, disease, and invasive species (Olson, 2009), acting alone or in concert with one another, contribute to amphibian population declines..

In the State of Washington, western toads are locally common, but rapid unexplained declines have occurred and they are absent from portions of their historic range (Hallock and McAllister 2005c, WDFW 2005). Trampling of juveniles, loss of vegetation, reduced water quality, and loss of habitat resulting from recreational activities such as hiking, camping, and fishing have been identified as posing a significant threat to boreal toads (USFWS 2004). In association with human activities around boreal toad breeding sites, the presence of Corvid species such as ravens and jays will inevitably increase, which may increase predation on western toads. Additional studies are needed to assess the overall impact of these activities and increased predation. Adult western toads are especially vulnerable to threats from roads (Hallock and McAllister 2005c) and trails (Chelgren et al. 2008) during movements to and from breeding sites in the spring, and dispersal of newly metamorphosed toads away from breeding sites in the summer and fall. The application of road salt may alter water quality of breeding sites during spring run-off. Alteration of toad breeding sites may lead to population declines or population extirpation. Because population declines have been rapid, we recommend that all known toad breeding sites be monitored annually.

Pacific Giant Salamanders

Crother (2008) notes four species of salamanders in the family Dicamptodonitae which was revised by Strauch (1870): Idaho giant salamander (*D. aterrimus*, Cope 1867), Cope's giant salamander (*D. copei,* Nussbaum 1970), California giant salamander (*D. ensatus*, Eschscholtz 1833), and coastal giant salamander (*D. tenebrosus*, Baird and Girard 1852). Earlier park records documented coastal giant salamander occurrences in the park as *Dicamptodon ensatus* according to Nussbaum (1976). Nussbaum had concluded that *Dicamptodon* included only two species, *copei* and *ensatus*, based on morphological variation. Good (1989) examined genetic relationships of *Dicamptodon* species and concluded that this genus comprises the four species described in Crother (2008). California giant salamanders (*D. ensatus)* are restricted to separate distributions along the central coast of California; Idaho giant salamanders (*D. aterrimus)* occur in the Rocky Mountains of Idaho and adjacent western Montana; coastal giant salamanders (*D. tenebrosus)* are distributed from southwestern British Columbia to Mendocino County, California; Cope's giant salamanders (*D. copei)* occur in Washington (Olympic Peninsula, southwestern Washington, and Columbia River tributaries to [now] MORA) and northern Oregon (Clatsop County eastward to Wasco County) (see Jones et al. 2005).

Past surveys in MORA (Schlegel 1992, Tyler et al. 2003, Samora, unpubl. data) have identified all *Dicamptodon* species as coastal giant salamander (*D. tenebrosus*)[4]; however, DNA analysis conducted for this inventory confirmed the presence of coastal giant salamanders and Cope's giant salamanders. Unfortunately, collections were not extensive but did confirm that Cope's giant salamanders occur in at least one stream [location removed] on the southwest side of the park, co-occurring with the coastal giant salamander. Historical databases should be corrected to note *Dicamptodon* sp. as "DIXX" except for those sites where DNA analysis has confirmed identification.

Tail clips for DNA analysis were collected to confirm *Dicamptodon* species. Tail clips (47 in 2002, 19 in 2005) were collected from giant salamanders found in first through 3rd order streams at 15 sites in six watersheds. Limited habitat data or environmental conditions were documented for these sites. The three tail clips identified as being collected from Cope's giant salamanders were all from [location removed]. No previous confirmed detections of Cope's giant salamanders had been made at MORA. All other tail clips (n = 63) were identified as coastal giant salamanders.

Dicamptodon were documented in fourteen 1st order streams (30% of total first order streams), five 2nd order streams (22% of total second order streams surveyed), and three 3rd order streams (27% of total third order streams surveyed. One hundred fifty-nine (adults, larvae, and juveniles) were documented in this survey. The predominant life stage detected were larval salamanders, although 37 adults were documented in lotic surveys and two in terrestrial surveys. Five sub-adults (juveniles) were also documented in lotic surveys.

Data from this study, combined with data from Tyler et al. (2003), indicate that a high percentage of *Dicamptodon* (76%) at MORA occur in 1st order streams, and are primarily found under rock cover in streams, waterfalls, and seeps (Tyler et al. 2003, unpubl. data, this study). Instream habitat, substrate, and overstory cover was not documented in this survey; however, the parkwide survey conducted from 1996-1999 (Tyler et al. 2003) found *Dicamptodon* in stream habitat, mostly in pools (both on and under substrate and suspended in the water column), and in banks, splash zones, and under substrate in riffles. *Dicamptodon* detections have also been made at four park lakes from 2000 to 2010 (Samora unpubl. data). In MORA streams, *Dicamptodon* are mostly found in and under small cobble, boulder, large cobble, pebble, and gravel larger than 8 mm, and in streams where depth ranges from 2 to 27 cm. The elevation range for *Dicamptodon* from park records indicates that they occur in forested areas of the park from 608 m (2230 ft) to

[4] Note that historical park records refer to *D. tenebrosus* as Pacific giant salamander, not coastal giant salamander, although this is the same species.

1496 m (4909 ft). Percent overstory vegetation in *Dicamptodon* habitat at MORA ranges from 5 to 75%, with most individuals occurring in streams with 21 to 65% overstory vegetation.

Observations are missing from the White and Huckleberry watersheds within the park and additional surveys should be conducted to verify their presence.

Coastal Giant Salamander

The coastal giant salamander is the largest terrestrial salamander in North America; adults reach lengths of 170 mm snout-vent length and 340 mm total length (Nussbaum et al 1983). Larvae are encountered more commonly than adults. Hallock and McAllister (2009b) reported that most individuals are found within 50 m of steams. All adult salamanders in this study were detected within four meters of streams, seeps or waterfalls. Johnston (1998) reported that terrestrial adults are more abundant in forested habitats than in pre-canopy sites, where they are found under rocks and in logs, root channels, and burrows.

Newly metamorphosed (Nussbaum et al. 1983, Johnston 1998), and sometimes paedomorphic (retaining larval characteristics in the adult life stage) animals move out of streams to the surrounding terrestrial habitat during rainy and wet periods (Welsh 1986). Some metamorphosed individuals remain in the vicinity of the stream; others prefer upland areas (Johnston 1998).

Larvae (Antonelli et al. 1972) and adults probably seek refuge from temperature extremes in the winter, at least in areas with freezing temperatures. Adults may seek refuge under rocks and logs or in animal burrows and root channels (Jones et al. 2005).

Breeding occurs during spring and fall (Nussbaum et al. 1983). Breeding habitat is reported to be pools or slow-moving portions of streams (Nussbaum 1969, Jones et al. 1990). Nussbaum et al. (1983) described egg deposition sites as the undersurface areas of rock or wood; the female stays in the nest until the eggs hatch and the young abandon the nest chamber up to 200 days after hatching.

Dicamptodon are both predators and prey. Adults are known to consume small mammals and other vertebrates as well as smaller individuals of their genus (Nussbaum et al. 1983). Coastal giant salamander larvae are known to feed on a variety of larval and adult invertebrates, mostly benthic, as well as mollusks fish (including salmonids and sculpins), other amphibian species, and, as with the adults, smaller conspecific individuals. Predators of *Dicamptodon* include fish (salmonids), weasels, river otters, water shrews, and garter snakes (Nussbaum et al. 1983).

Coastal giant salamanders are sympatric with Cope's giant salamanders and may occur in the same stream (Nussbaum and Clothier 1973, Nussbaum 1976, Daugherty et al. 1983). At least one stream in MORA was documented with both species present. The two species are not known to hybridize (Nussbaum 1976, Good 1989). *Dicamptodon* at MORA are also found to be sympatric with coastal tailed frogs in most streams although they generally occur within different portions of the stream. Welsh (1993) found larval coastal giant salamander numbers higher in stream reaches occupied by larval coastal tailed frogs and southern torrent salamanders (*Rhyacotriton variegates*), both of which are known prey of coastal giant salamanders. *Dicamptodon* are sometimes found in streams with sculpins or salmonids, with which they may compete for food or function as predator or prey (Antonelli et al. 1972, Parker 1993a, b).

Hallock and McAllister (2009b) reported that coastal giant salamanders are common and occur throughout western Washington; however, activities that alter the integrity of streams are of concern, especially those actions that increase water temperature and sedimentation. Management practices that do not protect streams from sedimentation may be particularly problematic for salamander populations that inhabit low-gradient streams where increased silt deposition may eliminate microhabitats crucial for the survival of the species. This happens when silt fills spaces between rocks and logs that would otherwise be used as sheltering, hiding, and nesting sites.

Cope's Giant Salamander

In Washington, Cope's giant salamanders occur primarily west of the Cascade Crest in the Coast Range, southern Puget Lowlands, and West Cascades ecoregions (Hallock and McAllister 2009a). This species is smaller than the coastal giant salamander, becomes sexually mature in the larval form at relatively small size, and rarely metamorphoses (Nussbaum et al. 1983). Habitat, food sources, and predators are similar to those of the coastal giant salamander. Egg laying and nest tending are similar to that described for the coastal giant salamander. Cope's giant salamander, however, does not have a well-defined breeding season (Nussbaum et al. 1983).

Given the difficulties of differentiating Cope's and coastal giant salamander larvae, we recommend that future documentation of *Dicamptodon spp.* at MORA be verified through DNA analysis.

Cascade Torrent Salamander

The Cascade torrent salamander was formerly known as *Rhyacotriton olympicus*, but was changed to *R. cascadae* (Good and Wake 1992). Four species are now recognized for this genus. The Cascade torrent salamander has not been documented within the park boundaries, but has been observed at locations adjacent to the southwest boundary of the park and on Gifford Pinchot National Forest lands, so the species may be present in the park. The Cascade torrent salamander is a Washington State sensitive species. Sensitive species status is applied to species for which serious concerns related to habitat loss exist in order to increase awareness among resource protection agencies. Sensitive status was established for the Cascade torrent salamander because of concerns about how the rapid rate of conversion of mature and old-growth forests to young stands as a function of timber harvest was potentially limiting habitat quality through increased microhabitat temperatures and sedimentation, and that local extirpation of populations was resulting from these changes (Corn and Bury 1989). Inadequate protection of headwater streams, seeps, and springs (all habitats presumed to be occupied) was also identified as potentially affecting the survival of local populations. Because of its status and these concerns, we recommend that additional searches for Cascade torrent salamanders be made in suitable habitat such as perennial streams (off-channel habitats that are slow flowing and shallow with minimum fines), in seeps, waterfall splash zones in areas of thick canopy cover. However, one study in Oregon suggested that the Cascades torrent salamander may not occur above elevations with heavy snow (AmphibiaWeb 2009).

Woodland Salamanders

Species of the woodland salamander family, *Plethodontidae*, are found in a variety of forested habitats in the park. Species in this family have no lungs, absorb oxygen directly through their moist skin, and require cool, moist microhabitat. These species do not require standing water for breeding or other life functions. They breed and forage on moist substrates in upland forest habitats. Females guard their eggs until development is complete (Nussbaum et al. 1983). Four plethodontid species occur in the park: the more common western red-backed salamander, Ensatina, and the rare Larch Mountain and Van Dyke's salamanders. The latter two species were the focus of our terrestrial and riparian surveys, respectively.

Van Dyke's Salamander

The type specimen for Van Dyke's salamander was first collected at Paradise in MORA (Van Denburg 1906).[5] This species is endemic to western Washington and occurs on the Olympic Peninsula, the Willapa Hills, and in the south and central Cascade Range. Nussbaum et al. (1983) described Van Dyke's salamanders as often being associated with seepages and streamside talus, but also talus slopes far from water bodies. This species has also been reported inhabiting talus in forests, upland sites, and in cave entrances (one cave observation was made in this inventory in August 2001). McIntyre et al. (2006) found that Van Dyke's salamanders appear to be associated with habitats that maintain cool thermal and hydric conditions favorable for a species that is sensitive to heat and desiccation due to physiological constraints. Few nests of this species have been found, but Hallock and McAllister (2005b) reported that nests found on the Olympic Peninsula were laid in early May and development was completed by early October.

