



SUMMER
2022

Windows to *Wildlife*

Your support at work in Idaho's landscapes

A biologist holds a Western Toad, a Species of Greatest Conservation Need, while wearing protective gloves to prevent the transmission of chytrid fungus.

Frog Farming and a Killer Fungus

by Tempe Regan*, Wildlife Diversity Biologist
Salmon Region, Idaho Department of Fish and Game

It all started with amphibians...

Although my passion for the outdoors was something I was probably born with, it was fostered by forays into the field as a young child under the tutelage of my parents. After school, on rainy, damp spring days, with the smell of rain and the sounds of water burbling in tiny streams inundating my senses, I would go out to the “peeper ponds” with my Dad to go “frog farming” as we called it. I would look for spring peepers or Pacific Chorus Frogs, and long-toed salamanders by carefully turning over logs and rocks, or blindly feeling in the muck for small, slimy life forms under bank overhangs. My Dad taught me to replace every stone and log disturbed the way that I found it, but to set it just slightly offset in its previous depression so that it created a nook underneath for hiding habitat for the amphibians I loved so dearly. I would run back to the house and report to my Mom the number of each species found, whether I found eggs, or the first tadpole. My Dad kept notes in a notebook on the dates we heard the first peeper, our name for Pacific Chorus Frogs, the date the Canada Geese returned, and other observations of our natural world. These memories are something that I only have to close my eyes to be taken back to.

In high school, when I was contemplating what I wanted to do for a career, I was still the kid who, as soon as I got home from school, would change her clothes and go “frog-farming.” All I knew, as I sat in the career seminar, was that I wanted to work with animals, but as I googled potential careers, two words popped up on the screen “wildlife manager.” Those two words gave me the direction for my passion to find the career I was born to do.

Fast forward many years. I find myself working for Idaho Fish and Game as a new Diversity Biologist looking for projects to kick off in my region. Memories of childhood frog farming endeavors and the fact that amphibians are the most threatened species group on the planet, under-going mass extinctions and alarming rates of decline across the globe, led me

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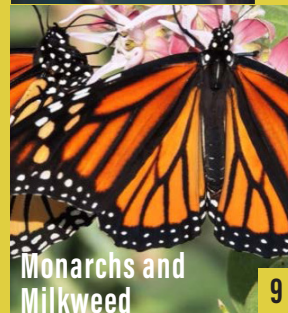
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to think of amphibians surveys as a potential new project. I figured surveying wetlands for amphibians would also be a great way to familiarize myself with this new area in Idaho I found myself living in.

In 2019, we began surveying wetlands for amphibians, for chytrid fungus, and also measuring the characteristics of each site that may or may not impact amphibian presence and use of a site. These characteristics include water pH, sun exposure, depth, water permanence and connectedness, disturbance types, aquatic and terrestrial vegetation, and presence of predatory fish. We also sampled sites for chytrid fungus by swabbing at least three individuals from selected sites.

Chytrid fungus (Bd) are shorthand ways of referring to *Batrachochytrium dendrobatidis*, which is a mouthful so you can see why scientists generally refer to it in shorthand notations. Chytrid is a somewhat mysterious fungal infection of amphibians that lives as spores both in soil and in water. However, in water, the spores develop a flagella or tail, for swimming. When these swimming

spores come into contact with an amphibian they penetrate its skin. Underneath the skin, the swimming spore turns into a cyst and enters its reproductive phase where it begins interfering with amphibian skin function, osmotic balance (salt and water in and outside of cells), respiration, and shedding and eventually can cause heart failure and death in a disease called chytridiomycosis, also another mouthful to say.

Chytrid is widespread globally and is the main cause of amphibian extinctions and declines, especially in areas where amphibians are already vulnerable due to other stressors like habitat loss and degradation, reduced population size, competition with invasive species, and environmental pollutants and toxicity. Some species of amphibian are not as susceptible to the infection and can live with it and even carry it to other amphibians. American Bullfrogs are a main culprit here, as they are invasive, widespread, and often transported and released. In Idaho, one species we think is actually very susceptible to chytrid fungus is the Western Toad, which is also a Species of Greatest Conservation Need, as well as chorus frog species (both Western and Pacific).

