OAK LODGE SANITARY DISTRICT

TERRESTRIAL ECOLOGY ENHANCEMENT STRATEGY

GUIDANCE:

LIVING WITH THE AMERICAN BEAVER

(Castor Canadensis)

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http://www.oaklodgesanitary.com/

CONTENTS

INTRODUCTION

The Terrestrial Ecology Enhancement Strategy (TEES) is part of Oak Lodge Sanitary Districts Surface Water Strategic Management Plan (SWSMP). It is intended to help achieve the watershed health goals and objectives for biological communities. Information about terrestrial plant and animal species and habitats in Portland inform the ongoing implementation of the SWSMP.
The main elements of the TEES include:

- Identification of priority plant and animal species and terrestrial habitats in need of protection, conservation and/or restoration
- Identification and prioritization of key management issues
- Recommendations for watershed-specific objectives
- Identification of priority strategies and actions
- Selection of species and habitats to be monitored
- *Guidance to city bureaus and citizens for improving species and habitats, and for addressing plant and wildlife management issues*

PURPOSE

American Beavers provide important watershed health and ecological benefits, yet are of management concern because of the damage they sometimes inflict on property. Striking a balance can be challenging, particularly in an urban setting. The purpose of this document is to offer guidance for living in harmony with this species, and (to the extent possible) for incorporating beaver activity into watershed management decisions and restoration projects—particularly for salmon recovery.
There are many excellent websites and resources that address the subject of living with beavers (see the section of this document titled, "RESOURCES and REFERENCES"). This guidance document draws upon those resources, and presents information that is particularly relevant to watershed restoration activities of Portland's Bureau of Environmental Services and management actions of Portland Parks & Recreation. Information presented here may be useful in project selection, project design and habitat management. These guidelines are advisory only, except where state laws and regulations are cited.

American Beavers in the Pacific Northwest

Includes information about beaver ecology, watershed benefits beavers provide, presence of beavers in Portland, and issues associated with being a species of management concern.

Guidelines for "Living With Beavers"

Presents guidelines for characterizing site conditions, identifying specific objectives for encouraging or discouraging beaver activity, and identifying appropriate actions and management strategies.

Oregon Laws, Rules and Policies

Summarizes current laws, rules and policies pertaining to beavers.

Resources and References

Contains sources of information used or cited in this document, along with other useful resources for readers desiring additional information.

AMERICAN BEAVERS IN THE PACIFIC NORTHWEST

The American Beaver is widely considered **a functional keystone species—**a "species whose removal would most alter the structure or function of the community" (Marcot and Vander Heyden, Wildlife-Habitat Relationships in Oregon and Washington, p. 185). The American Beaver was selected as a focal species for "Riparian Areas of Rivers and Streams Focal Habitat" in the Draft Willamette Subbasin Plan (Northwest Power and Conservation Council by the Willamette Restoration Initiative 2004) because of its capacity to modify habitat in ways that benefit many other species. The biological objectives in the Subbasin Plan are aimed at maintaining or expanding existing numbers and geographic distribution of beaver populations, through protection, restoration, and management of suitable habitat throughout the Willamette Basin.

At the statewide level, the Oregon Department of Fish and Wildlife coordinates a Beaver Workgroup that is focused on identifying and supporting research and information gaps that need to be addressed in order to improve understanding of beaver ecology and management. Such research will help maximize the ecological benefits that beaver provide and minimize negative economic (or other) impacts.

