



American Beaver
Activity Survey Protocol
for the
Pacific Northwest



Oregon State
University

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PURPOSE



This protocol is designed to provide an improved approach for recognizing and interpreting American beaver (*Castor canadensis*) activity, including the cryptic sign of non-damming beaver that is often overlooked. The following sections serve as an introduction to common beaver sign found throughout the Pacific Northwest. Descriptions for distinguishing different activity classes and photo examples are provided, acknowledging most photos were taken in western Oregon. These surveys can be performed for entire stream reaches (restoration project) or specific sites that will be used for modeling purposes (site selection criteria), or the combination of both. A colonization history for an area of interest can be inferred from the spatial-temporal observations used to classify beaver habitat use. Colony establishment and abandonment rates can also be identified if surveys are repeated annually.

THINGS TO KNOW BEFOREHAND

When and How to Survey

Timing is everything. Beaver surveys should be conducted during the principal dam building period (August - October) when beaver have the strongest propensity to construct dams, sign is easiest to detect, and beaver that dispersed in the spring (sub-adults and entire colonies) have settled at a new location.

Surveys should be conducted in an upstream direction to prevent water clouding that reduces visibility and impacts detection of sign. Scan the adjacent riparian area near the shorelines for foraging activity and any deciduous vegetation over hanging the channel since beaver can reach these when water levels are higher.

Activity Classifications

An activity status will be assigned to an individual study site or stream reach based on the youngest/newest beaver sign found. All activity regardless of age can be documented to further distinguish beaver habitat use, e.g., high-water refugia, dispersing beaver, etc.



Beaver Activity Classes

Current	<ul style="list-style-type: none">• presently active
Recent	<ul style="list-style-type: none">• active at least one season ago, but within the year
Past	<ul style="list-style-type: none">• active over a year ago
None	<ul style="list-style-type: none">• no sign found

Things to Consider

Remember, absence of evidence is not evidence of absence. Beaver use habitat in a cyclic manner and may reuse an existing site or a new area in the future. Also, high water events may flush out in-channel evidence of beaver sign, highlighting the importance of identifying beaver activity in the riparian areas.



Commonly Confused Rodent Foraging Sign

Like all rodents, American beaver clip plant material at a 45° angle (See photo above), which may be confused with foraging activity of Mountain beaver (*Aplodontia rufa*), and even nutria (*Myocastor coypus*). The diets of these species overlap beaver, but a large portion of an American beaver's diet (particularly later in the year) comprises of woody plants while the other species primarily forage on non-woody plants year-round. Scale is another important factor to consider when assessing teeth marks. Look for large grooves or "chatter" marks created by the beaver's incisors, which are approximately 1 cm in diameter. These grooves will be at least twice the diameter of incisor marks left by mountain beaver.

TYPES OF SIGN YOU MAY ENCOUNTER

Clipped or Girdled Vegetation



Current

Bright appearance where stem was clipped or girdled. Stem may feel slimy when picked up out of the water.



Recent

Dull appearance. Ends will swell or crack if immersed in water. Black spotting begins to appear.



Past

Grey to black appearance, cracking and decay very obvious.

Food Rafts



Clipped, partially consumed vegetation that floats on water surface. Found only at **currently** active sites.

Feeding Stations

Discarded chew sticks immersed in shallow water near shoreline where they can safely feed, but quickly escape if threatened.



Caches



Large quantity of clipped, mostly unconsumed stems piled underwater in pools. Rare behavior for areas where water doesn't freeze over during the winter.

Slides

Beaver use these paths or trails for accessing food resources on land. They are typically 12" wide and can occur on any bank slope.



Current

Wet, muddy appearance from recent belly drag or all vegetation is matted down.

Recent

Vegetation matted down, but undisturbed new growth found within slide.



Past

Almost non-existent and may be confused with other wildlife activity.



Canals

Beaver excavate these features to extend the waterline for additional access to food. Canals are a minimum of 12" wide and limited to water sources with wide valley floors. The appropriate way to assess beaver sign when canals are present is to age the foraging activity near these features.

Current

Muddy appearance from recent use or excavation. Fresh chew sticks or feeding station nearby.

Recent

No fresh foraging activity present. No sign of canal maintenance or use.

Past

Chew sticks or feeding stations are absent due to high winter flows. Canals may be filled with debris or growing vegetation, and no longer filled with water.



