6/5/2017

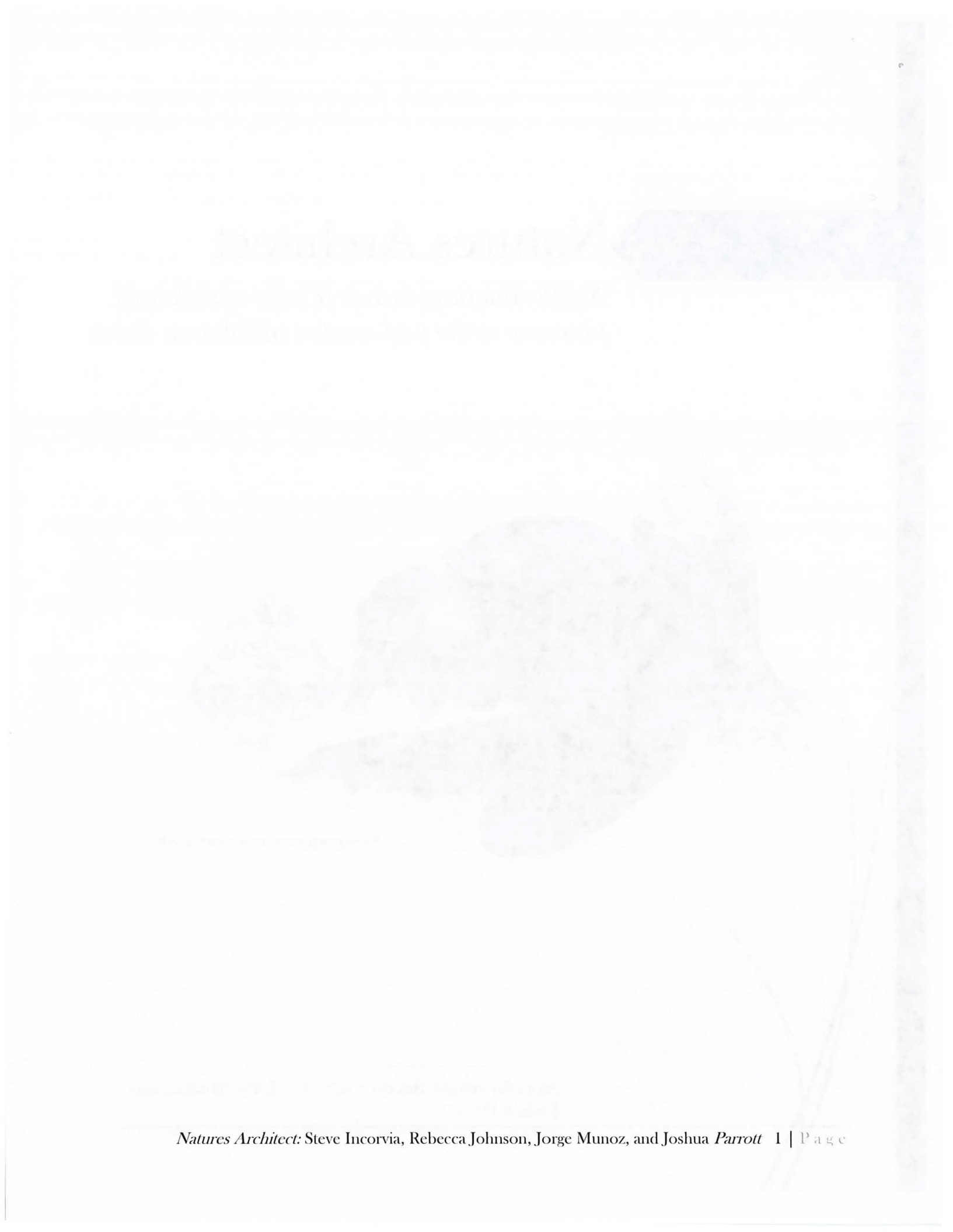
Natures Architect

North American beaver (Castor canadensis) presence in the mid reaches of Johnson Creek

Source: www.naturalhistory.si.edu

Steve Incorvaia, Rebecca Johnson, Jorge Munoz, and Joshua Parrott

MHCC NATURAL RESOURCES-WILDLIFE MANAGEMENT 2017



Contents

Background and Project Purpose 1.0

Johnson Creek flows 26-miles from Boring, Oregon to its confluence with the Willamette River in Portland. The watershed for Johnson Creek encompasses approximately 34,000 acres and winds through rural, urban, and agricultural areas (Environmental 2005). While not considered a major watershed for the region it is extremely important for the flora and fauna interfacing with the more urban aspects of our region, (See Figure 1.0). It serves an especially important function for the North American beaver (*Castor canadensis*).