Beaver Ecology

Beavers live throughout wooded and partly wooded portions of the Willamette Basin, with highest densities in the Coast Range. They typically inhabit rivers, 2nd to 4th order streams, lakes and sloughs. Beavers select relatively low-gradient channels with geomorphic characteristics that make them suitable for dam and lodge building

(Suzuki & McComb 1998); they usually avoid areas with rocky or bedrock banks[1]. There are few beaver lodges in western Oregon; instead, beavers are more likely to tunnel into stream banks for resting, staying warm, overwintering, giving birth and raising young. Beavers are notorious for building dams across creeks and other watercourses to impound water. This creates deep water for protection from predators, for access to food supplies, and to provide underwater entrances to dens. Beaver typically build their dams August – October when rainfall and stream flows are lowest and water temperatures are highest. As water levels recede in the summer, beaver activity shifts towards building and maintaining channels that lead to nearby ponds and food sources. Beavers eat the leaves, inner bark, and twigs of trees and shrubs, preferring aspen, cottonwood, willow, fruit trees and some ornamentals. They also eat ferns, aquatic plants, grasses and crops. Although they eat coniferous trees, more often they girdle and kill these trees for dam-building, rather than for food.

A mated pair of beaver will live together for many years—sometimes for life. They breed between January and March, and litters of one to eight kits (averaging four) are born between April and June. Beavers live in colonies of two to 12 individuals, comprised of an adult breeding pair, the kits of the year and kits of the previous year(s).

Watershed Benefits

A beaver's ability to intentionally alter the landscape is second only to humans. Through dam building and feeding, beavers alter hydrology, channel geomorphology, biogeochemical pathways, and community productivity[2]. Perhaps their greatest contribution is their role in creating diverse aquatic habitat structure, which collectively results in many watershed benefits:

- Attenuated peak flow volumes and velocities reduce channel incision and bank erosion while increasing localized flood storage capacity.

- Trapped sediments behind dams and in surrounding floodplains provide a growth medium for grasses and other herbaceous and woody plants.

- Increased vegetative structure strengthens streambanks for protection during erosive flows, and further contributes to increased sediment deposition, retention and filtration on gravel bars and floodplains.

- Increased sediment filtration and accumulation reduces the amount of solids transported downstream, improving water quality.

- Stored woody debris and leaf litter supports aquatic insect production—an important food for fish.

- Riparian plant communities (willow, cottonwood and alder) thrive amongst beaver activity. Beaver cuttings cause dense vegetative growth; each cut willow stem can lead to 3-4 new stems.

Ecological Benefits

In addition to affecting watershed processes and functions, beaver dams and ponds create slack water habitat for juvenile salmon to feed and grow. Debris jams, fallen trees, and brush provide cover for fish to hide from predators and refuge during high flows. The accumulation of downed woody debris in channel and in surrounding floodplain areas also provides nesting and roosting habitat, and food and cover for upland wildlife, waterfowl and songbirds, and other native wildlife, such as mink, otter, turtles, frogs and salamanders. Willows, cottonwood and alder thrive with beaver cuttings (as long as the habitat is extensive enough that forage species are not severely impacted or eliminated by the beaver activity); the resulting denser vegetative growth patterns benefit other species such as nesting songbirds. Hence, American Beavers fill a specific ecological function within a larger biological community; their reduction or extirpation can significantly alter or lower the biological diversity and productivity of an ecosystem. This was observed in Oregon in the early 1900's. Unregulated trapping in streams nearly eliminated the species from Oregon by the early 1900s, and was determined to be a key factor in the decline of stream health and salmonid productivity. With regulated trapping, beaver populations have recovered throughout the State in areas where sufficient suitable habitat is present.

Beavers in Oak Lodge Sanitary District

Historically beavers were widespread and were an integral part of the Districts watersheds. Although the current beaver population in the District area is nowhere near historical levels, beavers currently reside in all of the Districts watersheds. As District employees become better informed of the nature and location of beaver activity, a database and linked map for tracking beaver activity can be established. These tools may be useful in designing and modifying projects to accommodate beavers and/or address beaver interactions.

Beaver as a Species of Management Concern

The American Beaver provides many watershed benefits, but it is also a species of management concern in OLSD. Flooding behind dams and tree girdling and felling can damage property and affect human health. In these circumstances, beavers are often a

perceived nuisance. The subsequent section describes the District's "Living with Beavers" watershed management approach, and provides guidelines for balancing the benefits and risks of beaver presence in OLSD.

