



# Beaver Management Plan

City of Portland Environmental Services | Best Management Practices

Version 2.0

January 2020



City of Portland  
Bureau of Environmental Services  
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## CHART 1. BEAVER MANAGEMENT DECISIONS FLOWCHART

## 1. INTRODUCTION AND PURPOSE

The City of Portland (COP) Bureau of Environmental Services (BES) has developed the following best management practices (BMPs) to assist with beaver management within the city of Portland, Oregon. These BMPs have been prepared in coordination with representatives of local stakeholders and regulators within and adjacent to the city. While the American beaver (*Castor canadensis*) provides important watershed health and ecological benefits, beaver can be a concern within this urban setting because of the damage their activity can inflict on property and infrastructure.

The purpose of developing these BMPs is to: 1) describe watershed health benefits provided by beaver; 2) unify and clarify BES decision making; 3) document applicable regulatory requirements and consultations for various management actions; and 4) establish standards for when, where, and what methods of beaver deterrence should be used by BES.

The guiding principle for this effort is BES's mission: managing wastewater and stormwater infrastructure to protect public health and the environment. The BMPs were also developed to address BES's four watershed health goals: enhancing hydrology, habitat, water and sediment quality, and biological communities. These guiding principles are intended to comply with Oregon Department of Fish and Wildlife (ODFW) regulations and its Relocation Requirements for Beaver in Oregon (ODFW 2017).

While the BMPs covered here are expected to be effective at most currently identified problem sites, all have limitations, and sometimes unsuspected indirect effects or unacceptable costs. The BMPs in this document are intended to provide the information necessary to determine which technique, if any, is the best option for any particular situation.

The contents of this document will be continually reviewed, evaluated, and updated by BES as needed.

## 2. NATURAL HISTORY OF THE BEAVER

Beaver are North America's largest rodent and perhaps are second only to humans in their ability to alter the environment (Whatcom County 2009).

Oregon's early economy was built on beaver pelts. During the 1800s, by satisfying European and eastern American demand for beaver hats and coats, fur trappers virtually eliminated the species from many landscapes through unregulated trapping. With proper management, however, beaver have become re-established and are now common throughout their historical range in Oregon (ODFW 2012).

### 2.1 Beaver Ecology

Beaver live in ponds, marshes, and streams, and currently most of Oregon's waterways are home to beaver (ODFW undated). Within the Willamette Basin, beaver live throughout wooded and partly wooded habitats, with the highest densities in the Coast Range. They typically inhabit rivers, second- to fourth-order streams, lakes, and sloughs. They most likely use sites that have a stream gradient of less than 6 percent, canopy cover of 25 to 50 percent, and a bank-full width of 13 to 20 feet (ODFW 2012). Beaver usually avoid areas with rocky or bedrock banks. Beaver construct very few lodges in western Oregon; instead, beaver are more likely to tunnel into stream banks for resting, staying warm, overwintering, giving birth, and raising young.

Beaver are known for building dams across streams 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 from August through 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 (COP 2010).

Beaver reach sexual maturity between 1.5 and 3 years of age (UDWR 2012). Beaver breed between January and March, and litters of one to eight kits (averaging four) are born between April and June. They live in colonies of 2 to 12 individuals, composed of a monogamous adult breeding pair, the kits of the year, and sometimes the kits of previous year (COP 2010).

Young beaver are commonly displaced from the colony shortly after they become sexually mature. They often move to another area to begin a new pond and colony. However, some become solitary and occupy old, abandoned habitats (City of Calgary undated).

Beaver diet consists of 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.

## 2.2 Benefits of Beaver Activity

From increased water quality and enhanced fish and wildlife habitats to increased human connections to the natural world through wildlife viewing, beaver and their actions can provide many valuable benefits to the natural environment (COP 2010; USFS 2007). Because of these benefits, dissuasion or removal of beaver from a system must be weighed carefully.

Water-related benefits arise from water storage that can decrease the potential for flooding downstream of dams, prolonged stream flows through drier portions of the year, and increased habitat for a variety of fish and wildlife. In addition, water quality benefits include temperature moderation and removal or transforming of excess nutrients, trapping of silt, and adsorption of toxic chemicals.

