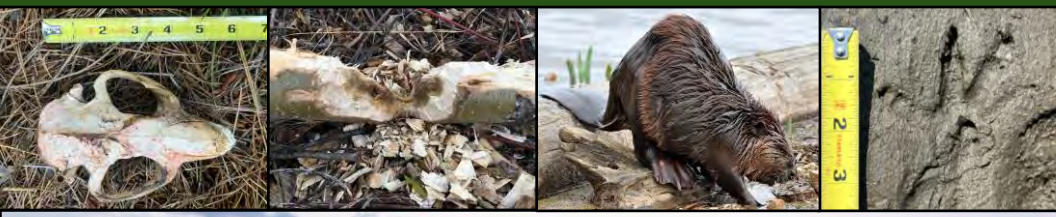
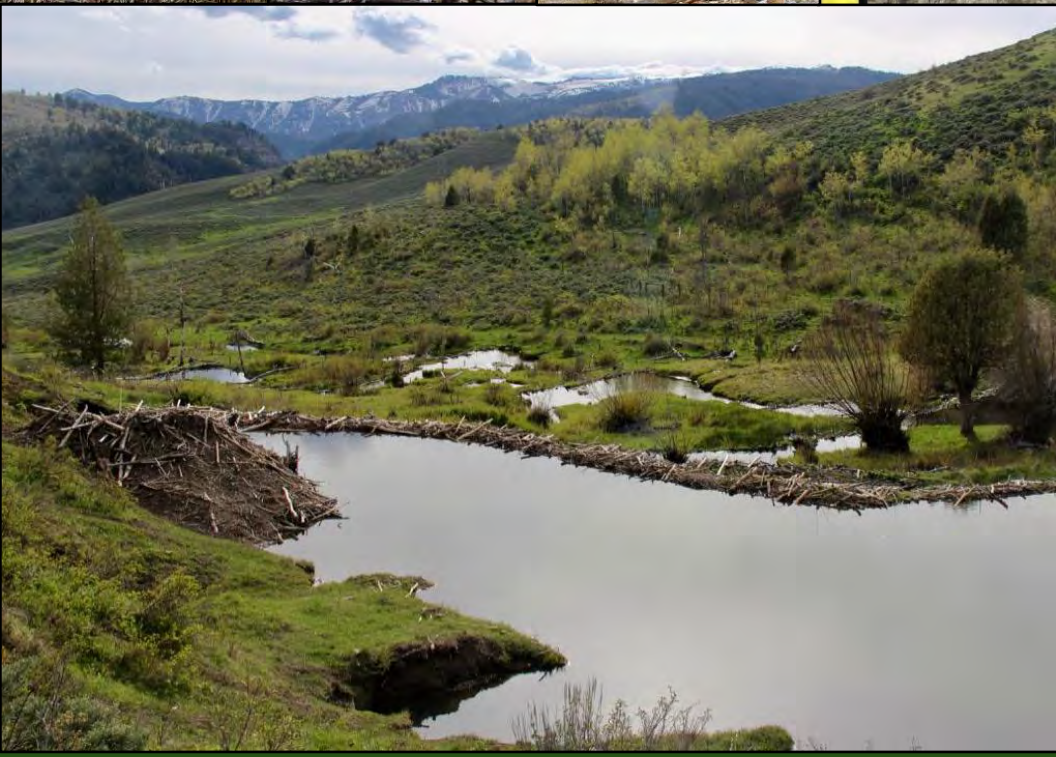
BEAVER TRACKS & SIGN

A GUIDE FOR FIELD SURVEYS





NATIONAL WILDLIFE FEDERATION

Rob Rich and Torrey Ritter

MONTANA FISH, WILDLIFE & PARKS

About This Guide

Drawing on specialized abilities to gnaw, dig, and build, the North American beaver (*Castor canadensis*) creates dynamic, complex habitats where land and water meet. Aerial imagery and predictive models offer hints about *what* beavers can do, but track and sign observations offer nuanced data that show *how, when, where,* and *why* beavers work. This is a guide to interpreting those beaver tracks and sign, with aims to: 1) inform and inspire anyone seeking a deeper understanding of beaver ecology and 2) support professional or community scientists keen to document beaver activity with field surveys.