GUIDELINES FOR "LIVING WITH BEAVERS"

"Living with Beavers" is the District's approach on how to best receive the benefits gained by this functional keystone species, while recognizing the potential for human /wildlife conflicts. The following section provides guidelines for OLSD resource managers and municipal property owners on how to best manage for beavers in the District. These may be applied in both general watershed management and also in project design and implementation situations.
The three main steps (for which details are provided), include:

- *Monitor and characterize site conditions and beaver activity* in the area of interest; identify site constraints or opportunities, and potential human / wildlife conflicts.

- *Establish specific objectives* relative to the District's watershed goals based on site characteristics, constraints and opportunities - either encourage and manage for beavers, or discourage nuisance beaver activity if human / wildlife conflicts prevail.

- *Identify actions and management strategies* best suited to the area of interest.

Monitor and Characterize Site Conditions

Resource managers should spend time monitoring watershed conditions on sites of interest, including hydrologic conditions (water features), habitat (aquatic and terrestrial), water quality (if relevant) and biological communities. OLSD staff are encouraged to use the *Terrestrial Ecology and Enhancement Strategy Short Form* to document existing conditions, and to help plan potential future actions that both improve conditions for wildlife and minimize human/wildlife conflicts.

Beavers are not always seen during site visits. Furthermore, they may be confused with two other mammals (native muskrat and non-native nutria). In order to determine whether beavers are present at sites, it is helpful to be able to discern these three species from one another, and to recognize indications of beaver activity such as dams, dens, slides and scent mounds.
Based on the TEES site characterization, resource managers can then document potential opportunities to attract beavers, or conversely recognize constraints that warrant exclusion (or prevention) of beavers. Beavers on their own will colonize riparian areas and creeks that are suitable. However, there may be circumstances that preclude beaver activity due to low population numbers or limited access and migration. With this in mind, there may be areas where resource managers wish to attract (or at least

tolerate)beaver activity to stimulate watershed processes, such as re-establishing floodplain connectivity.

Analysis of western Oregon streams by the Oregon Department of Fish and Wildlife suggests that suitable beaver habitat generally has the following characteristics:

- Small, year-round (perennial) streams with an active channel width 13- 20 feet wide
- Valley width greater than 2 times the active channel (bank-full) width
- Less than 6% stream gradient
- Stream canopy cover 25% -50% [not in ODFW guidelines—source?]
- Abundant food supply (i.e., a density of more than 220 trees/acre of small (6 – 12 inches DBH), primarily deciduous trees or shrubs adjacent to the stream

An example of these in the District Water Shed Basins are;

1. South Boardman
2. River Forest
3. Willamette River
4. Kellogg Creek
5. North Boardman

Establish Specific Objectives

Recognizing the many watershed benefits that beaver activity can impart as well as the potential risks to property, the decision to attract and encourage beavers into a particular area should be carefully evaluated. Questions to ask when considering beaver activity include:

- What hydrologic and physical conditions should be monitored that have the potential to cause damage to homes, roads or buildings?
- Are there trees that could, if damaged by foraging or changes to hydrologic function, damage homes or buildings?

- Are native riparian plant communities present on site *and also* within a minimum of a half mile of the project site to provide adequate resources for food and dam building over time? A minimum of a half mile of vegetated streambank or 20 acres of forage area are needed during the summer to support a family unit of 3-12 individuals. Plant communities should consist of a variety of herbaceous and woody plant communities.

- Is the stream gradient suitable for prolonged use by beavers (typically less than three percent but up to six percent)?

- Can the stream corridor support dam building (typically bank-full widths of 13-26 feet)?

- Is there a sufficient riparian corridor at/near the project site?

- Are stream banks and channel streambeds "formable" (i.e., not incised down to bedrock), to support dam building? Bedrock channels can be dammed; however upstream habitat usually is not desirable.

- Is there sufficient area to accommodate impounded water?

- Are there nearby beaver colonies (within 5-6 miles of the site)? If so, beavers have a better chance of finding your site.

