

Northern Leopard Frog *Lithobates (Rana) pipiens*

Interim report to
New Mexico Dept. of Game and Fish
Share with Wildlife Program



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OBJECTIVE

The purpose of this investigation is to understand the current distribution of the northern leopard frog (*Rana pipiens*) in New Mexico through surveys of recent and historic localities for this species and to collect *Bd* samples of *R. pipiens* captured.

INTRODUCTION

Rana pipiens is the nominal species of the *R. pipiens* complex, of which there are currently approximately 24 described species and seven undescribed species (Hills and Wilcox 2004) in North and Central America. *R. pipiens* is one of five native leopard frog species in New Mexico. The range of *R. pipiens* ranges from southern Quebec west to the extreme southern Mackenzie District of Canada, and south to Pennsylvania and Kentucky with isolated records in Maryland and West Virginia. It occurs west to the Pacific states and south to Nevada, Arizona, New Mexico, and throughout the Rocky Mountain states (Degenhardt et al. 1996 and Stebbins 2003). *R. pipiens* is known to occur from elevations near sea level to approximately 3050 m (Stebbins 2003).

R. pipiens is listed as a Species of Greatest Conservation Need (SGCN) in New Mexico (New Mexico Department of Game and Fish (NMDGF) 2016), but this species currently has no legal protection in New Mexico except from commercial collection. NatureServe codes for *R. pipiens* are vulnerable for the state and demonstrably secure nationally (BISON-M 2023). In 2006, the Center for Biological Diversity and others petitioned the U.S. Fish and Wildlife Service to list the western populations of *R. pipiens* under the Endangered Species Act, recognizing its vulnerable status in the Southwest (2006, Petition to list Western United States DPS of the Northern Leopard Frog). In a 12-month finding, USFWS determined that listing was not warranted at that time (USFWS 2011).

Declines have been reported throughout the range of *R. pipiens*, but mostly in the west (Alberta and British Columbia, Canada Montana, Idaho, Washington, Oregon, California, Nevada (Stebbins 2003, Lannoo 2005); parts of Utah (Lannoo 2005); Colorado (Corn and Fogelman 1984; Hammerson 1999); Arizona (Arizona Game and Fish Department), and New Mexico (NMDGF, C. W. Painter and R. D. Jennings *unpub. data*) in the United States. In New Mexico, declines have been reported from the Lower Rio Grande below Caballo Reservoir *pers. comm.* D. Burkett, J. Stuart, in the Jemez Mountains (*pers. obs.* Cummer et al. 2002), and in the Chuska Mountains (Painter and Jennings *unpubl. data*). Suggested reasons for declines have varied as our understanding of the scope of worldwide amphibian declines has increased. While pollution and habitat loss are obvious problems with solutions, amphibian pathogens such as the chytrid fungus, *Batrachochytrium dendrobatidis* (*Bd*) are widespread and problematic within amphibian communities and pose a threat to all native amphibians. Christman and Jennings (2018) documented *Bd* in 12 of 21 amphibian species sampled over 18 years and from every major river system in New Mexico.

The bullfrog (*Rana catesbeiana*) is a non-native invasive species in New Mexico (Figure 1) and have been implicated in the decline of native ranid frogs and other riparian obligate herpetofauna in the west (Hammerson 1982, Hayes and Jennings 1986, Schwalbe and Rosen 1988). *R. catesbeiana* may impact other frog species through intense predation, predatory or competitive larval interactions, and the transmission of parasites or pathogens (Hammerson 1999). However, native frogs have also declined in the absence of *R. catesbeiana* (e.g., high elevations in Colorado [Corn and Fogleman 1984; BLC *pers. obs.*]), which confounds the question of why native frog species are declining. Bullfrogs in New Mexico nevertheless are an exotic species in the state and considered undesirable.



Figure 1. Bullfrog (*Rana catesbeiana*), Santa Fe River. Photo by B. Christman.

