Sauk-Suiattle Amphibian Survey Report 2009

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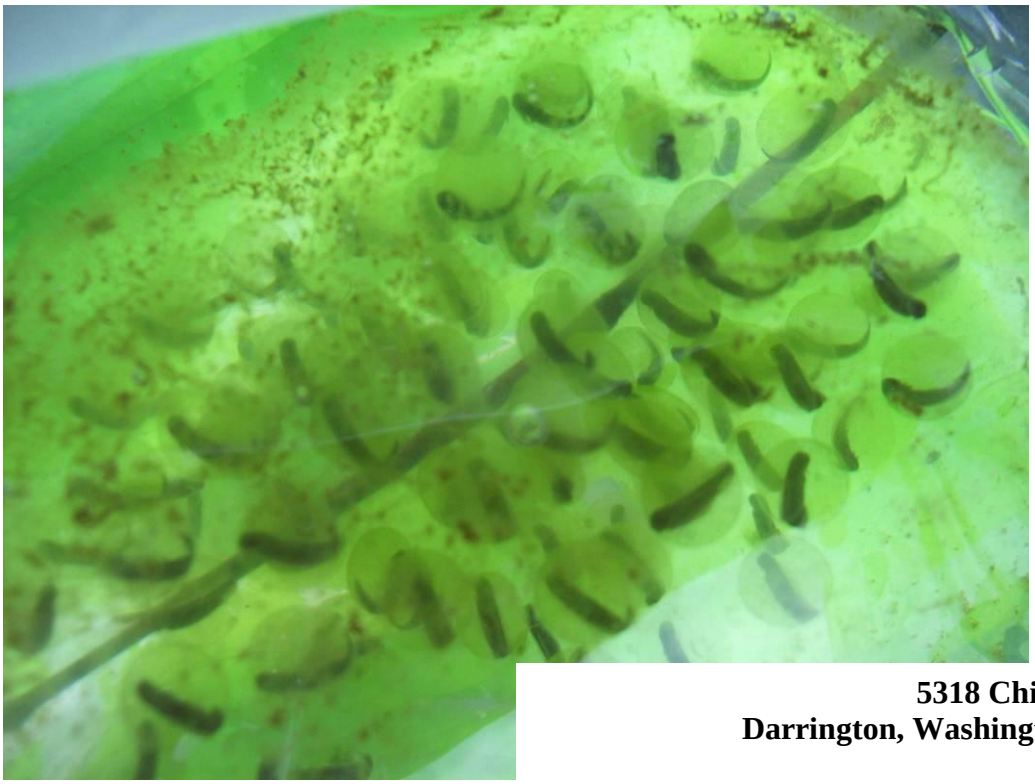

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Sauk-Suiattle Amphibian Survey Report 2009

This report is based on weekly amphibian surveys taken in the spring of 2009 in the Reservation Slough wetland on the east side of the Sauk-Suiattle Indian Reservation. The surveys were done as an update to the Sauk-Suiattle Wetlands Report, written in 2003. Both the original report and this update were supported by grants from the U.S. Environmental Protection Agency.

Survey objectives

The surveys were conducted in support of the Tribe's water quality program with the following objectives in mind:

1) *Assess the annual change in amphibian species and abundance.*

This year's surveys were the third of an annual program. Over the years, the surveys could help determine trends of amphibian populations in the lone Class 1 wetland on the 25-acre Sauk-Suiattle Indian Reservation.

2) *Analyze the data to highlight potential water quality or habitat concerns.*

Dips in amphibian numbers or species or unusual numbers of deformities could serve as an additional bellwether to the Tribe's regular water quality monitoring, alerting the Tribe to potential contamination or habitat alteration nearby.

3) *Help expand the regional amphibian database.*

Biologists throughout the Pacific Northwest have been striving for more coordinated regional amphibian monitoring that follows standardized methods. (Olson, Leonard, Bury, 1997) The Sauk-Suiattle Indian Tribe can contribute to those efforts over time by developing and improving this annual amphibian survey.

Description of survey area

The survey area covers 5.5 acres of a roughly 10-acre wetland that follows the course of an oxbow slough of the Sauk River. The survey area is confined to the portion of the wetland owned by the Tribe. Fortunately, that portion contains much of the best pond habitat. This is a Class One wetland, according to the Sauk-Suiattle Indian Tribe Wetlands Report (2003). The National Wetlands Inventory database describes the slough as a Palustrine forested and intermittently flooded area. Aerial photos show this slough was the main channel of the Sauk River in 1949. Sometime soon after, the main channel shifted to the east and has not reoccupied the slough, although channel migration will surely happen here someday again. In previous years, floodwaters from the Sauk entered this channel at above 25,000 c.f.s. at the Sauk at Sauk river gauge, which is a flood of roughly two-year occurrence. The slough also receives groundwater and is wet year-round, although water levels fluctuate based on flow connectivity with the main channel, which avulses frequently, sometimes close, other times far from the slough mouth. Beaver, otter and wood ducks are among the many wildlife species here. The dominant plant species are red alder, Reed canary grass and cottonwood.

