Small Mammals in the Lower Coos Watershed
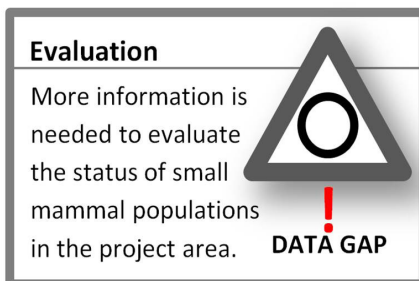
Summary:

- *No reliable estimate of beaver populations within the lower Coos watershed exists.*

- *Some researchers indicate beaver populations statewide are healthy, while others suggest beavers are declining in parts of Oregon.*

- *Raccoons are abundant and important terrestrial predators in intertidal habitats. However, little is known about the status and trends of raccoon populations in the lower Coos watershed.*

Photos: Raccoon: Jim Cruce Beaver: Gigner Holser

Evaluation

More information is needed to evaluate the status of small mammal populations in the project area.

DATA GAP

What's happening?

This data summary describes the status and trends of small mammals found in the lower Coos watershed (project area) for which data are available. Unfortunately, this short list includes only American beavers (*Castor canadensis*) and raccoons (*Procyon lotor*), and

the available information is not specific to the project area. (For a discussion of other mammals found in the project area, see the Large Mammals data summary in this chapter.)

American Beaver (*Castor canadensis*)

Because information about the ecology, movements, and dispersal of the American beaver is lacking, it's not surprising that the overall status of beavers is relatively unconfirmed (Hiller 2011). Some researchers indicate that beavers are generally "doing well" in Oregon (Hiller 2011, Oregon Conservation Strategy 2011). Others estimate that beavers

have declined in parts of the state (especially in southeastern Oregon)(ODFW 2006, Nordholm and Miller 2008).

From 1998-2003, the Oregon Department of Fish and Wildlife recorded beaver pool presence in salmon bearing streams of coastal Oregon (ODFW 2004)(Figure 1). Their data averaged over five years indicate that beavers inhabited approximately 17% of all salmon bearing streams in the Oregon Coast Coho Evolutionarily Significant Unit (ESU), with more beaver pools occurring in streams on the north coast (22%) and mid-coast (20%) than in either the Umpqua (4%) or mid-south coast (15%) Gene Conservation Groups

(CGCs)(Figure 1). No abundance trend over time is immediately apparent from these data (Figure 2). It should be noted that these data clearly understate beaver presence in the lower watershed, because only pools occurring in salmon bearing streams were counted as part of the ODFW survey effort. In addition, comparisons between watersheds may be misleading due to differences in habitat/topography that influence beaver population numbers, distribution, and behavior.

What little information we have about beavers in the lower Coos watershed comes from the South Slough Subsystem. Nordholm and Miller (2008) conducted a survey to "document the distribution of beaver activity and quantify beaver pool habitat" in South Slough's Winchester Creek drainage. Their data reveal that numerous beaver dams occur in clusters in all tributaries of Winchester Creek (Figure 3 and Table 1). They add that "the presence of beaver-dammed pool habitat… provides a significant portion of total fish habitat in some reaches [of Winchester Creek]" (see Background)(Nordholm and Miller 2008).

In addition to mapping beaver dam locations and measuring the extent of beaver-dammed pool habitat, Nordholm and Miller were also able to compare their data with information from previously conducted surveys to estimate how the distribution of beaver dams on Winchester Creek has changed from 1999-2008. They concluded that the number of large perennial dams in the upper headwaters of the Middle fork has increased, while composition of dams on the West Fork has shifted
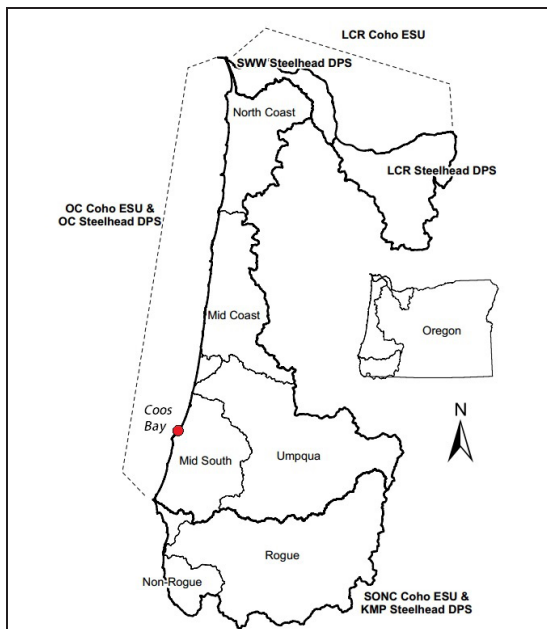

