

Active Beavers at Makah National Hatchery

The characterization of the beaver use patterns in the serpentine channel at Makah National Hatchery



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Abstract

The Makah National Fish Hatchery was built to ensure fish population growth runs smoothly. Within the hatchery there is a serpentine channel that serves as a double insurance for if the holding pond were to malfunction. Beavers are cutting down trees within the serpentine channel and are causing the channel to slow and the temperature to rise, which causes a problem for the fish because the same warm water is released back into a river that is being used in the fish hatchery. The reason why the warm water is a problem is because the oxygen intake decreases for the fish in warm water making it hard for them to breathe. The heat could also cause the fish to become sick with diseases, which could spread throughout all the hatchery fish causing problems for breeding. The hatchery has asked me to characterize the beaver usage patterns to better help and understand the beaver activity. I walked through the serpentine channel, collected data and came back to the computer lab to make a further analysis. Beavers are central place foragers but what I found about the beavers activity is different than the hypothesized. This may have been caused by tree removal by fish hatchery staff.

Introduction

The serpentine channel was constructed so that the water is colder and cleaner leaving the hatchery as before it entered. Before beginning to break down how the hatchery operates, it's best to note there are two water purification methods used in this cycle and those methods are the holding pond and the serpentine channel. First they take the water from the river through a pump into the holding pond to begin the purification process. Second, the water is used to respawn the fish. Third, it is then used to hold the fish in isles to be fed (so the water coming out will have scat in it). Fourth, the water is released into yet a second holding pond then it is circulated through the serpentine channel. The serpentine channel circulation helps the scat separate from the water. Finally, the water is released back in the river to restart the cycle, so if all the scat were to remain in the water it is dispersed throughout the river. This way the water that is being released is not being altered but rather just returning to the river in the same condition in which it was received. The serpentine channel is the second step of this purifying cycle as the holding pond is the first. In short, the serpentine channel was built to be a double insurance for the main holding pond that is used to purify the water before it is release back into the river

Beavers are actively cutting down trees, taking the branches, and leaving the rest to congest the flow of the channel. The congestion of the flow is bad because it causes the second holding pond to over flow so it no longer allows the water to readjust to be fish safe. In addition, the chopping down of the trees creates open space for the suns rays to beam on the water. The direct contact of sunrays on the water causes temperature to increase and oxygen to decrease. This creates

negative consequences on the fish because that same water goes back into the river and could cause fishes to become stressed, bloom diseases and decrease their oxygen intake (Rand 2009). The water temperature increases and the oxygen level decreases (Rand 2009). This creates a problem for the respawning process because with the fish carrying diseases the fish will just start dying off killing the eggs with them. So there would be no more fish to even respawn. So the beavers chopping down trees alter the breeding process.

What I had projected to find was beavers to be most active close to their den because they are central place foragers which means they like to make their homes close to the resources (McNew and Woolf 2005). In addition I figured that alder is going to be the most preferred tree to the beavers because it is within their preference (Callahan 2010) and it's located all around Neah Bay. I also thought that beavers will more than likely be creating their dens within the serpentine channel because of all the trafficking that happens around it as I was told by Caroline the biologist that manages the Makah National Hatchery.

Materials and Methods

The materials used for this operation were a clipboard, an aerial photo map of the serpentine channel, a red marker and a canoe. A co-worker and I floated the serpentine channel in a canoe and later hiked the fingers to locate beaver fallen trees. Beaver fallen trees were identified by using a red marker to draw a line across the channel on the aerial photo where beaver fallen trees were observed. In addition, I would mark other things I saw out there such as dead carcasses, freshly chipped trees, black markings found on the trees, and beaver dens. I would then take all the data I collected and bring it back to the computer lab for analysis. I took a colored copy of the same map that was not yet marked on and scanned it in preparation for it to be used in Microsoft PowerPoint. I used PowerPoint to document what I found during surveys.

Results

Red alder was the only species of tree in the serpentine channel and were the only species of tree removed by beavers, so I was not able to document a preference. A lot of the trees ranged around the same measurements of 12 to 18 inches in diameter.

Beaver activity appeared to be greatest in the center of the serpentine channel in aisles c, d, e, and f (figure 1). The activity starts 80 meters east of the dens and has a semicircular pattern. Aisle a had a little bit of activity but much less than other aisles. As you get into aisles g, h, i, and j the less beaver fallen trees will be present. Fresh cuts were observed in aisles d and e. So they appear to be showing recent activity in those aisles. There appears to be a case of inactivity the closer you get towards the dens.



Figure 1: Beaver activity at the Makah National Fish Hatchery in 2010.

The dens were found outside of the channel which I found to be odd considering the less trafficking area is on the center of the channel. The beavers appear to be most active in the middle of the serpentine channel although they are not making their dens within it. A pond located east of aisle h might be a beaver hiding location when traffic is present bearing in mind that beaver feed preference was found and that the dens are far southwest of the pond. I have also found a couple of dead carcasses in aisle f (figure 1). Which means that there was recent activity going on in that locale.

Discussion

Central place foraging behavior was to be expected before I observed collected data, but as you can see in figure 1 beavers are showing more of a decentralized method of activity. Considering the theory of central place foraging I thought I would find the dens more towards the center of activity which would be in aisles d, e, and f.

The reason for the results being different than expected is because in 2009 I was working with the staff there in the removal of some trees in aisles a and b (figure 2). So in reclamation, beavers are in fact central place foragers. It is still not

understood why the beavers are not active near the dens when alder trees are scattered throughout aisles a and b, but in theory I believe it is because the constant traffic on the road that leads out onto the aisle of the serpentine channel.

With the all the research I have done on beavers, the best suggestion I have that would not harm the animals and would be most sufficient in warding the beavers away is simply just taking some old clothes that still have human scent on them and fabricate them into a scarecrow. Beavers have a strong sense of smell and have bad eyesight (Mike Callahan 2010) so they would more than likely smell the scent of a human and just halt their activity. Once the scent wares off just grab some more old clothes and proceed. If this does not work, that's all right because the project will not cost any money.



Figure 2: Area of tree removal

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