To the east is a forested upland area that separates the slough from the Sauk River. The upland is mainly hardwoods, including some big leaf maples, but also has some conifers such as western hemlock, western red cedar and Douglas fir in the canopy.

See the aerial photo from 2006 on the next page.

Sauk-Suiattle amphibian survey area (outlined in light blue)

This 5.5 acre area is a Class 1 wetland, formed by old side channels of the Sauk River (at right), last occupied by the mainstem in 1949 or so. The area immediately east of the survey area is a forested upland braided with other old channels. To the north, beyond Tribal property, the wetland extends and curves back into the Sauk River floodplain. To the west is the Sauk-Suiattle Reservation (loop road with houses).

Summary of survey results

The 2009 survey found almost five times as many egg masses and twice as many frogs as the average from each of the previous two years. The egg mass boost was primarily from Pacific chorus frogs, which can lay multiple egg masses per frog annually, (Perrill and Daniel, 1983) so conclusions about population cannot necessarily be drawn from the increase. Red-legged frogs, by contrast, lay only one egg mass per frog annually, (McAllister, Leonard, 2005) but red-legged egg masses did not significantly increase. Northwestern salamanders also lay one mass per year (Thoms, et al., 1997), and in 2009, the salamander egg masses more than doubled from 2008. While survey improvements might account for a modest amount of the increases for chorus frogs and salamanders, it seems more likely that the majority of the increase was a result of some kind of natural explanation (ie: expansion of habitat, less predators.)

Egg masses

Surveys began Feb. 25 and continued every week, ending May 27. The only exception was the survey on April 28, which spilled over into the next day, April 29, because of an explosion of Pacific chorus frog egg masses that overwhelmed us. (See Discussion of Results.) By the end of May, we counted 1,460 different egg masses from three different species: red-legged frog (*Rana aurora)*, Northwestern salamander (*Ambystoma gracile*) and Pacific chorus frog (*Hyla regilla*). It should be noted that we saw a fourth species the previous year (2008), Western toad (*Bufo boreas*), but did not see any egg strings that year. In 2009, we did not see any Western toads or egg strings. We had hoped to make special visits in the summer of 2009 to see if toad breeding might be occurring after our normal survey season is finished, but scheduling did not allow it.

Red-legged frog egg mass. Photo by Kevin Lenon.

Survey improvements

Cataraft gives better access, better visibility to identify and flag egg masses. Photos by Scott Morris.

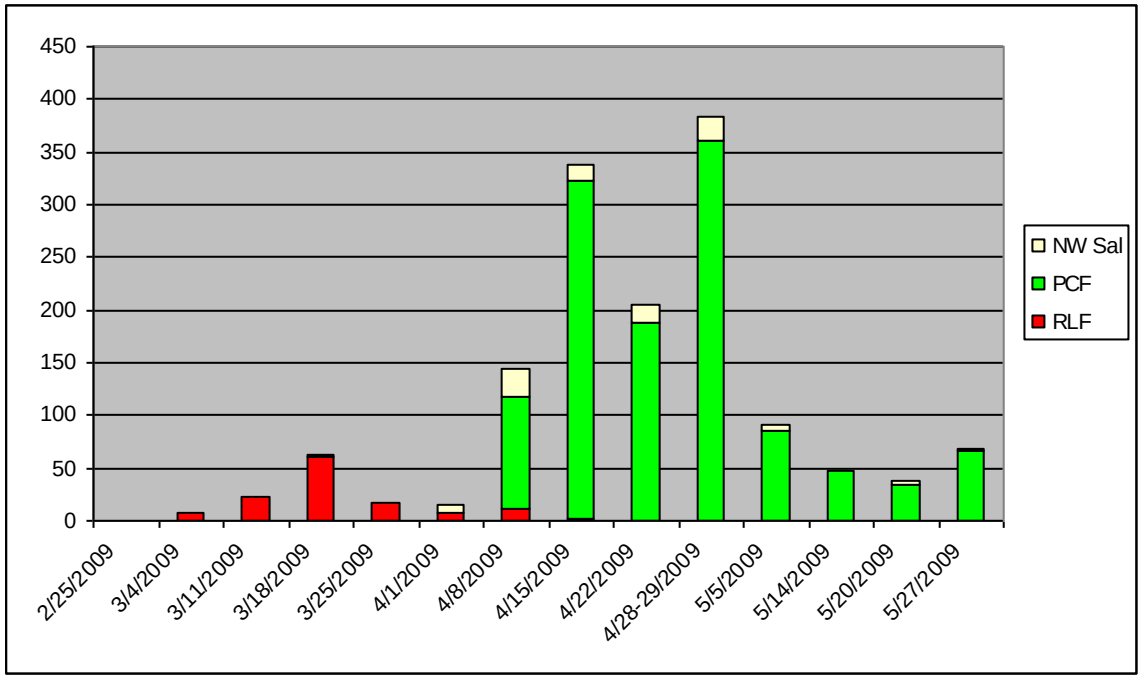
Our total egg mass count was substantially higher in 2009 than our first two previous survey years – almost *five times* higher (from the 300s to 1,460). Even accounting for the possibility of improved surveying (ie: more methodical, fastidious searching), it seems more likely to myself and the crew that we simply documented a much greater reproductive burst, primarily from Pacific chorus frogs.

