



PHOTO BY: David Moskowitz

DISCOVERY IN THE DUFF: A New Slug for the Inland Temperate Rainforest

by Rob Rich*

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Back in 2010, Michael Lucid starting trapping slugs. As a Wildlife Diversity Biologist with Idaho Fish & Game (IDFG), he was heading up the Multispecies-Baseline Initiative (MBI), one of the most collaborative, comprehensive wildlife surveys ever performed. Over five years across the inland temperate rainforest of Washington, Idaho, and Montana, the MBI sought 19 elusive animals about which little was known, including their existence. The MBI found all but one. Many of the other 18 species were in healthier populations than expected. But the MBI's greatest success may be wrapped in a twentieth, previously unknown species. In March of 2018—after confirming diagnostic

observations of the gastropod's genitalia with molecular and genetic evidence—Lucid's team discovered a new species: Skade's jumping-slug (*Hemphillia skadei*).

There hasn't been a project of such devoted gastropod intrigue since Henry Hemphill, the Delaware-born pioneer who surveyed the genus that now bears his name. A bricklayer by trade, Hemphill was also an amateur malacologist, and he found more treasure in mollusks than the gold he originally sought in the 19th-century American West. From his base in California, he traveled widely and collected much, churning out papers with titles such as "Description of a new California

mollusk," "New catalogue of shells for California and adjacent states," and "Descriptions of new varieties of North American land shells." Unfortunately, Hemphill's habit of selling false "varieties" of snails to collectors back East suggests he failed to forget his prospecting days. His brand of science earned a quick profit, but it produced lasting headaches for those puzzling out what species he actually found.

The notion of a "species" remains a difficult concept for classifying life, but today we better understand how a unique genome, a singular ecological niche, and the ability to produce

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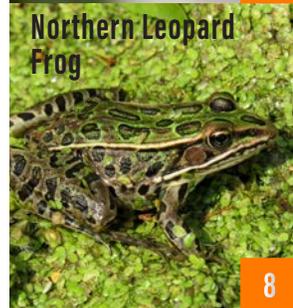
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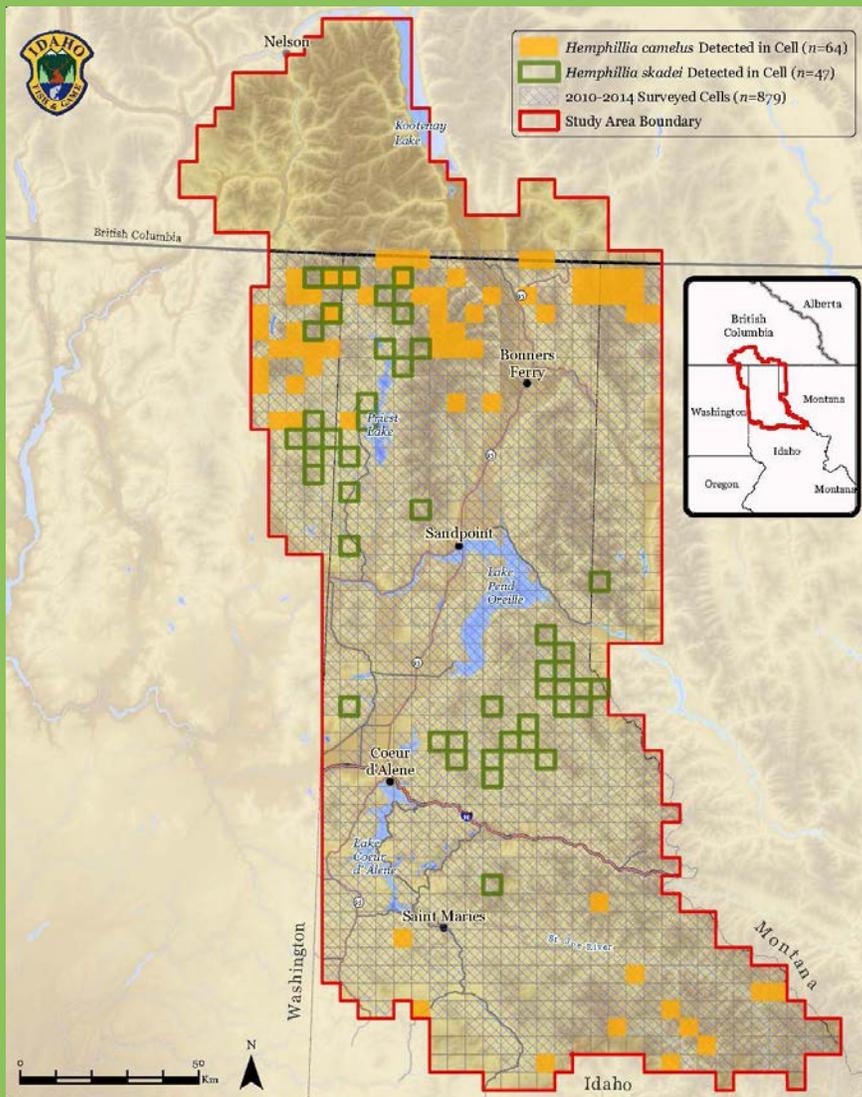
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Multi-species Baseline Initiative: *Hemphillia* species Detections