Van Dyke's salamanders are generally active when soil moisture is high (moist or wet) and soil temperatures are between 4 to 14°C (39.2 to 57.2 °F) (Jones 1999). Observations in MORA have been made from July through mid-September when air temperatures were from 8 to 20°C (46.4 to 68 °F) and water temperatures ranged from 4 to 18°C (39.2 to 64.4 °F). At MORA, observations of this species, for all years, were made at waterfalls (41%), seeps (33%), and at streamsides (24%) with rock as the predominant cover object; only four individuals were detected under wood. One observation was made in cave habitat, and one in talus habitat. In 2009, a Van Dyke's salamander was found along a major park highway, in association with Larch Mountain salamanders (Figure 35). Large decaying conifer logs near streams appear to be important habitat for nests (Hallock and McAllister 2005b).

Hallock and McAllister (2005b) reported that threats to this species may occur when riparian habitat is altered. Unaltered riparian corridors along all stream types, especially along 1st- to 3rd-order streams, should be maintained. Additional upland buffers would most likely benefit this species, and large woody debris in various stages of decay should be maintained near streams (Hallock and McAllister 2005b). During park trail, road, and other developed area construction projects, care should be taken not to alter microhabitat associated with this species.

Additional studies should address distribution, abundance, and habitat requirements, as well as life history for this species in the park.

[5] In 1999 and 2000 suitable habitat was searched extensively in the Paradise Valley and no detections of PLVA were made. No recent detections of PLVA were made until 1999 when PLVA were detected at two locations in the [location removed].

Larch Mountain Salamander

The Larch Mountain salamander was originally described as a subspecies to Van Dyke's salamander (Burns 1954, 1962). The Larch Mountain salamander was previously thought to be endemic to a narrow corridor along the Columbia River (Herrington and Larsen 1985). Surveys conducted in recent years have resulted in expanding the range to the north in the Washington Cascade Range and to the south in the Oregon Cascade Range (Crisafulli et al. 2008).

While movement patterns have not been studied, individuals of this species are thought to have limited dispersal ability, making daily to seasonal vertical migrations in the ground surface as microclimate conditions change, but not extensive horizontal overland movements (Crisafulli et al. 2008). Larch Mountain salamanders are primarily nocturnal and are typically active on the ground surface during the cool, wet weather of spring and fall (Crisafulli 2005).

The Larch Mountain salamander has been reported to occur at elevations from 50 to 1280 m (~160 to 4200 ft). In MORA, the elevational range for all observations of this species was 610 m (2000 ft) to 1162 m (3814 ft). Crisafulli et al. (2008) reported that Larch Mountain salamanders occur in a wide array of habitat types including: 1) old-growth forests, 2) younger naturally regenerated forests in gravelly/cobble soils with residual late successional features (snags and large down logs), 3) scree and talus (forested and un-forested), and 4) lava tube entrances where debris (e.g., pieces of lava, wood, fine organic and inorganic particles) has accumulated. In a large portion of the species range, late-seral forest conditions appear to be crucial to the species existence. In other areas, combinations of rocky substrates, soils, and vegetation provide suitable cool, moist microhabitat conditions necessary for Larch Mountain salamander survival. In MORA, the predominant habitats for all observations of this species in the park was talus with wood (non-round) slabs (25%), talus rock pile with cobble (21%), and cliff rock outcrop with wood <10 cm diameter (21%).

As with Van Dyke's salamander, the Larch Mountain salamander is sensitive to modifications of forest structure and microclimate. Crisafulli (2005) and others (AmphibiaWeb 2009, Hallock and McCallister 2005d) report that habitat loss, degradation, and fragmentation are the main threats to this species, and alteration of forest structure and microhabitats, and microclimate regimes within surface and subsurface environments are of highest concern. They also report that natural disturbances such as fire and volcanism are considered serious potential threats.

Development and maintenance of recreational facilities (i.e., trails, roads) are also threats to this species. In MORA, the highest density of Larch Mountain salamanders has been found within 1.5 m of the paved road edge of a major highway (Figure 35). Recommendations for protecting this Species of Concern are to avoid habitat loss or degradation, and to maintain undisturbed cool, moist surface and subsurface refuges (Crisafulli et al. 2008). This includes avoiding excavation or rock removal, road or campsite construction, and chemical applications within occupied or potential habitats.

Figure 35. Location of Larch Mountain salamander habitat looking [location removed]. The branch in road points to location where a Larch Mountain salamander was documented. This general area along ditch and associated cliff supports a high concentration of Larch Mountain salamanders. In 2009, a Van Dyke's salamander was also found in this area.

Crisafulli et al. (2008) recommended maintaining species persistence beyond site-scale management. Consideration of the types, conditions, and distributions of habitats at multiple-scales (e.g., habitat patch, watershed) could aid in long-term persistence of Larch Mountain salamanders in the landscape.

As with Van Dyke's salamander, future studies should focus on the distribution and abundance of Larch Mountain salamanders within the park, identification of suitable habitat, and general life history information.

Cascade Torrent Salamander

The Cascade torrent salamander *(Rhyacotriton cascadae)* is found on the west-slope of the Washington and Oregon Cascade Range (Leonard et al. 1993; Corkran and Thoms 1996; Jones et al. 2005; Lannoo 2005). The nearest detection of this species is on Skate Creek, just outside of the park's southern boundary (Jones, pers. Comm).

The Cascade torrent salamander is a stream-dwelling amphibian generally found along the edges of small, high-gradient, cold, rocky reaches and near seeps. Adults may be found along stream banks and during wet periods they may venture into upland areas. Although we searched for individuals beneath rocks along stream banks and in the splash zones, we did not detect any Cascade torrent salamanders. There are few studies devoted specifically to *R. cascadae*, relative to both biology and threats, and much information is inferred from the available literature on other torrent salamanders (Howell and Maggiulli 2011).

Abiotic factors, such as cobble and gravel substrates with low percentages of fine sediment and sand may be positively associated with salamander presence. One study found that Cascade torrent salamander occupancy and relative abundance at the landscape scale was greater in streams of consolidated geological composition, in streams with northerly aspects, as compared to southerly aspects, and increased with adjacent riparian forest age (Howell and Maggiulli 2011). Another study found that Cascade torrent salamander occupancy increased in streams with higher gradients (roughly ≥12° for *R. cascadae*) and *Rhyacotriton* spp. detection probability was negatively associated with water temperature (Kroll et al. 2008).

Additional searches for this species using light touch rapid assessment techniques and/or spotlight surveys should be conducted, especially along the southern portions of the park.

Other Species and Concerns

Red-legged Frog taxonomy has been revised. Crother (2008) recognized two subspecies, with one subspecies, *Rana aurora aurora* (northern red-legged frog), present in the Park. Crother (2008) now lists the northern red-legged frog (*Rana aurora*) as a single species and the California red-legged frog (*Rana draytonii*) as a separate species. Hallock and McAllister (2009c) have reported that current research using genetic analysis has documented the systematic revision of red-legged frogs (Shaffer et al. 2004) resulting in the designation of the subspecies into separate species, and that northern red-legged frogs are more closely related to Cascades frogs than to California red-legged frogs.

Northern red-legged frogs generally occur at lower elevations in forested habitats of MORA. Only 44 records exist for this species in the park from the 1980's to the present. Most northern red-legged frog observations for MORA are on the south side of the park. Additional searches in the northwest quadrant of the park should be made to verify their presence. In addition, observations made on the southeast side of the park should be verified. Northern red-legged frogs overlap with Cascades frogs at about 914 m (3000 ft) in elevation. Care should be taken to correctly identify this species which appears similar to the Cascades frog.

Rough-skinned newt (*Taricha granulosa*) is present throughout the park in dry, mesic and wet forest lakes and ponds as well as some subalpine areas, but this species has not been detected in large numbers Tyler et al. 2003; Schlegel et al.1992). Rough-skinned newts were detected at 21 sites in this study (13 adults, two larvae and two embryos at elevations ranging from 932 m (3060 ft) and 1621 m (5318 ft)).

Several studies have documented the negative effects that introduced fish have on native amphibian species (Bahls 1992; Knapp 2000, 2005; Tyler et al. 1998a; Tyler et al. 1998b). Studies conducted in the park have shown that salamander populations (*Ambystoma sp*.) recover after fish removal (Hoffman et al 2004). Northwest salamander (*Ambystoma gracile*) and long-toed salamander (*Ambystoma macrodactylm*) inhabit lakes, ponds and wetlands throughout the park (Tyler et al. 2003). Northwest salamander appear to be most affected by the presence of introduced fish in park lakes but Long-toed salamanders and Cascades frog (*Rana cascadae*) inhabit the high elevation lakes and ponds throughout the park and are also affected by fish presence. To date, at least 30 park lakes have reproducing populations of fish. A plan to remove fish from these lakes, minimizing effects on non-target animals, should be developed and implemented to restore native amphibian populations.

This report has had confidential information regarding park-sensitive species locations removed.

Summary

In this survey we confirmed the presence of 14 amphibian species at Mount Rainier National Park, including one new species, Cope's giant salamander. We also documented additional locations for several federally listed Species of Concern. The Cascade torrent salamander remains unconfirmed. The updated amphibian list is presented in Table 9.

Table 9. Amphibian species list for Mount Rainier National Park, and their status. C = confirmed present before survey; *C = previously identified as "expected to occur" and confirmed present in this inventory; + = expected to occur but not confirmed in this inventory; ** = federal or state listed species of concern.

Genus and Species	Common Name	Code	Special	MORA
Terrestrial breeding species				
Caudata — salamanders				
Woodland Salamanders (Family Plethodontidae)				
Plethodon vehiculum	Western red-backed salamander	PLVE		*C*
Plethodon vandykei	Van Dyke's salamander	PLVA	**	*C*
Plethodon larselli	Larch Mountain salamander	PLLA	**	*C*
Ensatinas				
Ensatina eschscholtzii	Ensatina	ENES		*C*
Aquatic breeding species				
Anurans				
Tailed frogs (Family Ascaphidae)				
Ascaphus truei	Coastal tailed frog	ASTR	**	*C*
Brown frogs (Family Ranidae)				
Rana aurora	Northern red-legged frog	RAAU		*C*
Rana cascadae	Cascades frog	RACAS	**	*C*
Chorus frogs				
Pseudacris regilla	Pacific treefrog	PSRE		*C*
North American toads (Family Bufonidae)				
Anaxyrus boreas[6]	Western toad	BUBO	**	*C*

[6] Olson 2009 reports that molecular analyses have resulted in re-naming western toad from *Bufo boreas* to *Anaxyrus boreas* but this is being refuted and another proposal has been made that the new name be considered as a Subgenus classification. In this scheme western toad would be *Bufo Anaxyrus boreas*. Olson reports that this is a dynamic situation and more changes can be anticipated.

Table 9. Amphibian species list for Mount Rainier National Park, and their status (continued). C = confirmed present before survey; *C = previously identified as "expected to occur" and confirmed present in this inventory; + = expected to occur but not confirmed in this inventory; ** = federal or state listed species of concern.