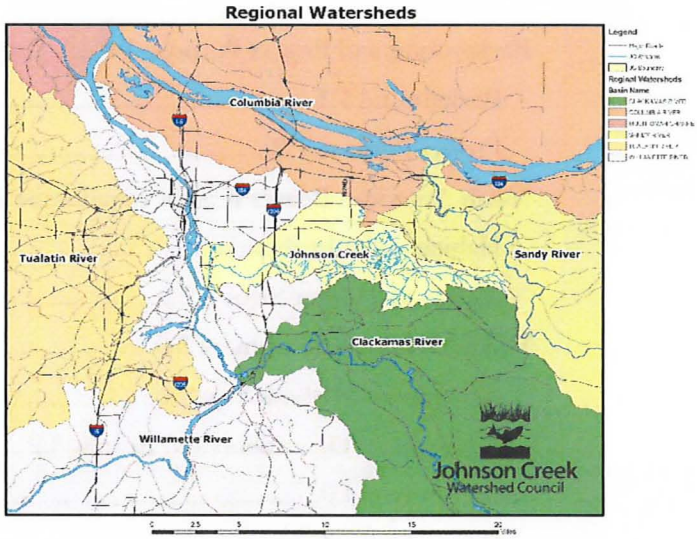


Figure 1.0: Johnson Creek and surrounding watersheds (Source: jcwc.org)

Background 1.1

In the early 1980's Johnson Creek was considered an "eye sore that frequently flooded (Johnson Creek 2017)". But in 1984 a loose group of grassroots naturalists organized to give tours of the watershed, trumpeting its beauty and environmental importance. In 1995, the group officially became the Johnson Creek Watershed Council (JCWC) and "Oregon House Bill 3441 passed, providing guidance for forming watershed councils as locally organized, voluntary, non-regulatory groups (Johnson Creek 2017)."

In 2015, in recognition of the importance of the species, the JCWC began performing beaver surveys along Johnson Creek. The first surveys were conducted in the spring. Kate Holleran, Senior Natural Resources Scientist with Metro, was the project's main scientific advisor (Johnson Creek 2017). Surveys were conducted by students of Mt. Hood Community College (MHCC). Every spring MHCC surveys continue under Kate Holleran's supervision with this report being the results of the 2017 student survey.

In 2016, volunteer surveyors were used to conduct beaver surveys in August and will be again this year. The USGS and Clean Water Services have been surveying beaver activity in the nearby Tualatin River Watershed as well (Johnson Creek 2017).

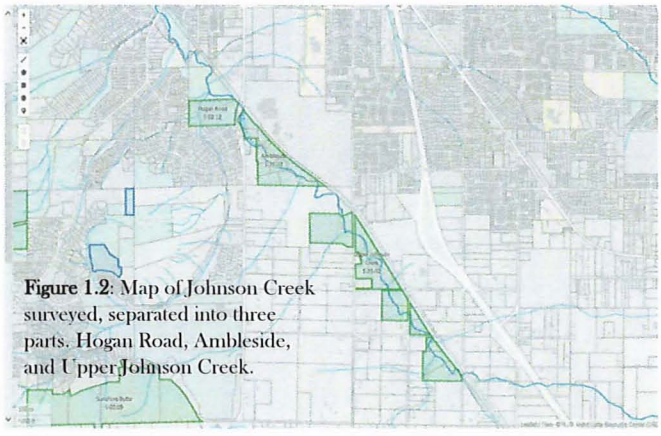


Figure 1.2: Map of Johnson Creek surveyed, separated into three parts. Hogan Road, Ambleside, and Upper Johnson Creek.

Project Purpose 1.2

This project will attempt to discover, identify, and map signs of North American beaver (*Castor canadensis*) along an approximately 2-mile stretch of Johnson Creek in Gresham, Oregon for the 2017 spring season. It is important for us to understand the health and size of our local beaver populations so that we may fully understand the needs, not only of our beaver populations, but of our local ecosystems and therefore choose management strategies that will be most effective.

North American Beaver (*Castor canadensis*) 2.0

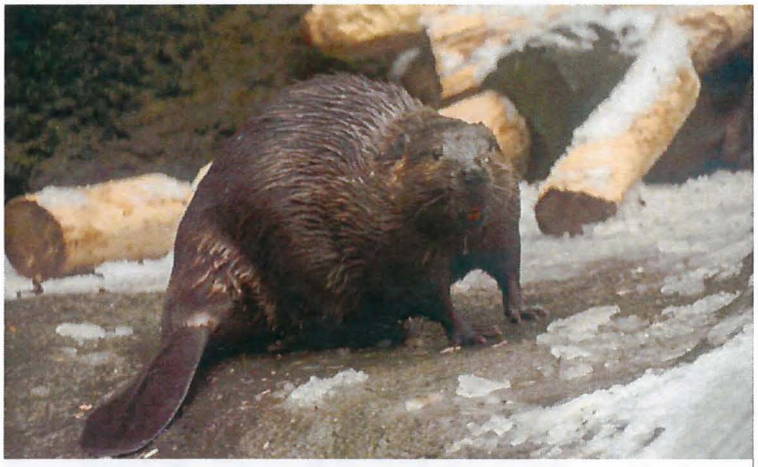


Figure 2.0: The North American Beaver, *Castor canadensis,* (Source: extension.oregonstate.edu)

The north American beaver is our county's largest rodent. It is also widely known as a keystone species for its ecological importance. In the 1800's beaver populations were at an all-time low due to trapping for fur. In 1899 Oregon passed the first of many protection measures and the species has been rebounding since. Presence of beavers is a good indicator of ecological health and species diversity. Associated species include threatened salmon and songbirds (Moskowitz 2010).