Elevated water levels behind dams can facilitate groundwater recharge, enhance vegetation growth, and maintain or create wetlands. Trapped sediments behind dams promote vegetative growth and enhanced riparian areas, despite the effects of beaver foraging (COP 2010; USFS 2007).

Beaver activities provide refugia for fish from high flows and potential predators. Their ponds can provide for increased insect production, which benefits insectivorous fish, amphibians, birds, and bats. Ponds also provide nesting and brood-rearing areas for waterfowl. Trees that die as a result of higher water levels can become snags, which attract insects that are in turn forage for a number of insectivorous species and provide habitat for bats and cavity-nesting birds. Fallen trees provide locations for bird roosting or nesting, turtle basking, and small mammal cover (COP 2010).

In addition, beaver provide humans with enhanced recreation and aesthetic opportunities through wildlife viewing, as well as recreational and commercial trapping.

## 3. BEAVER LEGAL STATUS

Numerous regulations within Oregon address trapping or other management of beaver. Generally, these regulations do not address the needs of COP in managing beavers. As a result, coordination with ODFW

was initiated in fall 2016 and continued in 2019 to clarify the types of actions allowable under this plan by current state regulations.

### 3.1 Lethal Trapping on Public Lands

On public lands, beaver are classified as protected furbearers under Oregon Administrative Rule (OAR) 635-045-0002 (33). Normally this designation carries several limitations to trapping by public agencies. However, in the context of nuisance beavers causing infrastructure damage, ODFW has provided guidance that allows for the use of a licensed wildlife control operator (WCO) to trap and remove beaver. Using a WCO for the purpose of removing a nuisance beaver does not require additional permits from ODFW at this time.

When using a WCO, most prefer to utilize live traps which allows for the release of non-target species and minimizes interactions with the public and their pets. WCOs are required by OAR 635-435-005(4) to follow American Veterinary Medical Association (AVMA) Guidelines for the Euthanasia of Animals: 2013 Edition when euthanizing wildlife. The WCO would be responsible for initiating these euthanasia methods in accordance with regulations and acceptable protocol.

### 3.2 Lethal Trapping on Private Lands

On private lands, the beaver's designation as a predatory animal under Oregon Revised Statute (ORS) 610.002 supersedes the trapping prohibition due to location (e.g., within a city's boundary). A private landowner may trap and kill a nuisance beaver on his or her property. There is no approval necessary from ODFW if the landowner performs this task, and there are no reporting requirements. If the landowner hires a WCO to perform this task, the operator reports its activity to ODFW.

### 3.3 Relocation and Hazing Activities

It is illegal for anyone to move a beaver in Oregon without a permit from ODFW. ODFW recently revised Relocation Requirements for live-trapping and relocating beaver (ODFW 2017). The intent of the Requirements is to maximize the ecological benefits provided by beaver while minimizing potential conflicts (e.g., damage to private property), identify strategies for successful establishment of beaver at release sites, ensure humane treatment of individual animals, and avoid adverse social, disease or genetic impacts on beaver populations where beaver relocation is deemed appropriate and is authorized by ODFW.

On a case-by-case basis, ODFW will coordinate with BES to consider live-trapping beaver in order to move them short-distances, within the same property ownership and within the animal's existing home territory. Such a move would be authorized by permit from ODFW.

Although ODFW could be willing to coordinate with BES on moving beavers causing damage or posing a public health risk within the animals' existing territory, it is preferable to try haze those beavers from problem areas first. Hazing is not a feasible technique in open waterways but may be effective within stormwater pipe systems and certain stormwater treatment ponds. An annual hazing permit from ODFW is required to implement any method of disturbance intended to move animals out of problem areas. The permit will outline acceptable methods and will be issued in conjunction with an Annual Incidental Take Permit (Kill Permit) in the event that hazing accidentally results in the death of an animal. Additional conditions will be noted in any valid permit currently held by BES.

Under certain terms, ODFW may also consider future long-distance relocations of beaver, outside their home range and likely across HUC 4 basins or smaller watersheds. Permit approval by ODFW may include terms such as an approved holding facility, medical screening or other requirements.