Genus and Species	Common Name	Code	Special	MORA
Caudata — salamanders				
Pacific Giant salamanders (Family Dicamptodontidae)				
Dicamptodon tenebrosus	Coastal giant salamander	DITE		*C*
Dicamptodon copei	Cope's giant salamander	DICO	**	**C*
Mole salamanders (Family Ambytomatidae)				
Ambystoma gracile	Northwestern salamander	AMGR		*C*
Ambystoma macrodactylum	Long-toed salamander	AMMA		*C*
Torrent salamanders (Family Rhyacotritonidae)				
Rhyacotriton cascadae	Cascade torrent salamander	RHCA		+
Pacific newts (Family Salamandridae)				
Taricha granulosa	Rough-skinned newt	TAGR		*C*

Five new western toad breeding sites were documented in this survey, but we also confirmed no toad breeding at several historic sites. The Cope's giant salamander was added to the park's amphibian list as confirmed through genetic analysis of larvae which are difficult to differentiate from the coastal giant salamander. We recommend that additional tail clips be collected for DNA analysis to verify the presence and distribution of Cope's giant salamander in other park watersheds. We documented several new sites for the two plethodontid Species of Concern, Larch Mountain and VanDyke's salamanders. We did not detect the Cascades torrent salamander during this survey period, but recommend that searches of additional suitable habitat be conducted to confirm its absence from the park. Targeted inventories for reptiles were not conducted, but we observed six garter snakes in aquatic habitat in several park watersheds.

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This report has had confidential information regarding park-sensitive species locations removed.

Appendix A. Lentic, lotic, and terrestrial survey site locations.

Table A-1. Locations of lentic survey locations.

Date	Site ID	Wetland GIS Number	Hydrography GIS CODE	Elevation (ft)	UTM E NAD27	UTM N NAD27	Site Description
6/10/2002	B1	583	LW33	3640	607165	5193885	LITTORALS
6/6/2002	B2	1353		2180	610234	5178799	POND AT STEVENS CANYON ENTRANCE (ON ENTRANCE SIDE OF HIGHWAY)
6/6/2002	B3	1344	L027	2180	610409	5178906	WESTSIDE OF HWY 123, 200M NORTH OF STEVENS CANYON ENTRANCE.
6/26/2002	B4	1202	LN14	4445	595221	5180713	POND EAST OF FROG HEAVEN.
6/26/2002	B5	1253	LN13	4320	594147	5180178	POND SW OF FROG HEAVEN
6/26/2002	B6	1167		4468	594773	5181034	FROG HEAVEN
7/1/2002	B7	1306	LZ26	3920	603442	5179480	SMALL MARSH LAKE
7/1/2002	B8	1299	LZ25	3950	603539	5179587	LARGEST OF THE MARSH LAKES NEAR BOX CANYON.
7/2/2002	B9	1221	LZ21	4600	598157	5180254	LOUISE LAKE
7/2/2002	B10	1308	LZ27	4540	599433	5179348	BENCH LAKE
7/3/2002	B11	1620		2153	584902	5176326	SMALLER WETLAND ABOVE TAHOMA CREEK CONFLUENCE WITH NISQUALLY RIVER
7/3/2002	B12	1635		2173	585106	5176488	LARGE WETLAND B/W TAHOMA CREEK AND NISQUALLY RIVER CONFLUENCE
7/3/2002	B13	1614		2199	585357	5176680	WETLANDS B/W TAHOMA AND NISQUALLY
7/3/2002	B14	1614		2199	585548	5176651	WETLANDS BETWEEN NISQUALLY AND TAHOMA CREEK
7/10/2002	B15	383	LW17	3236	610796	5197956	WETLAND EAST OF WHITE RIVER
7/10/2002	B16			3236	610740	5197842	WETLAND # D WHITE RIVER
7/12/2002	B17	376	LW20	5760	607099	5197895	CLOVER LAKE
7/11/2002	B18	59	LH01	4900	602004	5205056	100 M NW OF LAKE ELEANOR
7/11/2002	B19	116		4900	602604	5204125	LAKE ELEANOR TRAIL- WETLANDS SE OF LAKE ELEANOR
7/11/2002	B20	72	LH02	5000	602370	5204789	LAKE ELEANOR

This report has had confidential information regarding park-sensitive species locations removed.

Date	Site ID	Wetland GIS Number	Hydrography GIS CODE	Elevation (ft)	UTM E NAD27	UTM N NAD27	Site Description
7/10/2002	B21	398	LW19	3400	610773	5197592	SOUTHERN MOST WETLAND OF 5 WETLANDS ON WEST SIDE OF WHITE RIVER
7/10/2002	B22	390	LW18	3400	610720	5197777	SECOND TO LAST SOUTHERN WETLAND OF 5 WHITE RIVER WETLANDS
7/10/2002	B23			3540	608475	5194913	UN-NAMED WHITE RIVER WETLAND
7/9/2002	B24	1307	LM03	4577	584764	5179487	ALLEN LAKE
7/16/2002	B25	708	LP04	5318	584837	5191364	SUNSET PARK
7/16/2002	B26	631	LM26	4692	584219	5192906	BIGGER OF TWO LAKES SE OF HIGE GOLDEN LAKE
7/16/2002	B27	632	LM23	4498	583449	5192840	LARGEST LAKE SW OF BIGGEST GOLDEN LAKE
7/16/2002	B28	644	LM24	4527	583143	5192707	GOLDEN LAKES
7/16/2002	B29			4483	583248	5192972	UN-MAPPED WETLAND 400M WEST OF C2
7/16/2002	B30	627	LM21	4463	583338	5193057	GOLDEN LAKES
7/16/2002	B31	624	LM20	4454	583411	5193062	GOLDEN LAKES
7/16/2002	B32	719	LP07	5317	584764	5191213	SITE B SUNSET PARK
7/16/2002	B33	713	LP05	5325	584602	5191315	SITE F SUNSET PARK
6/16/2002	B34	707		5351	584683	5191424	SITE E SUNSET PARK
7/16/2002	B35	715	LP06	5318	584719	5191296	SITE C SUNSET PARK
7/16/2002	B36			5400	585040	5191065	UNNAMED UNMAPPED WETLAND, SUNSET PARK
7/16/2002	B37	634	LM25	4679	584012	5192761	SMALLER OF 2 LAKES SE OF HUGE GOLDEN LAKE
7/17/2002	B38		LIM16	5319	585327	5191972	SUNSET PARK
7/17/2002	B39	694	LM54	5401	585229	5191991	SUNSET PARK
7/17/2002	B40	688	LM53	5286	585095	5191980	SUNSET PARK
7/17/2002	B41	676	LIM15	5103	585100	5192110	SUNSET PARK
7/17/2002	B42		LM50	5050	584961	5192214	SUNSET PARK
7/17/2002	B43	669	LM49	5069	584906	5192213	SUNSET PARK
7/17/2002	B44	649	LM30	4911	583932	5192549	SUNSET PARK, BEHIND PATROL CABIN
7/17/2002	B45	643	LM34	4931	584343	5192673	SITE A1, GOLDEN LAKES W.T.
7/17/2002	B46	639	LIM35	4973	584452	5192725	SITE D1, GOLDEN LAKES, W.T.

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Date	Site ID	Wetland GIS Number	Hydrography GIS CODE	Elevation (ft)	UTM E NAD27	UTM N NAD27	Site Description
7/17/2002	B47	664	LM46	5174	583903	5192325	SITE 01, GOLDEN LAKES
7/17/2002	B48	678	LP01	5123	583748	5192249	SITE M1 GOLDEN LAKES
7/17/2002	B49	653	LM31	4911	583993	5192542	SUNSET PARK
7/17/2002	B50	642	LIM14	5001	584496	5192717	SUNSET PARK
7/17/2002	B51	646	LM36	4997	584421	5192661	SUNSET PARK
7/17/2002	B52	657		4988	584216	5192485	SUNSET PARK
7/17/2002	B53	656	LM39	4998	584315	5192552	SUNSET PARK
7/17/2002	B54	654	LM38	4996	584364	5192559	SUNSET PARK
7/17/2002	B55	651	LM37	5010	584450	5192585	SUNSET PARK
7/17/2002	B56	659	LM42	5056	584604	5192240	SUNSET PARK
7/17/2002	B57	645	LM33	4908	584226	5192664	SITE Z GOLDEN LAKES
7/17/2002	B58	648	LM32	4908	584153	5192643	SITE X, GOLDEN LAKES
5/15/2002	B59	1332	N/A	3060	611503	5178885	POND OFF THREE LAKES TRAIL
7/22/2002	B60	437	LW37	6710	601674	5196773	FROZEN LAKE
7/22/2002	B61	442	LF10	6370	600572	5196771	BERKLEY PARK
7/22/2002	B62	499	LW38	3160	602303	5195992	SHADOW LAKE
7/24/2002	B64	845	LP09	5502	585694	5187286	AURORA LAKE
7/24/2002	B65	859	LP12	5886	586719	5187041	ST. ANDREWS LAKE
7/24/2002	B66	852	LP10	5220	585628	5187225	UNNAMED POND SW OF AURORA LAKE
7/23/2002	B63	686	LW40	4373	611242	5191803	GHOST LAKE
7/22/2002	B68	1172	LZ15	5160	597746	5180985	THE HIGH LAKES TRAIL
7/22/2002	B69	1157	LZ13	5270	597426	5181149	LOST LAKE
7/22/2002	B70	1182	LZ16	5090	597786	5180880	HIGH LAKES TRAIL
7/22/2002	B71	1188	LZ17	5070	597978	5180826	LAKES TRAIL
7/22/2002	B72	1170	LZ20	5070	597977	5180832	LAKES TRAIL
7/22/2002	B73	1201	LZ19	5050	597935	5180704	LAKES TRAIL
7/22/2002	B74	1251	LN21	4790	597453	5180131	REFLECTION LAKES (LOWER)
7/22/2002	B75	1238	LN22	4790	597267	5180259	REFLECTION LAKES AND ADJACENT WETLAND
7/22/2002	B76	589	LW31	5230	612569	5193705	DEADWOOD LAKES
7/22/2002	B77	597	LW32	5326	612802	5193435	DEADWOOD LAKES
7/22/2002	B78	570	LW30	5060	612033	5194039	DEADWOOD LAKES
7/23/2002	B79	380/384	LH22	5665	605125	5197929	PROSPECTOR BASIN
7/23/2002	B80	395	LH23	5750	604352	5197630	SUNRISE, PROSPECTOR BASIN

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Date	Site ID	Wetland GIS Number	Hydrography GIS CODE	Elevation (ft)	UTM E NAD27	UTM N NAD27	Site Description
7/23/2002	B81	392	LH27	5600	604510	5197707	PROSPECTOR DR
7/23/2002	B82	361	LH21	5520	604833	5198189	SUNRISE PROSPECTOR CR
7/23/2002	B83	351	LH20	5520	604941	5198355	PROSPECTOR CREEK
7/23/2002	B84	487	LW27	5480	613392	5195871	LOWER CRYSTAL LAKE
7/23/2002	B85	508	LW08	5520	613308	5196078	MIDDLE CRYSTAL LAKE
7/23/2002	B86	N/A	LIW08	5880	613444	5195114	LAKE SOUTH OF UPPER CRYSTAL LAKE
7/23/2002	B87	517	LW29	5828	613719	5195476	UPPER CRYSTAL LAKE
7/23/2002	B88	396	LIH12	6041	605084	5197656	PROSPECTOR CR
7/24/2002	B89	234	LH11	5495	607123	5200974	NW OF LOWER PALISADES LAKE
7/24/2002	B90	240	LH12	5495	607330	5200880	LOWER PALISADE LAKE
7/24/2002	B91	230	LW05	5396	608812	5201115	BEAR PARK
7/24/2002	B92	250	LW06	5720	608301	5200637	BEAR PARK
7/24/2002	B93	401	LH27	6700	601524	5197569	BELOW MOUNT FREMONT
7/24/2002	B94	350	LH24	5360	602647	5198355	FOREST LAKE, SUNRISE
7/25/2002	B95	278	LW07	5200	607308	5199916	LAKE SOUTH OF UPPER PALISADE
7/25/2002	B96	257	LH14	5840	607248	5200402	UPPER PALISADES LAKE
7/25/2002	B97	233	LH10	5480	606388	5201118	UNNAMED LAKE NORTH OF PALISADES
7/25/2002	B98	218	LH09	5694	606226	5201328	UNNAMED LAKE NORTH OF PALISADES
7/25/2002	B99	637		5219	612057	5192745	NW OF TIPSOO LAKE
7/25/2002	B100	635		5336	612270	5192805	NW OF TIPSOO LAKE
7/25/2002	B101		LIO01	5070	611216	5190504	ABOVE CAYUSE PASS
7/25/2002	B102	741	LIO02	5020	611410	5190466	ABOVE CAYUSE PASS
7/25/2002	B103	732		4680	611745	5190961	BELOW 410/123 JCT.
7/25/2002	B104	725		4690	611415	5191100	CAYUSE JCT. 410/123
7/24/2002	B105	726	LW43	5183	607820	5191120	OWYHIGH LAKES (SMALL ONE)
7/24/2002	B106	727		5190	608124	5191026	WETLAND/POND EAST OF OWYHIGH LAKES
7/23/2002	B107	1015	LP21	4732	583092	5183305	KENWORTHY LAKES, NORTH LAKE
7/23/2002	B108	1019	LP22	4732	582926	5183214	KENWORTHY LAKE (BIG)

