

IT'S NOT EASY BEING GREEN

Montana's amphibians have not escaped the die-offs plaguing much of the world. But some species are getting a boost from actions by tribal, state, and other wildlife programs. **BY JULIE LUE**



WHERE DID THEY GO? Northern leopard frogs are common in Montana east of the Continental Divide. But for reasons unknown, the 3.5-inch amphibians have all but disappeared from the west side of the Divide. Until a recent introduction at two sites, the species had not been seen on the Flathead Indian Reservation in years, despite abundant streams, ponds, marshes, and other typical habitats.



Art Soukkala searches for leopard frogs on the Flathead Indian Reservation.

The cows watch curiously as Art Soukkala, wearing hip waders and carrying a long-handled net, stalks the edge of their pasture, on the Flathead Indian Reservation near Lonepine, about 30 miles west of Polson. A wildlife biologist with the Confederated Salish and Kootenai Tribes (CSKT), he is here on this late summer day with the landowner's permission to search for northern leopard frogs. Until recently, the amphibians had not been seen in this part of Montana for decades.

Within minutes, Soukkala pounces, then holds up a tiny frog the color of sagebrush, with round, sticky pads on its toes. Its body is scarcely longer than a thumbnail. "Pacific tree frog," Soukkala says. "At first I thought it was a grasshopper." He releases the small frog, and five minutes later, he's found another, sizably bigger one.

Though well-camouflaged among the plants, in hand this larger frog is vividly marked. Its body is white below and brownish-green above, with two pale ridges down the back and rows of dark, oval blotches surrounded by lighter halos—leopard spots.

"Young-of-the-year," says Soukkala. It's a northern leopard frog.

TROUT FOOD Pacific tree frogs are tiny amphibians native from western Montana to the Pacific Northwest as far north as southern Alaska. The species seems particularly vulnerable to predation by trout introduced to ponds, lakes, and streams.

Thanks to a tribal reintroduction effort that began in the early 2000s, northern leopard frogs are not only surviving here but also breeding and moving into new areas.

The success of this frog-friendly project and other efforts to protect and improve habitat in western Montana may signal that, despite abundant bad news for amphibians, there's something we humans can do to help.

SMALL BUT MIGHTY

With its high mountains, semiarid plains, and long, cold winters, Montana is not the most hospitable place for amphibians. It's home to relatively few native species: four

salamander species and nine frog and toad species. Yet these small animals play a key role in ecosystems across the state. They can be found in a wide variety of habitats, from forests to prairies, mountains to valleys, beaver ponds to backyards.

Amphibians live a "double life" (from the Greek word *amphibios*), both in water and on land—think tadpoles turning into frogs. They are also cold-blooded, what scientists refer to as "ectotherms."

"As ectotherms, amphibians are super important for channeling energy up the food chain," says Bryce Maxell, program coordinator of the Montana Natural Heritage Program and a co-author of *Amphibians and Reptiles of Montana*. "Amphibians gain energy from the aquatic environment as tadpoles and transfer that energy to the terrestrial environment when they metamorphose and are eaten by predators. They don't burn calories the way birds or mammals do, and they use every bit of energy that goes into them to increase their body mass."



CLOCKWISE FROM TOP: BRIAN TORNABENE; JULIE LUE; JULIE LUE

“As ectotherms, amphibians are super important for channeling energy up the food chain.”



NOWHERE TO HIDE Worldwide, amphibians are disappearing faster than any other group of animals. In North America, threats include habitat loss and degradation, pesticides, non-native predators such as bullfrogs, and, most damaging, an infectious disease caused by the chytrid fungus. “We’ve even found the fungus in the center of the Bob Marshall Wilderness,” says one expert.

In other words, it takes less food to grow a pound of frog or toad than a pound of mammal or bird. In turn, amphibians provide an important food source for everything from great blue herons to bobcats, even humans.

Amphibians, which absorb both air and water through their porous skin, also are important indicator species, according to Montana Fish, Wildlife & Parks nongame wildlife biologist Torrey Ritter. “If environmental contaminants are entering a system, or if a changing climate is affecting certain aquatic habitats, or if some other not-so-obvious disturbance is occurring, then amphibians will be one of the first species to be affected,” he says. “They act as an early warning system, giving scientists and policymakers time to respond before the disturbance gets out of control.”