This map shows the occurrence of the pale jumping-slug (*Hemphillia camelus*, in yellow cells) and Skade's jumping-slug (*Hemphillia skadei*, in green-bordered cells) within the MBI study area. Both species show associations with cooler temperatures and higher elevations than study area averages.

fertile offspring play into the definition. It's no longer enough to rely only on phenotype—a different appearance—which a shell-seller may be prone to do. Hemphillian practices have real consequences for conservation today, and it took a bold, pioneering project like the MBI to reconsider organisms that could go extinct before they're accurately seen as unique. As Lucid says, "You can't conserve species if you don't even know what they are."

While Hemphill correctly found most *Hemphillia* to be coastal, the pale jumping-slug (*Hemphillia camelus*) is among the few species that haunts the inland temperate rainforest, a wet ecosystem that develops where Pacific weather confronts the Northern Rockies. There, it is an endemic species, native to nowhere else on earth. Like its maritime kin, the pale jumping-slug is hermaphroditic, living a quiet life sliding among the debris of moist forests with red cedar and hemlock. Yet beyond these generalities, the MBI could not place the pale jumping-slug on a map. And so it joined the humped coin, smoky taidropper, fir pinwheel, and other invertebrates assumed to be imperiled, driving the MBI's original question: what's really out there?

Lucid's team quickly found the region's vast wet wilds did not reveal the slug's presence as easily as holes in lettuce. Success improved with beer-baiting, a tactic that involved saturating strips of cardboard with Natural Ice, which proved to be more economically feasible than Laughing Dog microbrew. At all 992 of these trap sites, Lucid's team also collected one liter of leaf litter, which was then frozen, dried, and sorted for the quarry. And of course, after checking the trap line, they looked. In timed, 15-minute forays within 50 meters of a central thermometer, they scoured each site as one looks for lost keys, homed in on anything that writhed or glistened in the duff.

Or jumped. As per their name, jumping-slugs coil and snap to evade predators. While they never really catch air, these feeble distractions may spark enough surprise to deter the likes of a bird, and they're remarkable evolutionary feats for a spineless creature. But the jumping-slugs did not wholly evade the MBI, which found them in a total of 111 sites. Sixty-four of those detected were clearly the pale jumping-slug, but the remaining 47 were something else entirely. The most indicative feature of slug species is the genitalia, so, with microsurgical scissors and dental probes in hand, Lucid's team went to work. They found the mystery slug's penis was unpigmented and shaped more like a barrel or acorn than the pale jumping-slug's pigmented, peanut-shaped penis.

Fine distinctions indeed. And an intriguing theme when this never-seen-before shape not only occurred with regularity, but revealed a unique DNA sequence in genetic testing. Geographically, this new creature was sandwiched between populations of the pale jumping-slug in the Selkirks and Coeur d'Alene Mountains to the north and south, which also happened to be sites with the coolest temperatures. The species seemed to care little for state lines, and Montana's individual—found in the Cabinets—evokes a lesson we're just beginning to understand about the value of protecting transboundary refugia in a warming world.