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Date	Site ID	Wetland GIS Number	Hydrography GIS CODE	Elevation (ft)	UTM E NAD27	UTM N NAD27	Site Description
7/23/2002	B109	1019	LP22	4732	582816	5183115	SMALL POND WEST OF KENWORTHY LAKE
7/23/2002	B110	1051	LN01	4800	583224	5182516	SMALL POND ON GOBBLERS KNOB TRAIL
7/24/2002	B111	724	LW43	5183	607830	5191137	OWYHIGH LAKES (LARGE LAKE)
7/22/2002	B112	548	LIW10	4721	601821	5194554	PONE EAST OF EMMONS
8/20/2002	B113	147	LF03	4562	595775	5203213	LAKE MARGORIE
8/20/2002	B114	137	LF02	4566	595561	5203406	LAKE OLIVER
8/20/2002	B115	177	LF04	4351	596156	5202539	LAKE ETHEL
8/21/2002	B116	213	LC32	5732	594832	5201306	FARTHEST LAKE NORTH OF WINDY GAP
8/21/2002	B117	244	LC34	5775	594900	5200778	WINDY GAP
8/22/2002	B118	225	LC33	5705	594803	5201187	FIRST LAKE ON THE SPUR OFF OF THE MAIN TRAIL AT WINDY GAP
8/27/2002	B119	920	LZ04	6200	602938	5185305	COWLITZ PARK
8/28/2002	B120	863		4930	603638	5186743	INDIAN BAR MEADOW BEFORE THE CREEK CROSSING
5/19/2003	B121	583	LW33	3640	607163	5193888	LITTORALS
5/20/2003	B122	1299	LZ25	3946	603525	5179648	BIG MARSH LAKE
6/2/2003	B123	305		3950	603347	5179527	SMALL WETLAND N OF SMALL MARSH LAKE
6/2/2003	B124	1306	LZ26	3950	603347	5179517	SMALL MARSH LAKE
6/2/2003	B125	1299	LZ25	3946	603420	5179741	BIG MARSH LAKE
6/4/2003	B126	288		4060	585205	5199481	MEADOW E OF LARGE MTN. MEADOW
6/4/2003	B127	293		4040	584939	5199401	MTN MEADOW
6/5/2003	B128	283	LM03	4282	585395	5199750	LAKE ACROSS FROM MOUNTAIN MEADOWS
6/9/2003	B129	318		3920	584713	5199084	LITTLE WETLAND SOUTHEAST OF GIS NO 308
6/9/2003	B130	308		3867	584423	5199154	BIG MOUNTAIN MEADOW
6/19/2003	B131	1368	N03-02A	2370	585708	5178375	SMALL WETLAND ACROSS TAHOMA CREEK
6/19/2003	B132	1632		2154	585060	5176444	BEAVER POND
6/24/2003	B133	573	LW30	5085	612090	5194053	WETLAND BELOW DEADWOOD LAKES

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Date	Site ID	Wetland GIS Number	Hydrography GIS CODE	Elevation (ft)	UTM E NAD27	UTM N NAD27	Site Description
6/24/2003	B134	589	LW31	5250	612555	5193620	LOWER DEADWOOD LAKE
6/24/2003	B135	597	LW32	5250	612756	5193419	UPPER DEADWOOD LAKE
7/1/2003	B136	635		5350	612266	5192810	WETLANDS NORTHWEST OF TIPSOO LAKE
7/1/2003	B137	637		5200	612060	5192749	WETLANDS NORTHWEST OF TIPSOO LAKE
7/7/2003	B138	1308	LZ27	4540	599491	5179419	BENCH LAKE
7/7/2003	B139	716	LO03	5346	613152	5191280	UPPER TIPSOO LAKE
7/7/2003	B140	705	LO01	5293	612974	5191544	SMALLE LAKE AT OUTLET TO TIPSOO NEAR PARKING LOT
7/7/2003	B141	703	LO02	5301	613022	5191543	TIPSOO, BIG LAKE
7/16/2003	B142	465		6000	594151	5196449	0.8 MILES WEST OF MYSTIC LAKE
7/16/2003	B143			6120	594052	5196300	100 METERS SOUTH OF GIS NO 465
7/16/2003	B144	477	LC43	6122	593951	5196305	200 M SOUTHWEST OF GIS NO 465
7/16/2003	B145	478		5828	594411	5196225	WETLAND WEST OF MYSTIC LAKE
7/16/2003	B146	491		5728	594756	5196032	WETLAND WEST OF MYSTIC LAKE
7/16/2003	B147	489	LF12	5710	594998	5196039	MYSTIC LAKE
7/16/2003	B148	1097	LN16	5337	595959	5182100	NISQUALLY VISTA TRAIL, INVESTIGATION OF 4 DEAD RACA ADULTS
7/28/2003	B149	246	LM01	5363	585626	5200544	EUNICE LAKE
7/30/2003	B150		O14-04A	4920	613318	5184650	SHRINER LAKE OUTLET
7/30/2003	B151	949	LO12	4889	613393	5184807	SHRINER LAKE
7/31/2003	B152	1057	LN02	4290	583809	5182488	LAKE GEORGE
8/5/2003	B153	1273	LO19	4676	616612	5179796	THREE LAKES, LAKE WEST OF CABIN
8/5/2003	B154	1285	LO20	4675	616695	5179796	THREE LAKES, LAKE EAST OF PATROL CABIN
8/5/2003	B155	1243	LO16	4646	617133	5180316	SMALL POND 700 M NORTHEAST OF THREE LAKES CABIN
8/6/2003	B156	1258		5230	614675	5180143	WEST OF LO18
8/6/2003	B157	1254		5230	614680	5180161	WEST OF LO18
8/6/2003	B158			5500	615081	5180158	NORTHWEST OF THREE LAKES, WEST OF LO18
8/6/2003	B159		LO22	5000	615773	5180115	POND DUE SOUTH OF LO18

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Date	Site ID	Wetland GIS Number	Hydrography GIS CODE	Elevation (ft)	UTM E NAD27	UTM N NAD27	Site Description
8/6/2003	B160		LO18	5000	615798	5180102	SMALL LAKE 1200 M WEST-NORTHWEST OF THREE LAKES CABIN
8/11/2003	B161	548	LIW10	4760	601985	5194580	EMMONS POND
8/18/2003	B162	156	LC07	3185	586942	5203153	GREEN LAKE
8/19/2003	B163	376	LW20	5732	607154	5197934	CLOVER LAKE
8/26/2003	B164	312	LM04	4929	586668	5198343	MOWICH LAKE
8/28/2003	B165	1221	LZ21	4596	598153	5180259	LAKE LOUISE
9/3/2003	B166	1342	LZ29	4678	599449	5178798	SNOW LAKE
9/3/2003	B167	1242	LN19	4830	597092	5180064	REFLECTION LAKE
8/04/2003	B168	NA	NA	4680	612122	5191188	MEADOW BETWEEN SR123 AND FIRST HWY 410 SWITCHBACK; E OF CAYUSE PASS

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Table A-2. Location of lotic and riparian survey sites.

Date	Site Name /ID	Stream Code	Wetland GIS Number	Elevation (ft)	UTM E NAD 27	UTM N NAD27	Site Description
5/10/2001	IPSUT FALLS	C08-00A	2332	2600	588941	5202741	IPSUT FALLS
5/10/2001	CARBON RIVER	SEEP#6	SEEP#6	2520	589260	5202530	CARBON RIVER
6/18/2001	FALLS CREEK FALLS	O09-00A	5538A	2240	610045	5179278	FALLS CREEK FALLS
6/27/2001	CARBON GLACIER SEEP #1	CARBON	GLACIER	3660 - 3710	592224	5199548	CARBON GLACIER SEEP #1
6/27/2001	CARBON RIVER SEEP #1	CARBON	RIVER	3130	591397	5200459	CARBON RIVER SEEP #1
7/3/2001	CATARACT CAMPGROUND	CATARACT	CATARACT	3020	591490	5200812	CATARACT CAMPGROUND
7/16/2001	OHANA FALLS	O00-00S	4645	2440	609547	5184184	OHANA FALLS
7/16/2001	SITE C	O15-00A	4751	2400	609884	5182999	SITE C
7/16/2001	SEEP B	SEEP B	SEEP B	2360	610025	5182380	SEEP B
7/16/2001	EAST SIDE TRAIL #1	ES # 1	ES #1	2680	610374	5185915	EAST SIDE TRAIL #1
7/16/2001	EAST SIDE TRAIL #2	O16-02A	4437	2770	609923	5185372	EAST SIDE TRAIL #2
7/16/2001	SEEP A	SEEP A	SEEP A	2300	610302	5181897	SEEP A
7/12/2001	MT. WOW # 1	WOW #1	WOW #1	3130	584752	5181687	MT. WOW # 1
7/12/2001	MT WOW WATERFALLS #2	WOW #2	WOW #2	3150	584721	5181799	MT WOW WATERFALLS #2
7/13/2001	UNNAMED FALLS E OF NAHUNTA	FALLS	@ CLIFF FACE	4220	594327	5181685	UNNAMED FALLS E OF NAHUNTA
7/13/2001	DENMAN FALLS	P03-00B	2	3530	583321	5187279	DENMAN FALLS
7/24/2001	CRESCENT CREEK	C11-01A	2245	4800	593234	5201009	CRESCENT CREEK
7/24/2001	FALLS #104	C11-01A	2545	3421	592268	5200862	FALLS #104
7/24/2001	FALLS #103	C12-00A	2621	3250	592218	5200840	FALLS #103
7/25/2001	SPRAY FALLS	M05-04C	3113	4850	588220	5196240	SPRAY FALLS
7/24/2001	N. LOOP TRAIL SEEP	NLTS72401	NLTS72401	2900	591860	5201555	N. LOOP TRAIL SEEP
7/24/2001	FALLS 3250'	F3250		3250	592211	5201196	FALLS 3250'
7/25/2001	W. SPRAY FALLS SEEP	WSFS72501		4800	588116	5196347	W. SPRAY FALLS SEEP
7/24/2001	CRESCENT CREEK SEEP EAST	CCSE72401	CCSE72401	4800	593349	5201106	CRESCENT CREEK SEEP EAST
7/26/2001	EUNICE OUTLET STREAM	M02-00D		5100	585520	5200301	EUNICE OUTLET STREAM
7/26/2001	MOWICH LAKE	M05-01C		5020	587069	5198531	MOWICH LAKE
7/18/2001	DEAD HORSE FALLS	N17-00A	4953	4020	594959	5181897	DEAD HORSE FALLS

