

The Beavers' Busy Year

by Mary Holland

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Along a stream a dam pops out of the water. Beavers are busy at work! These aquatic mammals have unique traits that aid them in building the perfect lodge to raise young beavers and keep predators away. Mary Holland's vibrant photographs document the beavers' activities through the course of a year. Do these beavers ever take a break? Follow along as they pop through the winter ice to begin the busy year of eating bark, building dams and gathering food just in time for winter to come again.

It's so much more than a picture book . . . this book is specifically designed to be both a fun-to-read story and a launch pad for discussions and learning. Whether read at home or in a classroom, we encourage adults to do the activities with the young children in their lives. Free online resources and support at ArbordalePublishing.com include:

- For Creative Minds as seen in the book (in English & Spanish):
 - Beaver Signs
 - Beavers as Habitat Engineers
 - Dam Building
 - Keystone Animal: Beaver Pond Wildlife
 - Beaver Tails
- Teaching Activities (to do at home or school):
 - Reading Questions ◦ Math
 - Language Arts ◦ Science
- Interactive Quizzes: Reading Comprehension, For Creative Minds, and Math Word Problems
- English and Spanish Audiobooks
- Related Websites
- Aligned to State, Common Core & NGSS Standards
- Accelerated Reader and Reading Counts! Quizzes
- Lexile and Fountas & Pinnell Reading Levels

eBooks with Auto-Flip, Auto-Read, and selectable English and Spanish text and audio are available for purchase online.

Thanks to Amy Yeakel, Education Program Director, and Dave Erler, Senior Naturalist, at the Squam Lakes Natural Science Center for verifying the information in this book.

Mary Holland is a naturalist, nature photographer, columnist, and award-winning author with a life-long passion for natural history. After graduating from the University of Michigan's School of Natural Resources, Mary worked as a naturalist at the Museum of the Hudson Highlands in New York state, directed the state-wide Environmental Learning for the Future program for the Vermont Institute of Natural Science, worked as a resource naturalist for the Massachusetts Audubon Society, and designed and presented her own "Knee-High Nature Programs" for libraries and elementary schools throughout Vermont and New Hampshire. Her other children's books include *Ferdinand Fox's First Summer* (Moonbeam Children's Book Award) with *Arbordale* and *Milkweed Visitors*, (Science Books and Films' list for the best books of 2006 in the category Children's Books under Zoological Sciences). Mary's book *Naturally Curious: a Photographic Field Guide and Month-by-Month Journey Through the Fields, Woods and Marshes of New England* won the 2011 National Outdoor Book Award for the Nature Guidebook category. Mary lives in Vermont with her lab, Emma.

Visit Mary's blog at naturallycuriouswithmaryholland.wordpress.com



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Did you know that beavers are mammals just like you? They have some hair, the mothers produce milk for their young, and most give birth to live young.



Beavers are a kind of mammal called a rodent. Mice, chipmunks, squirrels, woodchucks, and porcupines are also rodents. They all have four big front teeth called incisors that never stop growing. Can you find the incisors in the skull above?

Beavers use their incisors to cut down trees, to cut the trees into pieces, and to eat the bark. This helps to keep their incisors from growing too long.

They do most of this work at night, while you are sleeping, and they sleep during the day.

Beavers are good recyclers. They chew and eat the bark off sticks. Then the beavers use the sticks to build a dam across a stream. The dam stops the water from flowing, and turns the stream into a pond.



For Creative Minds

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Beaver Signs



Just because you don't see beavers, doesn't mean that they aren't there. Beavers live near water in cities and in the country and sleep during the day (nocturnal). While you may not see the beavers themselves, you might see signs that beavers are near. Match the descriptions of the beaver signs (in bold) to the images (by number).

Beaver families build their home, called a **lodge**, by piling sticks on the bottom of a pond. Sometimes beavers build their lodge on the banks of a pond, not in the middle of it. If you see a pile of sticks on the banks of a pond, you are probably spotting a beaver lodge. If the sticks are blocking the flow of the water and turning a stream into a pond, it's a beaver dam.

Have you ever left bite marks on something? When beavers eat the bark off a tree trunk, they turn their heads sideways and bring their four incisors together. Each tooth makes an **incisor bite mark** in the wood.

When beavers first live in a pond, they cut down trees close to their lodge and dam. Eventually they have to go farther and farther to find trees. Beavers are safer in water than they are on land because they can swim much faster than they can run. They dig ditches or canals that fill with water so the beavers can swim to the far-away trees and float them back to the lodge. If you see ditches or canals going from ponds into nearby meadows or woods, you are probably seeing a **beaver canal**.

Beavers are territorial. Like dogs and many other animals, they mark their home area with smells or scents. The beavers build piles of mud and leaves beside the pond. Then they spread a strong-smelling oily liquid called castoreum on the pile. These piles are called **scent mounds**. There are many messages the scent may be giving to other beavers, including "stay away" or "I'm looking for a mate."



Have you ever left footprints on a clean floor or in dirt? Beaver **tracks** are the same shape as their feet. The tracks made by a beaver's front feet are small, and the tracks from its webbed hind feet are large. While some tracks are very clear, others may be rubbed out by dragging their tail or wood. You might find beaver tracks in the mud at the edge of a beaver pond. Sometimes, you might even find tracks in snow.