The best argument for this is that our survey improvements were much greater between 2007 and 2008 than in 2009, yet the boost in egg masses was modest the second year compared to the third year. For example, in 2007, our crew was less experienced, we did not use a canoe and we only had hip waders to search the less accessible reaches of the pond. In 2008 we used a canoe and chest waders and covered the whole pond much better. In 2009, we upgraded to a cataraft to improve visibility and maneuverability compared to the canoe, but that improvement seemed to us less dramatic.

The only argument against the population boom would be that perhaps we are now a more experienced crew and had simply overlooked many Pacific chorus frog egg masses in previous years, because they are so small. It's true we did add a crew member

who is very meticulous in spotting the chorus frog masses, and his addition probably boosted our counts somewhat. (He added the trick of using an umbrella to shade the glare to make the egg masses stand out better.) But it did not seem to any of us that this would account for such a dramatic increase. Our surveyor hours did not dramatically increase, and our methods were the same. Given that we return weekly for our surveys, and each egg mass is flagged, (even the small chorus frog masses) we feel that we do a pretty good job finding egg masses that were missed in previous weeks.

Graph 1. ***New weekly egg masses 2009***



The egg mass count in 2008:	
- Red-legged frog:	118
- NW salamander:	43
- Pacific chorus frog:	195
Total:	357

Egg masses in 2009:	
- Red-legged frog:	129
- NW salamander:	104
- Pacific chorus frog:	1,209
Total:	1,442
Unidentified:	18
(probably PCFs)	

Amphibian sightings

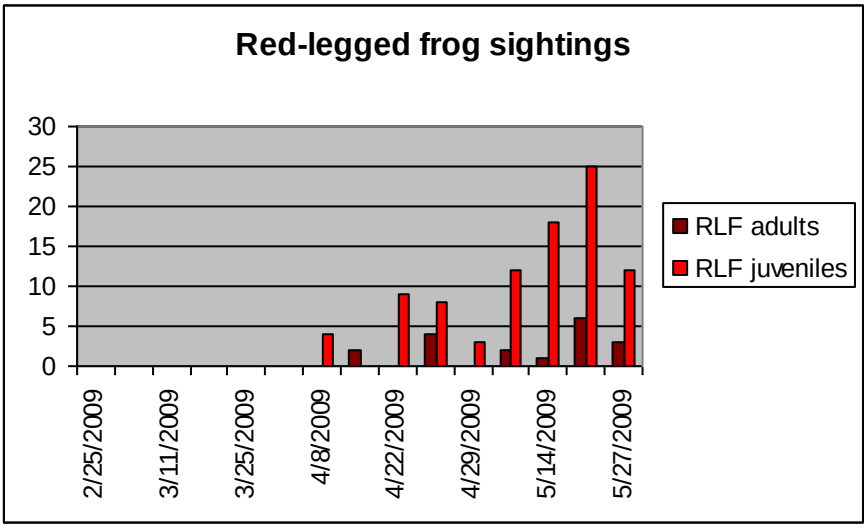
We identified 219 frogs, divided evenly between red-leggeds (109) and Pacific choruses (110). We also identified one dead frog from each of those species. In addition, we saw another 19 unidentified frogs. Including the live, dead and unidentified frogs, we saw 240. This is more than double the counts from the first two years (114 in 2007 and 90 in 2008.) The survey intensity was roughly the same all three years.

Of all these frogs, we saw no deformities, other than a dead chorus frog that appeared to have been stepped on.