Julie Lue is a writer in Florence.

THREATS GALORE

Amphibians are the most endangered group of animals on the planet. Since the 1970s, they have suffered massive die-offs worldwide due to habitat loss and degradation, pollutants like pesticides and herbicides, non-native predators, roads, and, perhaps most importantly, an infectious disease caused by the chytrid fungus.

The fungus, which attacks the animals’ skin, has spread to every continent except Antarctica. One reason is the use of live African clawed frogs exported around the world for human pregnancy testing in the 1930s through 1950s. Another is the proliferation and spread of the American bullfrog. Bullfrogs, which are less susceptible to the fungus’s ill effects, transmit the disease to more vulnerable species.

“No water body is safe from the fungus,” Maxell says. “We’ve found it even in the center of the Bob Marshall Wilderness, one of

the farthest places you can get from a road.”

Amphibian populations in eastern Montana are still doing fairly well, according to Maxell. So far, they have managed to adapt to warmer temperatures and earlier springs caused by climate change.

But in western Montana, western toads and northern leopard frogs have suffered dramatic declines since the 1970s. Though the toads remained fairly widespread, extensive surveys of Montana water bodies between 2000 and 2007 found them in only 1 to 2 percent of breeding sites. And west of the Continental Divide, northern leopard frogs were found only in two places near Kalispell and Eureka.

LEOPARD FROGS COME HOME

Dale Becker, CSKT Tribal Wildlife Program manager from 1989 until his retirement in early 2021, says that after successfully reintroducing peregrine falcons to the Flathead

Reservation, he and his team considered whether they could return any other native species that had disappeared. Northern leopard frogs fit the bill. They had not been seen on the reservation since 1980, but records showed they were fairly common in the Mission Valley in the 1970s. Becker also recalled conversations with tribal elder Charlie McDonald, who grew up on the reservation in the early 1900s: “He told me about these frogs that he never saw or heard anymore.”

Then in 1993 herpetologist Kirwin Werner walked into Becker’s office. A graduate of Cut Bank High and Carroll College, Werner had returned to Montana after retiring from teaching herpetology at Northern Michigan University. He and his wife settled outside of Ronan, where he began teaching at the Salish Kootenai College and would later serve as the senior co-author of *Amphibians and Reptiles of Montana*. Werner asked if there were any projects he could work on.

Werner, former CSKT wildlife biologist Janene Lichtenberg, and Soukkala began reintroducing leopard frogs to the reservation. The plan was to collect egg masses, instead of tadpoles or adults, to avoid transporting disease or depleting source populations.

Genetic testing showed little variation among leopard frogs across the state, allow-

ing biologists to use eastern Montana as a source. The scientists collected eggs in the Havre and Malta areas, and the Blackfeet, Assiniboine, and Gros Ventre tribes allowed them to gather eggs from breeding sites on their lands.

After collection, the eggs were flushed with clean water and transported back to the Flathead Reservation in insulated beverage coolers. But releases into a wetland near Pablo from 2003-06 failed to produce adult frogs. “We’re not sure why,” says Soukkala. “Spotted frogs overwinter in the area, but only a few leopard frogs survived.” The team shifted focus to a large, recently restored wetland near Lonepine, on tribal lands set aside for wildlife habitat mitigation as part of the SKQ Dam (previously Kerr Dam) settlement. The wetland contains almost no standing water in late summer, preventing hungry fish from living there.

“It draws down over the summer,” Soukkala says, “which is what you want for amphibian breeding. It stays wet long enough for the frogs to metamorph and then they head off because they’re more of a grassland species. But it minimizes the threat of aquatic predator populations for the tadpoles and eggs.”

The group also settled on a new method to give the frog larvae a head start—hatching eggs in tanks and letting them grow for a few days, in Werner’s garage or Soukkala’s basement. “Then you just dump them in,” Soukkala says with a laugh.

Releases at the new site began in 2006 and continued through 2015. Within two years, frogs were overwintering. Within four, they were heard calling during the breeding season. Egg masses, confirming natural reproduction, were first found in 2013. Tadpoles were also released in several locations downstream, including some smaller wildlife habitat mitigation lands.