Figure 1. ODFW (2004) beaver pool data come from Coho salmon stream surveys, which occur along the coast within a series of "Gene Conservation Groups" (GCG). The Coos watershed is within in the Mid-South GCG. Collectively, the Mid-South, Umpqua, Mid-Coast, and North-Coast GCGs make up the Oregon Coast Coho "Evolutionarily Significant Unit" (ESU). Graphic: Constable and Suring 2013
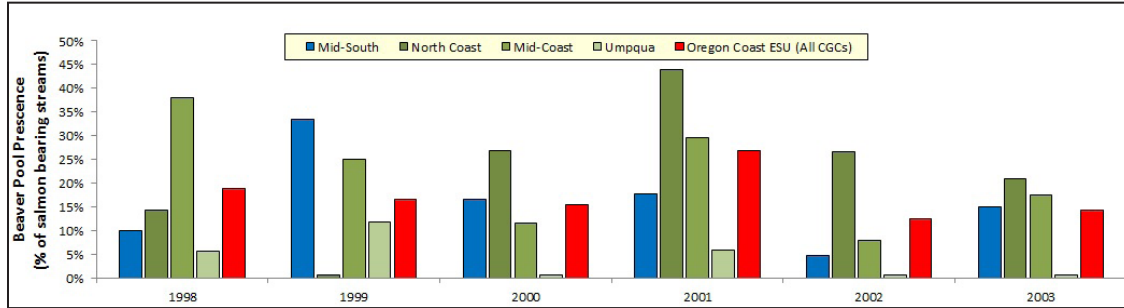
Mammals in the Lower Coos Watershed

Figure 2. Beaver presence in salmon bearing streams on coastal Oregon as indicated by percent of salmon bearing streams containing beaver pools. The Coos estuary is located in the Mid-South CGC (blue). Data from this region are compared with three other coastal Oregon CGCs (green) as well as the Oregon Coast ESU (red). The Oregon Coast ESU is comprised of all four coastal CGCs, including the Mid-South CGC. Data: ODFW 2004
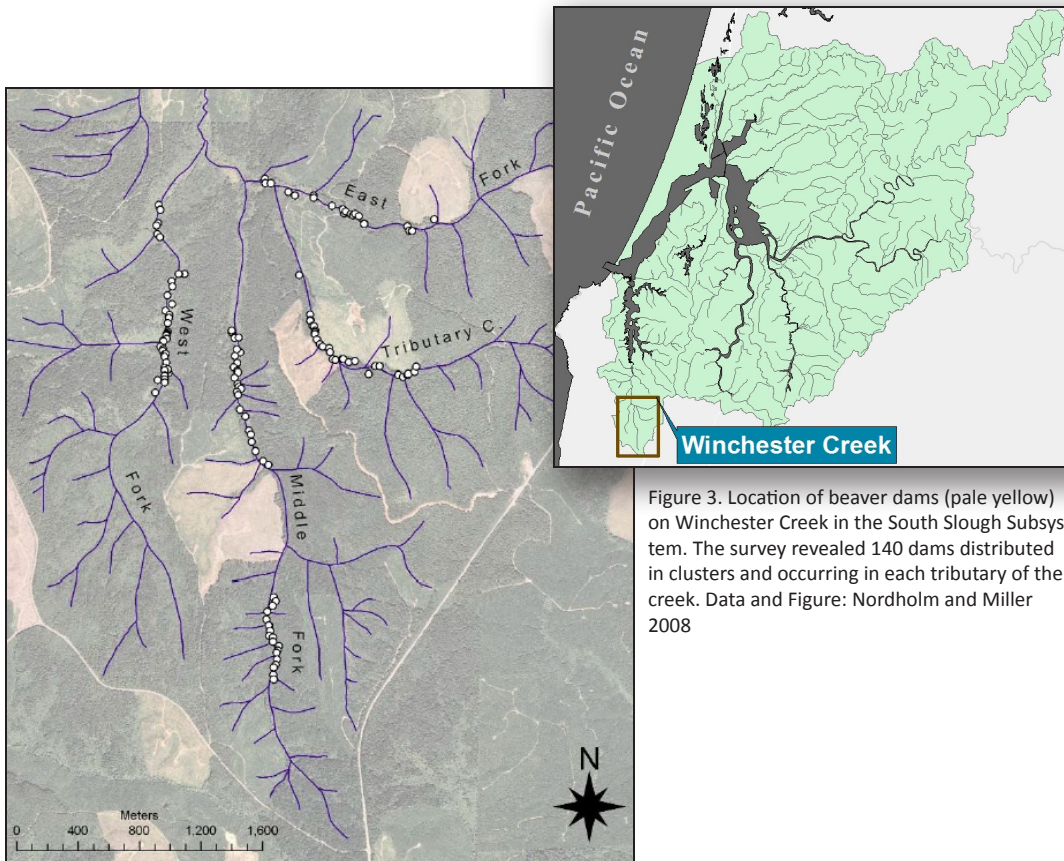