- **Size:** 100-120 cm, 16-30 kg
- **Field Marks:** While often only seen while swimming, the beaver is quite large, with brown hair and a large, flat tail. It also has large orange incisors.
- **Reproduction:** Beavers are colonial with family units living together with young of the previous year and that year living together before dispersal from the oldest. Highly territorial towards strangers. A pair of beavers will have 2-6 kits, in a single litter, each spring. Kits can swim within 24 hours of being born.
- **Diet:** Herbivorous. Mainly feeds on cambium of trees such as the red alder (ALRU) and cottonwoods.

(Moskowitz 2010).

Habitat and Distribution 2.1

While beaver can be found throughout north America in streams, marshes, ponds, and rivers, it is their ability to be productive in urban areas that make them particularly interesting and important to this project.

Climate change is effecting all species within the Pacific northwest. One aspect of these surveys that is not able to be addressed currently with only a few years of study, is the effects of climate change on the local beaver populations. As regional habitats change so do we expect the location and fitness of local beaver populations.

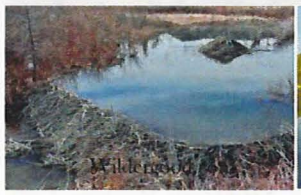
Figure 2.1: Distribution of *Castor canadensis in North America* (Source: carnivora.com)

Tracks and Other Signs 2.2

As mammals, beavers are secretive and hard to observe in person. Therefore, we rely on the signs that they leave to determine their presence. The following signs are indicators of beaver presence and were used during surveys, (see section 4.1).

- **Cambium Feeding:** Often seen when trees are felled for dams and lodges, but the primary purpose is to eat the cambium of trees for nutrition.

- **Dams and Lodges:** Beavers contruct dams using cut branches, logs, and mud in order to increase the area of water in which they inhabit. Lodges are made in within these beaver created pools. Neither is always seen when beaver are present, but both are excellent indicators of beaver prescence and health.

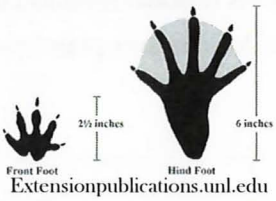


- **Bank Lodges:** When larger ponds are not available, beavers will create lodges in the sides of bodies of water. The entrances are usually submerged and angle up into the bank. These entrances are often observed when the water line drops.


- **Slides:** Long trails of mud along which beavers travel back and forth between land and water.

- **Scat and Scent Mounds:** Scat is usually deposited in the water and therefore rarely seen. But when found it is 2-4cm in diameter and 5 cm long. It resembles sawdust due to the beaver diet. Scent mounds are mounds of mud placed during the breeding season. They are scented with a strong smelling anal secretion called *castorum.*


- **Tracks:** Front tracks small and often obscured by hind tracks due to gait. Hind tracks large for size of animal and webbed. Tracks often obscured by tail dragging as well as felled wood dragging marks.



Extensionpublications.unl.edu

Wildlife Habitat Assessment 3.0

Beavers, like much wildlife, not only depends on its habitat to survive but actively shapes it. This may be evident most in the benefits beavers bring to riparian and wetland habitats. A healthy beaver population can many positive effects on the surrounding system, (see table 3.0).

Results	Description
Increased Water Retention and Base Flows	Beaver dams restrict the flow of waterways and keep water within the system for longer periods.
Decreased Peak Flows	Beaver activity can reduce peak flows, spreading water throughout the system for longer periods of time.
Expansion of Habitat Area and Complexity	Beaver activity expands riparian and wetland areas, as well as creating pools and ponds, all of which provides numerous species with habitat.
Increased Wetland Area	As water is retained it spreads laterally, creating wetland side channels and dissipating stream energy.
Increased Groundwater Recharge	Water table is replenished by overflow into surrounding areas.
Sediment Retention	Dams retain sediment that would normally flow downstream. Organic sediment provides nutrients, while pollutants are prohibited from entering and contaminating downstream habitats.
Temperature Moderation	Pools provide deep cool water in the system. Water flowing under dams remains cooler then turbulent water flowing free.
Nutrient Cycling	Beaver ponds and dams trap organic sediment keeping the nutrients in the system while also spreading them into wetland habitats through overflow.
Contaminants	By keeping water in the system for longer periods natural wetland/riparian purifying systems have time to work.