METHODS

To identify historic localities of *R. pipiens*, we contacted the Museum of Southwestern Biology at the University of New Mexico to request *R. pipiens* museum records. Dr. Randy D. Jennings at Western New Mexico University was also contacted to see what further data he had regarding this species because he and Charlie Painter (NMDGF) had begun work on this species in the early 2000's. Dr. Jennings provided a spreadsheet of historic records from museums across the country that hold collections of *R. pipiens* from New Mexico (see Christman 2009 and Christman 2010). We relied upon sites with positive *R. pipiens* detections from Christman 2010 to guide current survey efforts.

During our initial literature review and museum specimen research, we determined that the areas in which *R. pipiens* populations are likely to be extant include the San Juan River below Navajo

Dam, the Chama area, the east slope of the Sangre de Cristo Mountains, drainages in the Mora area and north, and downstream of Cochiti Reservoir on the Rio Grande. This last area is governed by a patchwork of tribal entities and therefore it may be difficult to obtain permission to access.

Amphibians were surveyed in aquatic habitats following U.S. Fish and Wildlife Service survey protocols (2002) developed from Arizona Game and Fish Department guidelines (Blomquist et al. 2000). Surveys involved walking the perimeter of stock tank and stream habitats watching for jumping frogs (plop counts), listening for calls, and dip-netting under banks and in vegetation for adult and larval amphibians. Binoculars were used to observe frogs at a distance. Temperature data were collected at aquatic habitats surveyed using a Miller Weber quick reading cloacal thermometer (appropriate for air, water, or body temperature measurements).

Chytrid Fungus Investigations

Tissue sampling for chytrid fungus *Batrachochytrium dendrobatidis* (*Bd*) infections in *R. pipiens* populations was conducted by swabbing the ventral skin surface of frogs' bodies and thighs with sterile wooden cotton swabs to collection skin tissue. The end of the wooden swab was then cut off and placed into a vial with 70% ethanol and labeled with date, locality, and species for later reference. Each frog for which a skin sample was collected was weighed, measured, and sexed. Each frog was handled using a fresh pair of nitrile gloves and clean plastic bags in an attempt to prevent contamination between samples. Samples will be mailed to Pisces Molecular in Boulder, Colorado for genetic analysis later this year.

Specimen Collection

Specimens (not to exceed two adults or five tadpoles) were collected at sites with populations with 20 or more frogs and 100 tadpoles in order to provide voucher specimens for future research; genetic samples were collected at each site (not to exceed 5 samples per population). Adult amphibian and reptile specimens were preserved in 10% formalin and larval amphibian specimens were preserved in 5% formalin. Tissue samples were preserved in 95% ethanol. All whole amphibian and reptile specimens and tissue samples were deposited at the Museum of Southwest Biology (MSB) at the University of New Mexico, Albuquerque. See Table 1 for specimen information.

Specific locality data of sites and collections (Table 1) were derived from U. S. Geological Survey (USGS) 7.5 min quadrangle maps and the use of a Garmin eTrex Global Positioning System (GPS) instrument recording coordinates in Universe Transverse Mercator (UTM) and North American 1983 (NAD83) datum.

Permits

Investigations and collections were conducted under the appropriate state permit (NMDGF Scientific Collecting Permit 2969). Permits or permissions have been issued for surveys at Coyote Creek, Cimarron Canyon, and Morphy Lake New Mexico State Parks; Charette Lakes, Elliot Barker, Humphries, L Bar, Marquez, and Sargent NMDGF properties; Bureau of Land

Management; Gila, Santa Fe, Carson, and Cibola National Forests; Valles Caldera National Preserve; the Navajo Nation; Sevilleta, Bosque del Apache, Rio Mora and Maxwell National Wildlife Refuges; and three ranches.

RESULTS

Surveys

We surveyed 22 sites from 30 April – 26 June, 2023 (Table 1). *R. pipiens* were found at five of those localities (Cedro Canyon, Redondo Creek, San Antonio Creek, Sapello River, and Coyote Creek). Two of these sites supported populations in 2009 – 2010 (Cedro Canyon and Coyote Creek), and two were new localities (San Antonio Creek and Redondo Creek). Other species encountered included the Boreal Chorus Frog (*Pseudacris maculata*), *R. catesbeiana* and Woodhouse's Toad (*Bufo woodhousei*) (Table 1).