What does it mean to interpret tracks and sign? In its broadest sense, wildlife tracking is a practice for interpreting indirect evidence of animal presence. From footprints and browse to feathers and scat, animals are constantly leaving signs of how they move, feed, grow, and interact. The animal and motive responsible for any given sign may not always be obvious, but tracking invites us to look closely, ask questions, create hypotheses, notice patterns, and filter possibilities grounded in natural history. After considering all the details in the context of the habitat and season, tracking can not only help us to identify which species made the sign, but also to interpret their anatomy, behavior, and ecology. As a noninvasive method to gather fine-scale data about species whose activity may be difficult to directly observe, tracking can also yield profound insights for conservation.

By tracking beavers at the scale in which they work, we can see the subtle components of watershed-wide complexity, and how those pieces shape processes that change through time. Tracks and sign provide a refined snapshot of beaver occupancy, and they teach us about how beavers' social, territorial behaviors shift across seasons. Tracking can also highlight the multi-generational formation of beaver habitats and, given the importance of prior use for the success of translocated and naturally returning beavers, it can help us guide beaver recovery and coexistence in the future.

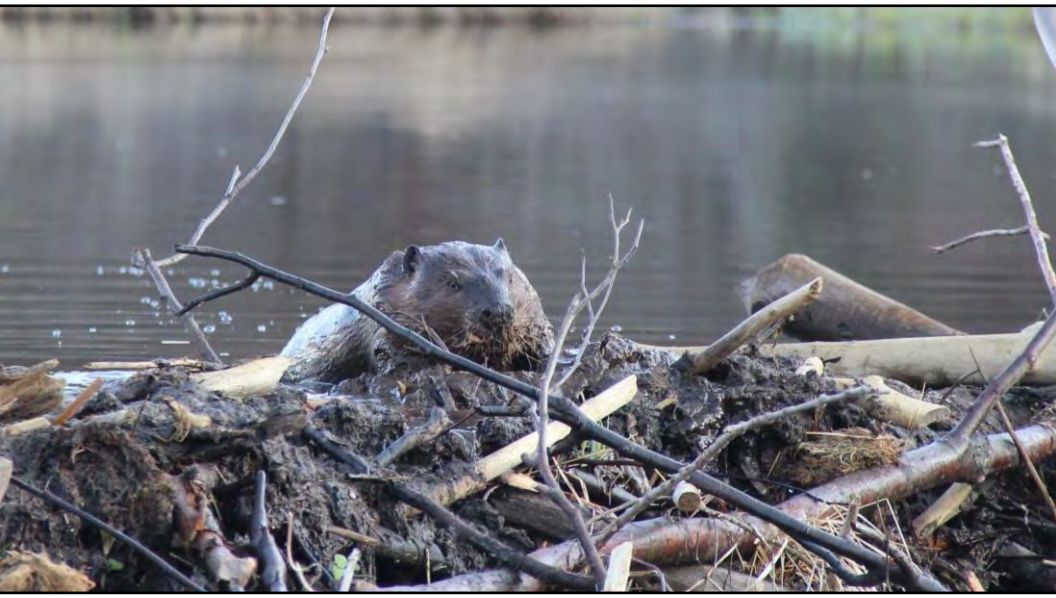


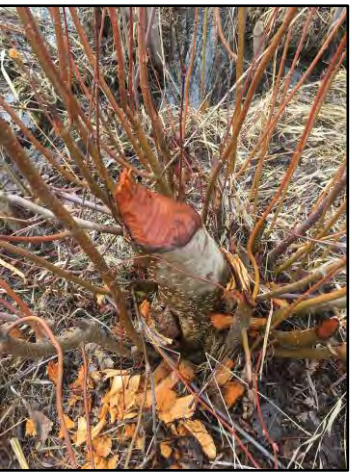
Photo Credits are due to Terry Kem (track pattern, p. 7), Minette Layne (beaver, cover), and Ben Goldfarb (dams, cover; beaver, p. 1). All other photos are from Rob Rich and Torrey Ritter.