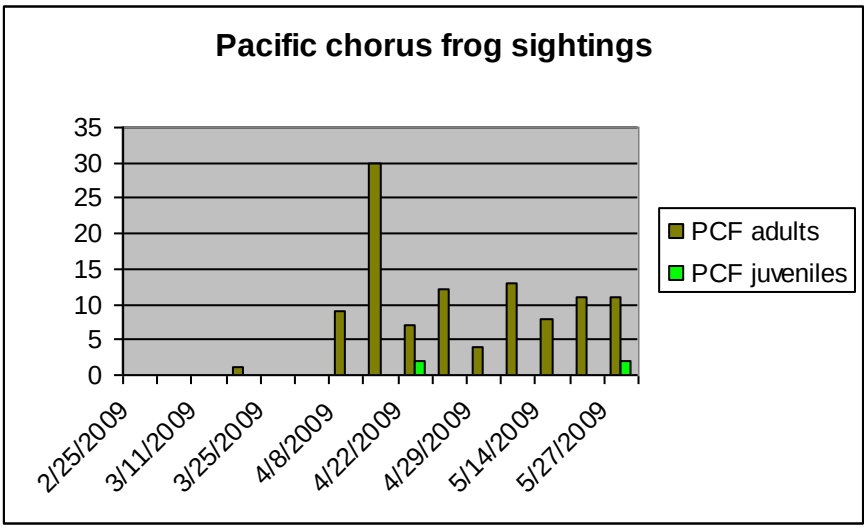
In addition, we saw one unidentified salamander larva with gills, probably a Northwestern.

Salamander larva. Photo by Kevin Lenon.

Graph 2.



Graph 3.

