

TRIP REPORT

Date: October 15-16, 2007
Site: Pahrangat National Wildlife Refuge
Agencies: U.S. Fish and Wildlife Service (FWS).
Personnel: Michael Burroughs, Shawn Goodchild
Purpose: Northern Leopard Frog and Speckled Dace Surveys

Background:

Our office was contacted by the Pahrangat National Wildlife Refuge to conduct spring surveys, primarily to ascertain presence and distribution of Northern leopard frogs and speckled dace. Current information regarding these two species was required for Refuge planning.

Summary:

Minnow traps for speckled dace were set on October 15, 2007, at five sites: Cottonwood Spring (North and South), L Spring, Lone Tree Spring, and Maynard Spring (North and South). Diurnal and nocturnal ocular and dip net surveys were also conducted at the above sites, as well as the BLM stock tank immediately east of Highway 93. One yearling leopard frog was observed at L Spring. Bullfrogs and *Gambusia* were observed at both Cottonwood Spring sites. No other fish or frogs were detected. CPUE was not determined due to long set time.

Details:

Cottonwood Spring South

A total of 7 traps were set at approximately 1415. The water temperature was 19°C. Five traps were set in the spring pool, two in the outflow. A total of 255 *Gambusia* were captured in the spring pool. A total of one *Gambusia* was captured in the outflow, in addition to two large Dystichid beetles. At least one juvenile and one adult bullfrog were present at the pool. No tadpoles were captured.

Gambusia were very abundant in the spring pool. In addition, they appeared to be in very good condition. Interestingly, no bullfrog tadpoles were seen or captured, which suggests either the productivity of bullfrogs in the pool was poor, or they were a result of immigration. Due to sediments and organic material, water level was fairly shallow. This likely contributed to the decline of the speckled dace by providing a favorable habitat for *Gambusia* and allowing for little niche separation between the two species. There was little flow in the outflow, which was unchannelized and spread out over mudflats. The water was probably too shallow for dace.

Cottonwood Spring North

Cottonwood Spring North consists of an approximately 100-meter long body of water in a ditch which was apparently built over a high water table or a spring. The majority of the substrate consisted of algae and/or a *Chara*-like plant, with the exception of a portion of the ditch that was shaded by a Russian olive, which was without aquatic vegetation. In general the depth to top of vegetation was approximately 2-6 inches.

Five traps were set at 1400, pulled at approximately 1300, and the water temperature was 17°C. A total of 82 *Gambusia* and 90 bullfrog tadpoles were captured. Three juvenile bullfrogs were captured in the traps. The number of *Gambusia* captured seemed to greatly underestimate their true abundance, since they appeared to be extremely abundant and similar in body condition as in Cottonwood Springs South. Over 10 juvenile bullfrogs were seen during nocturnal surveys, and the abundance of tadpoles suggest there is strong bullfrog reproduction at this site.

Lone Tree Spring

Lone Tree Spring was a small spring containing heavy overgrowth of emergent vegetation. A portion of the spring occurred under the canopy of a cottonwood, and was relatively open water. It was difficult to find sites to place traps due to shallow water depth. The water was turbid, and elk sign were present. Two traps were set at 1530, and water temperature was 20 °C. The site had a moderate hydrogen sulfide smell, and the water appeared to be poorly oxygenated based on substrate and lack of insects. Traps were pulled at approximately 1130. No fish or frogs were seen or captured, and one large *Dystichid* beetle was captured in the traps. Suitable leopard frog habitat occurs at this site. Although no leopard frogs were seen, they may be present. This site could be considered for repatriation of leopard frogs with some manipulation. No bullfrogs or their larvae were observed at this site.

BLM Stock Tank

This stock tank is a dug out spring approximately 50 meters east of Highway 93. In the past there has been open water, which was maintained by cattle grazing. Currently cattails are extremely dense, and water level is approximately 2 inches at the most and appears to be poorly oxygenated due to substrate and smell. In its current state, it is unsuitable for fish and not habitat for frogs.

L Spring

L Spring is a small, heavily vegetated spring with very little shallow, open water. It is highly organic, with a thick layer of muck substrate. Two small spring orifices are visible, and are essentially a small boil of water from a vent in the organic mud. Below the surface it consists of flocculated sand and organic material.