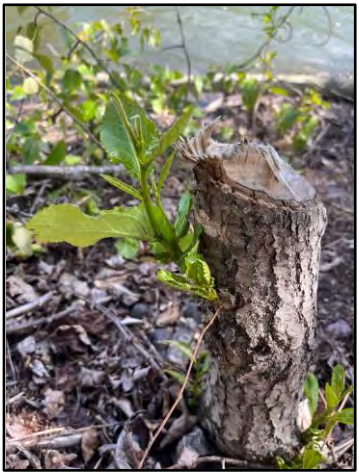
Clippings

Clippings are stems and trunks from shrubs or trees cut by beavers as food or construction material. Ends have angled cuts, grooved by beaver teeth. Clippings may concentrate in areas of feeding, harvesting, or building, but this sign can be found wherever beavers are or were active. Clippings can be 1) recent or 2) old.

Recent: Interior of cut stem is moist and/or bright at clipped ends or where bark of consumed clippings is removed. Numerous wood chips at base. Tracks and trails to clippings may be evident.

Old: Interior of cut stem is dry and drab, with cracking or fraying ends. This drying may take months, and associated debris, tracks, or trails may be gone by that time.



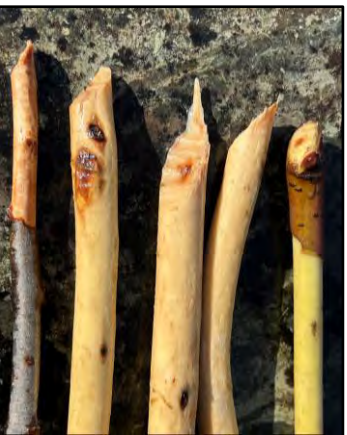


Beavers feed on cambium, the tissue layer of growth cells just beneath the bark. If the bark is easily stripped, the clipping may not show deep cuts.

When cutting across the grain, wood may show persisting, parallel grooves of beaver teeth. A single adult upper beaver incisor averages ~ 6.5mm, the widest of any rodent.

Many North American plants evolved to thrive with beaver herbivory. Elk, cattle, and other large herbivores, selectively eliminate buds, but beavers clip the entire stem, which stimulates the plant regrowth seen in this alder (left), cottonwood (center), and willow (below). Such resprouting may occur even if the clipping is old.

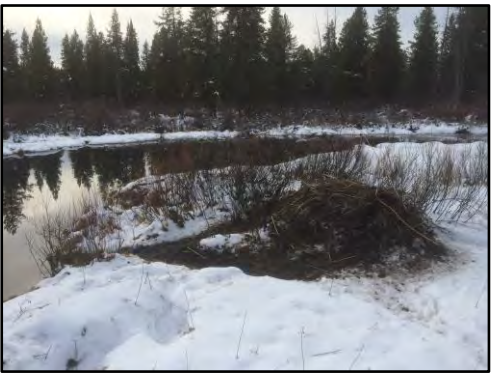
Wood chips vary in size depending on the size and condition of the clipping, but they often have splitting ends with a shape that appears scooped. Porcupines, whose activity can sometimes be confused with beavers, do not leave chips with evidence of such deep cutting into wood.



Lodges & Bank Dens

Lodges are free-standing or bank-adjacent structures made of sticks and mud. Bank dens are holes into land on the side of a stream. Both feature a dry, elevated chamber at their interior that provides beavers with shelter. Lodges and bank dens can be classified as 1) active, 2) inactive, or 3) relict.

Active: At least some fresh sticks and mud. Entry/exit points underwater. Concentrated signs of feeding, caching, and/or other activity often nearby. Although not a diagnostic feature, active lodges in winter may have an opening in the snow of their roof, indicating beavers breathing within.

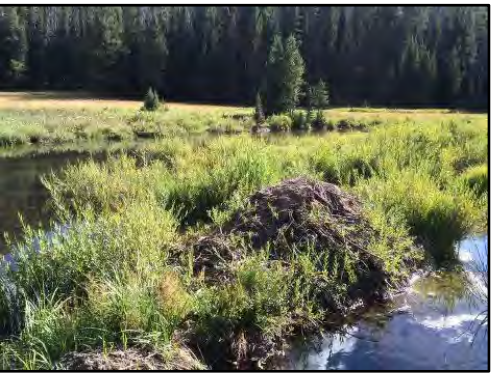


Beavers are in the process of sealing this lodge with fresh mud, which is transferred over the clean snow as they move to and from the water.

