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Closeup of a Big Brown Bat on a tree. PHOTO: Rita Dixon/IDFG

Beaver Dam Analogs

A Recipe for Wildlife Habitat

Artificial Logjams Helps Create Food, Water, and Space for Wildlife

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There is a reason beavers are the masters at building beaver dams. It is a lot of work! However, Idaho Department of Fish and Game (IDFG) biologists decided that they too could give beavers a run for their money on dam building. We sloshed around in streams clumsily building structures called beaver dam analogs (BDAs) in 90-degree heat. We knew, or maybe thought, we were as tough as beavers, but by the end of each day, we found ourselves icing our sore muscles and looking for the nearest watering hole with air conditioning. It was a lesson in humility and respect for the creatures we share these lakes and rivers with. In total, IDFG built 56 BDAs on five miles of stream, a feat we are very proud of. However, there is no doubt in my mind that beavers would have accomplished this task in half the time and with less aching muscles.

Wetlands are vitally important habitat for wildlife, water quality, and have high social and economic value. The loss of beavers, as well as damage from landscape use, fire, drought, pollutants, and disease has led to wetlands that are degraded, structurally starved, and less complex. These degraded systems have caused many streams to erode deep into the land. Humans are now trying to reverse the damage and turn these areas back into a messy, complex, self-sustaining system...all by creating artificial beaver dams. PHOTO: David Dressel/IDFG

What is a Beaver Dam Analog and Why Build Them?
The use of beaver mimicry structures known as beaver dam analogs is not a new technique to the West. In fact, BDAs have been used for roughly two decades to improve wetland health and add structural complexity to riparian ecosystems. They are simply human-made dams consisting of sticks, sod, mud, and posts to anchor the structures.

But first, what do we mean by *riparian*? These riparian areas, also commonly referred to as "riverscapes", are areas where land and water directly interact with each other. The streambanks, vegetation, and floodplain in these areas are shaped by the presence of water. Riparian areas are vitally important habitat types for wildlife, water quality, and have high social and economic value. Dozens of threats ranging from landscape uses, fire, drought, pollutants, and disease have led to degraded and less complex wetland areas. These degraded systems, in turn, offer decreased wildlife and human value.

Changes in riparian and wetland health have ushered in a drive to reverse the trend and improve wetland areas for both wildlife and people. How do we turn structurally starved, simple, and degraded wetlands into a messy, complex, and self-sustaining system? We accomplish this through low-tech process-based restoration (LTPBR).

What is LTPBR? It's a restoration method that does not need heavy machinery or complicatedengineering designs (low-tech) and initiates the process and lets the river do the rest of the work (process-based).

The other allure to this method is that it's relatively inexpensive to build these structures, which allows miles of stream treatment at a relatively low cost. All these attributes lead to creating a restoration method that can encourage wildlife use, improve stream health, and create a wetland system more resilient to drought.

In southeast Idaho, this low-tech process-based restoration method was recently used on US Forest Service (USFS) lands in the Mink Creek drainage near Pocatello. Specifically, IDFG and the USFS worked on five miles of stream on the West Fork and South Fork of Mink Creek. These sections were chosen for several important reasons:

- **No active beaver colonies are present** within the project boundary. The West Fork of Mink Creek has not had an active beaver colony since 2015 and the South Fork of Mink Creek has beaver activity directly above and below the project area.

- These **streams were incised,** disconnected from their floodplain, and lacked complexity and woody debris.

- The **vegetative community could support beavers** if they decided to disperse into the area.

Wetlands are designed to be messy, complex, and self-sustaining. Reconnecting streams to their flood plain re-charges and revitalizes surrounding wetlands and improves the riparian habitat. PHOTO: David Dressel/IDFG

The idea behind constructing BDAs in Mink Creek was to add stream complexity and further reverse the trend of those streams by improving the wetland and wildlife habitat. This particular section of the South Fork of Mink Creek goes dry by mid-July and will not see flowing water until fall precipitation. The West Fork, however, is a spring-fed perennial stream that sees water flowing year-round.

We set out to accomplish four main objectives with this project:

1. Repair major stream incision.
2. Improve habitat for big game, upland game, species of greatest conservation need (SGCN), and Yellowstone cutthroat trout.
3. Recharge groundwater and aid in the resiliency of this wetland to drought and fire.
4. Prolong the period at which surface water is available.