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Date	Site Name /ID	Stream Code	Wetland GIS Number	Elevation (ft)	UTM E NAD 27	UTM N NAD27	Site Description
7/18/2001	WATERFALL #28 (NARADA FALLS)	N13-00C	5281	4300	595770	5180740	WATERFALL #28 (NARADA FALLS)
7/19/2001	UNICORN CREEK 1	Z08-04D	5624	4720	599298	5178580	UNICORN CREEK 1
7/18/2001	NAHUNTA FALLS	N15-00A	5030	4380	594118	5181745	NAHUNTA FALLS
7/19/2001	CRYSTAL CREEK	W10-00B	3213	5500	613168	5196648	CRYSTAL CREEK
7/19/2001	SNOW LAKE CIRQUE SEEP A	SLCSA7190 1	E	5250	598914	5178301	SNOW LAKE CIRQUE SEEP A
7/19/2001	SNOW LAKE CIRQUE B	SLCSB7190 1	C	5300	598891	5178375	SNOW LAKE CIRQUE B
7/19/2001	SNOW LAKE CIRQUE SEEP C	SLCSC7190 1	B	5330	598806	5178444	SNOW LAKE CIRQUE SEEP C
7/19/2001	SNOW LAKE CIRQUE SEEP D	SLCSD7190 1	A	5320	598808	5178471	SNOW LAKE CIRQUE SEEP D
7/19/2001	SNOW LAKE CIRQUE SEEP F	SLCSF7190 1	D	5220	598919	5178562	SNOW LAKE CIRQUE SEEP F
7/19/2001	SNOW LAKE CIRQUE WATERFALL AND SEEP G	SLCWSG71 901	F	5270	598899	5178609	SNOW LAKE CIRQUE WATERFALL AND SEEP G
7/31/2001	FALLS #31	Z08-00F	5120	5810	598712	5183248	FALLS #31
7/31/2001	FAIRY FALLS (FALLS #32)	Z08-12A	4793	5440	599307	5182854	FAIRY FALLS (FALLS #32)
7/31/2001	GOLDEN GATE FALLS	N13-00G	4764	6300	597330	5183523	GOLDEN GATE FALLS
8/2/2001	MAPLE FALLS	Z08-01A	5576	3000	602226	5178791	MAPLE FALLS
8/7/2001	GARDA FALLS (FALLS #115)	F12-01A	3045	5000	596932	5196942	GARDA FALLS (FALLS #115)
8/15/2001	VAN HORN FALLS 3380	F06-00B	2270B	3380	597256	5202826	VAN HORN FALLS 3380
8/15/2001	VAN HORN LOWER FALLS	F06-00B	2270C	3200	597390	5202840	VAN HORN LOWER FALLS
8/15/2001	VAN HORN FALLS 3300	F06-00B	2270D	3300	597271	5202887	VAN HORN FALLS 3300
8/15/2001	VAN HORN FALLS 3620'	F06-00B	2270A	3620	596964	5202993	VAN HORN FALLS 3620'
8/10/2001	SNOW LAKE OUTLET FALLS	Z08-04A	5492	4600	599526	5179149	SNOW LAKE OUTLET FALLS
8/10/2001	FALLS WEST OF BENCH LAKE MEADOWS	Z08-05A	5505	4766	598958	5179257	FALLS WEST OF BENCH LAKE MEADOWS
8/9/2001	SEEP FALLS ON NW CORNER OF DENMAN PEAK	A	A	5800 (GPS)	596196	5178661	SEEP FALLS ON NW CORNER OF DENMAN PEAK
8/9/2001	PINNACLE PEAK TRAIL FALLS	B	B	5370 (GPS)	596798	5179357	PINNACLE PEAK TRAIL FALLS

Date	Site Name /ID	Stream Code	Wetland GIS Number	Elevation (ft)	UTM E NAD 27	UTM N NAD27	Site Description
8/10/2001	SNOW LAKE CIRQUE SEEPS H	H	H	5880	599060	5178694	SNOW LAKE CIRQUE SEEPS H
6/27/2000	MT. WOW TO TAHOMA CREEK	MT. WOW	MT. WOW	2520	585761	5179058	MT. WOW TO TAHOMA CREEK
6/28/2000	FALLS CREEK	FALLS	CREEK	2660	609671	5179791	FALLS CREEK
7/2/2002	V1	Z06-00D	5948	2800	605905	5177174	
7/29/2002	V2	N14-01A	4783	5440	593320	5183399	VAN TRUMP CREEK-FALLS ABOVE UPPER RIVER CROSSING
7/29/2002	V3	N14-01A	4783	5200	593217	5182965	VAN TRUMP CREEK-COMET FALLS
08/1/2002	N27	m05-01b	3036	5073	586611	5198148	MOWICH LAKE OUTLET
8/12/2002	V4	C03-00A	2291	1880	582546	5204930	JUNE CREEK
8/13/2002	V5	C06-00A	2230	2680	587228	5203889	RANGER CREEK-BELOW FALLS
8/13/2002	V6	NA	NA	2000	582525	5204774	SMALL STREAM ON SW SIDE OF CARBON RIVER NATURE TRAIL
8/14/2002	V7	C13-00A	2650	3600	590885	5199674	CATARACT CREEK
8/14/2002	V8	C07-00A	2005	2120	588093	5204741	CHENUIS FALLS-FROM CONFLUENCE OF CARBON TO BASE OF FALLS
8/15/2002	V9	C08-006	2332	2600	588809	5202216	IPSUT CREEK
8/20/2002	V10	F06-02B	2275	4300	596263	5202958	FALLS ON THE OUTLET OF MARJORIE LK.
8/21/2002	V11	C11-00C	2475	5770	594827	5200838	OUTLET OF WINDY GAP LAKE
8/21/2002	V12	F06-00D	2535	4620	596520	5201249	VAN HORN CREEK-LAKE JAMES INLET
8/21/2002	V13	NA	NA	5300	595685	5200483	SLUISKIN #1-FALLS OFF SLUISKIN MT.
8/21/2002	V14	NA	NA	6100	595555	5200324	SLUISKIN #2-FALLS OFF SLUISKIN MT. NEAR WINDY GAP
8/21/2002	V15	NA	NA	5780	595480	5200277	SLUISKIN #3
8/21/2002	V16	NA	NA	5780	595441	5200270	SLUISKIN #4
8/22/2002	V17	F06-00A	2248	3200	597443	5202833	VAN HORN FALLS-BELOW FALLS
8/5/2002	V18	O16-00H	4009	3680	611977	5189685	CHINOOK CREEK-TOP FALLS FROM PASS
8/22/2002	V19	F05-00A	2219	3040	598238	5203603	STREAM ON E. SIDE OF WEST FORK
8/27/2002	V20	Z09-00H	4519	5530	604496	5185501	FALLS #53 ON NICKEL CREEK

This report has had confidential information regarding park-sensitive species locations removed.

Date	Site Name /ID	Stream Code	Wetland GIS Number	Elevation (ft)	UTM E NAD 27	UTM N NAD27	Site Description
8/27/2002	V21	Z09-08A	4507	5800	603912	5185286	UNNAMED FALLS SW OF FALLS #52 COWLITZ PARK
8/27/2002	V22			6000	603073	5185359	COWLITZ PARK UNMAPPED STREAM WEST OF Z13-00D
8/27/2002	V23	Z13-02A	4481	5880	603254	5185326	TRIXIE FALLS - COWLITZ PARK
8/27/2002	V24	Z09-07B	4502	5850	603969	5185418	UNNAMED STREAM IN COWLITZ PARK
8/28/2002	V25	O24-00C	4201	4800	604344	5187611	BOULDER CREEK
8/28/2002	V26	O24-02A		4700	604736	5187820	STEEP DRAINAGES IN THE CLIFF COMING OFF INTO THE OHANAPECOSH PARK
8/28/2002	V27	O24-01A	4202	4450	605052	5187578	THIRD CREEK OF OHANA DRAINAGES
8/27/2002	V28	Z13-01A	4607	5960	603574	5185221	WATERFALL E OF TRIXIE FALLS - COWLITZ PARK
8/27/2002	V29	Z04-00A	4594	6040	602824	5185183	FALLS ACROSS VALLEY FROM TRIXIE FALLS
9/9/2002	V56	O09-00A	5538	2240	610054	5179316	FALLS CREEK BELOW HWY123
9/9/2002	V54	Z09-04A	5032	3500	605025	5181221	TRIB. WEST OF NICKEL CREEK DOWN FROM ST. JOHN'S FALLS
9/9/2002	V55	Z09-00E	5039	3600	605114	5181552	NICKEL CREEK BELOW ST. JOHN'S FALLS
9/10/2002	V30	M05-01C	NA	4950	587259	5198853	MOWICH INLET:STEEP SMALL CREEK BELOW FALLS
9/10/2002	V31	M02-***	3020	3740	583169	5197580	MEADOW CREEK ABOVE PAUL PEAK TRAIL BRIDGE
9/11/2002	V32	M05-08A	3019	5440	588415	5196757	GRANT CREEK 100M BELOW FALLS AT WONDERLAND TRAIL
9/11/2002	V33	M05-01B	3036	4640	586492	5197906	CRATER CREEK 100M BELOW FALLS AT WONDERLAND TRAIL
9/11/2002	V34	M05-02A	2980	4640	586898	5197179	LEE CREEK: 20M BELOW FALLS TO CONFLUENCE WITH M05-03A

This report has had confidential information regarding park-sensitive species locations removed.

Date	Site Name /ID	Stream Code	Wetland GIS Number	Elevation (ft)	UTM E NAD 27	UTM N NAD27	Site Description
9/11/2002	V35	M05-04C	3166	4960	588136	5196224	SEEP JUST BELOW SPRAY FALLS AND STREAM SECTION DOWNSTREAM OF TRAIL
9/12/2002	V36	O07-00A	5684	2500	610281	5178015	LAUGHINGWATER CREEK UPSTREAM OF TRAIL BRIDGE TO HWY 123 BRIDGE
9/12/2002	V37	O06-00A	4904	2080	610195	5177414	FROM HWY 123 UP 50M
9/12/2002	V38	O16-14A	4217	3200	611500	5187664	DEER CREEK
9/12/2002	V39	O02-01A	6239	2040	609484	5175625	STREAM NEAR S. BOUNDARY, OHANAPECOSH
9/17/2002	V40	O16-06A	4126	3280	610666	5188310	UPSTREAM FORM TRAIL CROSSING
9/17/2002	V41	O11-00A	5144	2320	610422	5180919	ABOVE E-SIDE TRAIL BRIDGE
9/18/2002	V42	N03-05A	5203	2800	584829	5181534	FROM W SIDE ROAD UP TO SMALL TRIB
9/19/2002	V43	Z06-01A	5980	2800	606122	5176842	STREAM EAST OF NICKLE CREEK
9/19/2002	V44	Z09-00A	5385	2940	604838	5179281	NICKLE CREEK
9/19/2002	V45	N12-00A	5685	2840	591566	5178190	SMALL TRIB. OFF EAGLE PEAK
9/19/2002	V46	N11-00A	5764	2880	591393	5177835	EAGLE PEAK CREEK
9/19/2002	V46	N11-00A	5764	2880	591393	5177835	EAGLE PEAK CREEK
9/23/2002	V47	W13-00A	3525	3420	610711	5195320	KLICKITAT CREEK
9/23/2002	V48	W17-03A	3738	4100	604990	5191557	TRIB. TO FRYINGPAN CREEK
9/23/2002	V49	W10-00A	3160	3520	611749	5197403	CRYSTAL CREEK
9/25/2002	V50	Z01-00B	6025	3200	597188	5176473	BUTTER CREEK
9/25/2002	V51	Z01-02A	6021	3800	597099	5176643	BUTTER CREEK TRIB.
9/5/2002	V52	N13-06B	4861	4880	597039	5182476	EDITH CREEK
9/6/2002	V53	N03-09A	5114	2800	586114	5180702	STREAM OFF MT. ARARAT
8/2/2005	TENAS CREEK	N02-00B	NA	2320	583044	5177634	TENAS CREEK
8/10/2005	TAHOMA TRIBUTARY	N03-09A	NA	2870	586017	5180765	TAHOMA TRIBUTARY
8/29/2005	LP 19 LAKE OUTLET	P03-01B	NA	4380	584371	5185960	LP 19 LAKE OUTLET
9/1/2005	EAGLE PEAK CREEK	N11-00A	NA	3080	591659	5177791	EAGLE PEAK CREEK
9/8/2005	NORTH PUYALLUP TRIBUTARY	P02-03A	NA	3200	585269	5188676	NORTH PUYALLUP TRIBUTARY

This report has had confidential information regarding park-sensitive species locations removed.