PHOTO BY: Ancient Forest Alliance

There's certainly been a hiker or a hunter who's walked by this species before, and the slug's surely been sighted by the Ktunaxa people who have long shared its habitat. And yet, maybe not. Existence is not a given, and we're still just learning how to see and name the new-old creatures who shape this planet, this rainforest, our home. And so, as the Anthropocene renders each species more precious than ever, this slug was named with a nod to Skaði, the goddess of Norse mythology known to ski and hunt among the wintry peaks. But the slug was also named for Skade, the young girl—born to Lucid and his wife Lacy Robinson, the fellow MBI biologist and co-author of the paper that welcomed the slug to the scientific world. Their daughter will come of age in a new climate, and in her name these biologists find vulnerability and hope. Even the microclimates are changing, and just by slowing down and looking closely, Skade's parents find promise in those tiny places. There, where it's subtly cooler or wetter or more resistant to fire, there just might be a species or a process that, dotted across the landscape, can teach us how to thrive.

Rob Rich is a naturalist, writer, educator, and beaver believer. His work has appeared with Earth Island Journal, High Country News, Sierra, Camas, and other publications.



PHOTO BY: TJ Watt, Ancient Forest Alliance

MULTI-SPECIES BASELINE INITIATIVE

BY THE NUMBERS



19 data-deficient Species of Greatest Conservation Need (SGCN). The MBI chose animals for their uncertain conservation status, not their charisma. This approach revealed fundamental trends from 2005 (pre-survey) to 2015 (post-survey) suggesting that 6 of the 19 deserved continued inclusion as SGCN, while 10 others were deemed healthy enough to drop off that list.



2,315 sites surveyed. Whether you're targeting a slug or a lynx, you're not likely to find anything if you go out just once in one spot. You've got to put in the time, miles, and faith to find the lesser-loved, seldom-seen creatures of this region. Enough said.



1,169 temperature loggers. Two of the most crucial baseline data points—species' occurrence and species' climate needs—are lacking for more plants and animals than you might imagine. The MBI explored both of these questions, and the ample deployment of temperature loggers confirmed that microclimates with cool refugia are critical for species like Skade's jumping-slug.



46 individual fishers. The fisher (*Pekania pennanti*) is a rare forest carnivore in the weasel family, and before MBI it was thought that few individuals lived across the three-state study area. Researchers found fishers to be locally abundant in the West Cabinets along the Montana border, but they were surprised to learn these animals are genetically isolated from populations in adjoining mountain ranges, which suggests a concern for habitat connectivity across the study area.



0 northern leopard frogs. Amphibians have been declining for decades worldwide, and it was a given they'd feature in the MBI. The MBI focused on five amphibians classified as SGCN, including the northern leopard frog (*Rana pipiens*), once among the most widely distributed amphibians in North America. But the last confirmed discovery was in 1955, and with zero observations throughout extensive surveys in 2005-2015, the species was deemed extinct in the study area.



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project partners. Land access permissions, laboratory assistance, funding, more funding, etc. Without the financial, technical, and administrative assistance of diverse collaborators, the MBI wouldn't have made it through a single year. But with its committed partners, the MBI earned seven grants, powered through five years, and became a beacon for the promise of collaboration.



200 citizen scientists. Have you ever hauled a deer leg on your back through the snow so that it can be tacked to a tree? If so, you might have joined the MBI's intrepid team of volunteer citizen scientists, which included help from Friends of Scotchman Peaks Wilderness, Idaho Conservation League, and Selkirk Outdoor Leadership and Education. From camera monitoring to data entry to multi-species surveys, these volunteers provided hours of labor, knowledge, and fun that were essential to project success.

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idahobirdingtrail.com

Watchable Wildlife

Building a Better Viewing Experience at Market Lake Wildlife Management Area

by Deniz Aygen*, Watchable Wildlife Biologist
Idaho Department of Fish and Game

One of the best places in eastern Idaho to observe birds has a noteworthy new blind that will help visitors get a better view of the massive migration of waterfowl during the spring.