Figure 3. Location of beaver dams (pale yellow) on Winchester Creek in the South Slough Subsystem. The survey revealed 140 dams distributed in clusters and occurring in each tributary of the creek. Data and Figure: Nordholm and Miller 2008

Segment	Total Dams	Total Survey Length (m)	Total Pool Length (m)	Percent Pool	Mean Pool Length (m) (± 95%CI)
Middle Fork	45	5450	1156	21.2	28.2 (± 5.3)
West Fork	42	3500	632	18.1	19.2 (± 6.6)
East Fork	23	1850	488	26.4	23.2 (± 8.1)
Trib C	30	2250	698	31.0	33.2 (± 28.3)
Total		13050	2974	22.8	25.6

Table 1. Summary statistics describing beaver presence in South Slough's Winchester Creek Data and Figure: Nordholm and Miller 2008

to include fewer perennial dams and a greater number of smaller, ephemeral dams. In fall 2004, several large west fork Winchester Creek beaver dams were breached by ODFW during an extended period of low flows to accommodate returning Coho salmon adults; with such low stream levels, the dams created uncrossable barriers, and the salmon only have one reach in the Winchester Creek system within which to spawn.

In 2010, Cramer attempted to estimate the population of beavers in the Anderson Creek drainage of the South Slough Subsystem using the "Rowcliffe Method" of bait and camera traps (Cramer 2010, Rowcliffe et al. 2008). Although these methods have been used successfully to assess wildlife populations in the past (Henchel and Ray 2003, Karanath and Nichols 1998), they did not generate enough data to estimate beaver populations in Anderson Creek. Cramer concludes that without "extreme modification" the Rowcliffe Method is "not a valid technique for estimating a beaver population."

Fisheries biologists and land managers have great interest in beaver ponds and pools and their associated influences on the surrounding habitat. These beaver-mediated habitats are discussed in the Background section of this data summary and in Chapter 11: Stream Habitat, Chapter 12: Vegetation, and Chapter 13: Fish.

Raccoon (*Procyon lotor*)

There are no data currently available that characterize raccoon populations in the

Figure 4. A juvenile raccoon foraging in an intertidal environment in British Columbia. Photo: CBParker, avatarlogs.com

project area. Through anecdotal observations, wildlife managers know that raccoons are locally abundant and that they are likely important predators in intertidal habitats within the lower Coos estuary. Research shows that raccoons forage in tidal wetlands (mudflats, marshes) for a variety of prey species, including crabs, oysters, clams, and segmented worms (Tyson 1950, Ivey 1948, Warrick and Wilcox 1981, Arbuckle 1982)(Figure 4). By studying intertidal animal communities, researchers have shown how predators influence the distribution and density of prey species, as well as the competitive interactions among intertidal organisms (Paine 1966, 1969; Peterson 1982; Summerson and Peterson 1984). Raccoons, as intertidal predators, likely influence the intertidal animal communities with which they interact, and yet raccoon populations are still not well studied.