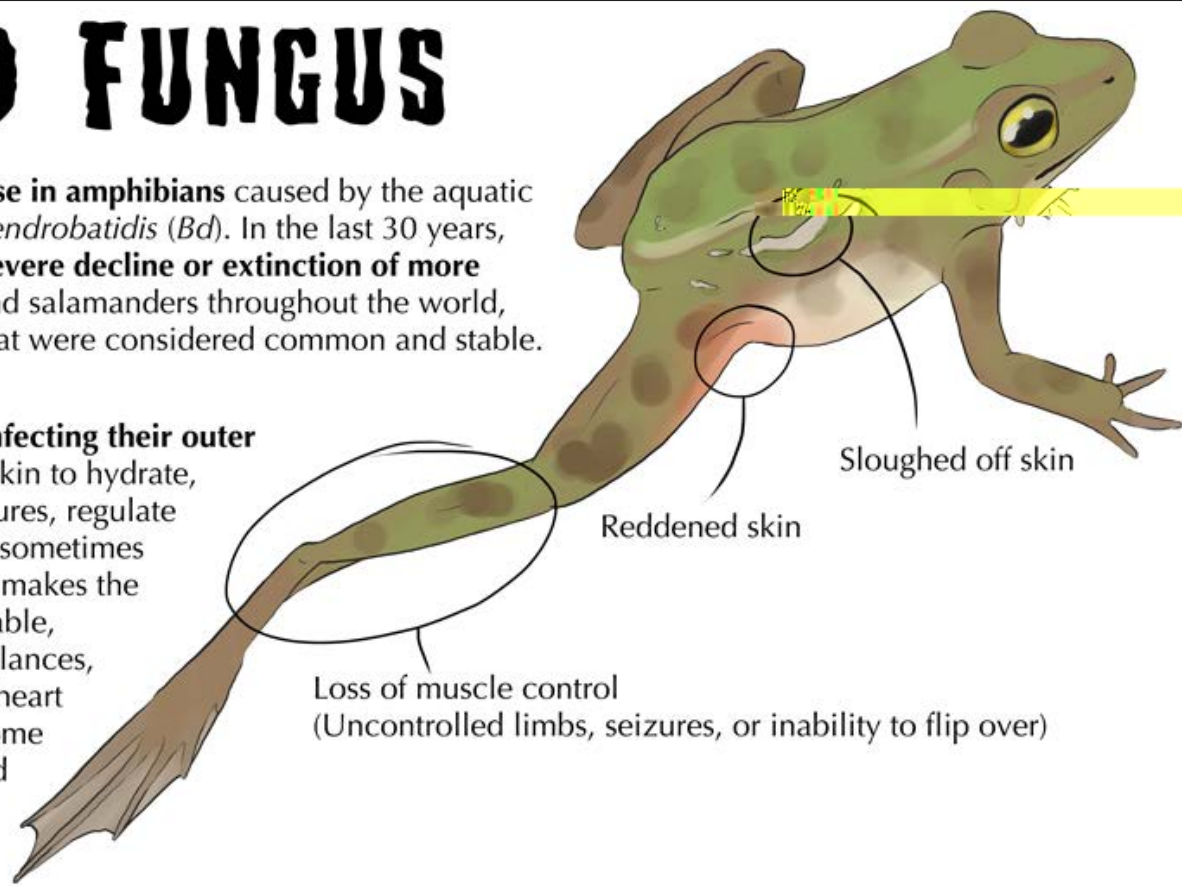


The life cycle of Bd starts with an aquatic spore that burrows into the skin of amphibians. Bd is a member of a group of fungus called chytrids, which are usually found underwater growing on dead plants and animal matter. Bd is the only chytrid fungus known to feed on living animals and it primarily affects the skin of amphibians. Because amphibians breathe and take water up through their skin, Bd makes this process tough. By catching and swabbing amphibians, it helps biologists to know how prevalent Bd is on the landscape.

CHYTRID FUNGUS

Chytridiomycosis is a disease in amphibians caused by the aquatic fungus *Batrachochytrium dendrobatidis* (*Bd*). In the last 30 years, *Bd* has been linked to the **severe decline or extinction of more than 200 species** of frogs and salamanders throughout the world, including several species that were considered common and stable.

