# DESOLATION MEADOW AMPHIBIAN SURVEYS – 2000

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## Introduction

As part of the Blue Mountains Demonstration Project of the Umatilla National Forest, amphibian surveys were conducted at the Desolation Meadow complex. The objectives of the project were to determine the presence or absence of Columbia spotted frog (*Rana luteiventris*) and to ascertain the presence of other amphibian species. The Columbia spotted frog is classified by the U. S. Forest Service Region 6 as a Sensitive Species, by the U. S. Fish and Wildlife Service as a Candidate for consideration to list as a Threatened Species, and by the Oregon Department of Fish and Wildlife as a Sensitive Species – Undetermined Status.

## Study Area

Desolation Meadow is in the Desolation Creek drainage, a tributary of the North Fork John Day River, in Grant County, Oregon. It is administered by the North Fork John Day Ranger District of the Umatilla National Forest. Elevation range is about 1645 to 1680 meters (5400 to 5520 feet). The area is a complex of wetlands and meadows extending for about 3½ kilometers (2¼ miles) along the North Fork of Desolation Creek, which runs east to west through the site, joined by several small creeks from the north and south (Figures 1 and 2). Having been partially ditched and drained, as well as overgrazed by domestic livestock, Desolation Meadow was later fenced to exclude livestock, and a number of rock weirs were placed across the main creek channel to slow water velocity and try to re-raise the water table. Rocky Mtn. elk (*Cervus elaphus*) make extensive use of the meadow, along with sandhill crane (*Grus canadensis*), snipe (*Gallinago gallinago*), coyote (*Canis latrans*), and many other wildlife species.

## Methods

Two amphibian surveys of Desolation Meadow were conducted during 2000. Two surveyors visited the area on May 24 through 26, soon after the roads were free of snow. One surveyor revisited the site on August 24 and 25 (with a second observer on the 25$^{th}$). On the first visit, surveyors walked a meandering course through every meadow section, going to each feature that appeared to be a pond or small stream on the aerial photo, as well as examining all areas of standing water encountered during the survey. Only a few sections of Desolation Creek were surveyed, because high water flows were considered to be unsuitable amphibian habitat. The primary objective of our first survey was to find breeding sites. On the second visit, surveyors followed a similar procedure, but because the water level was much lower and many sections of the meadow were dry, more time was spent surveying the main channel of the creek. The primary objectives of our second survey were to re-check breeding sites identified on the first visit, and to find sites used by adult amphibians in the dry season and by froglets dispersing after metamorphosis.

At each potential amphibian site, a basic survey (Thoms et al. 1997) was completed. For discrete ponds, we walked around the perimeter and through wider sections, scooping with a net (either a long-handled dipnet or a small aquarium net) every few steps. For meadow areas with standing water, we walked a zigzag course, using the nets and searching for open water pockets, surveying these as we did ponds. For small streams running through the meadow, a surveyor walked along one side, brushing a dipnet through the vegetation on the opposite side, and

surveying stream pools in the same way we did ponds. For Desolation Creek, one surveyor walked along each side, using the dipnet or a long branch to flush any frogs from the edge vegetation or from under the cut banks. We picked up boards and rolled small logs, replacing them after searching for salamanders and frogs. Amphibians observed were usually identified visually, or were captured if necessary for identification, measurement, or photographic documentation. All amphibians caught were released at the capture sites immediately after examination.

Sites where amphibians were found were plotted on the aerial photo and topographic map of the meadow and briefly described. The numbers of adults, juveniles, metamorphs (froglets), larvae, and egg masses of each species at each site were recorded, along with the range of sizes, weather and habitat data, and water temperatures. Photographs were taken of several sites, and of the species and life stages found in the meadow. Observations of other wildlife in the area were also recorded.

**Results**

Amphibians were found at 15 sites within Desolation Meadow during one or both of the surveys. Figure 1 shows these sites on the aerial photo, Figure 2 shows them on the topographic map, and Table 1 briefly describes the habitat at each site. Table 2 shows the species, development stages, and numbers of amphibians found at each site on each survey.

During the May survey of Desolation Meadow, 4 species of amphibians were captured or observed. Columbia spotted frogs were found at 5 sites, including 2 sites where the presence of eggs and/or tadpoles confirmed breeding. Pacific treefrogs (*Hyla regilla*) and long-toed salamanders (*Ambystoma macrodactylum*) were also found breeding in several sites. Two adult western toads (*Bufo boreas*) were found at Desolation Meadow, but no evidence of breeding. No amphibians were observed in or along the banks of Desolation Creek. During a brief visit to nearby Jumpoff Joe Lake on May 25, breeding toads were heard and spotted frog egg masses were seen.