Considering these characteristics will help resource managers and project managers better establish objectives for a particular area, stream reach, culvert, roadway or property. To the extent feasible, objectives should:

- be specific, measurable, attainable, realistic and time-bound;

- set clear expectations for extent of acceptable beaver activity, and identify "benchmarks" or "triggers" for taking action to prevent and reduce beaver activity; and

- be included in project design, and/or land use plans as appropriate; and

- include site monitoring protocols for monitoring and documenting active use and development at the project site.

An example of an objective for encouraging beaver activity (with contingencies) for a stream restoration project might be Boardman Creek running through Stringfield Park (North Clackamas County Parks)

> *Beaver activity including dam building, ponding water, tree girdling and felling are acceptable between river mile 0.5 to 2.4 as long as activity does not cause substantive erosion and damage to storm-water, sanitary line and State Park property. Newly planted riparian*

plant communities will be protected for first 5-years after projects are constructed.

Identify Actions and Management Strategies

If well-crafted, the objectives will give resource managers and project managers enough information to prescribe site-specific or project-specific actions and management strategies. It should be clear whether the long-term goal is to encourage or discourage beaver activity.

Encouraging Beaver Activity

If it is appropriate to encourage beaver activity and clear objectives have been crafted, the following guidelines may be useful:

- Plant tree and herbaceous plant species that are preferred by beavers.
- Plant adequate densities to provide sufficient food and den-building materials, while protecting some trees for succession (beavers will abandon sites when food supplies are inadequate).
- Exclude (e.g., fence-off) constructed and vegetated "natural" areas to protect those areas
- Create or protect corridors to natural forage areas.
- Fence off areas so as to give beavers refuge from predators, pets, and human interactions.
- Construction near beaver communities should occur during the midsummer to avoid times of peak beaver activity (which is in the fall).
- Build structures that provide beavers with stable foundations in which to build dams upon or in front of (i.e. log structures and/or multiple floodable terraces).
- Allow for changes in hydrology; allow for floodable terraces.
- Inform surrounding landowners of your intent and provide materials (e.g., fencing, trees that beavers do not prefer) to mitigate for interactions outside of the project area.

Beaver Relocation and Re-introduction

Oregon Department of Fish and Wildlife's general policy is to not release beavers into urban areas to re-establish populations. Presumably, most prime habitat is already occupied by beaver, and therefore relocation is not likely to be effective. Beavers require a lot of food and if released into an area without an adequate food supply, will readily

move in search of new forage. Notably, in rural areas, only 12% of relocated beavers stay in their new stream systems; the average distance from release site to the area of establishment is 8 miles.
If identified as a desired need, however, all beaver relocation activities and release locations must be pre-approved by ODFW and cannot proceed without a permit from that agency. ODFW adopted *Guidelines for Relocation of Beaver in Western Oregon* in May, 2010. The guidelines establish standards for when, where, and by whom beaver may be relocated on public and private lands in western Oregon, and provide a process for monitoring and evaluating the success of beaver relocation efforts. The guidelines also provide direction to ODFW staff when evaluating applications to relocate beaver.

Discouraging Nuisance Beaver

Depending upon the location of beaver activity and whether it is causing property damage, resource managers and property owners may consider one or more courses of actions to prevent and reduce beaver damage:

- Dam removal and modification is a short term solution; habitat alteration such as removal of forage and construction material may be more effective[3].

- Planting sites with species that beavers do not prefer may be effective. Those species include: Sitka spruce, elderberry, cascara, osoberry (Indian plum), ninebark, and twinberry.

- Do not plant species preferred by beavers near beaver trails and other known beaver activity areas.

- Exclusion or fencing of areas and caging trees needing protection works, but needs to be monitored to maintain effectiveness.

- Applying a product called "4 The Birds" to trees has been found to be effective by District storm water maintenance crews. Electric fences and abrasive paints may deter some foraging behavior as well. Natural scent deterrents such as scat or urine from predators are less effective; chemical deterrents have not been shown to work.

- As a last resort, ODFW's biologists should be contacted. They can recommend authorized trappers for culling or relocation, if applicable.