Table 3.0: Benefits on habitat from beaver presence. (Source: Castro 2015)

Assessment Methodology 3.1

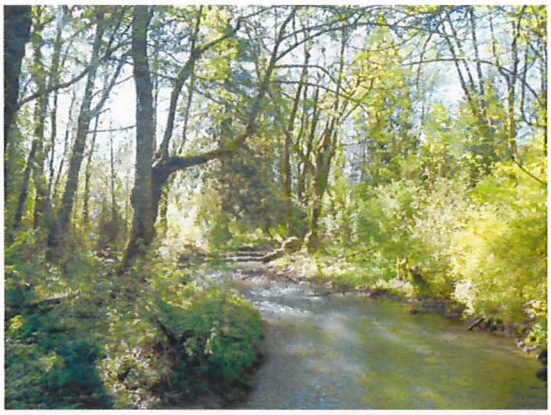
The protocol for the Wildlife Habitat Assessment (WHA) was first compiled in 1983 by a multi-agency group with members from the City of Beaverton, Oregon, the Portland Audubon Society, the U.S. Environmental Protection Agency, the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, the Oregon Department of Fish and Wildlife, and the Wetlands Conservancy. It was first created to address the needs of the City of Beaverton, but has been modified by agencies since then to address their specific data needs. The version which was used for this project had been previously modified by Metro in 2001.

The main adjustments were to focus less on water quality, which is difficult to assess in the field, and more on vegetative habitats.

The WHA is broken down into two sections. A narrative description of the site, and a numerical scoring system to ascertain current site conditions and what those sit conditions could be with active enhancements. (See Appendix for completed WHA data sheets for this project.)

Assessment: Description and Results 3.2

For the purposes of this project our area of interest was broken down into three, separate reaches. Each reach provided significantly different results in habitat assessment and signs of beaver presence. Therefore, all in-field assessments and results found we be given separately for each reach. The assessment was conducted on the 3rd May 2017. For full results and scoring please see the completed data sheets included in the appendix.



Upper Johnson Creek (UJC):

The UJC reach proved to have conditions that were near ideal for beaver populations (Environmental 2010). This includes a perennial stream with a >6% gradient, 40% canopy cover, and plenty of vegetation for food. Stream channeling provides more riparian area as well as some plots that could be considered wetland.

There is an ample herbaceous layer made up of different, native grass species and clovers. A shrub layer that includes Tall Oregon-grape (*Berberis aquifolium*,) *Salix* spp., and several *Rubus* spp. The upper canopy is dominated by red alder (*Alnus rubra*,) western redcedar (*Thuja plicata*,) black cottonwood (*Populus trichocarpa*,) and Douglas-fir (*Psedotsuga menziesii*.) Vegetation, and thus beaver food sources near the stream are abundant. The UJC reach received an existing sore of 83. Its enhanced score of 99 could be achieved with the removal of invasive species, (patches of Himalayan blackberry (*Rubus armeniacus*,) and reed-canary grass (*Phalaris arundinacea*,) are present,) removal of homeless camps, and tree plantings, (see section Recommendations in section 5.2 for more planting information.)

Ambleside:

In many ways, Ambleside is a study in contrasts to the UJC reach. While the stream gradient remains the same, canopy cover has reached 80% or more. Due to this cover vegetation that is preferred by beavers, (red alder, black cottonwood,) has less chance to grow and has been replaced by less desirable shrub species such as Indian plum (*Oemleria cerasiformis*,) sword fern (*Polystichum munitum*,) and native and landscaped rose (*Rosa* spp.). For ideal beaver conditions the existing canopy would need to be thinned.

The most pressing issue when it comes to Ambleside's habitat potential is human disturbance. Several, (now abandoned,) residences line the stream banks through the reach. A few concrete weirs are present

within the stream. The biggest obstacle to beaver habitation is that the stream sides have been reinforced by a man made stone wall. With this wall in place bank lodges will be impossible to create. It is for these reasons that Ambleside has received an existing score of 65 but an enhanced score of 99.

Hogan Road:

Hogan Road, habitat wise, lies somewhere between UJC and Ambleside. The gradient remains the same, canopy cover is between 15-20%, but a proportionately smaller stream area flowing through it. Its herbaceous layer consists of grasses and copious amounts of stinging nettle (*Urtica dioica*). Its shrub layer is dominated by Himalayan blackberry, especially on the north side. Its canopy is made up of red alder and black cottonwood.

While there is human disturbance in the form of residences lining the southern and western portions, it is not as extreme as that found in Ambleside. What makes the Hogan Road reach unique is that it is the final "natural" reach of Johnson Creek before it becomes more "urbanized" further downstream. This could make it a favorable habitat buffer zone that will be discussed further in our recommendations. Hogan road has an existing score of 74 and an enhance score of 98.