Four traps were set at approximately 1600 hours. Traps were retrieved at approximately 1100. No temperature was taken. No fish were seen or captured. Several large *Naucorid*-type insects and *Dystichid* beetles were trapped. One yearling northern leopard frog was observed during diurnal surveys, which was sitting on the bank next to a peaty shallow. Several springsnail shells and live fingernail clams were collected from the spring orifice. Additional taxonomical distinction and distributional information will be described when time permits. These collections are likely significant and could be remnant populations from the Pleistocene.

Maynard Spring (North and South)

Both of these sites were overgrown. Maynard Spring South had an extremely dense growth of cattails, and Maynard Spring North had moderate to heavy growth of cattails. It was difficult to find locations to trap, and eventually dug and cleared out two sites. Both sites were moderately sulfurous and appeared to have poor oxygen contents. No fish or frogs were captured or observed.

Culvert at Refuge Road

Two traps, extra from Maynard Springs, were set overnight in the culvert outflow of the Refuge headquarters road. A total of 23 bullhead, 2 bluegill, and 1 black bass were captured, all juveniles. It is likely the bass was largemouth. This, with common carp, was the expected suite of fish.

Recommendations:

Cottonwood Springs

The South site remains an excellent location for restoration, and has good potential for a wide range of aquatic and terrestrial species. Incorporated into site restoration should be erosion control, which would lessen storm runoff into the springpool, and rock armoring in concert with sufficient depth, which should reduce cattail growth. *Gambusia* would likely be easily removed if the site was temporarily dewatered with pumps and pipes prior or during construction. Bullfrog management would be problematic while frogs are present in the Middle Marsh. Aggressive mechanical controls would lessen chance of frog emigration from the marsh. During construction, sheets of caliche or cobble placed in shallow water, perhaps isolated by gravel berms, may provide amphibians a breeding site.

The North site currently has little value to native wildlife. It would be relatively simple to remove *Gambusia* and bullfrogs, which is recommended, by filling with substrate and reconfiguring a new spring orifice, and channel if feasible. Issues with bullfrog management at this site are the same as with Cottonwood South.

At both these sites, non-native trees such as Russian olive should be removed, and replaced by more desirable vegetation. Suggested vegetation, depending on desired target communities, may include a mix of willow species (willow flycatcher), cottonwoods (raptors, woodpeckers, wood ducks), or sedge and bunchgrass (nesting waterfowl, small mammals). These are not mutually exclusive, and several types planted would be beneficial. Native vegetation, primarily trees, would benefit the aquatic community by seasonal allochthonous inputs.

Upon restoration, it would be recommended to restock this spring with several age classes of speckled dace, as well as Pahrana gat roundtail chub. It is preferable to obtain local dace; however if not present then dace from Deacon or Brownie Spring would suffice, since they were determined to have a similar genetic makeup.

Lone Tree Spring

This spring would be problematic to develop a flowing system due to low flows. More analysis of this site should precede recommendations. A small, deep pool lined with rock may be beneficial and maintain small populations of fish. Given the size, it may be better to manage this spring for leopard frog, and not reintroduce fish.

L Spring

Given this site had a leopard frog detection, and the occurrence of the invertebrates in the spring orifice, to prevent extirpation of endemic organisms extreme care should be implemented in developing a restoration plan, if needed. Additional discussions with spring experts should guide the need for restoration. From a fisheries perspective, this spring appears to contain excessive organics, and would benefit from being dug into a small armored channel with a series of small, rock-lined, pools to maintain open, agitated, water. Small, unvegetated flats could be developed to expand leopard frog habitat; however, significant effort should be implemented to focus on microhabitat structure to benefit frogs but limit predation. Based on location and assumption bullfrogs are not present in Maynard springs, it is unlikely bullfrogs would invade; however, this needs to be analyzed.

Maynard Spring

Both these sites were overgrown with cattails, which significantly contributed to the decaying organic substrate and filamentous root masses. Given the density of the cattails, we were unable to trap effectively. It is recommended to clear several swaths within the cattails to find the deeper water, then resurvey during the spring. If fish or leopard frogs are present, clearing some cattails would enhance their breeding success. The best hand tool to clear cattails are the hand trimmers used by Ash Meadows NWR. By cutting several inches underwater, the meristem rots and there is less regrowth. Both these sites would benefit from restoration but would be complicated by the road toe and the potentially historic roadways on the side of the hill. It may be sufficient to dig out the springs to place liner and substrate, which would limit cattails. If fish are not present, it would be advisable to collect dace from Deacon and Brownie Spring to stock several age classes after restoration.