

**Chehalis ASEP**  
**Terrestrial Amphibian Survey Summary**  
**3rd Progress Report**

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This report summarizes results the Chehalis ASEP terrestrial amphibian surveys in the vicinity of the proposed footprint of the dam and its reservoir. We initiated surveys for this effort on 24 February 2014. This summary provides data for the slightly over four-month period through 26 June 2014.

**Site selection:** We chose sites from a 128-site pool that had been strategically selected to provide an array of sites concentrated across the footprint of the proposed dam and its reservoir and their vicinity. We stratified the selection so that two-thirds of the sites were selected from within the proposed dam footprint, and the remaining one third were above and below the footprint. Figure 1 shows the sites sampling to date, with sampled sites within the footprint in gold ●, sites below the footprint in pink ● and sites above the footprint in blue ●. Remaining sites available for selection are white ○. We selected sites above and below the footprint to provide a sense of potential gradients in distribution across this landscape; for example, limited data indicated that Van Dyke's salamander is found at elevations somewhat above the dam and reservoir footprint but it was unclear whether the species would be found at elevations within the footprint. Our minimum target number of sites is 53, though by the time sampling is completed, the total number of sites sampled may be somewhat larger. We have a site pool considerably larger than our target number to enable randomized selection within the pool and site replacement if some selected sites prove inaccessible because of steep slope conditions (safety) or road washouts, both of which have occurred in our selection and survey process to date.

**Sampling:** We conducted all surveys with a field crew of three to six, and sampled on three or four days (Monday through Wednesday or Thursday) each week. Up to 10 March 2014, we laid out triplicate plots 4 meters (m) wide × 12 m long at each site with their short axes adjacent one another and their long axes abutting the wetted edge of a stream reach. Each surveyor light-touch surveyed (Quinn et al. 2007) each plot once independently on three consecutive days. Light touch surveys involve overturning only movable surface objects to enhance detection. From 10 March 2014 onwards, due to low detection rates with the previous survey method, we surveyed nine 3 m wide × 5 m long plots at each site, separated by 5-10 m and with their short axes abutting the wetted edge of the stream. The separation distance among the nine plots allowed us to locate plots across the stream-edge habitat in the absence of obstructions (cliffs, etc.). Surveyors sampled the entire area of each of the nine plots at each

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site. Sampling was done by raking through the litter with a potato rake, overturning movable surface objects, and dismantling woody debris sufficiently decayed to pull apart.

**Results:** To date, we have surveyed a total of 48 sites, 4 below the reservoir footprint, 28 within the footprint and 16 upstream of the reservoir footprint (Figure 1). We found 309 individuals representing at least 11 amphibian species, and we recorded no amphibians at only six of these 48 sites. Ambiguity in the number of species reflects the fact that the one neotenic giant salamander encountered was not captured (neotenes are larviform adults – reproductive adult salamanders that retain larval characteristics [e.g., gills, tail fin, etc.]). This individual may have represented a 12<sup>th</sup> species (Cope’s giant salamander [*Dicamptodon copei*]) since the only other giant salamander encountered to date was a positively identified Coastal giant salamander (*D. tenebrosus*), a large post-metamorphic animal. The distribution, numbers of species, and numbers of individuals found are shown in Figures 2, 3, and 4 and Table 1.

**Table 1.** Amphibian species and numbers found during terrestrial amphibians surveys, February-June 2014. Subtotals or totals for sites may be less than summed site sums for species across habitat categories because one or more species may have occurred at the same site. Total sites being >48 reflects our inclusion of incidental amphibian siting at nine additional sites.