## 4. DISTRIBUTION AND ABUNDANCE WITHIN THE CITY

In early 2016, Multnomah County Drainage District (MCDD) and BES identified the locations of dams, dens, and beaver activity. A total of 58 records were collected on beaver activity in the MCDD area. Through use of this management, additional sites will likely be identified.

Within Peninsula Drainage District #1, a total of 15 locations were identified and mapped. Of these sites, 14 were identified as dams and 1 was a den collapse (undetermined if it was a nutria or beaver den). No critical issues requiring immediate action were identified.

Within Peninsula Drainage District #2, a total of 12 sites were identified. Of these sites, 11 were dams and 1 was a suspected beaver den. No critical issues requiring immediate action were identified.

Within MCDD #1, a total of 25 locations were identified and mapped. Of these, 12 sites were identified as dams, 7 were identified as problem sites, 2 were beaver den collapses, 1 was identified as generic activity, 1 was noted as being a clogged tide gate, and 2 were not identified in more detail. Several of these locations were identified as problem sites.

Within the City of Portland, beaver are present in nearly all perennial streams, sloughs, channels and in both major rivers. The exception is some of the steeper gradient streams draining the west hills towards the Willamette River. Virtually all suitable habitat within Portland is occupied by beaver.

## 5. BEAVER DETERRENCE METHODS

BES will consider all options for resolving beaver conflict within their infrastructure. Techniques will range from no action to habitat modifications and from moving beaver to lethal actions. Each of these techniques is described below. A flowchart that summarizes when each of the actions below is a valid method is shown in Chart 1. In some cases, multiple methods may be required.

### 5.1 No Action

In areas where no adverse effects are currently observed or anticipated, beaver activities should be monitored. Activities are recorded in GIS mapping and observation logs.

### 5.2 Vegetation Management

In areas where beaver are not anticipated to be an issue with infrastructure, maintain or establish vegetation as deemed optimal for the site.

In areas where beaver are not desired, the planting of unpalatable plants can achieve some overall habitat improvements while deterring foraging by beaver. These plants include Sitka spruce, incense cedar, Pacific ninebark, red elderberry, cascara, osoberry (Indian plum), and twinberry (COP 2011). BES is proposing to develop an unpalatable plant species list for design of new BES-owned water quality facilities where potential for beaver activity exists. The list might also be used for vegetation maintenance and replacement in facilities with beaver presence.

Managers should avoid planting cottonwood, aspen, or willow in areas where beaver are not desired, as these are the preferred foods for the species.

In certain areas within the Portland International Airport plan district, airport landscaping standards should be followed to decrease the prevalence of bird attractants. Section 5 of the Portland Plant List (COP 2011) describes the allowed plants that decrease the conflicts between wildlife and aviation activities. The plants described above are unpalatable to beavers, however, they may provide roosting, forage, and/or cover for other forms of wildlife. Plants selected for planting within certain areas of the airport are planted because they generally do not attract wildlife; they do not provide attractive roosting habitat for species posing a threat to aviation safety and are generally non-seeding or non-fruiting.

### 5.2.1 Wire Mesh Cages

In locations where trees or shrubs should be protected from gnawing or felling by beaver, install wire mesh cage around the circumference of the trunk to prevent beaver from gnawing on standing trees (Figure 8). This method has been successful in the Portland area, but requires material and labor, as well as periodic maintenance. An effective mesh cage consists of the following:

- The gauge should be size 14 to be flexible enough for this application.
- Mesh openings should be minimum 4 inches and maximum 6 inches; typically, 2x4 inch openings.
- Mesh should be placed so that 12 or more inches of space is present between the tree and the mesh so that beaver are not able to contact the tree; use an 18-inch gap for growing trees.
- Mesh cages should extend at least 4 to 5 feet above ground level.
- In flood-prone areas, mesh cages should extend above the high-water level.
- Cages should be securely anchored to the ground; typically, with 1x2x24 inch wood stakes woven into mesh.
- For clusters of shrubs, encircle priority area with single, larger diameter fence as needed.
- For newly planted revegetation sites still in establishment phase, select subset of priority trees to protect, depending on long terms site goals.
- Cages require monitoring, maintenance, removal, and reinstallation as trees grow.