Beaver Survey 4.0

For this project two beaver surveys were conducted. The first was completed on 12th April 2017. The second was completed on 24th May 2017. The surveys were spaced in such a way as to observe the reach during the early spring, immediately post winter flooding period and the early summer, recovery period.

Survey Methodology 4.1

Our survey protocols were set forth by previous Mt. Hood Community College (MHCC) field surveys, as well as those conducted by summer volunteers with the JCWC. The survey team was provided a data sheet to record their findings (see appendix,) that focused mainly on three data types.

1. Dam present? If so was dam active or inactive? Was the dam breached? Any beaver sign (see section 2.2,) present within 200 feet of dam?
2. Sign present? If so, what type? If cambium feeding, what species of vegetation?
3. Coordinates of dam and/or sign, (latitude/longitude.)

To accomplish this all members of the survey crew walked both sides of the stream in their study area. Whenever possible the crew would spread out up to 100 feet apart. Often, impassable vegetation, roads, or structures made spreading out too far impossible so they survey crew adapted in the field as necessary.

When a dam or other beaver sign was found all members of the survey team would observe it and fill out the data sheet together, making sure that all data points were agreed upon.

When possible pictures were taken to document each data point found.

Survey Results 4.2

Survey One: 12th April 2017

Upper Johnson Creek

Given its ideal beaver habitat it was no surprise that most beaver activity was found in UJC. Figure 4.2.1 shows our findings.

- Red marks are dam locations. All three dams found were breached and it is unknown if they were still actively used.
- Green marks are feeding signs. Most feeding was done on red alder, with black cottonwood and willow species also feed on.
- Blue marks are tracks found. These tracks were found on the stream side in the mud. The weather before the survey had been quite rainy. We feel confident that these tracks were fresh.
- White marks are bank lodge locations. It is unknown if this lodge was active.

Figure 4.2.1: Google Earth map with UJC beaver activity marked. (Source: Google Earth 6th May

Ambleside

No dams or sign was found.

Hogan Road

While the conditions of the Hogan Road reach were less than ideal, some beaver sign was found (see figure 4.2.2).

- White marks are bank lodge locations. Both lodges found had tracks, (feet and tail marks,) in them indicating recent use. Vegetation that would enclose the opening to the lodges had been recently chewed off as well.
- Blue marks are tracks found. The tracks indicated are those not found immediately in the bank lodge openings.

Figure 4.2.2: Google Earth map with Hogan Road beaver activity marked. (Source: Google Earth 6th May 2017)

Survey Two: 25th May 2017

Upper Johnson Creek:

Similar to the first survey, the second survey showed most of the beaver activity to be confined to UJC. Most of what was found was mud slides, except for Dam #3 on the southern end of the UJC which was repaired and active as well as fully functioning.

Ambleside:

No dam or sign was found. Noise from the heavy equipment demolishing the houses was loud that day.

Hogan Road:

Like the first survey, not much sign was found. We noticed that the bank tunnel was still actively being used and we also saw a live beaver swimming in the creek close to the bank tunnel. It swam towards the bank next to the bank tunnel and the beaver disappeared into the undercut underneath the roots exposed along the bank.

Conclusion 5.0

In conclusion, we found many definite signs of current and past beaver activity in the Upper Johnson Creek and Hogan Road reaches of the creek for both surveys. Nothing was found in Ambleside in either survey, most likely due to the lack of favorable habitat. Upon our return for the second survey it was evident that the beavers had been active in repairing Dam #3. The third dam is now a functioning dam since it's been repaired and it was neat to see the work that the beavers had put into the dam since the first survey. Looking at photos from the first survey and comparing them to what we saw in the second survey it shows just how beavers are real architects. The use of mud and sticks was real prevalent, water on the upstream side of the dam had pooled up creating the type of habitat that the beavers are trying to achieve.

During our second survey in the Hogan Road reach we were traversing through the thick vegetation making our way to where we had recorded a bank tunnel along the creek. Upon making it to that location one of the members of our crew was monitoring the spot when he caught a glimpse of a live beaver swimming in the creek near the bank tunnel. The beaver was headed towards the cut bank and disappeared into the bank. We think there may be an underwater entrance into the bank tunnel due to the beaver not resurfacing after quite some time and not being seen swimming further down the creek. This ended up being our most significant finding since we got to put eyes on an actual live beaver.

Survey Observations 5.1

The bulk of observations for this area during the first and second survey were chewed trees/shrubs, followed by a few mud slides into the creek, a couple bank tunnels, two dams that were either breached or washed out and no longer active and one dam that was breached earlier in the spring and repaired upon the second survey.