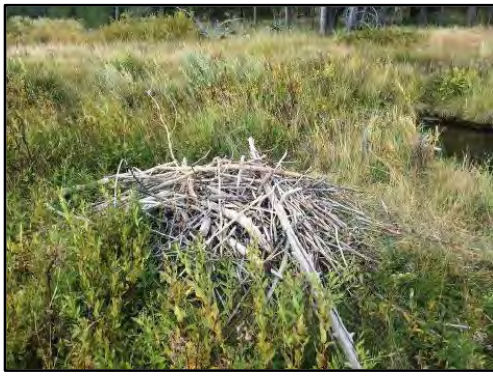
The entrance to this bank den is not clear, but fresh clippings and loose, disturbed gravel/sediment is a sign of beaver movement and use.

Inactive: No fresh sticks and mud, but repairs with these materials are possible. Entry/exit points may be partially exposed. No fresh signs of feeding, caching, or other activity nearby.

Relict: Dry and degraded, with collapsing exit/entrance points. In need of significant structural repair. No fresh signs of feeding, caching, or other activity nearby.



Water still covered the entrances to this structurally intact lodge, but the lodge does not include fresh mud or sticks. Plants grow thick and undisturbed around the lodge, and some of the willows that beavers cut and used to build the lodge are sprouting. Minor repairs could make this livable.

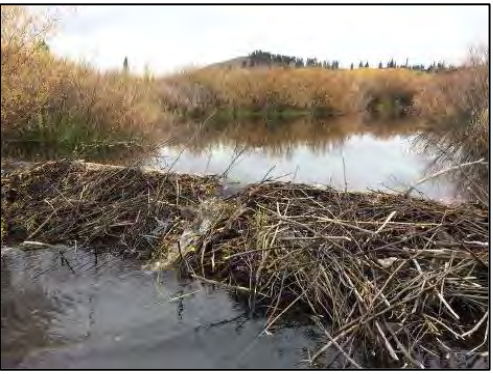


The inner chambers were visible through the dried sticks of this relict lodge. Any mud that once sealed this structure has weathered away, the collapsing entrances were exposed, and no recent beaver activity occurred nearby.

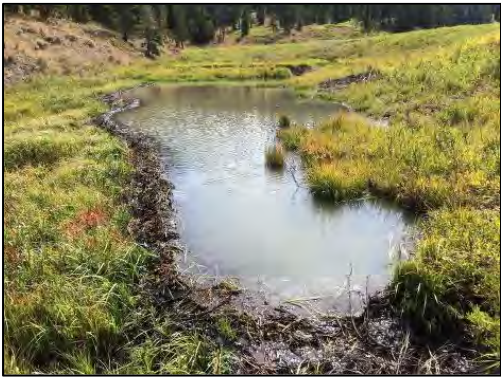
Dams

Dams are intentional arrangements of sticks, rocks, mud, and other building materials to impound water, which provides beavers with safety from predators and access to food. Dams can be classified as 1) active, 2) inactive, 3) relict, or 4) absent.

Active: Moist and firm with at least some fresh sticks and mud woven into dam structure. Pooled water brims close to the lip of the dam. Tracks, scats, or other associated signs of regular maintenance activity.

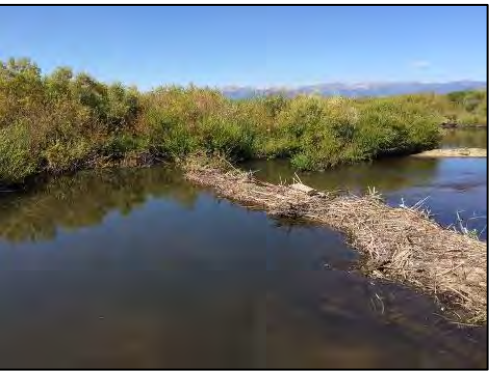


While the sticks in this dam may seem loose and old, the structure is firm and robust, with water brimming at lip of dam. The flowing water is a point where beavers routinely cross for maintenance.