### 5.2.2 Abrasive Paint

In areas where trees should be protected from gnawing or felling, but where investment in the higher costs for material and labor is not worth the effort, abrasive paint may be used. Based on anecdotal information, it is suggested that this method is not very effective in the Portland area, however. This method requires minimal material and labor and annual repainting. This method might be useful for volunteer events where skill in manual labor is not critical to success. Abrasive paint should consist of a mixture of:

- 8 ounces of fine sand (30-mil, 70-mil, or masonry sand)



- 1 quart of latex paint, matched to the color of the tree trunk

Once combined, the mixture is painted on the tree to 4 feet above the ground.

If abrasive paint is used, monitoring of its effectiveness should be conducted and reported to better understand its applicability for future use.

## 5.3 Habitat Modification

These techniques include dam breaching/removal and installation of pond levelers, beaver deceivers, and other devices. When using any of these methods within the MCDD leveed area, it is important that migratory fish passage remains open to the extent practicable. Outside of the leveed area, fish passage must be maintained. Additional regulations regarding removal or fill of material within regulated waters is discussed below.

### 5.3.1 Habitat Modification Regulations and Consultations

Beaver dams and dens are not a regulated resource by ODFW and can be removed or altered without a permit from that agency. However, depending on the location within the city, dam breaching or removal can require notifications and consultations with ODFW District Wildlife Biologist, District Fish Biologist and/or Regional Conservation Biologist under this plan (See Table 1.) Confirmation a den/lodge has been abandoned should occur prior to alteration or removal activities to limit potential injury or death to a beaver.

Removal or fill of more than 50 cubic yards of material from Waters of the State requires consultation with Oregon Department of State Lands (DSL). Within waters mapped as Essential Salmon Habitat (ESH) by the state, removal or fill of *any* volume of material requires consultation with DSL.

However, removal of beaver dams is exempt from DSL permitting if the following criteria are met:

- The dam and its associated wood pose a direct and demonstrable danger to the following:
  - human life or real property, or
  - transportation facilities including culverts, bridges, and roads
- The removal is no more than the amount necessary to reduce or eliminate these threats.

In this situation, beaver dams are considered “large wood” by DSL and removal is allowed under an exemption for danger and risk (see [OAR 141-085-0530\(9\)](#)). This exemption applies to both ESH and non-ESH waters and there is no volume threshold. Under this management plan, BES would *only* remove dam material to protect property or infrastructure from a direct and demonstrable threat, so any removal is covered under this exemption and BES and MCDD do not need to seek permission from DSL for dam removal.

When flow devices such as pond levelers or “beaver deceivers” are proposed in Waters of the U.S., the necessity of obtaining a permit from the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act must be examined by the designated plan lead in coordination with the USACE. Depending on water body, this could also include an Endangered Species Act (ESA) impact analysis. Within the MCDD boundaries, the presence of fish listed under the federal ESA is assumed to be negligible. Always consult with the ODFW District Fish Biologist prior to installing flow devices where migratory fish are present or potentially present.

Lowering water levels in beaver ponds may unintentionally strand amphibian egg masses causing mortality. State-sensitive red-legged frogs lay their eggs in beaver ponds in Portland. If lowering pond levels, determine if amphibians may be present and consult with designated plan lead and ODFW Regional Conservation Biologist for avoidance and minimization measures. Salvage actions require an ODFW permit.

In general, BES constructed stormwater treatment facilities, such as sediment retention ponds and bioswales, are not Waters of the State or Waters of the U.S. Therefore, the following activities may occur without agency consultation in BES constructed stormwater treatment facilities: dam breaching, dam material removal, den material removal and placement of pond levelers and beaver deceivers. However, some facilities may overlap with regulatory waters and careful consideration should be given on a case-by-case basis. Always consult with agencies if there is any question about regulatory status of a facility.

Finally, placement of flow devices within the City of Portland, such as pond levelers and beaver deceivers, may trigger flood hazard regulations under city code Title 24.50. Within the mapped 100-year floodplain, flow devices described in this plan do not meet the definition of “fill” in Portland Title 24.50 and no consultation is required. Placement of flow devices within a FEMA mapped floodway or virtually any stream or drainageway will likely require a “no rise” analysis be submitted to Portland Bureau of Development Services.