Table A-3. Terrestrial survey site locations.

Date	Site ID	Watershed	UTM E NAD27	UTM N NAD27	Elevation (ft)
5/30/2001	EAGLE PEAK #1	NISQUALLY	592660	5179796	3480
5/30/2001	RICKSECKER #1	NISQUALLY	593014	5179990	3400
5/31/2001	RICKSECKER #2	NISQUALLY	593247	5179966	3400
5/31/2001	RICKSECKER #3	NISQUALLY	592765	5180399	3420
5/31/2001	RICKSECKER #4	NISQUALLY	592764	5180245	3460
5/22/2001	COUGAR ROCK CAMP CLIFF	NISQUALLY	591413	5179526	3160
6/4/2001	MAPLE CREEK #3	COWLITZ	602068	5179526	2900
6/4/2001	MAPLE CREEK #1	COWLITZ	602282	5179176	2860
6/4/2001	MAPLE CREEK #2	COWLITZ	602293	5179143	2840
6/5/2001	MAPLE CREEK #4	COWLITZ	601737	5179275	3000
6/5/2001	MAPLE CREEK #5	COWLITZ	601357	5179477	3000
6/14/2001	ST. ANDREWS #1	PUYALLUP	583239	5187441	3800
6/14/2001	ST. ANDREWS #2	PUYALLUP	583325	5187042	3640
6/14/2001	ST. ANDREWS #3	PUYALLUP	583119	5186210	3540
6/15/2001	SOUTH PUYALLUP #1	PUYALLUP	584958	5184460	3814
6/14/2001	SOUTH PUYALLUP #2	PUYALLUP	584631	5184321	3460
6/20/2001	CARBON RIVER #1	CARBON	590251	5201704	2800
6/21/2001	FISH CREEK #1	NISQUALLY	584965	5181505	2970
6/21/2001	ROUND PASS	NISQUALLY	584930	5183019	3500
6/28/2001	FISH CREEK #2	NISQUALLY	584832	5181955	3100
7/10/2001	FISH CREEK #3	NISQUALLY	585093	5181209	2900
7/3/2001	CARBON RIVER #2	CARBON	590581	5201577	2640
5/15/2002	LM1	OHANAPECOSH	611121	5178380	2825
5/19/2002	S4E19	PUYALLUP	608734	5177137	2340
5/29/2002	LM2	OHANAPECOSH	610697	5178091	2400
5/29/2002	LM3	OHANAPECOSH	609897	5176667	2000
5/30/2002	LM4	CARBON	588582	5203149	2400
6/4/2002	LM5	WHITE	612323	5201522	2910
6/5/2002	LM6	WHITE	611853	5202699	3010
6/5/2002	LM7	WHITE	612011	5202563	3250
6/5/2002	LM8	WHITE	612118	5202352	3400
6/5/2002	LM9	WHITE	612237	5202223	3550
6/6/2002	LM10	OHANAPECOSH	611024	5180881	2500
6/10/2002	LM11	WHITE	605513	5192592	4100
6/12/2002	LM12	CARBON	592025	5201737	3400
6/12/2002	LM13	OHANAPECOSH	610325	5183878	2450
6/3/2002	LM14	OHANAPECOSH	610366	5184329	2450
6/3/2002	LM15	OHANAPECOSH	610208	5185194	2450
6/3/2002	LM16	OHANAPECOSH	610556	5185741	2410
6/3/2002	LM17	OHANAPECOSH	610604	5186052	2450
4/29/2003	LM18	NISQUALLY	585961	5176724	2550
4/29/2003	LM19	NISQUALLY	585766	5176841	2580

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Date	Site ID	Watershed	UTM E NAD27	UTM N NAD27	Elevation (ft)
5/1/2003	LM21	NISQUALLY	590511	5178398	3400
5/1/2003	LM22	NISQUALLY	590630	5178641	2890
5/6/2003	LM23	OHANAPECOSH	610777	5180493	2400
5/8/2003	LM24	CARBON	588429	5204658	2600
5/22/2003	LM26	CARBON	586986	5202891	3200
5/29/2003	LM27	OHANAPECOSH	610812	5186775	2900

This report has had confidential information regarding park-sensitive species locations removed.

Appendix B. Summary of lentic, lotic, and terrestrial survey results.

Table B-1 Summary of amphibian species by lentic survey sites at Mount Rainier National Park.
Coordinates for survey sites are presented in Appendix A, Table 1. AMGR=northwestern salamander, AMMA=long-toed salamander, BUBO=western toad, PSRE=Pacific treefrog, RACAS=Cascades frog, RAAU=northern red-legged frog, TAGR=Rough-skinned newt.

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Table B- 2. Summary of amphibian species by lotic and riparian survey sites at Mount Rainier National Park. Coordinates for survey sites are presented in Appendix A, Table 2. AMGR=northwestern salamander, ASTR=coastal tailed frog, DITE=*Dicamptodon tenebrosus*, DICO=*Dicamptodon copei*, ENES=Ensatina, PLVA=Van Dyke's salamander, PLVE=Western red-backed Salamander.

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Table B- 3. Summary of amphibian species by terrestrial survey sites at Mount Rainier National Park. Coordinates for survey sites are presented in Appendix A, Table 3. ASTR=coastal tailed frog, DITE=Dicamptodon tenebrosus, ENES=Ensatina, PLLA=Larch Mountain salamander, PLVE=western red-backed salamander, TAGR= rough-skinned newt.

[Table has been removed to protect sensitive information]

This report has had confidential information regarding park-sensitive species locations removed.

Appendix C. Spatial distribution of amphibian species documented during surveys.

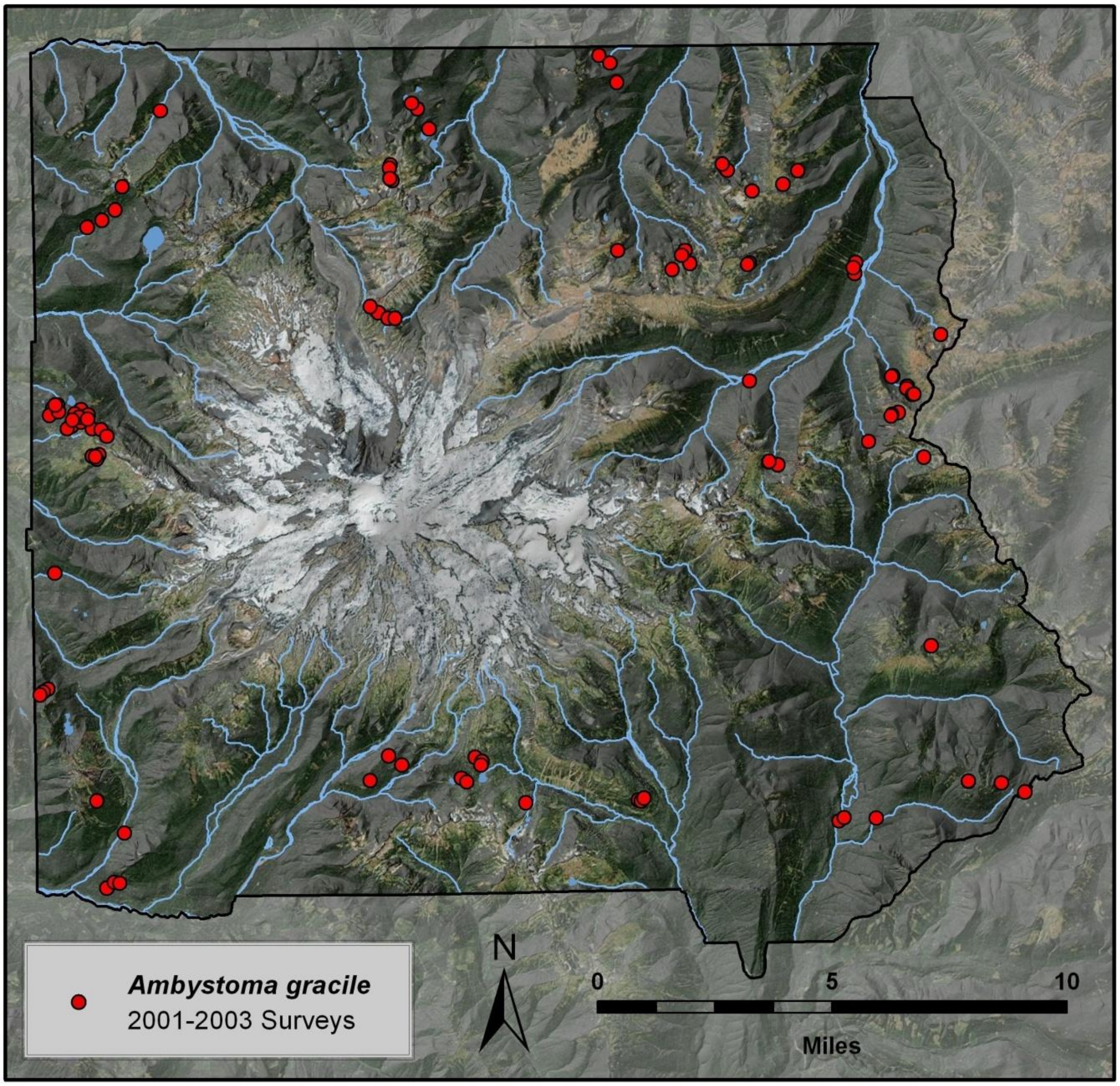

Figure C-1. Spatial distribution of northwestern salamanders (*Ambystoma gracile*) at Mount Rainier National Park.