During the August survey, the same amphibian species were found again except for western toads, and one reptile was also found, the western terrestrial garter snake (*Thamnophis elegans*). Three additional breeding sites were found where egg masses had been overlooked or not yet laid by the amphibians at the time of the first survey. One of these was a 3$^{rd}$ breeding site for spotted frogs, with several tadpoles remaining that had not yet completed metamorphosis. Only 4 froglets (3 spotted frogs and a single treefrog) were found in the entire meadow. No amphibians were found in Desolation Creek, however 5 adult spotted frogs, 1 spotted froglet and 1 adult treefrog were found in several small, temporary oxbow pools formed as the water level in Desolation Creek dropped.

Habitat used by amphibians for breeding was spread through all sections of Desolation Meadow (Figures 1 and 2). The breeding sites for spotted frogs were in 3 parts of the meadow. At Site #1 breeding occurred in a pond at the junction of 2 ditches that are filling in. At Site #3 breeding occurred in 3 ponds that are closely linked by a seasonal small stream. At Site #10 breeding probably occurred in the slow meander of “Cabin Creek” where the late season tadpoles were observed. All of these sites had very small ponds, 2 to 6 meters in diameter and less than ½

meter deep, and the first 2 sites appeared to be maintained by elk wallowing. Sites #1 and #3 were also used for breeding by both treefrogs and long-toed salamanders, each of which bred at several other sites as well.

**Discussion**

Recently metamorphosed amphibians were very rarely observed during the August survey. While salamander metamorphs were expected to be underground and not observable, the scarcity of froglets of spotted frogs and treefrogs was more puzzling. None of the dried-up breeding ponds had any dead larvae, so it does not appear that larvae became stranded and died as a result of early drying of the ponds. Although it is possible that most of the year's reproductive output for these species could have been consumed by garter snakes and other predators at the ponds, or by trout when metamorphs dispersed along streams, it is far more likely that the froglets had dispersed many weeks earlier and we were not able to find their late summer habitats. Those that were found were dug with the dipnet out of dense moss patches in very shallow, standing water. There may have been many more froglets hunkered down in similar habitat where it was very difficult to extract them.

The effects of past overgrazing and draining in Desolation Meadow are still apparent, even though livestock are now excluded and ditches are partially filled in. The North Fork of Desolation Creek runs in a narrow, steep-walled channel, yet the aerial photo of the site and the topography observed while walking through the meadow clearly show that the creek used to meander over a broader area, and formed large oxbows and side channels. With more extensive habitat (that possibly lasted longer into the summer) amphibian populations may once have been larger, and western toads may have reproduced at the meadow, but there are no known historical data to investigate. Undoubtedly it is the abundant springs and seeps along both sides of the meadow that have counteracted the down-cutting of the creek and the lowering of the water table in the meadow. The present creek channel appears to be healing in at least some sections, but newly created oxbows are very small because the creek is constricted within the narrow channel.

Desolation Meadow supports a breeding population of Columbia spotted frogs, a Federal and State Sensitive Species, and appears to provide most, if not all, of the yearround habitat needs of this species. Pacific treefrogs and long-toed salamanders also are reproducing at the meadow. Although trout in the North Fork of Desolation Creek and its tributaries could be depressing numbers of one or more of these species, there appear to be successfully reproducing populations of all coexisting in the varied microhabitats available in this complex, and apparently resilient, wetland system. As long as the creek and the elk continue their roles in amphibian habitat formation and maintenance, the spotted frog as well as the other species should continue to occur without human assistance.

Table 1. **DESOLATION MEADOW AMPHIBIAN SURVEYS – DESCRIPTION OF SITES WHERE AMPHIBIANS WERE FOUND.**

1 – Junction of long, East-West ditch and short North-South ditch near former helispot. Ditches are partially filled in, although North-South ditch was carrying water in May. Two small ponds (maximum 20 cm depth) are probably maintained by elk wallowing. One pond still had some water in August, and North-South ditch was still oozing water.

2 – Central part of South edge of meadow. Several small, shallow pools (largest is 3 X 7 m), probably maintained by elk wallowing. Dry in August.

3 – "Tri-pond" – South-central part of meadow. A series of 3 small ponds closely connected by a seasonal rivulet, with a 4$^{th}$ pond a few meters further downstream. The largest pond is 10 X 10 m and maximum depth is 40 cm. May be maintained by elk wallowing. Dry in August.

4 – East-flowing section of one of the channels of Skinner Creek. About 20 cm deep and 30 cm wide. Sunny in May but completely hidden by dense sedges in August.

5 – Small pond within long, East-West ditch near the center of its length. Maximum depth is about 15 cm. Dry in August.

6 – Series of long ponds along narrow north side of meadow at extreme West end. Maximum depth is about 15 cm. Dry in August.