Bd attacks amphibians by **infecting their outer skin layers**. Frogs use their skin to hydrate, control their body temperatures, regulate minerals and nutrients, and sometimes even breathe. The infection makes the skin thicker and less permeable, resulting in electrolyte imbalances, loss of muscle control, and heart failure. Frogs may also become lethargic and have reddened or sloughed off skin.



Several treatments have shown promise but there is currently **no cure**. One key may lie in figuring out why some species are more susceptible than others — some species are resistant while others experience **85-100% fatality**.

Alithographica

References: <https://amphibiaweb.org/chytrid/chytridiomycosis.html>
<http://www.amphibianark.org/the-crisis/chytrid-fungus/>

After our first survey season in 2019, we tallied up our work and overall we surveyed 133 wetlands. We detected amphibians at 48 of 133 surveyed wetlands (36%) and did not detect any amphibians at 54 of 133 (40%) surveyed wetlands and 22 of 133 sites were dry (16%). We most commonly detected Columbia Spotted Frogs but also detected Long-toed Salamanders, Western Toads, and chorus frogs.

We swabbed 60 individual amphibians for chytrid fungus from 21 different wetlands and 44 of 60 (73%) tested positive compared to a 2012 study in the same area when only 2 of 51 (4%) swabbed individuals were positive at only two sites. Of the 21 tested sites, 18 were positive for chytrid fungus and just three sites had no individuals test positive for chytrid.

This marked increase in chytrid across our study area aligns with chytrid fungus biology in general - once the fungus is in an area, it is able to spread rapidly downstream in watersheds as well as cross-country in soil on car tires, boots, hooves, blowing dust, and many other vectors. A study in Australia found that chytrid was more prevalent in areas with more roads and associated with urbanization and human activities compared to the remote, wilderness areas of the study site.

(Below): A female Western Toad is handled carefully before being tested for *Bd*. A cotton swab is used to rub the skin of the frog to collect skin cells. These skin cells are then tested in a lab in search of chytrid fungus.





Columbia Spotted Frogs are found in Idaho in the Owyhee uplands and in southern Twin Falls County. They live in spring seeps, meadows, marshes, ponds and streams, and other areas where there is abundant vegetation.

Photo: Chuck Peterson

From 2019 to 2020, we worked on revising our study and were able to expand these amphibian surveys across the state of Idaho. We also focused specifically on our Western Toad population and targeted surveys to revisits of known, historical Western Toad breeding sites. Western Toads exhibit high levels of site fidelity to breeding sites, they tend to return to stable sites year after year to breed. By monitoring those sites, we hope to be able to compare current use of sites to historic use to understand population trends of Western Toads in Idaho. We visited a total of 62 historic breeding sites in 2020 out of a total of 345 sites statewide. We detected toads at 45% of sites (28/62 sites) which provides a preliminary indication that we probably are losing toads across Idaho in terms of total numbers and historic breeding site occupation but more work needs to be done. Some sites, when revisited, were no longer holding water, or had been degraded to the point of non-use by any amphibian species. Additionally, many sites (not all but the majority) tested positive for chytrid fungus.

There is evidence that Western Toads are susceptible to chytrid fungal infections and with chytrid seemingly more ubiquitous across the landscape, especially over time, the question of what can be done arises. Currently, there is no way to prevent or feasibly treat a chytrid infection, but conservationists can take other actions to bolster the resilience of Western Toads to chytrid fungus by making sure they have everything they need habitat-wise for completing their life-cycle. This includes continued access to historic breeding sites (think habitat connectivity), good water quality, vegetation in and around the wetland, persistent surface water for at least the duration of a toad metamorphic cycle, shallows for warmer water and nursery grounds for tadpoles, very little soil disturbance and erosion to wetlands, hiding cover for toads and tadpoles both in and out of the water, protection from invasive species and predators including keeping American Bullfrogs out or removing them when possible, and minimizing hoof disturbance and trampling to both the wetland and toad eggs, tadpoles and adults.

As I walk around a wetland on a survey, the mud sucks at my boots the same as it did when I was a 12 year-old “frog farmer” in Montana, the smells of wetland water and detritus are the same, the sounds of spring and the tint of green new growth beneath last year’s brown grass is the same. As I take in the sights and smells of spring, I can’t help but stop and marvel at this full circle in my life. My love of nature, and passion for taking care of it, began when I was very young and was initiated while holding a little chorus frog in my hand one rainy spring day. Now, as a professional, I find myself conducting rigorous, science-based surveys for amphibians and the purpose of each of those endeavors align: to understand how many amphibians are present at a location, what threats they face, and to find ways to help amphibians persist on a changing landscape.