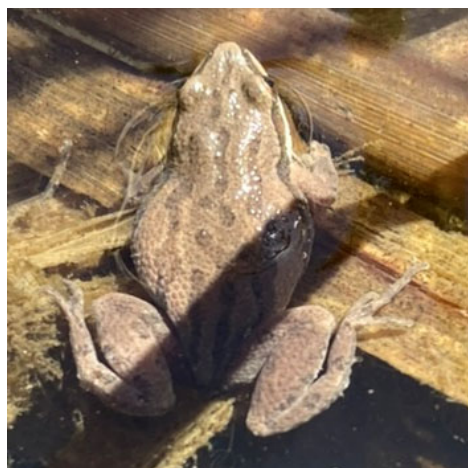


Figure 2. *Pseudacris maculata*.



Figure 3. *Bufo woodhousei*. Photos by B. Christman.

As of 26 June, surveys have been conducted at one site in Socorro County, five sites in Sandoval County in the Jemez Mountains (Santa Fe National Forest), two sites in Santa Fe County on BLM property, seven sites in Rio Arriba County along the Chama River, two sites in Taos County on Carson National Forest, three sites in San Miguel County on private land, one site on NMDGF property (Charette Lakes), and one New Mexico State Park (Coyote Creek) (Table 1).

Comparisons between 2010 and 2023 show a reduction in the number of occupied sites (Table 1). We surveyed five localities at which *R. pipiens* was detected in 2010 (Santa Fe River, Cedro Canyon, Manuelitas Creek, Coyote Creek, and Upper Charette Lake); *R. pipiens* was still present in only two localities (Cedro Canyon and Coyote Creek). The Santa Fe River appears to be currently dominated by *R. catesbeiana*; these were present in 2010 but seem more abundant in 2023. Manuelitas Creek experienced significant post-fire flooding events from the Hermits Peak/Calf Canyon Fire in 2022, which has resulted in habitat quality loss (specifically loss of wetland habitats) and may have had a negative impact on *R. pipiens* at this locality. Upper

Charette Lake was dry during our survey on 6 May, which explains why no *R. pipiens* were detected.

At Cedro Canyon (reported as Cerro Canyon in Christman 2010) in the Cibola National Forest, we observed four *R. pipiens* and three egg masses. We observed two subadult *R. pipiens*: one in Redondo Creek and one in San Antonio Creek; both creeks drain out of the Valles Caldera National Preserve (VCNP). These subadult individuals are believed to be frogs dispersing from breeding sites established in 2014 after reintroduction efforts in the VCNP. *R. pipiens* were also observed in on the Sapello River (n=2) in San Miguel County and at Coyote Creek State Park (n=4) in Mora County.

Chytrid Fungus *Bd* Results

To date we have collected five *Bd* swabs (Table 1) and have not had those analyzed yet.

Future Plans

We plan further surveys in Colfax County.

Table 1. Sites surveyed for *R. pipiens*, April – July, 2023. Species abbreviations: Amma = *Ambystoma mavortium*, Buwo = *Bufo woodhousei*, Psma = *Pseudacris maculata*, Raca = *Rana catesbeiana*, Rapi = *Rana pipiens*.