Recommendations 5.2

One thing we as a group came to realize during the late spring and possibly into late summer was that there is an overwhelming amount of overgrown vegetation lining the buffer of the creek. We recommend using a floatation device for future surveys this time of year, especially within the Upper Johnson Creek and Hogan Road reaches. The presence of thick vegetation along the creek made it difficult to find beaver sign and navigate safely through the reaches. Another thing that can be done is to lessen human disturbance as much as possible, such as discouraging homeless camps, moving of river rocks and other natural materials in the creek that may cause wildlife undue stress.

Upper Johnson Creek:

We recommend replanting of trees that are preferred by beavers to provide food and building materials, (ex. Red alder, Willow species), due to the loss of previous plantings from the winter floods. Planting of trees that are not preferred by beavers to provide shade for the creek and lower water temperatures, (ex. Western red cedar), this will allow the fast-growing Red alder to be food until the Western red cedar is established. Replanting of Red alder may be necessary after two years. Use vexar tubing to protect the Western red cedar while it grows. We also recommend the use of herbicide treatments to reduce the amount of blackberry that's overtaken the north side of the creek along the bicycle path.

Ambleside:

Needs restoration work such as thinning of the canopy cover. Removal of manmade structures such as concrete weirs and stone side walls along the banks of the creek. Removal of the houses along the banks of the creek and the paved roads that run through that area will help lessen the human impact on that area. All these restoration recommendations will help to create habitat connectivity by opening up Ambleside to be more inviting to the beavers in the area and help grow the population since they'll have more habitat to thrive in.

Hogan Road:

This reach already acts like a buffer zone from the urban/residential area that is downstream, so it would make sense to keep it that way. In addition, you could do similar plantings like that of the Upper Johnson Creek area to add more shade for the creek and food sources for the beavers.

Appendix 6.0

Works Cited 6.1

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GIS Maps 6.2

See attached.