Species		Numbers of individuals found							
Standard English Name	Scientific Name	Below footprint		In footprint		Above footprint		Totals	
		Sites	Ind	Sites	Ind	Sites	Ind	Site	Ind
<b>Terrestrial Amphibians</b>									
Dunn’s salamander	<i>Plethodon dunni</i>	0	0	6	14	3	5	9	19
Ensatina	<i>Ensatina eschscholtzii</i>	1	1	5	6	8	11	14	18
Van Dyke’s salamander	<i>Plethodon vandykei</i>	0	0	1	5	0	0	1	5
Western red-backed salamander	<i>Plethodon vehiculum</i>	3	7	17	77	12	48	32	132
Subtotals		3	8	18	102	14	64	35	174
<b>Stillwater-breeding Amphibians</b>									
Pacific treefrog	<i>Pseudacris regilla</i>	0	0	12	17	0	0	12	17
Northern red-legged frog	<i>Rana aurora</i>	1	1	3	3	1	1	5	5
Roughskin newt	<i>Taricha granulosa</i>	0	0	6	8	2	2	8	10
Western toad	<i>Anaxyrus boreas</i>	1	1	12	17	2	2	15	20
Subtotals		2	2	32	45	4	5	38	52
<b>Stream-breeding Amphibians</b>									
Giant salamanders	<i>Dicamptodon sp.</i>	0	0	0	0	2	2	2	2
Coastal tailed frog	<i>Ascaphus truei</i>	0	0	6	7	3	3	9	10
Columbia torrent salamander	<i>Rhyacotriton kezeri</i>	0	0	8	60	7	11	15	70
Subtotals		0	0	12	67	11	16	23	82
Overall Totals		3	10	36	214	18	85	57	309

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We detected the terrestrial amphibian more frequently than other types, with 174 individuals of the four species found (Table 1). The significant discovery over the last month was the finding of 5 Van Dyke's salamanders (*Plethodon vandykei*) at one site within the proposed dam inundation footprint on 19 and 23 June 2014; Van Dyke's salamander had not been detected in previous surveys. Of the four terrestrial amphibian species, the western red-backed salamander was the most frequently encountered (n = 132). *Ensatina* and Dunn's salamander, with almost the same total numbers of individuals encountered to date (Table 1), were more frequently encountered than Van Dyke's salamander, but much less frequently encountered than the western red-backed salamander. We have now found both of the terrestrial amphibian Key Species, Dunn's (*Plethodon dunni*) and Van Dyke's salamanders, with Van Dyke's being the least frequently encountered of the four terrestrial amphibians.

Except for western toad and treefrog egg masses found incidental to the plot surveys for terrestrial amphibians, we also incidentally encountered 134 total individuals of four species of stillwater-breeding and three species of stream-breeding amphibians. 73 of these 134 individuals were in some post-metamorphic life stage (i.e., metamorphosed juveniles or adults). Twelve of the 20 post-metamorphic western toads encountered were juveniles; the remaining 8 post-metamorphic western toads were adults. These adults included one adult male-female pair that was in amplexus in the process of depositing eggs on 29 May 2014, and a second male-female pair in amplexus that had not yet deposited eggs on 2 June 2014. The remaining 61 individuals found were all pre-metamorphic, and consisted of one coastal tailed frog tadpole incidentally observed in the shallows of a stream and 60 larval Columbia torrent salamanders found in no fewer than nine seeps and other moist stream-margin areas. We found 27 Columbia torrent salamanders in two small seeps within a meter of each other along Crim Creek.

In the course of completing terrestrial plots ~100 m above the Panesko Bridge, we incidentally discovered western toad egg masses (easily identified from their characteristic jelly strings), in a side pool of the Chehalis main channel on 27 May 2014. Based on surveys of this area on 28 May 2014, we estimate that there were a total of 23 locations where western toad egg masses had been laid in this substantial side pool. On 29 May 2014, we surveyed the main channel upstream from this location to within 200 m of the Sorting Yard Bridge and found an estimated 19 more locations where western toad egg masses had been deposited in different side pools. The toad egg masses at some these ~42 locations had been laid within the last 24 hours and the aforementioned pair of toads found in amplexus was in the process of depositing one of those egg masses. A few of the western toad egg masses were just hatching, suggesting that they have been deposited during the previous week. Further, over 20 of Pacific treefrog egg packets, two adult roughskin newts, and dozens of juvenile specked dace (*Rhinichthys osculus*) were observed in several of the same side pools in which western toads had bred on these dates. Since the 27 May 2014, we have surveyed 8.35 river miles (RM) within the