Then in 2017, CSKT fisheries specialist Cindy Bras-Benson brought a photo of a frog to work. Her father, Bud Bras, had found unfamiliar frogs hopping all over the tribal lands he leases for growing hay near Lonepine. When Bras-Benson showed Soukkala the picture, he was thrilled. It showed that northern leopard frogs were colonizing new areas three or four miles from the closest reintroduction site. “Kirwin

CLOCKWISE FROM TOP RIGHT: JEREMIE HOLLIMAN; NATHAN COOPER; RANDY BEACHAM; JEREMIE HOLLIMAN; ANDREW DUBOIS; ART SOUKKALA



NATHAN COOPER

Montana amphibians

A few of the state’s 13 native species

Columbia spotted frog



Woodhouse’s toad



Western toad



Long-toed salamander



Plains spadefoot toad



would have been thrilled too,” Soukkala says, explaining that the herpetologist passed away in 2015, just as the leopard frog population was taking off.

Soukkala says he will continue monitoring the frogs’ expansion from reintroduction sites and would like to begin another reintroduction elsewhere on the reservation. “At some point we hope to be able to use our own ‘home-grown’ eggs in addition to those we obtain from eastern Montana.”

UPPER BITTERROOT PROJECT

Roughly 150 miles south of the Flathead Reservation, another amphibian project is under way. On an August morning, a small group of FWP employees and volunteers—including two hardy 12-year-olds—gathers along Overwhich Creek, in the West Fork drainage of the Bitterroot River. Ritter, the FWP biologist, and Alexis McEwan, assistant zoologist for the Montana Natural Heritage Program, are demonstrating the proper procedure for a kick-net survey. They drag their feet in the streambed, disturbing cobbles and upending rocks while holding large nets downstream to catch whatever floats free.

Amid the debris in her net, McEwan finds several dark, wriggling creatures, each with a long tail marked with a white spot. These are larvae, or tadpoles, of the Rocky Mountain tailed frog. The tadpoles use their suckerlike



mouth to cling to rocks in mountain streams, where they live and grow for about three years before undergoing metamorphosis.

The group is revisiting stream segments surveyed the previous year, following a project to remove non-native Yellowstone cutthroat trout above Overwhich Falls. In 2017, 2018, and 2019, roughly 10 miles of small streams above the falls were treated with rotenone, an organic toxicant that kills fish and other gill-breathing organisms.

“The primary goal was to remove a source of non-native cutthroat genes from the West Fork,” says now-retired FWP fisheries biologist Chris Clancy, who planned the project with Mike Jakober, a Bitterroot National

Forest fisheries biologist. Streams above Painted Rocks Reservoir but below Overwhich Falls contain genetically pure native westslope cutthroats, which are vulnerable to hybridization with Yellowstone cutts “dribbling over” the falls. Removing trout above the falls ends any genetic dilution.

A SAFE PLACE

A secondary goal is to leave the streams above the falls fishless, as they were historically, to create a refuge for amphibians. The area is rich in tailed frogs, western toads, Columbia spotted frogs, and long-toed salamanders. Removing a non-native predator may help them flourish, and making these shallow, hard-to-reach streams fishless barely makes a dent in local angling opportunities. Upstream from Painted Rocks Reservoir, anglers can fish roughly 200 miles of streams containing westslope cutthroat trout.

The project does come with what Clancy calls a “short-term pain, long-term gain” for amphibians. Rotenone causes considerable mortality among tadpoles, though some manage to survive, likely by burrowing in the stream bottom. Ritter says the most recent tailed frog survey on several treated streams was encouraging, with decent numbers of both tadpoles and adults to help the population bounce back.

Nongame biologists like Ritter work directly with individual species, including tailed frogs, black swifts, and great gray owls. But with the responsibility for managing hundreds of species, including amphibians, FWP’s Nongame Wildlife Program is increasingly focusing on protecting varied habitats in larger landscapes, according to bureau chief Kristina Smucker. “That way you can help more than just one species at a time,” she says. Among the many recent FWP habitat acquisitions or easements benefiting fish and wildlife including amphibians in western Montana:

- ▶ Lake Creek Conservation Easement north of Whitefish;
- ▶ North Shore Wildlife Management Area on Flathead Lake;
- ▶ a riparian restoration project on Spotted Dog WMA near Deer Lodge; and
- ▶ the Stumptown addition to Garrity WMA near Anaconda, which protects riparian habitat along Warm Springs Creek.