Date	Locality	County	Species	Bd swabs	Breed site	Habitat type
30-Apr	La Jencia Creek	Socorro	Buwo			riverine
30-Apr	Cedro Canyon #1	Bernalillo	Rapi	yes	yes	riverine
	Cedro Canyon #2	Bernalillo				
1-May	Santa Fe River, BLM	Santa Fe	Raca			riverine
	Santa Fe River	Santa Fe				
1-May	pond, BLM	Santa Fe	Raca			earthen tank
2-May	E. Fork Jemez River #1	Sandoval	none			riverine
	E. Fork Jemez River #2	Sandoval				
2-May	Redondo Creek #1	Sandoval	Rapi	no	no	riverine
	Redondo Creek #2	Sandoval				
2-May	Sulphur Canyon	Sandoval	none			riverine
2-May	E Fork Jemez River	Sandoval	none			riverine
3-May	San Antonio Creek #1	Sandoval	Rapi, Psma	1	no	riverine
	San Antonio Creek #2	Sandoval				
4-May	Sapello river #1	San Miguel	none			riverine
4-May	Sapello river #2	San Miguel	Rapi	1	yes	riverine
5-May	Coyote Creek SP #1	Mora	Rapi, Psma	2	yes	riverine
	Coyote Creek SP #2	Mora				
6-May	Manuelitas Creek	San Miguel	none			riverine
6-May	Upper Charette Lake	Mora	none			lake
23-Jun	Rio Grande del Rancho	Taos	none			riverine/beaver pond
23-Jun	Rio Chiquito	Taos	none			riverine
24-Jun	Chama River #1	Rio Arriba	none			riverine
24-Jun	Chama River #2	Rio Arriba	none			riverine
24-Jun	Chama River #3	Rio Arriba	none			riverine
25-Jun	Chama River #4	Rio Arriba	none			riverine
26-Jun	Cebolla River	Rio Arriba	Buwo	no		riverine
26-Jun	Chama River #5	Rio Arriba	none			riverine
26-Jun	Rio Gallenas	Rio Arriba	none			riverine
10-Jul	Upper Underwood Lake	Taos	Amma	no	no	lacustrine
10-Jul	unnamed stock tank	Taos	none			pond
10-Jul	Beaver Lakes #1	Taos	Psma, Amma			lacustrine
10-Jul	Beaver Lakes #2	Taos	Amma			lacustrine
10-Jul	Beaver Lakes #3	Taos	Amma			lacustrine
10-Jul	Beaver Lakes #4	Taos	Amma			lacustrine
10-Jul	Beaver Lakes #5	Taos	Amma			lacustrine
11-Jul	Vermejo River #1	Colfax	Rapi, Buwo			riverine
	Vermejo River #2	Colfax				
11-Jul	Vermejo River, off channel pool	Colfax	Rapi		yes	wetland

11-Jul	Vermejo River #3	Colfax	Rapi, Buwo			riverine
	Vermejo River #4	Colfax				
11-Jul	Vermejo River #5	Colfax	Rapi, Buwo	yes		riverine
	Vermejo River #6	Colfax				
11-Jul	Van Bremmer Canyon #1	Colfax	Rapi, Buwo, Amma		yes	riverine/wetland
11-Jul	unnamed Tank #1, Van Bremmer Canyon	Colfax	none			stock tank
11-Jul	unnamed Tank #2, Van Bremmer Canyon	Colfax	none			stock tank
11-Jul	Van Bremmer Canyon #2	Colfax	Rapi, Amma		yes	riverine/wetland
12-Jul	unnamed stock tank	Colfax	Amma			stock tank
12-Jul	Van Bremmer Canyon #3	Colfax	None			riverine
12-Jul	Van Bremmer Canyon #4	Colfax	None			riverine
12-Jul	Lower Vermejo River	Colfax	Rapi, Buwo			riverine/beaver pond
12-Jul	Van Bremmer Canyon #5	Colfax	None			riverine
12-Jul	pond in the plains	Colfax	Buwo, Psma			stock tank
12-Jul	Ponil Creek	Colfax	Raca			riverine
13-Jul	pond, Fowler Pass	Colfax	Psma, Amma			wetland
13-Jul	wetland, Fowler Pass	Colfax	Psma, Amma			wetland
13-Jul	Bonita Creek #1	Colfax	None			riverine
	Bonita Creek #2	Colfax				
13-Jul	Crater Lake	Colfax	Psma, Amma			pond
13-Jul	Cimarroncito Reservoir	Colfax	Rapi, Amma			reservoir
13-Jul	Cerrososos Creek #1	Colfax	None			riverine
13-Jul	Cerrososos Creek #2	Colfax	None			riverine
13-Jul	windmill, Cerrososos Creek	Colfax	Rapi, Buwo			drinker & pond
14-Jul	windmill, lower Cerrososos Creek	Colfax	Raca, Buwo, Amma			drinker & pond
14-Jul	Cerrososos Creek #3	Colfax	None			riverine
14-Jul	No.2 Lake	Colfax	Buwo, Raca			lacustrine
14-Jul	unnamed stock tank	Colfax	tadpole shrimp			stock tank

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