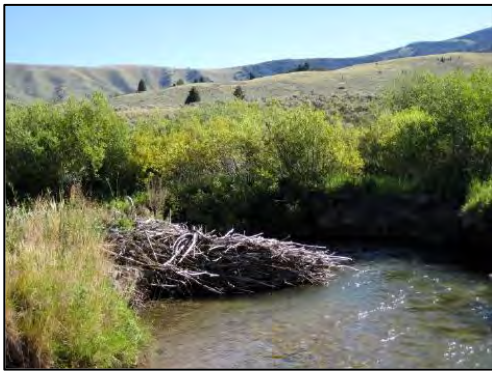
Dams take many shapes. Active dams feature ample mud pressed against their upstream side for sealing strength.

Inactive: Dry and porous with lost mud and aging sticks, but still functional and relatively easy to repair. Some water remains pooled, but well below the lip of dam. No signs of recent maintenance.



Despite a few recent clippings washed up against the dam from upstream, nothing fresh is integrated in the dam's structure. The pooled water has fallen below the dam's lip, and the dam's loose stick structure has degraded on the far end. But this dam is still functional, and could be restored quickly.

Relict: Overgrown, indistinct, or dysfunctional. Beyond potential for swift repair. The once-impounded area has been replaced by plants or flows freely. No associated signs of recent activity.

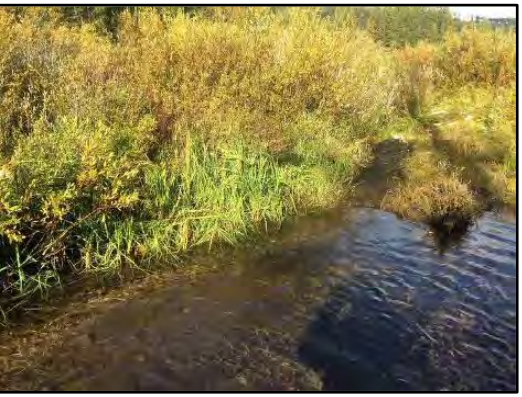


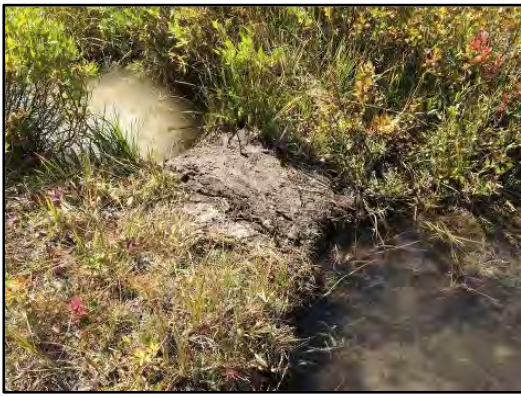
Dry, mudless elements of the dam's structure may alter some flow, but the dam no longer serves its purpose for beavers. Relict dams often retain an anchor point on one or both of the banks. Relict dams require extensive rebuilding for full function.

Canals and Trails

Canals are water corridors for beaver travel and material transport maintained with intentional digging or dredging and regular use. Trails serve the same purpose on land but are maintained with regular use. Both features often lead to and from clippings, dams, lodges, caches, or other sites of frequent activity.

Canals and trails precede dam building, and their use continues where beavers are active. Since canals can also persist, their hints of prior use also encourage beavers to return to inactive habitat. Due to the tracks and drag marks from tails or transported plants, trails will often feature bared mud (right), and canals will feature disturbed gravels or stream bottom substrate (left). Trail length varies by site. Some may indicate regular beaver forays to choice plants away from the water (left); others include short crossover spots between adjacent waters (right). Canals and trails are travel networks for beavers, and they add diversity to water flow along streams.