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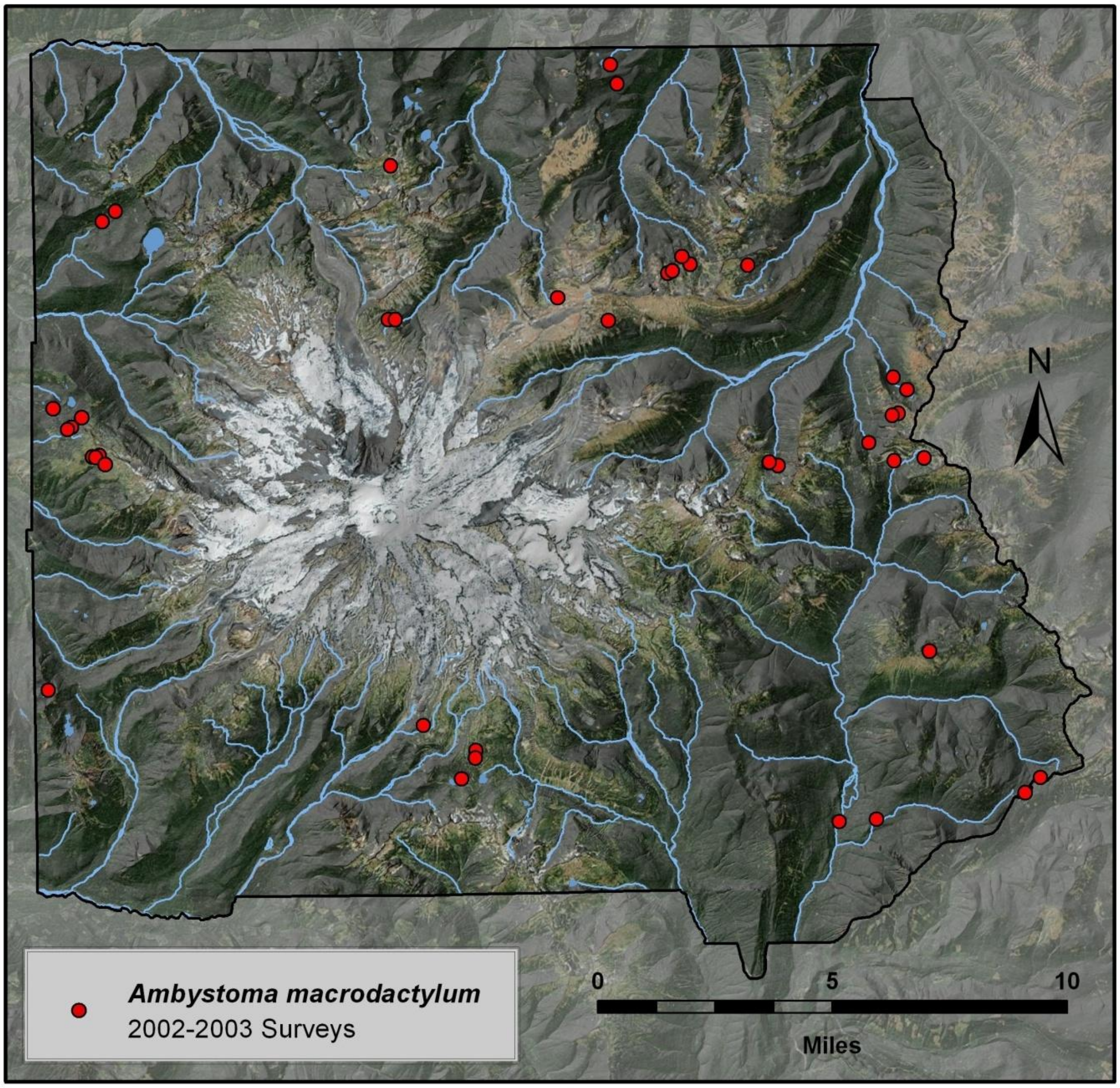

Figure C-2. Spatial distribution of long-toed salamanders (*Ambystoma macrodactylum*) at Mount Rainier National Park.

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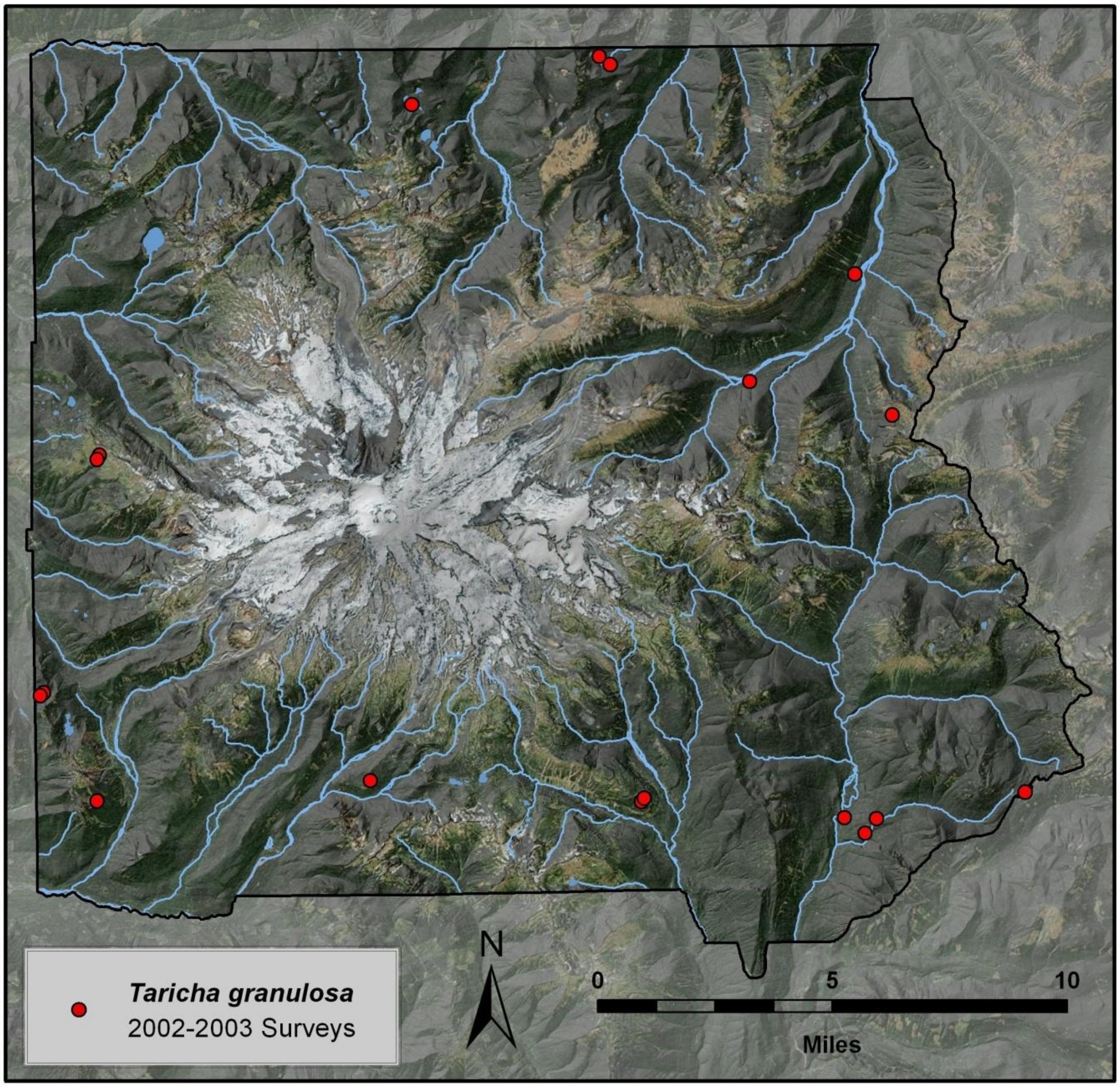

Figure C-3. Spatial distribution of rough-skinned newts (*Taricha granulosa*) at Mount Rainier National Park.

This report has had confidential information regarding park-sensitive species locations removed.

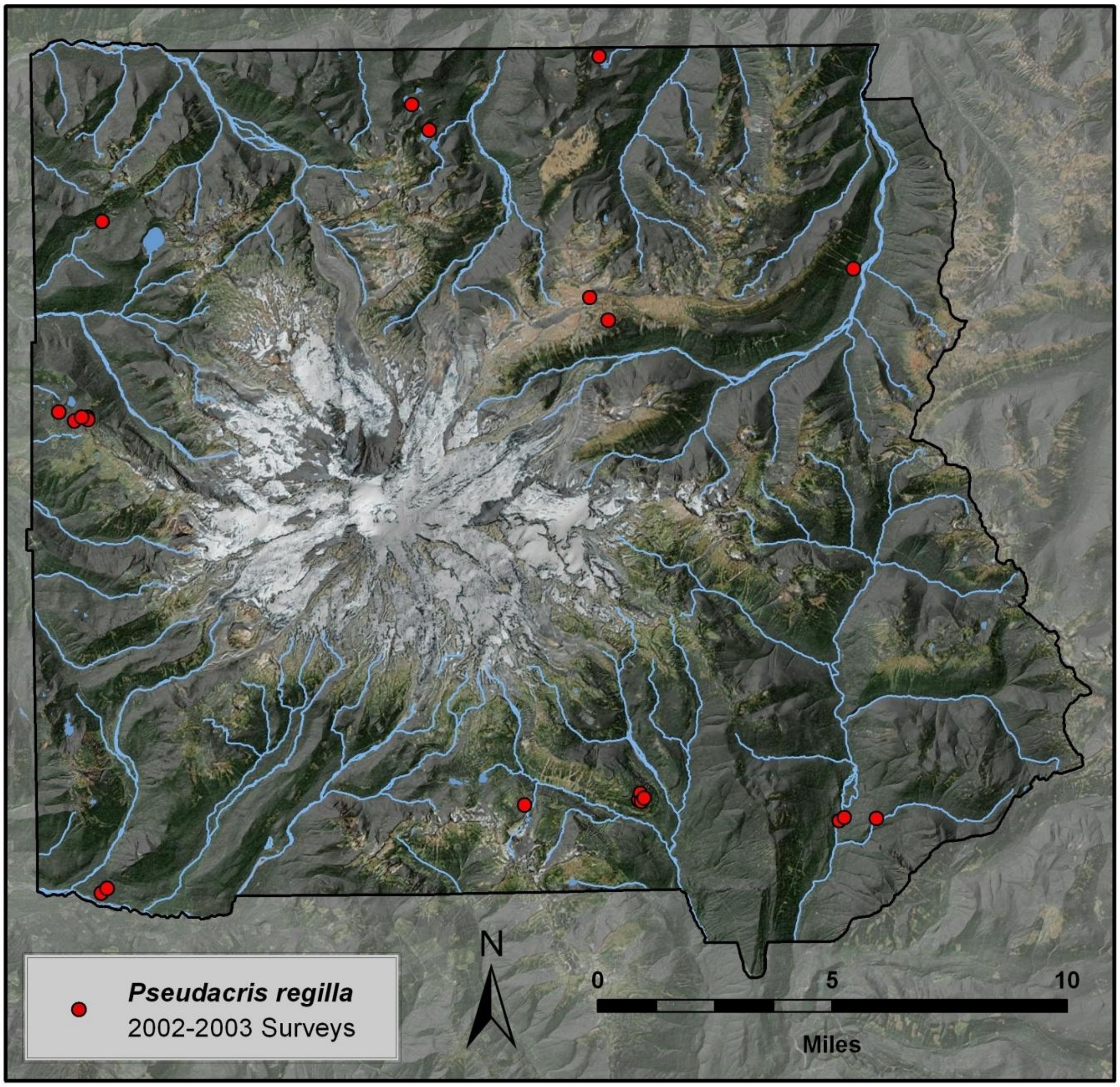

Figure C-4. Spatial distribution of Pacific treefrogs (*Pseudacris regilla*) at Mount Rainier National Park.

This report has had confidential information regarding park-sensitive species locations removed.

Figure C-5. Spatial distribution of Cascades frogs (*Rana cascadae*) at Mount Rainier National Park. [map removed].