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reservoir and dam footprint for western toad egg masses, western toad tadpole groups and mixed western toad egg mass and tadpole groups (Figure 5). These 8.35 total RM have included 7.60 RM along the mainstem Chehalis, 0.75 RM on Crim Creek, and 0.10 RM on Lester Creek. These surveys have revealed 114 total sites where western toads have bred in instream off-channel areas. At these 114 total sites, we recorded an absolute minimum estimate of 198 egg masses or tadpole groups representing egg masses. We expect this number to be an underestimate of no less than 25% because of our conservative method estimating western toad tadpole groups that actually represented different egg masses. During these surveys, we also recorded Pacific Treefrogs (*Pseudacris regilla*) early life stages (egg masses and/or tadpoles) at 15 of the western toad sites (Figure 6), and Roughskin Newts (*Taricha granulosa*) at two of western toad sites. Roughskin Newts were also recorded from an additional three instream off-channel habitats in which western toads were not found along Crim Creek.

**Discussion:** As expected, terrestrial amphibian surveys recorded more terrestrial amphibians than other amphibian taxa. Also as expected, the most frequently encountered terrestrial amphibian was the western red-backed salamander; western red-backed salamanders are more frequently recorded than *Ensatina* in the generally more mesic Willapa Hills (M. Hayes, unpublished data), as *ensatina*, a relatively drier habitat-adapted species, is less frequent in coast range areas than in more interior areas (for example, the Cascade slope). The fact that Dunn's salamander was as frequently recorded as *Ensatina* likely reflects the riparian nature of our surveys, since Dunn's is strongly riparian-associated and *Ensatina* is widespread, but as noted above, linked to relatively drier conditions. These types of drier conditions are likely to occur in non-riparian areas in the upper Chehalis landscape. The finding of Van Dyke's salamander at 195 m (640 ft) at one site within the dam footprint was rather unexpected, as the only two historical records for this species in the upper Chehalis system headwaters were recorded from elevations about twice as high (400 m [1300 feet]); admittedly, however, surveys in the upper Chehalis system have not been comprehensive. However, this discovery was made in a highly shaded, cool temperature pocket (soil temperatures were 15°C [59°F]) dominated by western red cedar (*Thuja plicata*) that only rarely gets illuminated by the sun. Such areas may be limited within the reservoir footprint, but this find suggests that Van Dyke's salamander may be more common in these types of microhabitat.

We also expected to find both stillwater-breeding and stream-breeding amphibians. Sixteen of the 20 records of juvenile and adult western toads were all proximate to oviposition or rearing sites that had been previously observed or recently found in the Chehalis main channel. Notably, the level of western toad breeding in main channel is much greater than originally suspected. Western toads deposit egg masses with a mean clutch size around 8,000 eggs, so local production at oviposition within the 8.5 RM surveyed area (Figure 5) is likely well over 1,500,000 despite the fact that we have not yet surveyed the 1.57 RM; we plan to survey these remaining reaches in early July. Western toad breeding is well distributed over the Chehalis