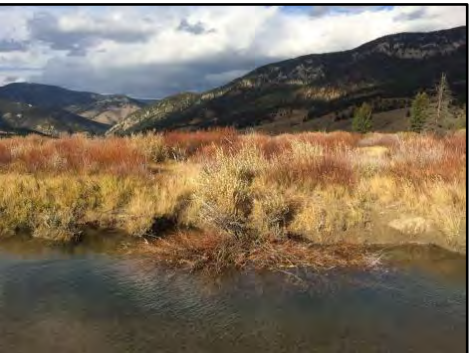


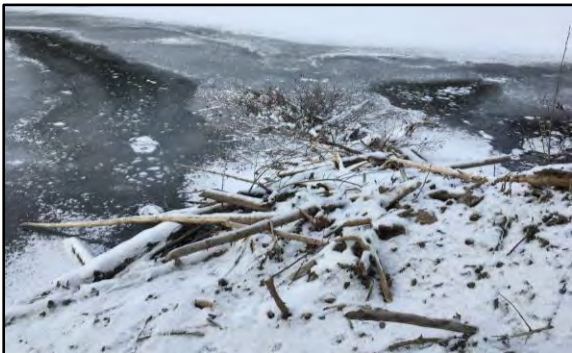


Caches

Caches are intentional gatherings of large (1-4m long) clippings stored in the water for use as winter food. They may be active (clippings recent; adjacent to lodge) or inactive (old, drying clippings; dispersed from lodge).

Where winter ice denies access to fresh forage, beavers begin cache construction in late summer, often within 20m of a lodge or den (left). Branches may be visible above the surface, but most are underwater. Clippings in caches retain their bark and are not scattered on the surface as in a feeding area. In early winter, pockets of air in beaver fur may release bubbles to the surface of new ice (right), a potential sign of beaver accessing canals and caches.

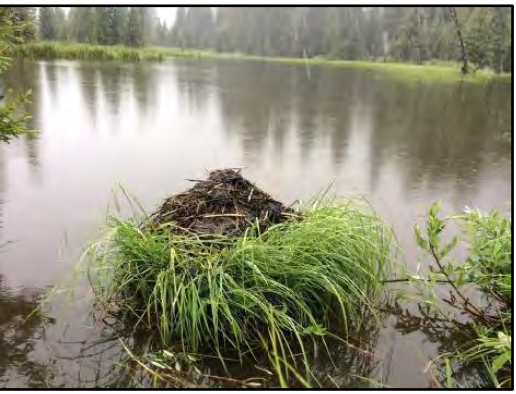


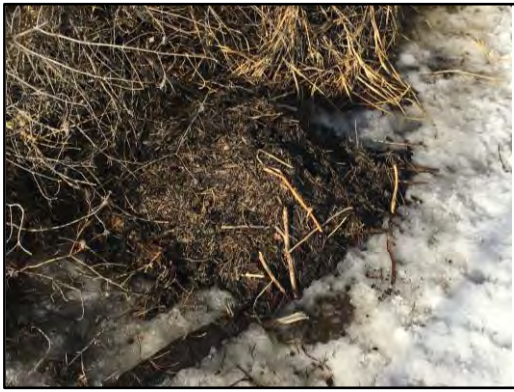


Scent Mounds

Scent mounds are constructions of grass, sticks, and mud marked with secretions from castor glands.

Scent mounds can range in size from a small pawful to a very large (60+ cm tall) heap on the bank and may occur abundantly around a beaver's territory. The scent from these mounds is often strong and sweet, with hints of vanilla. Fresh scent mounds are moist, not only from the beaver's secretions, but also from their tendency to include mud dredged from underwater. Scent mounds are used primarily to designate territory boundaries, but they also communicate information on kinship, gender, and readiness for breeding among beavers.

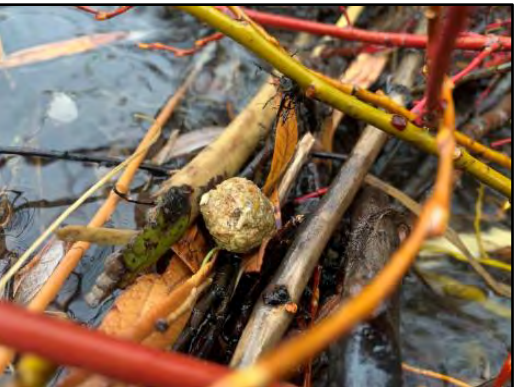


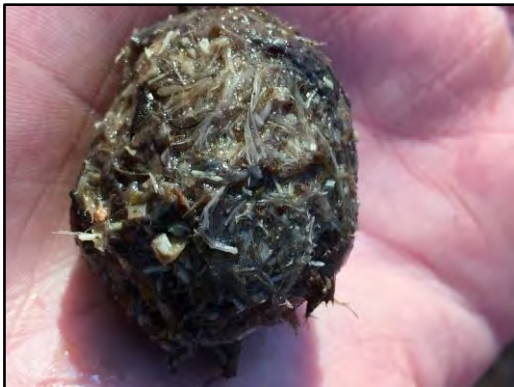


Scat

Scats are small (2-4cm D x 3-7.5cm L) consolidated masses of fecal material.