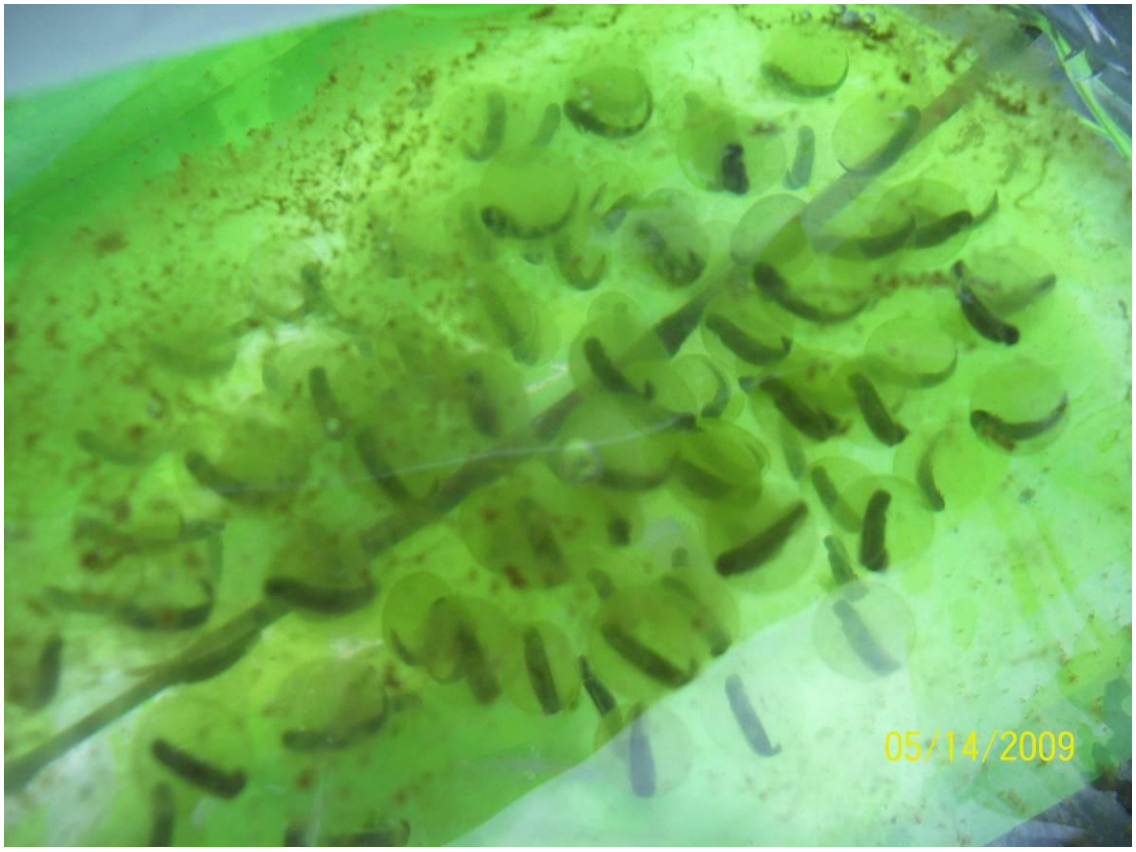


Summary of protocols

Protocols are detailed in the Tribe's "Surface Water Quality Monitoring Manual and Standard Operating Procedures." In summary, two to four people spread out through the Tribe's 5.5-acre portion of the wetland, looking for amphibians and their egg masses in a Visual Encounter Survey. We looked in the most likely terrestrial habitat, and we also focused concentrated efforts in and near the wet spots, which proved to have hundreds of egg masses throughout the spring. Egg masses were flagged and given individual numbers to avoid double counting and to track their development. Egg masses that were flagged were tracked for health with weekly estimates of the percentage of eggs that appeared dead. For our field identification guides, we used "Amphibians of Oregon, Washington and British Columbia," (1996) by Charlotte C. Corkran and Chris Thoms, and "Amphibians of the Pacific Northwest," (2005) edited by Lawrence L.C. Jones, William P. Leonard and Deanna H. Olson.

We also kept watch for any amphibians as we moved through the survey area, keeping track of age and species whenever possible. We tried to capture by hand any amphibian we saw, to facilitate identification. We kept them moist while handling the animals, then released them once identified.

Pacific chorus frog egg mass, shaded by pink umbrella. Photo by Kevin Lenon.



Northwestern salamander egg mass close to hatching. Photo by Kevin Lenon.

As in 2008, suitable amphibian breeding habitat remained expansive. Moderate winter floods, heavy snow, good flows through the spring, combined with beaver activity all helped to maintain water level to completely inundate the grassy clearing near the wetland's main pond. Water depth in the grassy area tended to be about 18 inches and remained so through the survey.

Discussion of results

As in 2008, we started the survey in late February to try to find egg masses of long-toed salamanders, which typically breed in winter when temperatures are above freezing (Bull, 2005). This can even mean January in some lower elevations, but we had a very cold winter with a very heavy snowpack (snowfall of about 70 inches in three weeks, accumulations of more than 3 feet), so our timing again was not bad. We have yet to find any definitive sign of long-toed salamanders, but it seems possible we could have some in this wetland. We had hoped to make some early visits in January of 2009, but the snowpack was too thick until late February, and even then some snow remained until well into March.

The big question in 2009 was why did we have such a dramatic increase in egg masses? This was particularly true for Pacific chorus frogs (up from 195 to 1,209), but also for Northwestern salamanders (43 to 104).

At the same time, red-legged frogs showed only a modest increase in egg masses (118 to 129), even though we saw twice as many live frogs as the first two years.

One plausible answer might be the higher water, which increased the shallow water habitat in the grassy clearing that chorus frogs took great advantage of. Red-

leggeds seem to favor the slightly deeper, more open water of the pond – habitat that did not really expand. Salamanders were able to take advantage of both areas.

Given that chorus frogs can lay three or more egg masses per female in a year, perhaps good conditions throughout the spring allowed more multiple clutching. Single-clutching red-leggeds did not show much of an increase, so population gains for frogs might be more modest than at first glance.

Even so, the salamanders, also single-clutchers, doubled their egg mass production, so at least some boost can be presumed.

Another factor might be that we saw very little presence or even sign of predation in 2009. We only saw one snake, and typically we see several to a dozen during the year. That might still be too small a sample size to mean much, but it's worth noting.

One deviation in the 2009 survey from previous years happened during the April 28 survey. That day, we found such an explosion of chorus frog egg masses that we could no longer keep up with tracking the development of all the previous egg masses. Before then, as in other years, we would revisit each flagged egg mass and keep simple notes such as "5% dead, eggs, submerged," or "25% dead, tails beginning, floating," to mark the development of the embryos in simple terms. Hatched masses would also be marked down over the weeks.

As the number of new egg masses we found kept tallying up and up on April 28, we finally decided to abandon tracking the old masses and simply mark notes on the development of any new ones we found. Even by doing this, we ran out of time April 28 and had to come back April 29 to finish covering the rest of the survey area. (A smaller portion.) This probably skewed our data a little, but not as much as if we had failed to cover the whole area.

From that week on through the end of the survey in May, we no longer tracked previous egg mass development – we simply noted the development of each new mass and left it at that.

The only other concern is one we've noted in previous years, that we don't cover the entire 10-acre wetland. Thus, a lot of potentially good habitat to the north could harbor more amphibians in one year and less in the next but not be accounted for in our study. The hope is that over time such fluctuations, if there are any, would even out as long as our methodology remains essentially the same.