The Boreal Chorus Frog is a small frog that is about 1.5 inches long. They are polymorphic in color, usually with three length-wise stripes down their body, a pointed snout, and a dark strip through each eye. They can be found in southern and eastern Idaho (map: iNaturalist).

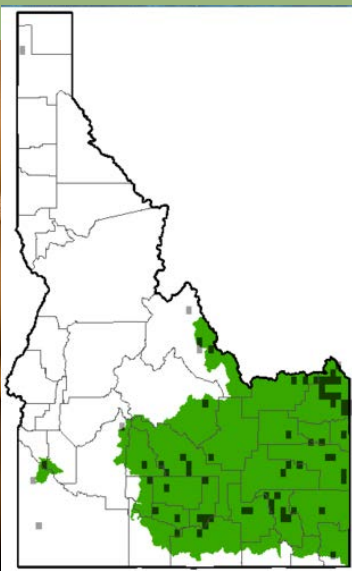


Photo: Chuck Peterson

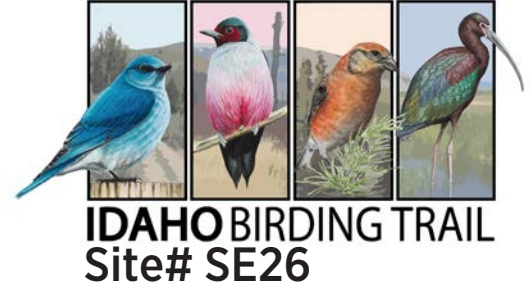
On The Idaho Birding Trail

Blackfoot River Wildlife Management Area

14002 Blackfoot River Rd., Soda Springs, ID • (208) 232-4703
idfg.idaho.gov/wma/blackfoot-river

eBird ebird.org/hotspot/L4256681

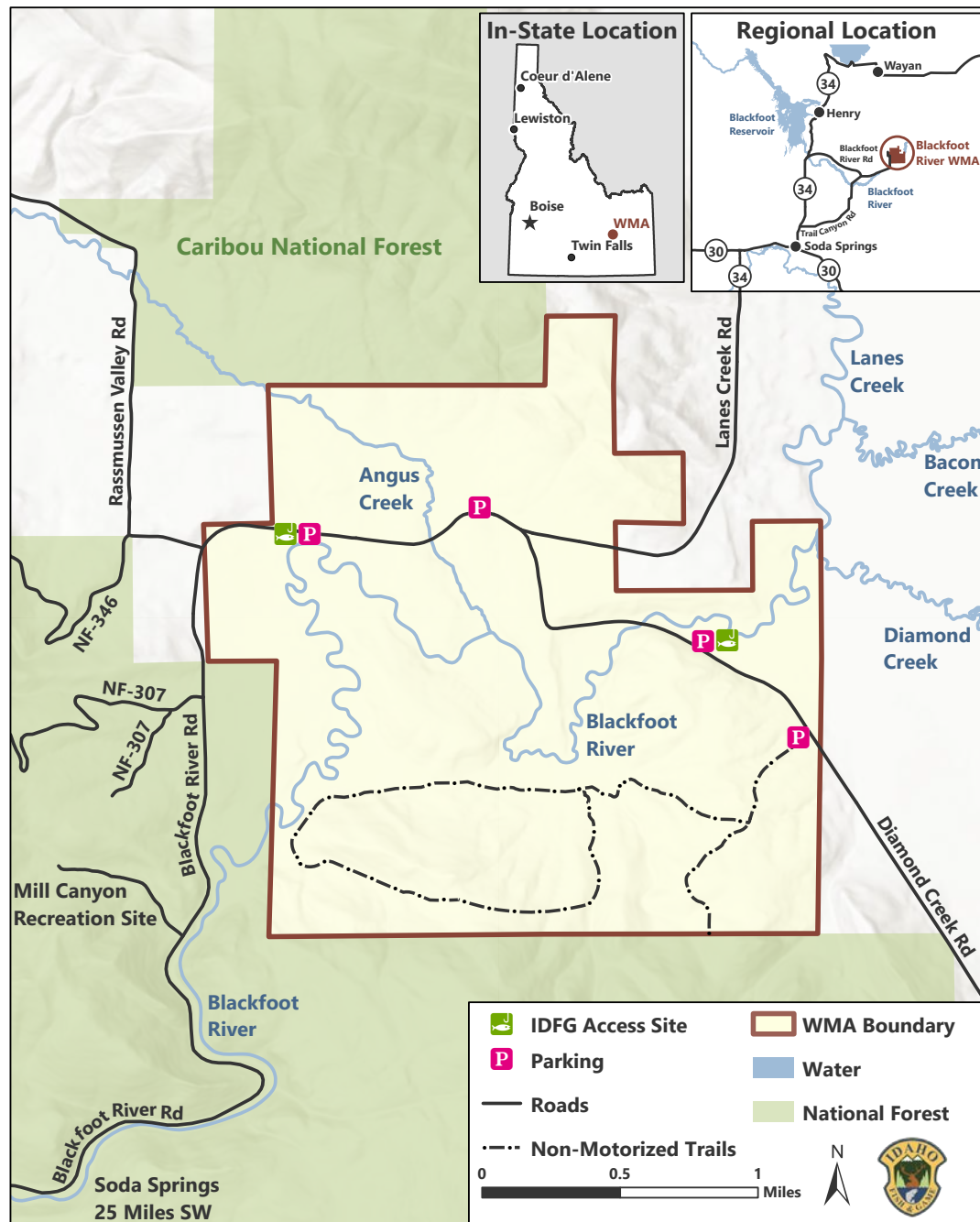
LAT/LONG: 42.8279442, -111.3493363



DIRECTIONS: In Soda Springs, ID 34 N for ~11 mi; R (E) on Blackfoot River Rd at mp 69.9; zero odometer; travel 10.4 mi; stay to the L as rd turns to gravel at mi 10.9; mi 13.7 pass Mill Canyon Campground; mi 14.7 is WMA; rezero odometer; parking areas at mi 0.6 and mi 1.3; mi 1.5 turn R to additional parking at mi 2.5 and mi 3.0.

Blackfoot River WMA is located at the lower end of a high valley in eastern Idaho. County roads run through the WMA where visitors will find four parking areas — two provide access to the Blackfoot River and two access the surrounding upland areas. Motorized vehicles are restricted to parking lots and established roads.

Mountain Bluebird, Savannah and Vesper Sparrows, Yellow Warbler, Cliff Swallow, American Kestrel, Red-tailed Hawk, and Ruffed and Dusky Grouse breed in the area. Bald Eagle and Trumpeter Swan are frequently seen in early spring and late fall. Waterfowl including