The Work

Before any BDAs were built, a pre-monitoring program was initiated in the hopes to capture pre and post differences after project completion. These methods include drone flights, trail cameras, temperature HOBO loggers, amphibian and beaver surveys, photo waypoints, and water flow measurements (CFS). These monitoring techniques were geared towards understanding if we are indeed accomplishing the goals of this project. Monitoring will continue for several years after the construction of BDAs. In addition, a permit was secured from the Idaho Department of Water Resources before any construction of structures.

During the summer and fall of 2022, IDFG biologists, technicians, partner biologists, USFS biologists, and volunteers constructed 56 BDAs on the West and South forks of Mink Creek. The placement of each BDA was determined by historic beaver dam locations, areas that could form ponds, and locations that were conducive to getting equipment into. Six-foot posts with a pencil end were pounded into the stream in a weave pattern using a hydraulic post driver or a gas-powered driver. Because of the ephemeral nature of the South Fork section, BDAs were partially constructed into the dry bed rock until the Fall rains brought enough moisture to ensure the dams were built correctly. Once posts were securely embedded within the stream, a combination of foliage (willows, aspens, junipers), logs, and buckets upon buckets of mud were used to build and “plug” the beaver dam analog. Depending on the width of the stream section, individual BDAs took between one and three hours to build.

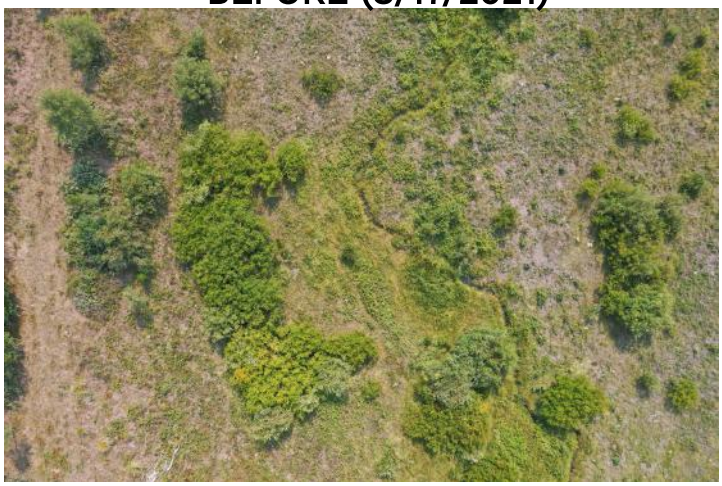
Gas and hydraulic powered post drivers are used to drive posts into the riverbed. A combination of sticks, logs, and mud are used to build and seal the dam. PHOTO: David Dressel/IDFG

The Why?

One of the major benefits of LTPBR methods is the simple change in stream morphology that can occur. Both streams have become disconnected from their floodplain and run along a single incised channel. As the water hits the BDA, it forms additional channels and flooding along the valley bottom. As water is pushed, it reaches vegetation such as willows that may not see water most years. This changing of water pathways helps reconnect the stream to its original floodplain. Simultaneously, BDAs help slow water down, decreasing erosion and depositing sediment that raises the water level of the stream. This multitude of effects is what makes simple BDAs so powerful.

A drone flight was taken on the West Fork of Mink Creek post-project completion (August 2022) to capture images of BDAs and their associated effect on the floodplain. These images were compared to the pre-drone flight in August 2021. These images clearly show additional water pooled on the upstream section of each BDA and demonstrates the immediate effect these BDAs have on the distribution of water along the floodplain. It is important to note that while more water is readily available on the floodplain surface, the amount of water entering and leaving the system remains the same. This information was demonstrated by the installation of staff gauges and CFS measurements above and below the project area. PHOTOS: David Dressel/IDFG

BEFORE (8/17/2021) | **AFTER (8/31/2022)**






One of the immediate hydrologic effects of a BDA is the pooling of water directly upstream. This water pooling is often referred to as “deep water refugia” and is one of the largest benefits of BDAs and beaver dams. Deep pools (like the one on the left) provide breeding areas for SGCNs, like western toads and northern leopard frogs, and overwintering habitat for cutthroat trout. They produce feeding areas for waterfowl, upland game, and shorebirds, and provide cover for beavers to hide from predators. Even big game animals use the newly formed pools.

Simply, it all comes down to space!

Wildlife need space. These BDAs turn small width sections of streams into areas for wildlife to inhabit and use. Directly after the construction of BDAs on the West Fork, trail cameras were deployed on several of the pools formed by our structures. Within days, big game animals like moose and deer were regularly using these deep pools. We anticipate that many of our amphibian and avian SGCN species will also begin to use these pools in the coming years.