The new wildlife viewing blind at Market Lake Wildlife Management Area (WMA) opened its windows on May 11 and offers WMA visitors a unique opportunity to get an up close and personal view of migrating and resident ducks, geese, and waterbirds that utilize the WMA.

The ADA compliant blind improves public access at Market Lake WMA. It has a wheelchair access and windows of various heights and sizes to accommodate observers of all ages, benches for sitting, interpretive bird signs, and room for lots of people. The viewing blind takes advantage of the natural habitat and proximity to a pond, which attracts birds and other wildlife.

Acquired in 2018, the pond and surrounding area is the latest addition to the WMA. It lies across Interstate 15 from a conservation easement that helps to conserve the open lands buffering the WMA. The easement's agricultural fields and the acquisition's wetland areas are valuable to many important bird species.

The Idaho Department of Fish and Game and Idaho Foundation for Fish and Wildlife funded the project.

To Get There: The viewing blind is on the former Western Wings Pond on 800 North near the overpass that crosses Interstate 15 two miles north of Roberts.

Watchable Wildlife

Top: Visitors enjoy a birds-eye view from the blind. *Middle:* A ruddy duck struts his stuff at the pond. *Bottom:* The brand new blind offers plenty of space for the public to quietly take in the sights and sounds at the WMA.



The Coeur d'Alene Salamander: A Fine and Pleasant Misery

by Joel Sauder*, Wildlife Diversity Biologist - Clearwater Region
Idaho Department of Fish and Game

Idaho is home to an amazing array of wildlife species. Some are easy to observe, say from a window of a home or car. However, some are more cryptic, requiring a careful hunt and a tolerance for misery. The Coeur d'Alene Salamander falls generally in the latter category, but finding it in the wild is wholly worth the effort.

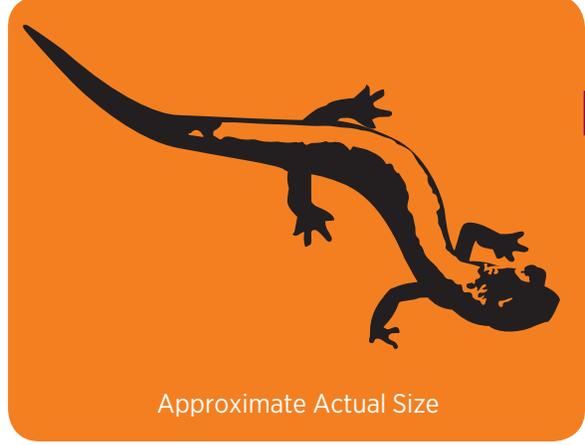
Coeur d'Alene Salamanders were first discovered on the shores of Lake Coeur d'Alene in 1939. These long, slender salamanders can reach up to 3 to 4 inches in length and typically have a black body with a scalloped edge dorsal stripe that is often yellow in Idaho but can be orange, green or red in other parts of its range. Amazingly, these amphibians have no lungs or gills! They breathe entirely through their skin, meaning their skin must be kept moist at all times. This explains why Coeur d'Alene Salamanders are closely associated with seeps, springs, and waterfalls in the moist forested habitat types of Northern Idaho.

In the cold of winter and the heat of summer, Coeur d'Alene Salamanders hide in the interstitial spaces between rocks, spending over half the year there and making them tough to find. However, during spring and fall, when temperatures are moderate and rain keeps the surface moist, they emerge to feed and breed. North-facing rocky seeps and springs with abundant, thick moss that remains moist all summer long are particularly good places to look for Coeur d'Alene Salamanders. At these areas, the best time to search is after dark, during or right after a rainstorm, when salamanders come out to feed on insects and other invertebrates.

Late this spring, I was doing some fieldwork along the North Fork of the Clearwater River above Dworshak Reservoir. One of my

objectives was to do bumblebee surveys while in the area, but a series of spring rainstorms eliminated that option; however the rain made for perfect salamander hunting conditions.