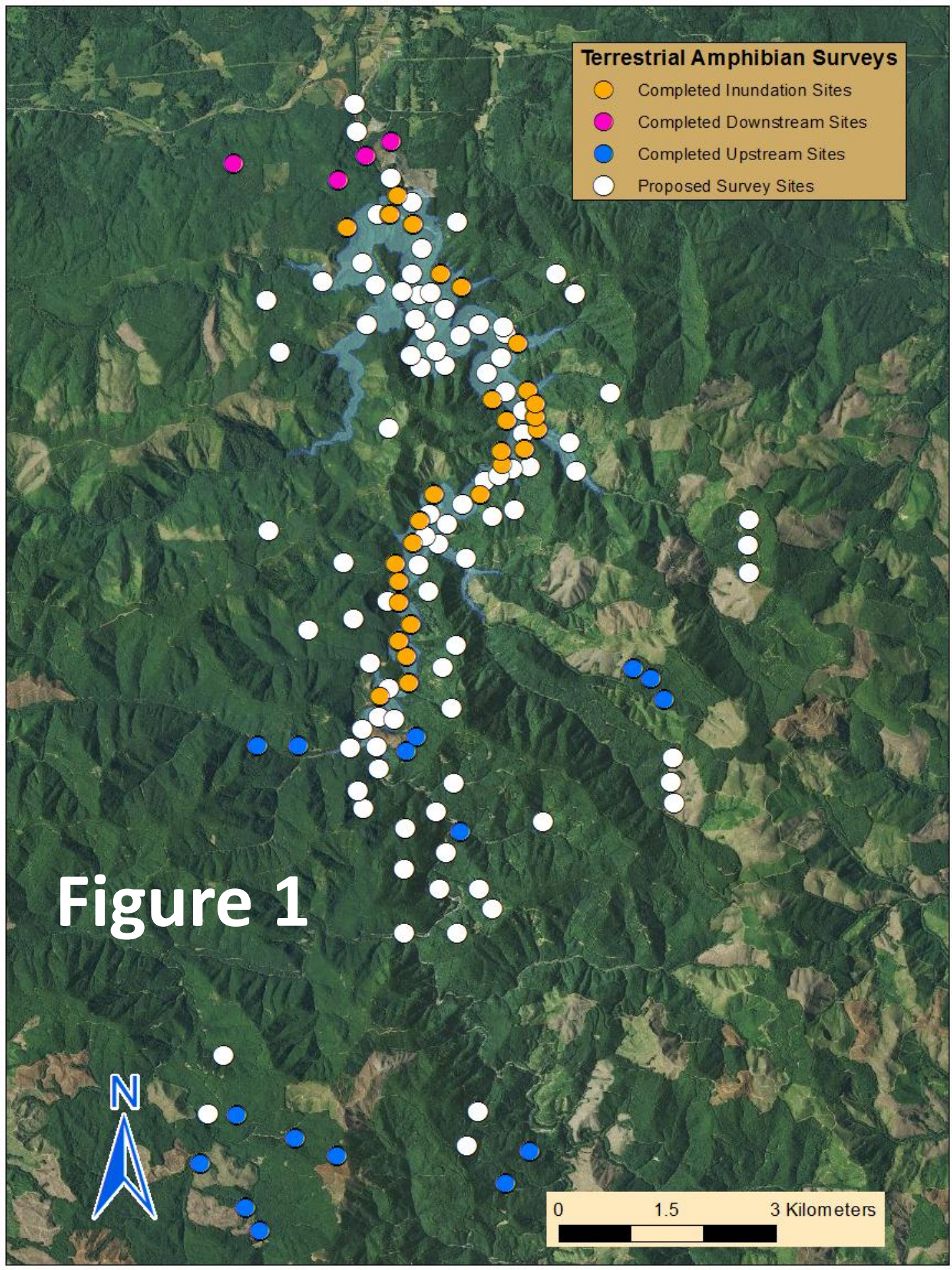
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River mainstem within the proposed dam footprint with the exception of the 0.8 km (0.5 mi) reach below Fisk Falls (Figure 5), where the mainstem becomes highly confined and little instream off-channel habitat appears seasonally with the declining hydrograph. Though remaining survey gaps need to be completed, we believe the overall area of the proposed dam footprint may represent a critically important breeding area for western toads in the Chehalis River mainstem. Comparison with downstream reaches would be needed to fully understand this possibility.

### Literature Cited

Quinn, T.; Hayes, M.P.; D.J. Dugger; T.L. Hicks; and A. Hoffmann. 2007. Comparison of two techniques for surveying headwater stream amphibians. *Journal of Wildlife Management* 71(1):282-288.