Mallard, Gadwall, Northern Pintail, American Wigeon, and teal nest on the WMA. Courtship displays of several pairs of Sandhill Crane can be seen in the spring, along with shorebirds such as Wilson’s Snipe, Willet, Long-billed Curlew, and Spotted Sandpiper.



The **IDAHO BIRDING TRAIL** is your guide to the best birding and wildlife viewing in Idaho!



Spotlight Species of Greatest Conservation Need

Pacific Lamprey

Adapted from *Windows to Wildlife, Volume 16, No 2*



Description

One of Idaho's three dozen native fishes, the Pacific Lamprey (*Entosphenus tridentatus*) literally means "stonesucker with three teeth." Lampreys are one of only two groups of living fishes worldwide that are without jaws. They are also one of the oldest fish alive today with a fossil record that dates some 400 million years. Because of their elongated body structure, lampreys are often confused with eels. While the outward body structure of both the eels and lamprey are easily comparable, the similarity stops there.

Unlike eels, lampreys are jawless - they have a fleshy oval disk-shaped mouth with numerous tooth-like plates of keratin that cover the disk and tongue. This modified mouth allows these fish to move not only by swimming motions but also by grabbing or sucking onto hard surfaces.

They possess no paired fins (pectoral and pelvic), have no scales, and have numerous gill openings rather than a single opercula-like structure over their gills. Adult Pacific Lampreys have two blue eyes that they use to see. Pacific Lampreys are the only lamprey species found in Idaho waters.