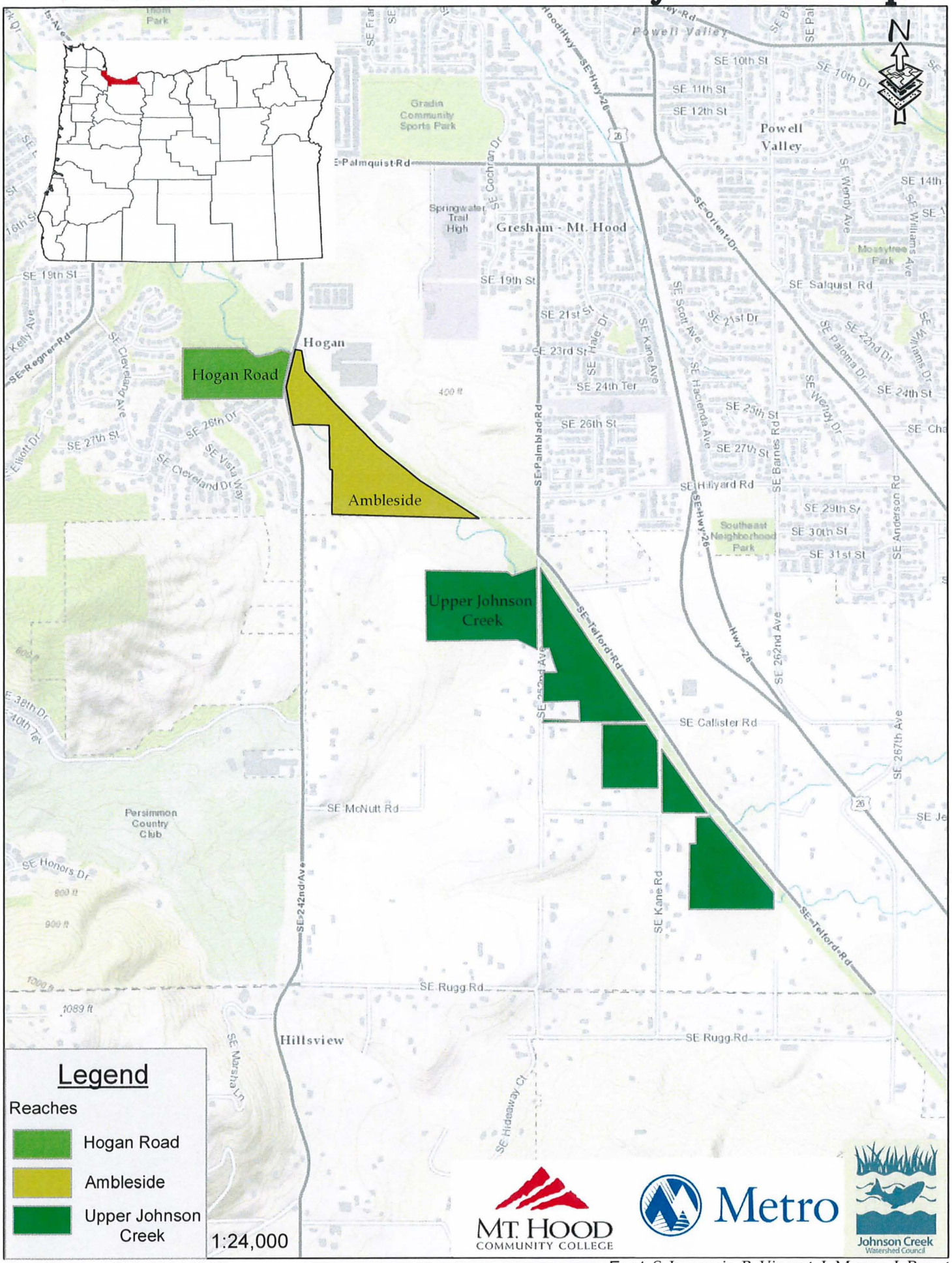
Data Sheets 6.3

See attached.

Wildlife Habitat Assessment Sheets 6.4

See attached

Johnson Creek Beaver Survey: Reach Map



Coordinates: WGS 1984 MAS
Projection: Mercator Auxiliary Sphere

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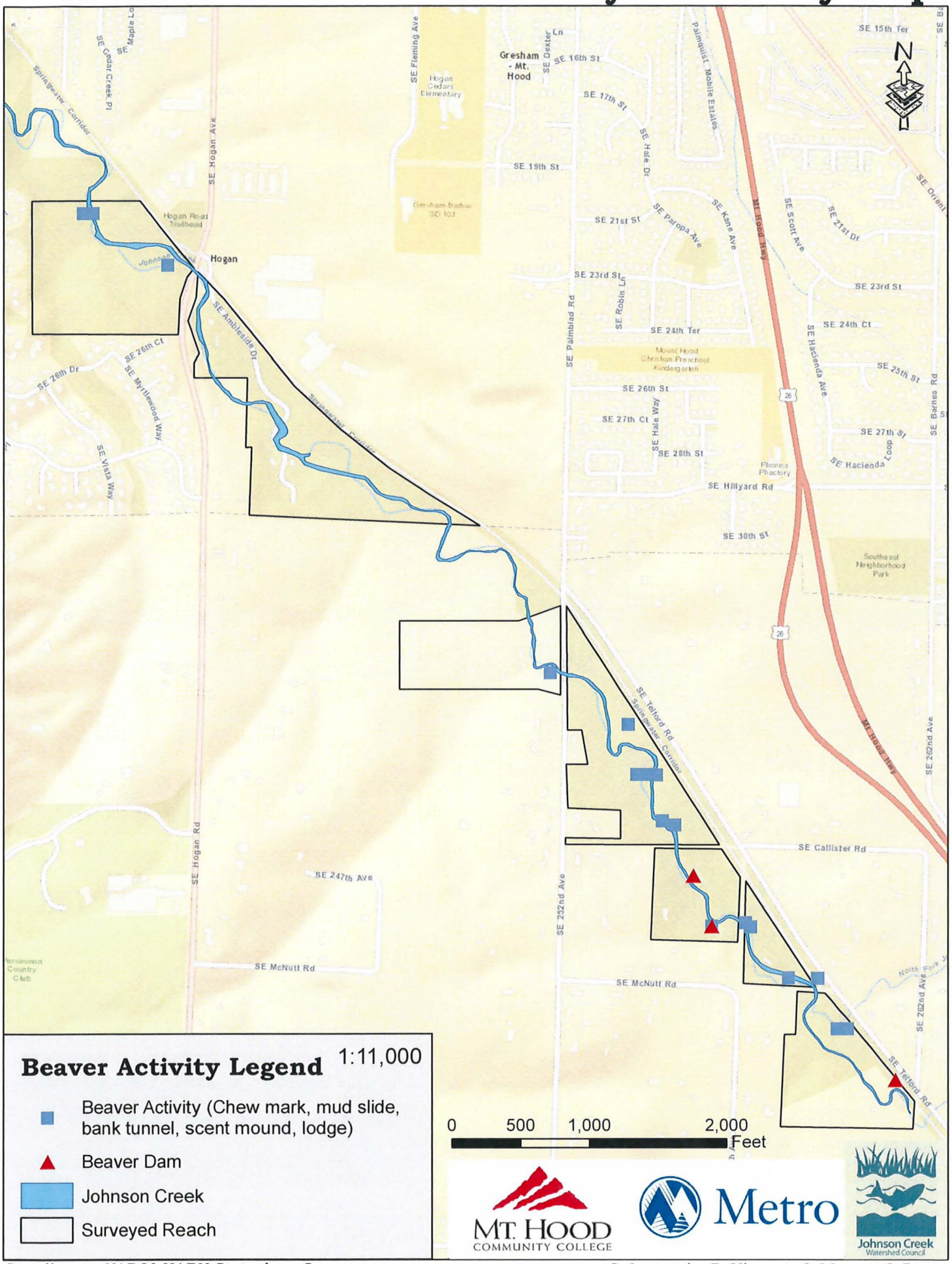
May 30, 2017