7 – Upper "Cabin Creek" at the Southwest corner of the meadow. Deep and cold, with abundant sedge lying along the flow in May, so it looked like excellent summer RALU habitat. By August, the section nearest the cabin (about 150 m long) had been very closely grazed by horses.

8 – Long, slow-flowing section of rivulet in the center of the large Southwest part of the meadow. Of the several rivulets in that part of the meadow, this section forms the slowest, widest, most open pool in the otherwise dense sedges. Still oozing water in August.

9 – Rivulet on South side of meadow, opposite Line Creek. It splits into 2 channels about 100 m before flowing into Desolation Creek. The Eastern channel has several large potholes that were at least 2 m deep, but only held a few cm. of water in August.

10 – West end of long, East-West ditch. Flowing water in May. In August, this end of the ditch was oozing water, in large area of dense sedges in very shallow water.

11 – Small oxbow (5 X 1 m) surveyed in August, that was a small side channel at higher water. Shallow with gravel substrate, but North edge deeper with small overhanging bank.

12 – Section of "Lost Creek" on the South central edge of the meadow. Very shallow but slightly flowing in May and August, without a well-defined channel.

13 – Sharp curve in lower section of "Cabin Creek" just below where it turns to flow West. Very slow flow in May and August, with mud and gravel substrate. Sunny, dense sedge around edges.

14 – On the North side of Desolation Creek near the West end of the meadow. Two, small off-channel ponds, still holding shallow water in August.

15 – Near East end of meadow in mature conifer area. Shaded overflow channel with several tiny pools retaining water in August.

Table 2. **DESOLATION MEADOW AMPHIBIAN SURVEYS – NUMBERS OF EACH SPECIES AND DEVELOPMENT STAGE AT EACH SITE.** See Figures 1 and 2 for site locations. RALU = Columbia spotted frog, BUBO = western toad, HYRE = Pacific treefrog, AMMA = long-toed salamander. A/J/M = numbers of adults, juveniles, and metamorphs counted during surveys. L/E = numbers of larvae and egg masses counted or estimated during surveys (confirms breeding by that species at that site). May = first survey in May, Aug. = second survey in August.

| | **RALU** | | **BUBO** | | **HYRE** | | **AMMA** | |
|---|---|---|---|---|---|---|---|---|
| **SITE** | **A/J/M** | **L/E** | **A/J/M** | **L/E** | **A/J/M** | **L/E** | **A/J/M** | **L/E** |
| **1 -** May | 1/ 0/ 0 | 200/0 | 1/ 0/ 0 | | | 100/ 0 | | 3/ 6 |
| Aug. | | | | | | | | 1/ 0 |
| **2 -** May | 1/ 0/ 0 | | | | | 0/ 3 | | 2/ 4 |
| Aug. | | | | | | | | |
| **3 -** May | 4/ 1/ 0 | 500/1 | | | | 60/ 20 | | 4/ 10 |
| Aug. | | | | | | | | |
| **4 -** May | 1/ 0/ 0 | | | | | | | |
| Aug. | | | | | | | | |
| **5 -** May | 0/ 2/ 0 | | | | | 0/ 5 | | |
| Aug. | | | | | | | | |
| **6 -** May | | | | | 1/ 2/ 0 | 600/0 | | |
| Aug. | | | | | | | | |
| **7 -** May | | | | | 3/ 0/ 0 | | | |
| Aug. | | | | | | | | |
| **8 -** May | | | | | 4/ 0/ 0 | 0/ 25 | | |
| Aug. | 0/ 0/ 1 | | | | | | | |
| **9 -** May | 0/ 1/ 0 | | | | | | | |
| Aug. | 1/ 0/ 0 | | | | | | | 6/ 0 |
| **10-**May | | | 1/ 0/ 0 | | | | | |
| Aug. | | | | | 0/ 0/ 1 | | | |
| **11-**May | | | | | | | | |
| Aug. | 4/ 0/ 0 | | | | 1/ 0/ 0 | | | |
| **12-**May | | | | | | | | |
| Aug. | 0/ 4/ 0 | | | | | | | |
| **13-**May | | | | | | | | |
| Aug. | 1/ 0/ 1 | 3/ 0 | | | | | | |
| **14-**May | | | | | | | | |
| Aug. | 0/ 0/ 1 | | | | | | | |
| **15-**May | | | | | | | | |
| Aug. | | | | | | | | 2/ 0 |
| **TOTALS:** | | | | | | | | |
| **MAY** | 7/ 4/ 0 | 700/1 | 2/ 0/ 0 | | 8/ 2/ 0 | 760/53 | | 9/ 20 |
| **AUG.** | 6/ 4/ 3 | 3/ 1 | | | 1/ 0/ 1 | | | 9/ 0 |