Range and Habitat

Pacific Lampreys are distributed throughout the Pacific Rim from Japan to Mexico. In Idaho, they may be found in tributaries to the Snake, Clearwater and Salmon rivers. Pacific Lampreys provide critical ecosystem services each stage of their life cycle; they are a food source for several species and act as filters for water and sediment during their larval stage to keep rivers clean. Their bodies also return nutrients to aquatic ecosystems once they die, providing a crucial connection between the ocean and the river.

Life History

Like salmon, they are anadromous; they spawn in freshwater, migrate to the ocean to forage and mature, and return to freshwater to spawn and begin the cycle again. In the ocean, adult Pacific Lampreys attach to a host fish and suction nourishment from it using its jawless mouth. Adult Pacific Lampreys leave the ocean during June and July to migrate upstream. Like salmon and steelhead, they do not feed after they leave the ocean. They spend the winter in the river before spawning late May to early July and die soon after.



Photo: ToruTsuZaki



Photo: Oregon Zoo/Michael Durham



Young lampreys are eyeless and burrow into sand where the current is slow. There they live for 3 to 7 years feeding on algae and bits of plant or animal material. When they are large enough, they undergo a radical metamorphosis into adult lamprey (rearrange internal organs, develop eyes, and their characteristic toothed sucking disk). They move downstream to the ocean during the spring where they live as parasites on other fishes and even sperm whales for 1-3 years! Little is known of their ocean movements.

Female Pacific Lampreys lay 100,000-300,000 eggs in a nest made of gravel, and males fertilize the eggs. After spawning, they die and decompose, which provides nutrients and energy to the stream.

Photo: Jeremy Monroe, Fresh Water Illustrated



(Top left): Pacific Lamprey climbing a vertical wall. (Top right): Pacific Lamprey teeth and mouth. (Bottom): An adult lamprey suction onto a streambed stone.

Conservation and Importance

Designated as a Species of Greatest Conservation Need, Pacific Lamprey have survived three ice ages and five mass extinctions, but in the past 100 years their numbers have seen a dramatic decline. Pacific Lamprey require good quality/intact freshwater habitats for spawning and rearing, mainstem river conditions that allow good migration routes to the ocean and back, and favorable ocean conditions to feed, grow, and mature. Challenges such as culverts, dams, and water diversions impede their ability to migrate to the ocean and back (technology used for salmon passage like fish ladders aren't as passable by lamprey). Other stressors such as freshwater habitat degradation damages spawning and rearing areas; and juvenile lamprey are susceptible to poor water quality caused by pollutants, contaminants and warming climates, and changing ocean conditions.

The good news is that Native American tribes and Federal, State and local agencies and other organizations are working to help restore the Pacific Lamprey to Idaho and throughout the Pacific Northwest. They're installing passage structures so lamprey can move more easily. In some cases, they're removing dams or altering them to ease passage. They're restoring damaged streams to help lamprey spawn and rear young. They're also moving lamprey to areas they used to live such as above the dams along the Columbia River.

Cultural Importance

Pacific Lamprey have been prized by tribes of the Columbia River Basin for their spiritual, cultural, and nutritional importance.