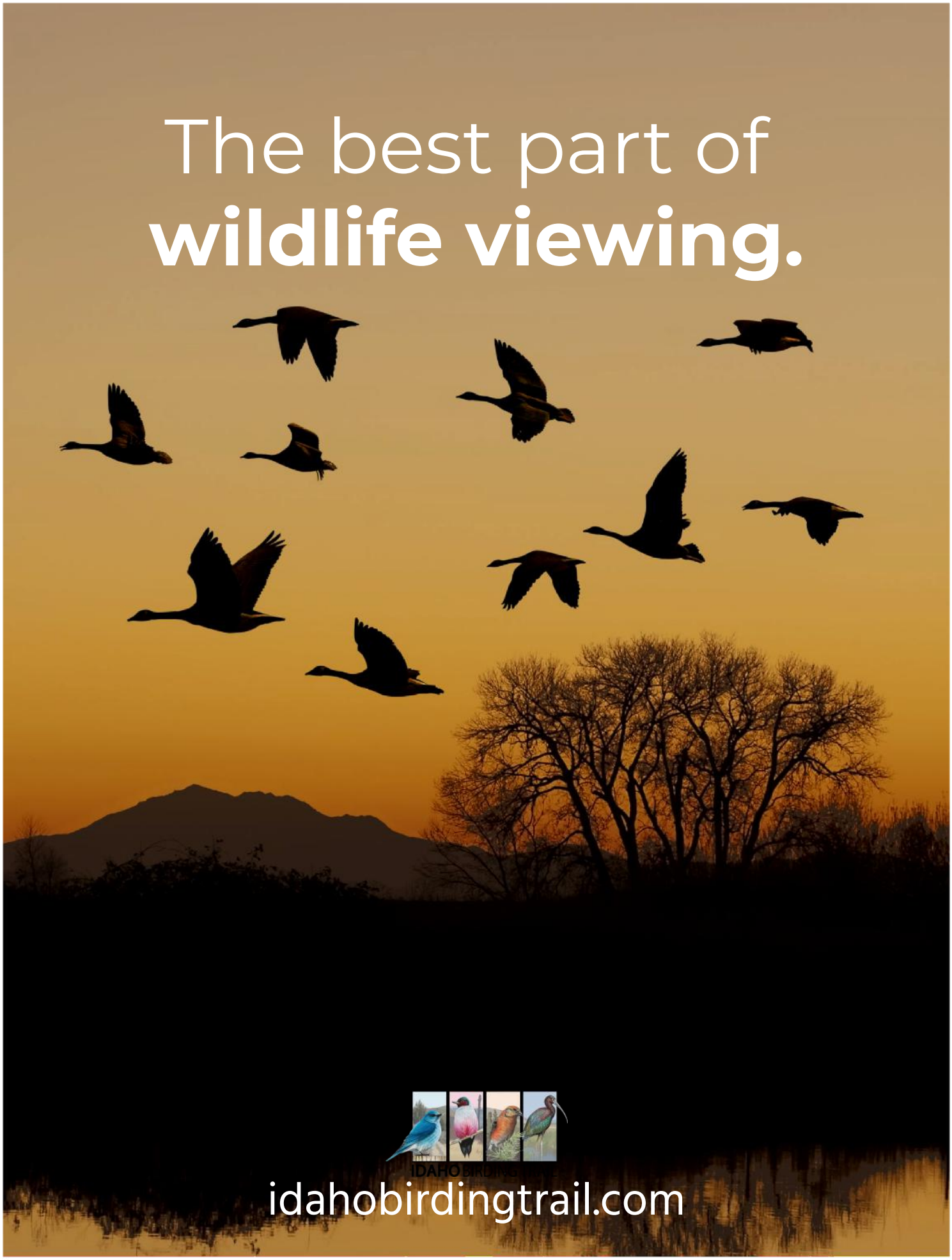
Why use BDAs and Not Beavers?

You would be hard pressed to find a better dam building crew than a few beavers, so why did we choose to build these dams ourselves? Beavers are fantastic engineers and have profound positive effects on wetlands and wildlife. However, over the past several years, recent efforts by IDFG have seen relatively low survival of translocated beavers.

Moving animals from one location to another is incredibly stressful on wildlife and can have mixed results. This was exacerbated by the lack of deep water immediately available to these beavers at those sites. Because of that experience, IDFG decided to use BDAs to initially create these deep-water pools for beavers. We wanted to “get them started.” Since beavers currently occupy the South Fork of Mink Creek, we hope they will naturally disperse into our project site. Since there are no active beaver colonies on the West Fork, we hope beavers from the main stem will find their way to this newly formed habitat. However, if that does not happen, IDFG is actively pursuing the possibility of translocating beavers into that section. This will ensure that our BDAs are maintained and continue to benefit a variety of wildlife species.