Johnson Creek Beaver Survey 1: Activity Map



Beaver Activity Legend

- Beaver Activity (Chew mark, mud slide, bank tunnel, scent mound, lodge)
- Beaver Dam
- Johnson Creek
- Surveyed Reach

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Johnson Creek Watershed Council

Coordinates: NAD83 HARN Stateplane Oregon
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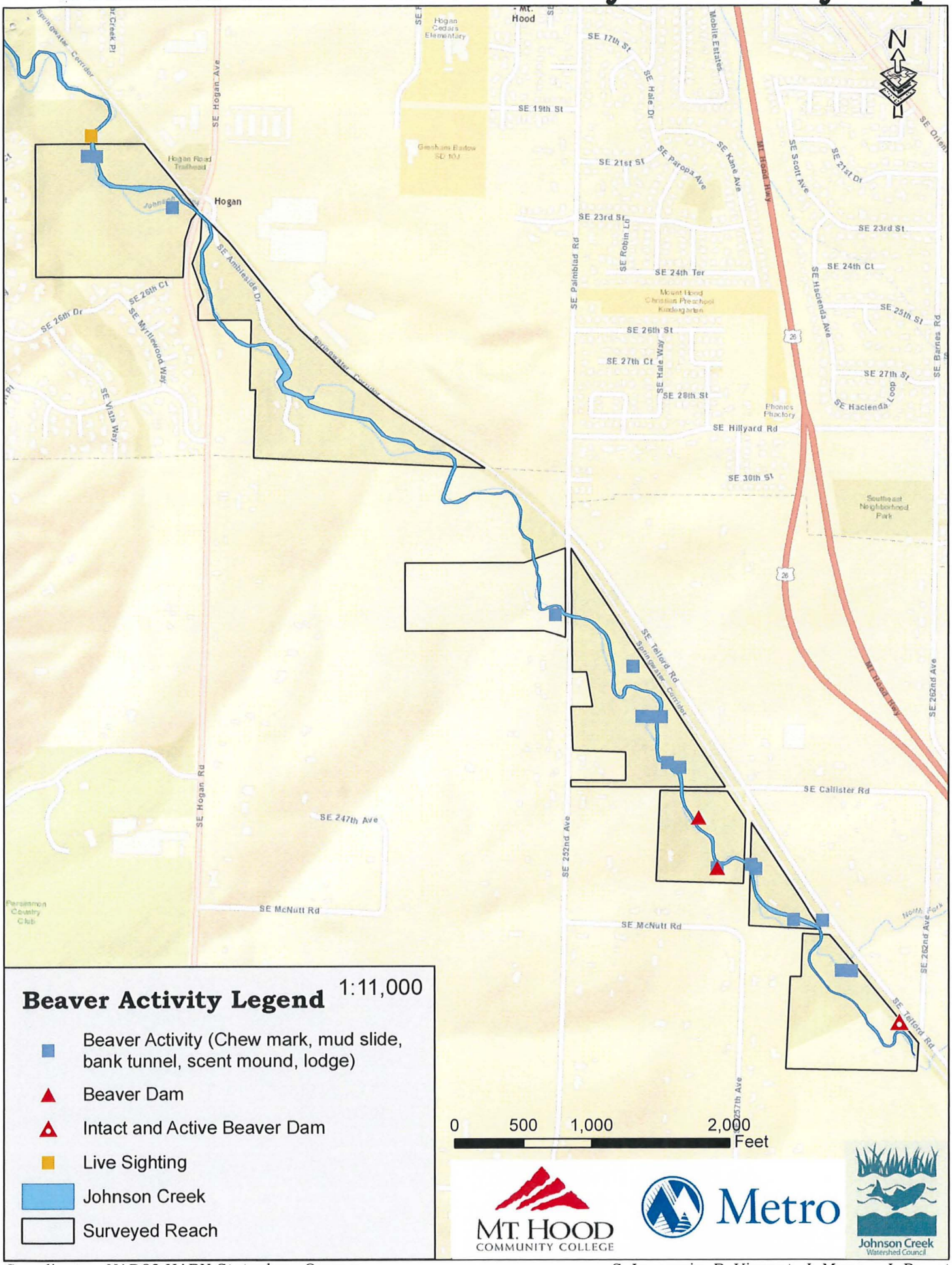
Johnson Creek Beaver Survey 2: Activity Map



Beaver Activity Legend

1:11,000

- Beaver Activity (Chew mark, mud slide, bank tunnel, scent mound, lodge)
- Beaver Dam
- Intact and Active Beaver Dam
- Live Sighting
- Johnson Creek
- Surveyed Reach

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Johnson Creek Watershed Council

Coordinates: NAD83 HARN Stateplane Oregon
Projection: Lambert Conformal Conic

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