A short drive along the river revealed 10 wet seep areas with near vertical, fractured rock bluffs and thick moss that appeared to be ideal Coeur d'Alene Salamander habitat. I recorded the sites on my GPS so I could find them easily in the dark and found a place to wait for dark to fall. About 10pm, I suited up in my rain gear, donned my headlamp, steeled myself for some wet fun, and started my hunt. Five minutes into my first stop, I found a salamander. It was climbing on the moss, right close to the base of the seep areas. The site, the timing, and the yellow dorsal stripe make it highly likely to be a Coeur d'Alene Salamander. However, there is a second salamander species in Idaho, called the Long-toed Salamander that looks very similar. A close examination showed the 4th toe on the hind foot to be shorter than the 3rd toe, so NOT a Long-toed Salamander. I had in my hands a seldom seen species, found only in the Rocky Mountain of Idaho, Montana, and British Columbia—the Coeur d'Alene Salamander. Over the following 2-hour drive, I checked seeps and springs. I found salamanders at seven of the 10 sites. It was like an Easter egg hunt, but in the dark, and in the rain. To top it off, part way through the night the rain stopped and I got home mostly dry! A pleasant trip and not much misery for the rare treat of seeing such a cool species.



Approximate Actual Size



Species of
Greatest
Conservation
Need

North Idaho, Northwest
Montana, and Southeast
British Columbia are the
only places where Coeur
d'Alene Salamanders live.

Filling the Feeders Correctly: Top 5 Reasons NOT to Use Red Hummingbird Nectar

1 It serves NO purpose

Most hummingbird feeders on the market have enough color on them (red or otherwise) to attract hummingbirds without the need for red dye in the nectar. If there is no red on your feeder, simply tie a piece of red flagging, rope, or fabric to it.

2 The dye is petroleum based

The dye in colored nectar is red dye #40. Red dye #40 is now made mostly from petroleum, which is not good for any animal to ingest!

3 Nectar from flowers is clear — not red

Nectar made with white table sugar and warm water at a 1:4 ratio most closely approximates the naturally clear nectar found in flowers.

4 The red dye passes through the hummingbird

The dye stains their excretions red. These indicators mean the red dye is “not metabolized, but passes through the kidneys, where it might cause problems.” (see photo on right)

5 You can make clear nectar more simply

No more trips to the store to buy nectar. Make it at home. It will attract and feed all the hummingbirds you can handle!



Hummingbird Nectar Recipe

1. Combine 1:4 ratio of plain white table sugar to warm water.
2. Allow the sugar to dissolve.
3. Fill feeders and store remaining nectar in the fridge for up to 2 weeks.

Your feeder should be emptied and cleaned twice per week in hot weather; cooler weather, once per week.

Spotlight Species of Greatest Conservation Need

Northern Leopard Frog

by Michael Lucid*, Wildlife Diversity Biologist - Panhandle Region
Idaho Department of Fish and Game

Northern Leopard Frogs begin their year with one mission: to mate. After spending a motionless winter at the bottom of deep-moving water channels, leopard frogs emerge as temperatures start to warm in March or early April. They then hurry to shallow nearby ponds where males begin to call on warm sunny days. Females respond to those calls and eggs are laid and fertilized in short order. Adults move to grassy upland habitat and, in a week or two, small tadpoles emerge from clusters of floating eggs.

As the season moves on, tadpoles eat organic debris and algae eventually metamorphosing into fully formed frogs by summers' end. As temperatures cool, the adults and newly formed juveniles make their way back to aquatic over-wintering habitat. More slowly this time, without the urgency of mating. The frogs dive to the bottom of the slow moving water channels and come to rest on the bottom. They go into a deep state of torpor on the bottom while slow moving water gently moves oxygen across their bodies. Frogs that survive the winter will emerge again in the spring and the cycle will continue.

Although this story still plays out in southern Idaho, leopard frogs **haven't been found in northern Idaho since 1955**. Reasons for the decline are not certain but human-caused hydrological changes such as dams and irrigation in combination with the deadly amphibian chytrid fungus are both likely players. There are only two natural leopard frog colonies left in the northwestern portion of their range. One in Moses Lake, Washington and the other in Creston, British Columbia about 10 miles north of the Idaho Border.