Even if a habitat project helps only a single frog species, with a frog’s remarkably varied life history “it’s like getting three or

Hear what frogs and toads have to say

The Montana Natural Heritage Program’s Montana Field Guide, available at fieldguide.mt.gov, provides information about Montana’s amphibians and a chance to listen to their calls. To create and download or print a custom field guide for a specific area, use the “species snapshot” function.



four species in one,” Ritter says. “They start out as this little swimming, weird-looking alien thing with a round head and a tail, then they grow tiny little legs, then they turn into a frog with a tail, and then most turn into an adult tail-less amphibian. It’s just an unbelievable transformation.”

Yet as remarkable as Montana’s native

frogs are, Ritter adds, their sensitivity to pollutants, habitat loss, disease, and bullfrogs leaves them vulnerable to human development. “The CSKT and Overwhich Creek projects and the various habitat projects all show ways we might be able to mitigate that and help at least some of the frog species struggling to survive,” he says. 🐸

TOP TO BOTTOM: BECCA WOOD; KRISTINA SMUCKER

FINDING ROTENONE SURVIVORS Below left: One year after it was last treated with rotenone to remove non-native trout, surveyors on Overwhich Creek sort through debris in kick-nets looking for Rocky Mountain tailed frog tadpoles. Lower right: Buckets hold an adult tailed frog and several tadpoles, which were returned to the stream after identification. One goal of fish removal is to create a refuge for native amphibians.



PHOTOS: JULIE LUE; MAP: LIKE DURAN/MONTANA OUTDOORS

BULLFROG BULLIES

In addition to risks posed by pollutants, habitat fragmentation, and disease, frogs face elimination by one of their own. Outside its home range in the eastern United States, the American bullfrog threatens many native bird, rodent, reptile, and amphibian populations, earning it a spot on the list of 100 worst invasive species in the world. Bullfrogs can now be found in 40 countries and nearly every U.S. state.

The aquatic invaders were likely introduced to Montana by people who wanted to hunt or raise them for food, or as unwanted pets released into the wild. (Note: Bullfrogs have been a prohibited species in Montana since 2005.) Populations are especially well-established in the Bitterroot Valley, along the lower Yellowstone River (particularly downstream from Laurel), and in parts of the lower Flathead River Basin, including Lonepine Reservoir, occupied by reintroduced northern leopard frogs.

Large, prolific, and voracious, bullfrogs vacuum up anything they can fit in their super-sized mouth, including ducklings, small snakes, fish, rodents, other amphibians, and even bullfrogs smaller than themselves. They also can spread the chytrid fungus.

The Bitterroot Valley is especially hospitable to bullfrogs, says Bryce Maxell, program coordinator of the Montana Natural Heritage Program, because of the abundant artificial ponds built by homeowners. Many are bowl-shaped: deep and steep-sided. Though often designed for fish, they also provide habitat for bullfrogs, whose tadpoles need deep water for overwintering (in cold climates, they

grow for two years or more before undergoing metamorphosis). In contrast, saucer-shaped ponds—shallow, with gradual edges—favor native amphibians, many of which complete metamorphosis weeks or months after hatching.

Controlling bullfrogs may be extremely difficult in the Bitterroot and along parts of the Yellowstone, Maxell says. But habitat modification—turning bowl-shaped ponds into saucers—would help support native amphibians, as well as shorebirds and other bird species. Direct control efforts should be focused, he says, on new areas where bullfrogs are reported. “It’s kind of like a wildfire. You want to put out embers that are falling.”

Kristina Smucker, FWP’s Nongame Wildlife Bureau chief, says the department has teamed up with the Montana Conservation Corps and Montana Department of Natural Resources & Conservation on a pilot project starting this summer that will test the effectiveness of different bullfrog eradication methods in western Montana. “We’re also urging people to learn how to identify bullfrogs and then report sightings to their local FWP office,” she says. ■



Learn to identify bullfrogs, then report any sightings.