Dens and Lodges

Contrary to popular belief, beaver commonly den in banks regardless of channel size and damming activity. The following structures can have multiple entrances and exits, and can be aged based on the presence of nearby foraging activity.

Current: Submerged entry point and fresh chew sticks discarded outside opening. Lodges will have evidence of fresh mud packing.

Recent: Potentially submerged entry point with older chew sticks still present near entrance

Past: Potentially submerged entry point and no chew sticks present



Bank Den

Burrow in stream bank that angles upward.

Bank Lodge

Attached to stream bank. These are remodeled bank dens.



Traditional Lodge

Structure is surrounded by water on all sides.

Scent Mounds

These territorial markers or “scent fences” are typically constructed in the spring when beaver are dispersing. They are found near the shoreline where beaver use nearby debris (grass, leaves, or mud) to construct the mound and then deposit castoreum. Height will vary.

Current: Distinct castor odor and damp from recent beaver visit.

Recent: Structure present, but desiccated.

Past: Unlikely to find in areas with flashy flows due removal during high water events.



Examples of Current Use



Tracks and Scat

The following types of sign are limited to currently occupied sites due to their short longevity.



Tracks

Hind feet are easy to distinguish based on large size and webbing between toes.

Size: 4-7 in. L X 3-5 in. W



Scat

Small (1.5-2.5 in.), cylindrical droppings with sawdust-like appearance. Clustered upstream of a dam, near den/ lodge entrances or feeding stations.

IS IT A BEAVER DAM?!

We often find discarded chew sticks that have accumulated on a pool-tail crest and appear dam-like. To qualify as a dam, look for the intentional placement of sticks on the downstream face (façade) of the dam (see red circles below) that run parallel with the channel. This confirms the beaver's presumed intent to construct a dam.



Surprisingly, beaver dams can be challenging to identify.



DAM MEASUREMENTS

Assigning Dam ID

Tracking individual dams provides an opportunity to document beaver damming activity across space and time. Assigning a dam ID depends on the sampling scheme. If the beaver activity surveys target multiple sites that have equal survey lengths, the Dam ID will contain the site number listed first, followed by the spatial order the dam was encountered while moving in an upstream direction, e.g. 34-1 (first dam found at site 34). If the dam is part of a complex, each subsequent dam will receive an additional letter designation, e.g. 34-1-A (second dam found at site 34 that forms a complex with 34-1). The next dam found in succession would be labeled 34-2 if it was not connected by impounded water, but was still located in site 34. Dams encountered for beaver activity surveys that are a partial or full inventory of a stream reach (survey length varies based on tributary) can use the former label system or substitute the site ID with the tributary name, e.g. Racks Creek 12. Letter designations would still be used to identify a complex.



Photographing the Dam Façade

Using an underwater magnetic slate (preferred) or dry erase board, list the dam ID and survey date. Take a picture that best captures the dam façade and most importantly, the information recorded on the slate/board. If follow-up surveys are planned, capture distinguishing features in the background (trees in riparian area, log, bend in channel, etc.) to assist with future identification.



Dam Status



Nascent

- First stage of dam construction.
- Unlikely to be impounding water.



Intact

- Impounding water, but may have minor leaks.



Breached

- Small section missing from dam structure that could be repaired.
- May still be impounding water



Blown-Out

- Nearly unrecognizable remnants of structure still present in the stream banks.

Dam Type

Distinguishing a primary dam from a secondary dam relies on a size comparison since denning and foraging locations are not limited to the primary dam.



Secondary Dam

Only present in a complex, are smaller than the primary dam, and may have more than one present in either stream direction of the primary dam.

Primary Dam

Can be a single dam or the largest dam/impoundment within a complex.

Dam Maintenance

Answer **YES** only if fresh mud packing and/or new construction material such as vegetation, wood, or rock have been added to the structure.



Newly added material



Dam Length

Only measure the beaver placed material and include the curve if present. Not always measured from bank to bank since beaver may stop short of these. Exclude breached section if present.

Breach Length

Measure length of breached section and note its location (front or bottom) in the comments section.