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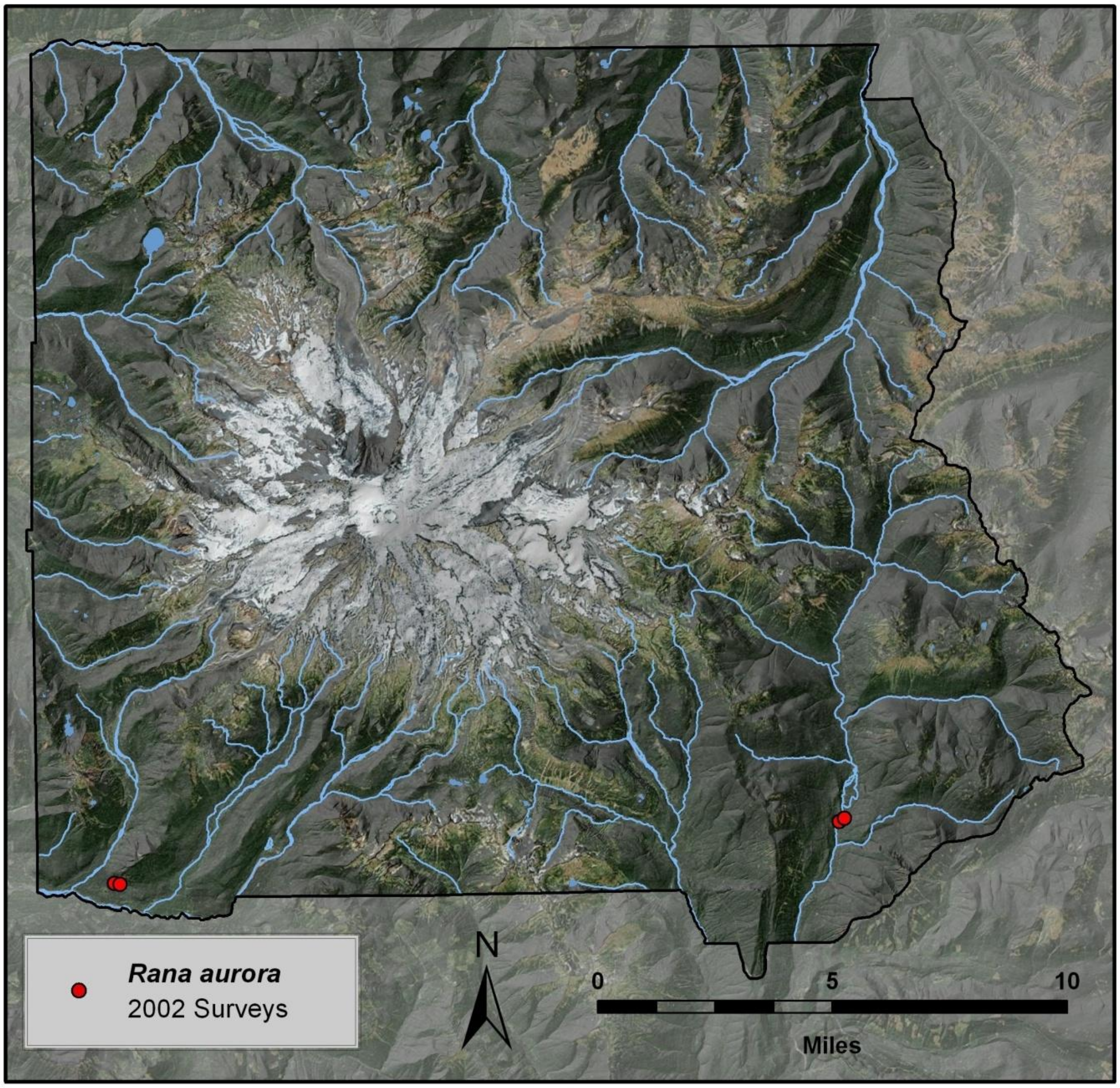

Figure C-6. Spatial distribution of northern red-legged frogs (*Rana aurora*) at Mount Rainier National Park.

This report has had confidential information regarding park-sensitive species locations removed.

Figure C-7. Spatial distribution of coastal tailed frogs (*Ascaphus truei*) at Mount Rainier National Park. [map removed].

This report has had confidential information regarding park-sensitive species locations removed.

Appendix D. Documented environmental and habitat conditions for Van Dyke's and Larch Mountain salamanders.

Table D-1. Documented environmental and habitat conditions for Van Dyke's salamanders. [* location removed].

Date	Site Name *	Watershed	Elevation (ft)	Habitat	Cover Object	Moisture	Air Temp (°C)	Soil Temp (°C)	Total Length (mm)	SVL (mm)
5/10/2001		Carbon	2520	Seep	Rock	Wet	11	6	92	46
9/11/2002		Mowich	4960	Seep	Rock	Wet	10	7	105	60
9/11/2002		Mowich	4960	Seep	Rock	Wet	10	7	65	38
9/11/2002		Mowich	4960	Stream	Rock	Wet	10	7	96	54
7/13/2001			3530	Waterfall	Rock	Wet	10	8	120	61
7/13/2001			3530	Waterfall	Rock	Wet	10	8	59	36
7/24/2001		Carbon	3250	Waterfall	Rock	Moist	13	10	41	25
7/24/2001		Carbon	3250	Stream	Rock	Moist	13	10	38	22
7/25/2001		Mowich	4850	Waterfall	Rock	Moist	14	8	120	64
7/25/2001		Mowich	4850	Waterfall	Rock	Moist	14	8	108	56
7/25/2001		Mowich	4850	Waterfall	Rock	Moist	14	8	90	50
7/25/2001		Mowich	4800	Seep	Rock	Moist	12	12	38	23
7/25/2001		Mowich	4800	Seep	Rock	Moist	12	12	40	25
7/25/2001		Mowich	4800	Seep	Rock	Wet	12	12	51	27
8/2/2001		Cowlitz	3000	Cave/Talus	Rock	Wet	12	10	110	
8/5/2002			3680	Stream	Wood	Moist	19	10	110	65
7/19/2001		Cowlitz	5300	Seep	Rock	Wet	14	11	86	42
7/19/2001		Cowlitz	5300	Seep	Rock	Wet	14	11	93	48
7/19/2001		Cowlitz	5300	Seep	Rock	Wet	14	11	60	32
7/19/2001		Cowlitz	5330	Seep	Rock	Wet	13	10	100	55
7/19/2001		Cowlitz	5320	Seep	Rock	Wet	13	10	108	53

This report has had confidential information regarding park-sensitive species locations removed.

Table D-2. Documented environmental and habitat conditions for Larch Mountain salamanders. [* location removed].

Date	Site Name *	UTM E *	UTM N *	Watershed	Elevation (ft)	Air Temp. (C°)	Habitat	Micro Habitat	Cover Object	SVL (mm)
6/4/2001				Cowlitz	2840	10	Conifer	Wood	Log 1(11-25cm	43
6/5/2001				Cowlitz	3000	9	Conifer	Bark Heap	Cobble	34
6/15/2001				Puyallup	3814	7	Conifer	Rock Pile	Log 1(11-25cm	27
7/10/2001				Nisqually	2900	24	Cliff	Rock Outcrop	Cobble	0
5/15/2002				Ohanapecosh	2825	12	Talus	Rock Outcrop	Cobble	26
5/15/2002				Ohanapecosh	2825	12	Talus	Wood	LOG4 >100 cm diameter	18
5/15/2002				Ohanapecosh	2825	12	Talus	Rock Pile	Cobble	0
5/19/2002				Ohanapecosh	0	7				30
5/29/2002				Ohanapecosh	2400	9	Talus	Rock Outcrop	Cobble	46
5/29/2002				Ohanapecosh	2000	14	Talus	Rock Pile	Cobble	52
6/12/2002				Carbon	3400	25	Talus	Rock Pile	Cobble	51
4/29/2003				Nisqually	2580	8	Conifer	Wood	Log 2 (26-50cm	40
4/29/2003				Nisqually	2580	8	Cliff	Wood	Log 1(11-25cm diameter)	38
4/29/2003				Nisqually	2580	8	Cliff	Rock Outcrop	Branch <10cm diameter	37
4/29/2003				Nisqually	2580	8	Cliff	Rock Outcrop	Branch <10cm diameter	17
4/29/2003				Nisqually	2580	8	Cliff	Rock Outcrop	Branch <10cm diameter	50
4/29/2003				Nisqually	2580	8	Cliff	Rock Outcrop	Branch <10cm diameter	42
4/29/2003				Nisqually	2580	8	Cliff	Rock Outcrop	Branch <10cm diameter	34
4/29/2003				Nisqually	2550	8	Cliff	Rock Pile	Bark	42
5/1/2003				Nisqually	2890	15	Talus	Wood	Branch <10cm diameter	33

This report has had confidential information regarding park-sensitive species locations removed.

Appendix E. Amphibian and reptile National Park Service species (NPSpecies) vouchers.

Table E-1. Amphibian and reptile National Park Service species vouchers.

Category	Order	Family	Standard Scientific Name	Present Accepted Scientific Name[1]
Amphibian	Anura	Ascaphidae	*Ascaphus truei*	*Ascaphus truei*
Amphibian	Anura	Bufonidae	*Bufo boreas*	*Anaxyrus boreas*
Amphibian	Anura	Bufonidae	*Bufo boreas boreas*	*Anaxyrus boreas boreas*
Amphibian	Anura	Hylidae	*Pseudacris regilla*	*Pseudacris regilla*
Amphibian	Anura	Ranidae	*Rana aurora*	*Rana aurora*
Amphibian	Anura	Ranidae	*Rana cascadae*	*Rana cascadae*
Amphibian	Anura	Ranidae	*Rana pretiosa*	
Amphibian	Caudata	Ambystomatidae	*Ambystoma gracile*	*Ambystoma gracile*
Amphibian	Caudata	Ambystomatidae	*Ambystoma macrodactylum*	*Ambystoma macrodactylum*
Amphibian	Caudata	Ambystomatidae	*Ambystoma tigrinum*	*Ambystoma tigrinum*
Amphibian	Caudata	Dicamptodontidae	*Dicamptodon ensatus*	
Amphibian	Caudata	Dicamptodontidae	*Dicamptodon tenebrosus*	*Dicamptodon tenebrosus*
Amphibian	Caudata	Dicamptodontidae	*Dicamptodon copeii*	*Dicamptodon copeii*
Amphibian	Caudata	Plethodontidae	*Ensatina eschscholtzii*	*Ensatina eschscholtzii*
Amphibian	Caudata	Plethodontidae	*Ensatina eschscholtzii oregonensis*	*Ensatina eschscholtzii oregonensis*
Amphibian	Caudata	Plethodontidae	*Plethodon larselli*	*Plethodon larselli*
Amphibian	Caudata	Plethodontidae	*Plethodon vandykei*	*Plethodon vandykei*
Amphibian	Caudata	Plethodontidae	*Plethodon vandykei vandykei*	
Amphibian	Caudata	Plethodontidae	*Plethodon vehiculum*	*Plethodon vehiculum*
Amphibian	Caudata	Rhyacotritonidae	*Rhyacotriton cascadae*	*Rhyacotriton cascadae*
Amphibian	Caudata	Salamandridae	*Taricha granulosa*	*Taricha granulosa*
Amphibian	Caudata	Salamandridae	*Taricha granulosa granulosa*	
Reptile	Squamata	Anguidae	*Elgaria coerulea*	
Reptile	Squamata	Anguidae	*Elgaria coerulea principis*	*Elgaria coerulea principis*
Reptile	Squamata	Boidae	*Charina bottae*	*Charina bottae*
Reptile	Squamata	Colubridae	*Thamnophis*	*Thamnophis*

This report has had confidential information regarding park-sensitive species locations removed.

Category	Order	Family	Standard Scientific Name	Present Accepted Scientific Name[1]
Reptile	Squamata	Colubridae	*Thamnophis elegans*	*Thamnophis elegans*
Reptile	Squamata	Colubridae	*Thamnophis ordinoides*	*Thamnophis ordinoides*
Reptile	Squamata	Colubridae	*Thamnophis sirtalis*	*Thamnophis sirtalis*

[1]As in Crother (2008).

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

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National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
1201 Oakridge Drive, Suite 150
Fort Collins, CO 80525

www.nature.nps.gov