If beavers are living in a pond, there will be lots of trees that have been cut down for food and for building a dam and a lodge. There will also be many wood chips on the ground by these tree stumps. The beavers chew the chips off the tree trunks in order to make the trees fall down. When beavers cut down a tree with their incisors, it leaves a **pointed tree-trunk tip**.

Beavers keep their lodge very clean and only go to the bathroom in the water. You don't see their droppings, or **scat**, very often. Look for it in the water near their dam. Beaver scat is about as long as your pinkie finger, and it is made of little bits of bark that look like sawdust.

Before ice forms on the pond, beavers cut down branches and put them in a **food-supply pile** on the bottom of the pond near their lodge. When the pond is frozen with ice and they can't leave the pond to get food, they swim out to this pile of branches to get food to eat. After they take a branch or piece of log back to the lodge, they eat it, and then throw the leftovers back into the pond.

More Beaver Signs:



Answers: 1-scent mound, 2-beaver canal, 3-lodge, 4-incisor bite marks

Answers: 5-winter food-supply pile, 6-pointed tree trunk, 7-scat, 8-hind foot track

Beavers as Habitat Engineers



Beaver Lodge in Pond



Abandoned Beaver Lodge

Other than humans, no other creature changes its surroundings as much as beavers. They turn small, wooded streams into ponds, and turn forests into open meadows. The new ponds and meadows become habitats for fish, birds, and many other animals.

First, they must choose just the right size stream—not too small and not too large.

Next, they build a strong dam to limit the flow of the stream enough to raise the water level. Sticks, branches, logs, stones, mud, and plants are used to build the dam. The shape and size of the dam depends on where it is built. The upstream side of a dam is usually much longer than the downstream side, which makes it very strong. Dams blocking larger streams are often bowed upstream, as that also adds strength to the dam.

Then the beavers build a lodge in the bank or in the middle of the pond. Beavers rely on the water around their lodges to protect them from their enemies (predators) like coyotes and wolves. The doors to the lodges are underwater because most of their enemies don't swim. The beavers have several underwater doors going in and out of their lodge so they can easily escape from danger.

Beavers are always checking on the water level of their pond. Some water still flows through the dam, but it is very important that the entrances to the beaver lodge stay under water. This keeps predators from reaching the beavers when they are inside the lodge. If the water gets too low because the dam is leaking, the beavers are quick to repair the dam.

After several years, when the beavers have eaten all the food close to the pond, they look for another stream where there is more food and build a new pond. Without the beavers there to tend it, the dam weakens and cannot hold back the pond water. When the old dam breaks, the pond drains, turns into a marsh, and then into a meadow with a stream running through it. In time, shrubs and trees may grow where the pond used to be, making a forest once again.

Dam Building



Beavers need deep water around their lodges to keep predators away. The beavers don't go to the local hardware store to buy what they need; they have to find things in the area around where they are building.

If they need branches, they cut trees and then cut the branches. They don't have saws to cut the wood, so they use their long incisor teeth.

If they need mud, they find it and dig it. Beavers don't have shovels, so they use their hand-like front feet and strong, claw-like nails to help them dig.

They gather other things in their habitat to use in the dam. These other items might be plants or even trash left by humans. Hopefully, the trash won't hurt them.

After they find things to use in the dam, they have to carry the items to the building site. They can carry things in their teeth and in their front paws—even when swimming!

Once they get the items back to the dam-building site, they still have to pile it so that it stays together with the water pushing against it.

Even after the dam is built, the beavers work hard to keep it in good shape—until it is time to leave the area and build a new beaver pond somewhere else.

Which of these things do you think beavers might use to build a dam?



Answers: All of them: sticks, fishing float, mud, and stones.

Keystone Animal: Beaver Pond Wildlife

Some people think that beavers are “pests” because the beavers cut down their trees or turn their backyard into a beaver pond. Scientists who study beavers have shown us that beavers are a **keystone species**. That means that many other plants and animals depend on beaver ponds and wetlands. When the beavers leave to build a new pond, some of the other living things may completely disappear from the area.

Which of these animals do you think would rely on beaver ponds and wetlands for all or some of their needs?



Answer: All of these animals live in and around the beaver pond. Starting in the upper left, animals are: eastern newt, wood duck, painted turtles, moose, green frog, red-winged blackbird, river otter, green heron, snapping turtle, white-tailed deer, raccoon, dragonfly, and great blue heron.

Beaver Tails

Beavers are easily identified by their long, flat tails that are covered with scales.

Beavers slap their tails on the water to signal danger to other beavers.

They also store fat in their tails during the winter, which helps them survive. When it's hot outside in the summer, the tails release heat, helping to keep the beavers cool.

Beavers use their tails for balance and to support standing—like a bike kickstand.

Last but not least, beavers use their tails as rudders to steer while swimming and for balance when floating in the water.



For more information on beaver adaptations, go to the free on-line teaching activities at ArbordalePublishing.com. Click on the book's cover to get to its homepage.

This book would not have been possible without the generosity, patience and devotion of Kay Shumway, a beaver whisperer if there ever was one—MH

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