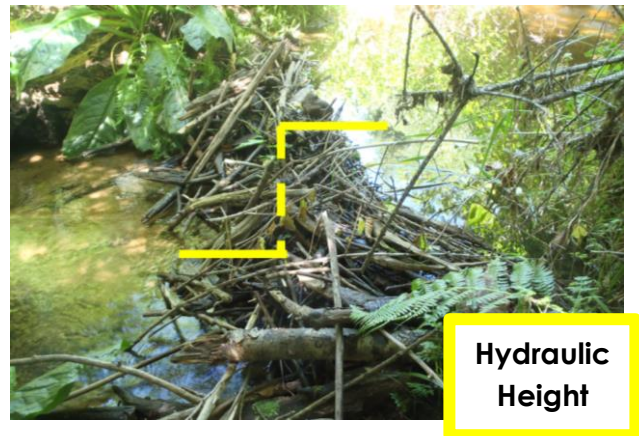


Dam Height

Measure the dam height at three evenly spaced locations along the dam length. Measure below the waterline if the dam extends below this.

Hydraulic Height

Measure vertical difference between upstream and downstream water surface levels at an individual dam.



Anchoring Material

Identify the dominant material (>50%) the dam is constructed on or anchored to. This does not refer to the material that the beaver used to construct the dam.

Material Options	
CWD	≥ 10 cm diameter
FWD	< 10 cm diameter
Pool-Tail Crest	Sediment ridge found (often gravel or cobble) at downstream end of pool.
Man-Made Structure	Culvert, rock weirs, dam analog, or large wood placement
Unknown	Unable to determine (common with older dams)

IMPOUNDMENT MEASUREMENTS

These dimensional measurements are often recorded after the pond has been surveyed. It's a good habit to keep track of the max width and depth measurements encountered until the final, largest measurement has been identified.

Pond Shape

Determine if the pond is triangular or rectangular (most common) for properly estimating surface area.



Pond Length

Pond length starts at the waterline on the dam, follows the channel thalweg, and ends where the stream returns to its normal wetted width or where you reach the pool-head crest.

Max Pond Width

Record the maximum width perpendicular to the thalweg. This is typically found immediately upstream of the dam.

Max Pond Depth

Record the deepest water depth found. This is typically found immediately upstream of the dam.



APPENDIX A: DATASHEETS

Dam Tracking

Date:		Observers:			
Dam ID:		Tributary:			
Latitude:			Longitude:		
Picture Taken: Yes No			Location Saved on GPS: Yes No		
Dam Status: Nascent Intact Breached Blown-Out			Dam Type: Primary Secondary		
Active Maintenance: Yes No			Impounding Water: Yes No		
Dam Height:			Hydraulic Height:		
Dam Length:			Breach Length:		
Anchoring Material: CWD > 10cm FWD < 10cm Pool-Tail Crest Man-Made Unknown					
Pond Shape: Triangular Rectangular					
Pond Length:		Max Pond Width:		Max Pond Depth:	
Comments:					

Activity Classification

Date:	Observers:
Site ID:	Tributary:
CURRENT Activity <input type="checkbox"/> Clipped or Girdled Veg. <input type="checkbox"/> Slides <input type="checkbox"/> Bank Dens <input type="checkbox"/> Bank Lodge <input type="checkbox"/> Regular Lodge <input type="checkbox"/> Food Rafts <input type="checkbox"/> Feed Stations <input type="checkbox"/> Food Caches <input type="checkbox"/> Scent Mounds <input type="checkbox"/> Scat <input type="checkbox"/> Canals	
RECENT Activity (<1 year) <input type="checkbox"/> Clipped or Girdled Veg. <input type="checkbox"/> Slides <input type="checkbox"/> Bank Dens <input type="checkbox"/> Bank Lodge <input type="checkbox"/> Regular Lodge <input type="checkbox"/> Feed Stations <input type="checkbox"/> Food Caches <input type="checkbox"/> Scent Mounds <input type="checkbox"/> Scat <input type="checkbox"/> Canals	
PAST Activity (>1 year) <input type="checkbox"/> Clipped or Girdled Veg. <input type="checkbox"/> Slides <input type="checkbox"/> Bank Dens <input type="checkbox"/> Bank Lodge <input type="checkbox"/> Regular Lodge <input type="checkbox"/> Feed Stations <input type="checkbox"/> Food Caches <input type="checkbox"/> Canals	
<input type="checkbox"/> NO Activity	
Comments:	