This is where the good news comes in. The Idaho Department of Fish and Game is working with partners, including British Columbia, Washington State, and the Yellowstone to Yukon Conservation Initiative, to **recover leopard frog populations in northern Idaho and beyond**. Through a combination of **habitat restoration**, threat reduction, and recovery planning, the Northern Leopard Frog Recovery Team is working together to provide hope that leopard frogs may someday once again be part of the spring chorus of north Idaho wildlife.



PHOTO BY: Gary Nafis,
californiaherps.com (CC BY-NC-ND 3.0)

Life Cycle

Northern Leopard Frogs complete their life cycle — from laying to tadpoles turning into adults — in a single season.

Left: Frogs lay individual clear eggs with a visible embryo contained within each egg. **Right:** Tadpoles have gills, just like fish, so they can breathe under water. **Bottom:** Northern Leopard Frogs eat a wide variety of animals including ants, beetles, flies, worms, and smaller frogs.



PHOTO BY: Alexis McEwan; Montana
Natural Heritage Program



PHOTO BY: Terry Anderson



PHOTO BY: USFWS

Wildlife Viewing

Summer Birding, Southeastern Idaho Style

by Hilary Turner*, Wildlife Technician
Idaho Department of Fish and Game

Southeastern Idaho is a wonderful place to spend the summer as a birder. With diverse habitats there is no shortage of places to explore the avifauna. A few of my favorite places to watch birds during the summer are in the sagebrush steppe, juniper foothills, and Snake River riparian corridors.

The sagebrush is never devoid of life, but in the summer it is the birth place of the next generation of sagebrush obligate songbirds. Ubiquitous in any sagebrush ecosystem, Brewer's Sparrows can be heard vigorously defending territories. Though drab, this smallest North American sparrow has an amazing vocal repertoire. The Sage Thrasher is another songbird that breeds exclusively in sagebrush. The thrashers also have a unique vocal range and can imitate many species, including Sora, though they are more frequently heard including portions of meadowlark and sparrow songs in their amazing vocal collections. The large, elegant Sagebrush Sparrow can be found in extremely dry sagebrush ecosystems. They require large tracts of intact sagebrush and can be difficult to find until you are at a good site for them! If you are seeing lots of interspace and cactus near you, be sure to listen closely for the Sagebrush Sparrow's plain but lovely song.

The juniper foothills around eastern Idaho are full of birds in the summer! Breeding Black-throated Gray Warblers are at the northern extent of their range in eastern Idaho. They are easy to hear as they sing their buzzy, simple songs, but finding them can be tricky. Blue-gray Gnatcatchers are also at the northern extent of their range. These tiny songbirds are not associated closely with juniper across North America, but in Idaho they are only found in juniper. Another specialty in Idaho's juniper is the Juniper Titmouse. This drab crested songbird nests in old woodpecker cavities or natural cracks and crevices in juniper trees. Unlike the gnatcatcher, they are associated with juniper throughout the ranges and like the gnatcatcher, they are at the northern extent of their range. Also found in juniper ecosystems in summer are Green-tailed and Spotted Towhees and Chipping Sparrows.

The Snake River and its riparian corridors are important to many species of breeding birds like Yellow Warblers, Cedar Waxwings, and Song Sparrows. These common birds occur in very high densities. Also present along these corridors are more uncommon species such as the Yellow-billed Cuckoo. The Western population of Yellow-billed Cuckoo is listed as threatened under the Endangered Species Act. Habitat degradation among other things have negatively affected this specialist species which requires large tracts of undisturbed cottonwood-willow gallery. Cuckoos are also very difficult to

detect, even when they are present. Intensive survey efforts are undertaken each year to quantify this population in Idaho.