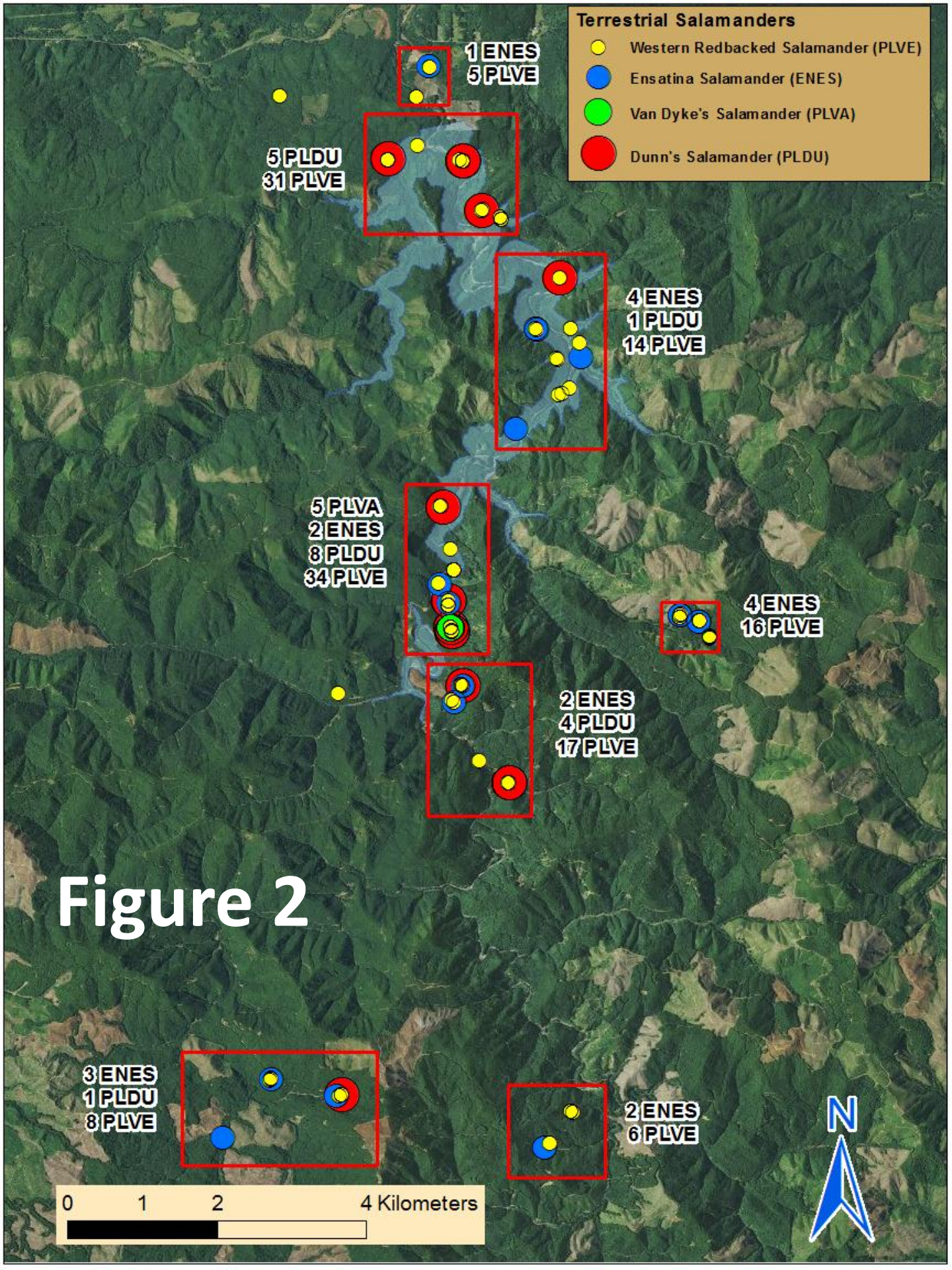




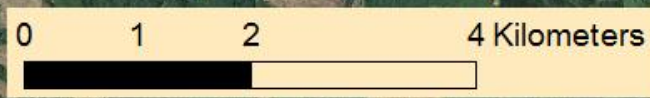


**Terrestrial Salamanders**

- Western Redbacked Salamander (PLVE)
- Ensatina Salamander (ENES)
- Van Dyke's Salamander (PLVA)
- Dunn's Salamander (PLDU)