The information we do have about raccoons on Coos estuary tidal flats is based on an observational behavior study of raccoons in coastal habitats. Not surprisingly, Davidson (1990) concluded that local raccoons forage on a variety of intertidal organisms, includ-

ing crabs, sea urchins, bivalves (i.e., clams, oysters, and mussels), as well as fruits, insects, and small fish. She adds that, although raccoons appear to be accustomed to human disturbance (e.g., spotlighting), their behavior is a function of their environment. Most notably, raccoons on tide flats near human development (e.g., Glasgow) tend to be nocturnal foragers, while raccoons in low-development areas (e.g., South Slough Subsystem) extend their foraging period into the daylight hours.

Why is it happening?

The effectiveness of beaver survey methods limits our ability to generate a reliable population estimate for the project area. Although traditional methods (i.e., live trapping) are somewhat reliable, they are costly and labor intensive (Swafford et al. 2003, Cramer 2010). The efficacy of other monitoring methods (e.g., camera trapping and visual inspection of food caches, scent mounds, or cuttings) is questionable at best (Swafford et al. 2003, Baker and Cade 1995, Cramer 2010).

The use of computer modeling to predict the distribution of European beavers (*Castor fiber*) has been somewhat successful in Austria (Maringer and Slotta-Bachmayr 2006). However, a number of factors (e.g., habitat abundance and behavioral diversity) may limit the ability to apply these models to American beaver populations in Pacific Northwest estuaries (Cramer 2010).

A more complete understanding of the behavior of beavers in the Pacific Northwest in also lacking. Cramer (2010) explains that most beaver research focuses on northern latitudes (e.g., northern Canada), where climate-dependent behaviors such as lodge building are common. She adds that, although beaver behavior on the Pacific Northwest coast is distinct from individuals in northern Canada, relatively little research has been completed on beavers in these habitats.

Raccoons are "opportunistic feeders," meaning their diets are highly variable with preference given to food sources that are most easily accessible (Kaufmann 1982). Davidson (1990) has documented this behavior in the Coos estuary by demonstrating a statistically significant ($P < 0.01$) preference for large (> 30mm) soft-shelled clams (*Mya arenaria*) taken from the highest zone of the intertidal flats. She hypothesizes that these clams are most readily available, because the higher elevation mudflats are devoid of seagrasses, which act as an impediment to raccoon foraging.

Figure 5. Range map showing the extent of North American beaver habitat (purple) in Oregon. Figure: Csuti et al. 1997

Background

The American beaver is the largest rodent in North America, and although beavers are most closely associated with mountain and coastal forest habitat, they occur extensively throughout Oregon anywhere were there is permanent water (Figure 5)(Csuti et al. 1997, ODFW n.d.). Beavers are often associated with their characteristic incisor teeth, which grow continuously and must be maintained by tree cutting and feeding on the outer bark of trees as well as grasses, forbs, and aquatic vegetation (ODFW n.d., Cramer 2010). Due to the high value and cultural significance of their pelts in the Pacific Northwest, beaver harvesting was historically common (see sidebar).

Beavers are considered "ecosystem engineers," because they effectively "manufacture" habitat by impounding (damming) water using immediately available materials, including wood, stones, mud, and plant parts (Jones et al. 1996, Wright et al. 2002, Lawton

Figure 6. A beaver dam on Cox Creek in the South Slough Subsystem illustrates the beaver's ability to use a variety of materials to impound water.

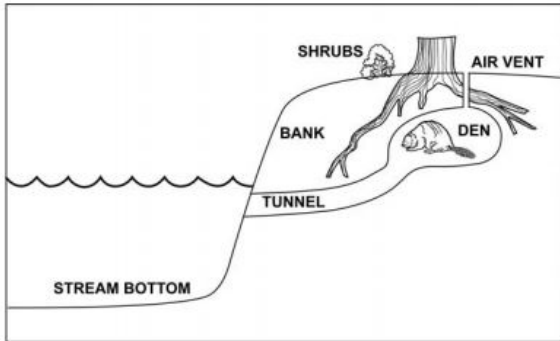*Mammals in the Lower Coos Watershed*

Figure 7. Beavers often construct occupy dens, which are often dug into the side of a stream bank and provide access to habitat via an underwater opening. Dens provide shelter and serve as a nursery for their young. Figure: ODFW n.d.

and Jones 1995, Cramer 2010, ODFW n.d.) (Figure 6). Beaver dams change the hydrology of the streams in which they live, often creating deep pools that provide protection from predators as well as easy access to both food resources and entrances to their dens (Cramer 2010, ODFW n.d.)(Figure 7).