STATE LAWS, RULES AND POLICIES

Beaver are legally classified as "Protected Furbearers" in Oregon. Oregon Administrative Rule (OAR) 498.012 states that no one shall take any wildlife the Fish and Wildlife Commission has classified as "protected". However, there are exceptions to this rule: 1) Beaver may be harvested during established seasons with a valid Furtaker's License, and 2)

Oregon Revised Statute (ORS) 610.105 provides the authority for private landowners to lethally remove beaver and other rodents from their lands without a permit from the Oregon Department of Fish and Wildlife. ODFW promotes "Living With Wildlife," and encourages public and private landowners to first use beaver exclusion devices and habitat modification techniques for alleviating beaver damage. These methods are also suggested to prevent damage.

ODFW's response to beaver damage (e.g., loss of or harm inflicted on land, livestock or agricultural or forest crops) is guided by Oregon Revised Statute 498.012 which authorizes landowners to take wildlife that is causing damage, is a public nuisance, or poses a public health risk on their land. Beavers causing damage on *public* lands are protected by their status as a Protected Furbearer and require a permit from ODFW before any action can be taken. Beavers on *private* lands fall under OAR 610.002 (which defines "Predatory Animal") and OAR 610.105 (which gives a private landowner the authority to "take" predatory animals or noxious rodents). These two statutes are implemented by the Oregon Department of Agriculture.

ODFW typically makes a determination of damage over the telephone based on the information provided by the complainant - e.g., loss of crop trees, damage to roads or other human structures from beaver damming activities. ODFW documents beaver damage complaints on a wildlife damage complaint form that includes fields for describing the claimed damage and quantifying the monetary value of the damage. ODFW generally does not have the staff resources to go to sites and evaluate damage first-hand. They typically provide technical assistance to the landowner - giving them advice and providing them with the current list of ODFW-permitted Wildlife Control Operators (WCO). Clackamas County does not provide assistance with beaver issues. Similarly, the OLSD does not provide assistance to private landowners.

Trapping to address damage can be done by the landowner or their agent (i.e., Wildlife Control Officer). Trapping to address damage can occur within the furbearer season as per applicable OARs or outside the furbearer season. A landowner cannot retain beavers taken within the trapping season without a proper trapping license.

Live trapping of beavers is legal, but the relocation of beavers (or any wildlife) is illegal without a permit from ODFW. All release locations need to be approved by ODFW. ODFW issued beaver relocation guidelines for Western Oregon in May 2010. These can be downloaded from the ODFW website: http://www.dfw.state.or.us/wildlife/living_with/docs/Guidelines_for_Relocation_of_Beaver_in_Western_Oregon_052610.pdf.

The purposes of the relocation guidelines are to establish standards for when, where, and by whom beaver may be relocated on public and private lands, and to provide a process for monitoring and evaluating the success of beaver relocation efforts. They also provide direction to ODFW staff when evaluating applications for relocating beaver. *ODFW is currently not releasing beaver into urban areas to re-establish populations.*

Quick Legal Facts Regarding Beavers

On Public Land: Classified as Protected Furbearers. Laws are Implemented by ODFW.

On Private Land: Are considered a Predatory Animal. Laws are implemented by the Oregon Department of Agriculture. Landowners or their agents may lethally remove beaver without a Permit from ODFW. ODFW's website has a list of ODFW licensed Wildlife Control Operators.

Live trapping and Relocating Beavers: Refer to the ODFW Beaver Relocation Guidelines, which include a process for evaluating Applications and selecting release sites. An ODFW permit is required to live trap and/or relocate beaver.

Removal of Beaver Dens: ODFW does not recommend dens be removed, but does not require a permit to do so. Note; Removing muskrat lodges is prohibited.

Removal of Beaver Dams: ODFW does not recommend dams be removed, but does not require a permit to do so.

RESOURCES and REFERENCES

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Clackamas, OR 97015
Tel: (971) 673-6010

U.S. Fish and Wildlife Service (Partners for Wildlife Program) may supply funding and/or materials for a beaver water level control device.

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