**Figure 2**





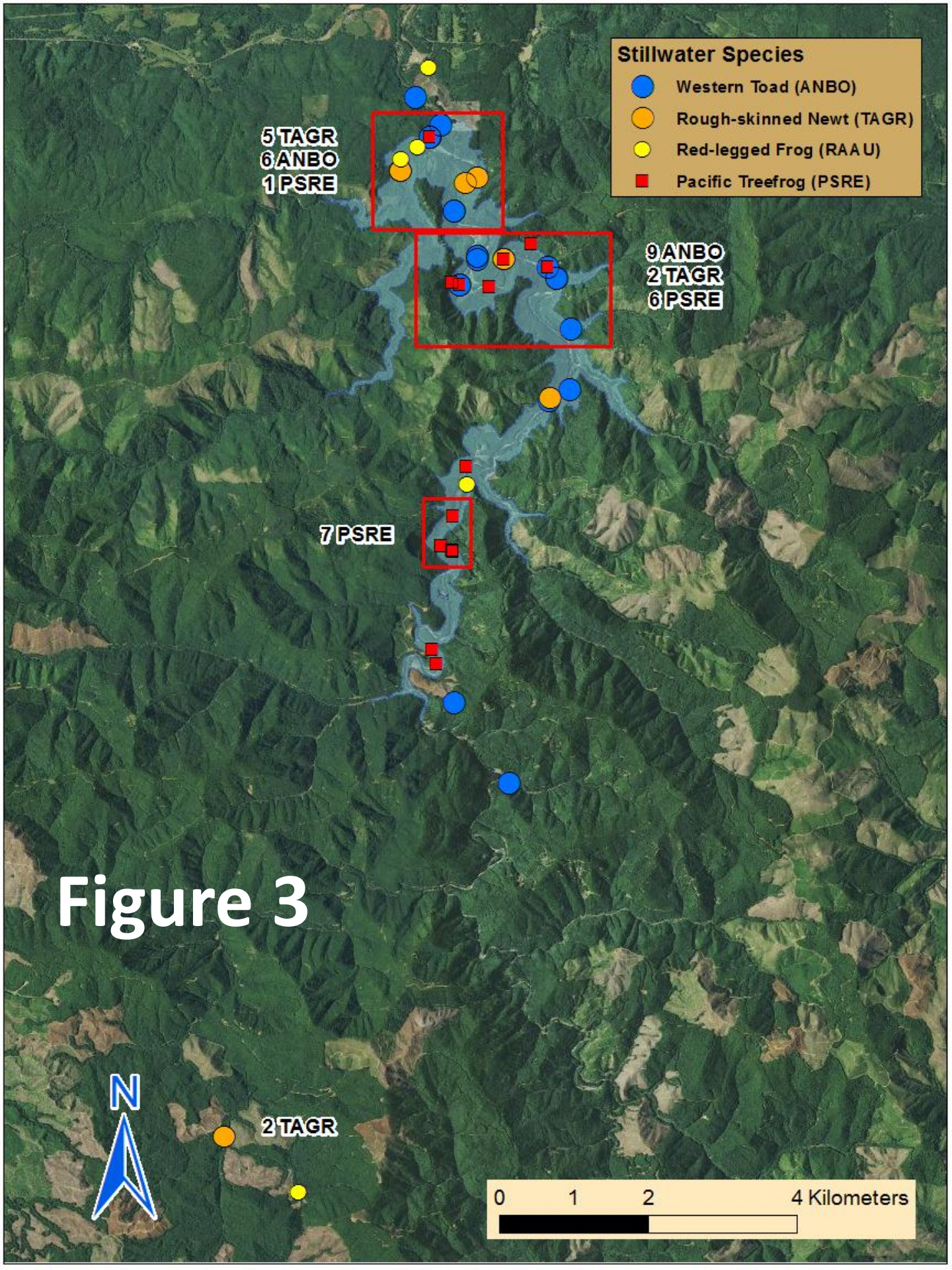


Figure 3



**Stream Breeding**

- Coastal Tailed Frog (ASTR)
- Giant Salamander (DISPP)
- Cascade Torrent Salamander (RHKE)

2 ASTR  
26 RHKE

25 RHKE

3 RHKE  
2 ASTR

5 RHKE  
1 ASTR

6 RHKE

**Figure 4**