Due to their tendency to modify the hydrology of the landscape around them (Fouty 2003), beavers have been the source of some controversy. The construction of beavers dams in sensitive areas (e.g., agricultural land, urban development, and near important infrastructure) can compromise the integrity of culverts, roads, septic systems, and other infrastructure, as well as impede the productive use of land (Cramer 2010, ODFW n.d.). But landowners may also benefit from beaver activity, which can reduce channel scouring and bank erosion, promote vegetation that helps bank stabilization, improve water quality by trapping silt and removing toxic chemicals, and create a number of recreational and aesthetic values associated with wetland areas (ODFW n.d., Needham and Morzillo 2011).

In 2011, ODFW conducted a survey to assess public opinion about beaver activity on private land across the state (Needham and Morzillo 2011). Of the 411 respondents in coastal Oregon, about one third (30%) of landowners indicated that they have experienced impacts (i.e., damage to their property or neighboring properties) from beaver activity on their land. Despite these damages, very few landowners (20% in coastal Oregon) felt that beavers are a nuisance, most (62%) agreed that "beaver populations should be left alone," and a strong majority (85%) believed that "beavers are a sign of a healthy environment" (Table 2).

The practice of relocating beavers from sensitive areas to more suitable habitat was publicly adopted in Oregon as early as 1932 (Hiller 2011). More recently, management agencies have begun purposefully relocating beavers to improve habitat quality for the federally listed coastal Coho salmon (*Orcorhynchus kisutch*). Research has documented juvenile Coho using beaver ponds in the South Slough Subsystem as overwintering habitat (Miller and Sadro 2003), and many believe that beaver activity may improve fish production while promoting overall habitat complexity (Leidhold-Bruner et al. 1992, Snodgrass and Meffe 1998, Collen and Gibson 2001, Kemp et al. 2012, Hiller 2011, Cramer 2010, Duke 1982).

Despite encouraging prospects, there is some evidence to suggest that the relocation of beavers for salmon habitat enhancement may not be an effective strategy, because it may result in low beaver survival and limited sal-

	East	Coast	Portland	Southwest	Total
Beavers create wetlands that benefit other living things	84	90	89	86	87
I may never see a beaver, but it is important to me that they exist	78	89	93	87	86
I would get enjoyment from seeing beavers	78	82	87	85	83
Beavers are a sign of a healthy environment	75	85	86	82	82
People should be willing to tolerate some conflicts with beavers	66	78	85	75	75
Beavers have a right to exist regardless of any damage they cause	46	69	70	64	61
Beaver populations should be left alone	46	62	66	59	58
Beaver populations should be controlled	61	45	33	43	47
No beaver should be destroyed	30	50	58	49	46
Beaver damage to roads or other property is a major problem	34	26	11	21	24
Beavers are a nuisance animal	30	20	9	22	21
I am afraid of beavers	2	3	7	5	4

Table 2. Oregon landowners' opinions about American beavers. Columns indicate percentage of respondents that agreed or strongly agreed with the corresponding statements. Sample size is 1,512 respondents statewide with responses categorized by region: East (432 responses), Coast (411), Portland (302), Southwest (367). Figure: Needham and Morzillo 2011

Figure 8. Range map showing the extent of raccoon habitat (purple) in Oregon. Figure: Csuti et al. 1997.

monid habitat development (dam production tended to be limited and ephemeral)(Petro et al. 2015, Rodgers et al. 1987).

Raccoons are versatile omnivores, meaning that they live in a broad range of habitats and have diverse diet preferences including both plants and animals (Csuti et al. 1997, Audubon n.d.). Raccoons occur almost ubiquitously throughout western Oregon and into the eastern half of the state as well, where they

are restricted to canyons and river basins that hold permanent water (Figure 8)(Csuti et al. 1997). Raccoons are well adapted to live in urban and suburban habitats, where a lack of predators and access to reliable food sources (e.g., trash cans, compost bins, pet food bowls) allow raccoons to proliferate (Audubon n.d.).

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