Summer is an important time for all birds because it is when most are able to breed, recruiting for the next generation of their species. We can take some very important steps to protect birds during this important stage in their annual cycle. One study found that more than **1 billion birds are killed by outdoor cats annually in North America alone**. It is especially critical that cats be kept indoors in the summer because bright collars, bells, and other tricks do not work when cats are stalking naïve baby birds. Even de-clawed cats are extraordinarily skilled hunters, especially when they encounter baby birds that don't know to be afraid. If you want to help protect birds this summer, and at all times of the year, keeping your cat indoors or contained on an outside "catio" is one of the best ways to do so!

The second largest source of human-caused mortality in birds are windows. Windows reflect the surrounding habitat so the windows looks like an extension of the habitat and birds cannot see that there is something they can hit. Products such as **Acopian BirdSavers** and other methods are encouraged to prevent birds from flying into windows. Note that falcon or hawk shapes and other stickers on windows have little to no effect. If you are curious about how to stop birds from hitting your windows, there are many **sources of information** for preventing bird strikes on residential windows.



Life in the Sagebrush Sea

The Sage Thrasher is a sagebrush-obligate species dependent on large patches of sagebrush steppe for successful breeding. They are incredible songsters and mimic other birds while they sing.

Summer Wildlife Events

Boise WaterShed

11818 West Joplin Rd., Boise; (208) 489-1284
bee.cityofboise.org/watershed/events/calendar-of-events

WATERSHED WEEKEND SERIES: 3rd Saturdays, 10AM to 1PM

Join us for hands-on activities, interactive exhibits, public art, and presentations the whole family can enjoy! A Water Renewal Facility tour starts at 11:30AM. FREE admission! No pre-registration required for families/individuals but groups of ten or more must call in advance.

July 20 - Idaho Beaver Drop

Did you know that in the 1940s beavers were relocated into Idaho's backcountry by dropping the parachuting rodents from planes? Come explore the fascinating world of beavers and attempt the beaver drop challenge!

August 17 - Water Festival

Quench your thirst for fun with local engineers from Carollo Engineers, Inc. to launch water rockets, race your friends through a hydraulic maze, build your own filter and win prizes, all while learning about the water cycle and water treatment.

Jim Hall Foothills Learning Center

3188 Sunset Peak Rd., Boise; (208) 493-2530
bee.cityofboise.org/foothills/events/calendar-of-events

BOISE BIRDING SERIES: 2nd Wednesdays, 6AM to 10AM

Our free birding program is great for experienced and novice birders alike. Terry Rich, our local ornithologist, provides information and tips on birds in the Boise area and beyond! Come to one or all sessions! Bird books and binoculars are available to borrow. No registration necessary.

July 10 - Birding at Bogus

We're migrating to Bogus Basin to enjoy the cooler temperatures just like the birds. Meet at the Foothills Learning Center at 6 AM to arrange carpools.

MK Nature Center

600 S. Walnut Street, Boise; (208) 334-2225
idfg.idaho.gov/site/mk-nature-center

WILDLIFE WEEKEND PROGRAMS FOR FAMILIES: 1PM to 4PM

These open-house style programs are designed for families with kids ages 3-13 years. Free and open to the public (donations encouraged).

July 21 - Crayfish

Crayfish are freshwater crustaceans that populate Idaho's waters. We will be catching crayfish during this program and getting up close (but not too close-ouch) and personal with these important underwater decomposers!

August 18 - Class in the Creek

Class in the Creek is one of MK Nature Center's signature programs. If water levels in the Boise River are ideal, we will give you boots, buckets and nets and help collecting insects and other living creatures from the Boise River. This program is designed for families with kids 8 and up (younger kids can attend, but water conditions may not be safe for younger kids).

The Next Generation of Ecosystem Engineers

A baby beaver is called a kit. Kits can see, hear, walk, and swim soon after they are born. Baby beavers drink their mother's milk for about six weeks. After that, they will eat only plants. By the time beavers are one year old, they can cut down trees and help repair the dam and lodge. Beavers live with their parents until they are about two years old then they find their own place to build a dam and start a family.

When a beaver makes a dam, they slow the flow of water in a stream and, consequently, a pond or wetland is formed. Many plants and animals rely on these wetlands so beavers are very important to the ecosystem.



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