In the end, wetlands such as streams and rivers work on a long temporal scale. These systems took a long time to get to a degraded state, and they will take a long time to get back to a self-sustaining system again. However, coupled with some recent landscape use changes by the USFS, we hope our LTPBR project will help reverse the trend of these riverscapes to a high-functioning system again.

Pools are created on the upstream section of beaver dam analogs resulting in wildlife habitat. Trail cameras captured footage of several animals using the newly formed pools. PHOTOS: IDFG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Coeur d'Alene River Wildlife Management Area

The Coeur d'Alene River Wildlife Management Area (WMA) is a collection of land parcels along the Coeur d'Alene River between Harrison and Cataldo. Additional parcels are scattered around the lake and along the St. Joe and St. Maries rivers. It covers 8,638 acres. Largely a mix of wetland habitats and small lakes, this WMA is for the birds. It provides high quality habitat for waterfowl, upland birds, as well as protected nongame wildlife.

Thousands of birds, including tundra swans, descend on its waters to rest and feed during their seasonal migrations. A host of other birds such as osprey, mourning doves, great blue herons, kingfishers, hawks, and harriers can also be seen here.

PLATFORM FOR SUCCESS

Occurring on every continent except Antarctica, osprey can be found throughout Idaho where there's water. Because osprey feed almost exclusively on live fish throughout their life cycle, they are sentinels for aquatic health - they are very sensitive to environmental contaminants, overfishing. and climate-related changes.

Man-made nesting platforms can provide a safe place for osprey to nest in the absence of a tall structure. Platforms can be seen throughout the Coeur d'Alene River area.

Big Brown Bat *Predator of Nocturnal Insects*

Species of Greatest Information Need

Big Brown Bat

Big Brown Bats (*Eptesicus fuscus*) are one of 14 species of bats found in Idaho. Like humans, bats are mammals. They are warm-blooded, covered in fur, give birth to live young, and nurse their young (called pups). Unlike humans, bats have wings that consist of wing membranes stretched between the side of the body and the support system formed by the arm, hand, and finger bones, which allow them to fly.

Wingspan: 13-16 inches
Nose to tail length: 3.4-6.1 inches
Weight: 0.4-0.8 ounces
Lifespan: up to 19 years in the wild
Primary predators: American Kestrels, domestic cats, owls, Long-tailed weasels, and American bullfrogs

Identification: A medium-sized and heavy-bodied bat with a large head, broad nose, short, broad wings, and short, rounded ears. Brown to copper-colored glossy fur with blackish membranes that lack hair.

Range: They can be found from southern Canada through southern North America into northwestern South America, including many islands in the Caribbean. In Idaho they occur statewide.

Habitat: Most summer roosts are located in attics, barns, bridges, or other human-made structures, where colonies of a few to several hundred individuals gather to form maternity colonies. Adult males are most often solitary in summer, but they may roost with the females or in all-male colonies. Big Brown Bats can be found in a range of habitats from urban areas, grasslands and shrublands, forests, alpine tundra, cliffs, scree, and rock, aquatic and riverine, and subterranean habitats. Also roost in cavities of live and dead trees.

Diet: Mostly a beetle specialist, but also eats moths, ants, flies, mayflies, mosquitoes, stoneflies, and other insects, including agricultural insect pests.

Behavior: First to leave their roost sites to forage in the evenings, they are fast-flying, open-area foragers, often using the same feeding ground each night. Also normally flies in late afternoon. Commonly use night roosts in between foraging bouts, favoring garages, breezeways, and covered porches.

Breeding: Mating occurs in fall and winter (between September and March). Females store sperm, and ovulation and fertilization are delayed until after arousal from hibernation in spring. In the western US, they give birth to only one pup each year, typically from May to early July.

Migration/Hibernation: Makes short-distance movements into caves, mines, inconspicuous rock crevices, and other underground structures to hibernate only during the coldest weather. Apparently hibernate alone or in small clusters of less than 20 individuals. Where most of these bats spend the winter remains unknown.

Status/Conservation: Vulnerable in Idaho, Big Brown Bat is a species of greatest information need. Primary threats include white-nose syndrome, collisions with wind turbines, and improper management practices for bat control activities in human structures.

Thank You

Thank you to those who made direct donations, purchased or renewed a specialty wildlife license plate, or contributed to the Idaho Nongame Wildlife Fund when completing their taxes.

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

Windows to Wildlife
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Belted Kingfisher PHOTO: Andy Morffew/Flickr CC