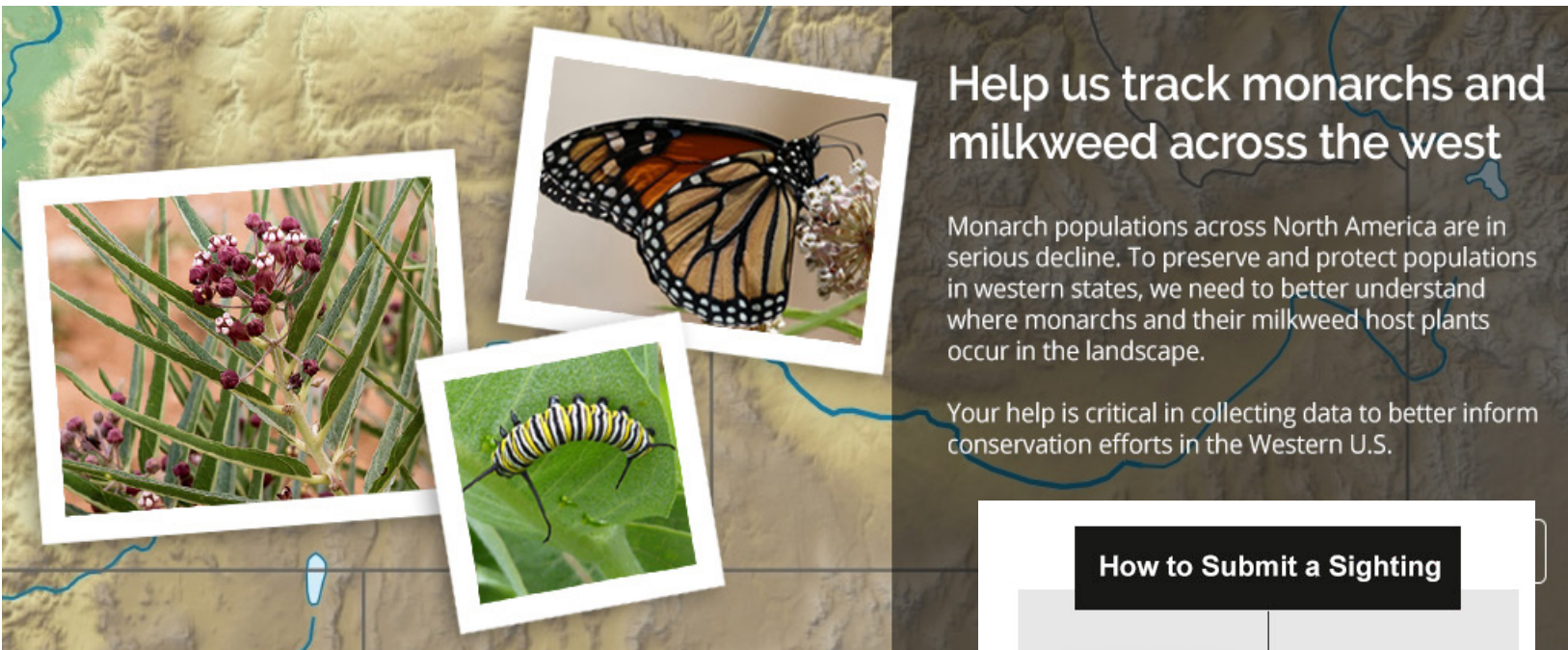
Learn more about the passion and determination of those working to ensure the lamprey's survival by watching the 25-minute film, "The Lost Fish."

Watch the film at: vimeo.com/116177956



Community Science - How You Can Help!

Monarch and Milkweed Tracking in Idaho



Help us track monarchs and milkweed across the west

Monarch populations across North America are in serious decline. To preserve and protect populations in western states, we need to better understand where monarchs and their milkweed host plants occur in the landscape.

Your help is critical in collecting data to better inform conservation efforts in the Western U.S.

How to Submit a Sighting

1



Take a photo of a monarch and/or milkweed

2



Login and upload your photo(s)

3



Identify your sighting

4



Submit your sighting!!

About

This project is part of a collaborative effort to map and better understand monarch butterflies and their host plants across the Western U.S. Data compiled through this project will improve our understanding of the distribution and phenology of monarchs and milkweeds, identify important breeding areas, and help us better understand monarch conservation needs.

See more at: <https://www.monarchmilkweedmapper.org>

How Can You Help?

Your help is critical to the success of this project!

- Sign up for an account: <https://www.monarchmilkweedmapper.org/app/#/user/signup>
- Upload your photos of monarchs and milkweeds;
- Identify milkweeds using our milkweed key, which profiles over 40 milkweed species found in the west;
- Submit data which will help researchers determine the distribution, phenology, and conservation needs of monarchs and milkweeds in the west; and
- Learn about monarchs, their host plants, and ongoing conservation efforts for these species.

Once you have an account, go out and start looking! Check your local parks, natural areas, gardens, and even roadsides. We're looking for all stages of monarchs, so don't forget to look at milkweed leaves and stems to see if caterpillars or eggs are present. Snap a few photos (learn more about how to photograph milkweeds and monarchs [here](#)) and then sign in and submit your data.

Have fun while learning more about monarchs and the special habitats they use in your area!

Thank You for Your Support!

PHOTO: public domain

Thank you to those who made direct donations, purchased or renewed a wildlife license plate, or let us know of a tax check-off donation between April 1 – June 30, 2022.

Your contribution provides important funding for wildlife and habitat conservation in Idaho.

Hunt's Bumble Bee; PHOTO: Public Domain

Windows to Wildlife

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