Beavers exhibit autocoprophagy (when an individual consumes their own of feces to maximize nutrient uptake), but the soft, green primary scat will not be seen unless the beaver is observed making and consuming one. The secondary scats (shown below) are the more common sign and look like balls of soggy sawdust, often deposited along dam crossover points (left) or in deep water just upstream of dams. The secondary scats are reliable evidence for recent beaver activity because their loose, fibrous materials degrade quickly in water.

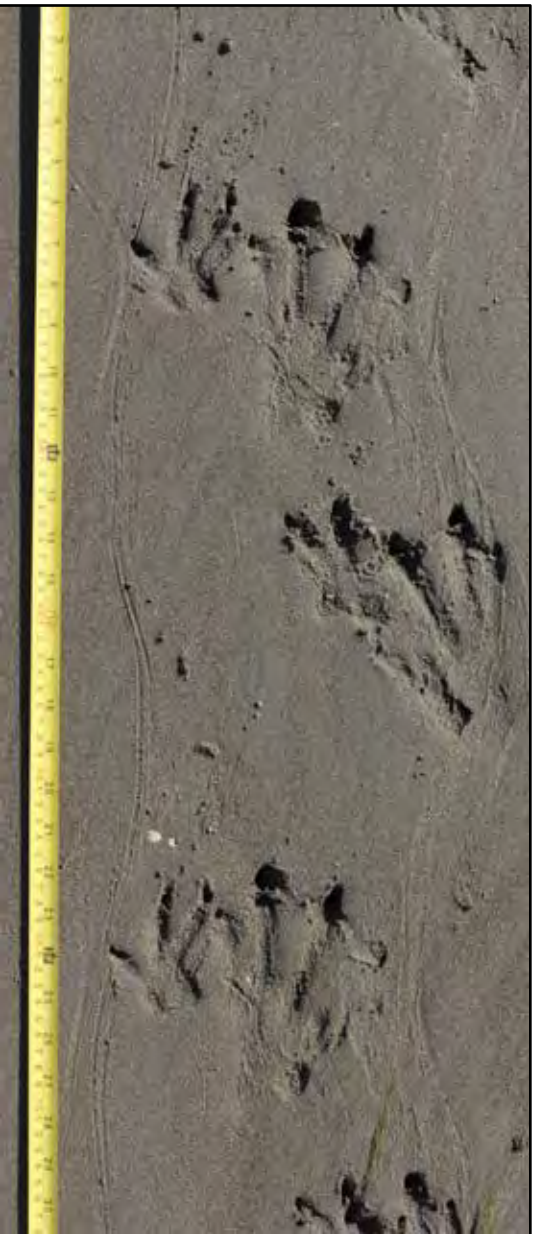




Tracks

Tracks are footprints – and sometimes tail or body prints – left as beavers travel on the ground.

When comfortably foraging or traveling, beavers typically walk, which leaves a track pattern of evenly spaced track pairs that alternate between sides of their body. In each track pair, a large, webbed hind foot steps adjacent to or on top of a smaller, unwebbed front foot track. The beaver's tail or vegetation the beaver is transporting can sweep over the footprints, obscuring key details and potentially influencing the track pattern. When alarmed or threatened, beavers may bound for short distances.



Left front track equipped for digging and manipulating wood (lower left) and left hind track with long, webbed toes for powerful swimming (upper right).

Front: 4.5-9cm L x 5.5-7cm W. Roughly the size of a credit card. Typically features four finger-like, blunt-clawed, unwebbed toes that curve inward. A much smaller, shorter inner toe (or its claw) may show lower in the track. All the toes connect to the palm pad, and there are two lobed pads at the base of the track.

Hind: 10.5-20cm L x 6-13cm W. At least double the size of front tracks. Toes are webbed to just below the blunt nails at their tips. The outer three toes often register the deepest. The heel is long and often round at the base of the track.

Track Pattern: When a beaver walks (as in left photo), the stride (length between the same points on sequential tracks of the same foot) is roughly 29-52cm. A beaver's straddle (width between outermost edges of the entire trail) is often 13-26cm.