All the above regulatory considerations and requirements for this plan are summarized in Table 1.

### 5.3.2 Dam Breaching and Removal

Dam breaching should be considered under two scenarios. The first scenario is when there is acute flooding risk as a result of the dam. Because beaver will often rapidly repair a breached dam, breaching should be considered a short-term, emergency approach to relieve dangers to property and/or infrastructure. When emergency breaching is conducted, analysis should be completed to ensure that released flows do not endanger other structures or property downstream from the breached dam. In some cases, beaver will not repair dams and breaches can remain effective for prolonged periods of time.

The second scenario in which dam breaching is viable is after a dam has been abandoned but is still creating an unacceptable risk to infrastructure. Dams may be breached to the extent that they might still provide benefits associated with beaver dams, while still protecting infrastructure.

Dam removal is a more significant effort and will typically drain the entire beaver pond. This often exposes submerged den and burrow entrances, allowing access by terrestrial predators. To protect beaver kits that may not be fully mobile and vulnerable to predation, avoid wholesale dam removal during the kit season from April to June. Site and condition appropriate best practices for sediment control should also be deployed for dam removal to manage sediment plumes.

There are two recommended ways to breach or remove a beaver dam depending on the size of the dam. These are described below:

- Breaching or removing a dam by hand: Remove material from the dam slowly by hand and/or using hand tools such as four-pronged pitch forks, long-handled cultivator rakes (potato hooks), shovels and chain saws to dislodge and remove material.
- Power excavating: Remove material slowly using a backhoe or excavator to breach or remove large dams. The machinery should be stationed at the top of the bank, road, or bridge where

practicable. Remove the dam from top down in layers, scraping off six inches to one foot of material to reduce the potential for flooding or stream scouring. Wait for the water levels to stabilize and flow to clear before removing the next layer. Remove material to the desired depth or substrate or to the natural substrate level if needed. Under this plan, ponds should only be lowered to the level necessary to eliminate risk and no further, to maintain compliance with the OR DSL large wood exemption.

### 5.3.3 Pond Levelers

In areas where free-standing dams are not an acute threat to infrastructure and are not located at a culvert, but where pond levels should not rise above a certain elevation, pond levelers can be installed (Pollock et al. 2015; Wheaton 2013). These devices generally consist of a pipe placed in the dam, extending upstream with a wire mesh cage surrounding the intake. A number of designs exist, examples include the Clemson Beaver Pond Leveler and a design from the Snohomish County Public works; both are described in the [Beaver Restoration Guidebook](#). BES utilizes the design developed by [Beaver Solutions](#) and [Beaver State Wildlife Solutions](#). Each leveler will need to be field fit to each set of conditions, however the general specifications are:

- 40-foot length of 12- or 18-inch diameter high density polyethylene (HDPE) pipe, double-walled and not perforated, with vent holes cut along the top side and a notch cut in the bottom of the intake end.
- 6x6x6 foot wire mesh cage with domed top surrounding intake, constructed of 6x6 inch wire mesh fabric, 3/16-inch diameter wire, non-galvanized. Use one fabric sheet for floor; avoid seams in floor where adjoining sheets are fastened together.
- Metal “T” style posts to secure pipe and intake cage to pond bed.
- 2x2x2 foot wire mesh cage on downstream end of pipe (same 6x6 mesh fabric as intake cage).
- Upstream end of pipe placed in bottom center of cage and cage placed in deepest water possible (set intake as deep as possible).
- Place downstream end of pipe in beaver dam, extending a few feet past dam, with pipe invert placed a desired water surface elevation.

This method requires an investment of time and materials, plus monitoring and maintenance to ensure the mesh cage and pipe remain in good condition. Periodic cleaning might be necessary to clear the cage of obstructions.

### 5.3.4 “Beaver Deceivers”

Beaver deceiver devices are used when dams are blocking culverts, flow paths, or other openings. Beaver deceivers consist of non-galvanized wire mesh fencing staked upstream of the culvert to be protected (Pollock et al. 2015; Wheaton 2013). The mesh should be located away from the opening of the culvert to prevent it from being used to anchor wood for a more effective dam. A typical device is trapezoidal in shape with the upstream end at least 8 feet from the culvert opening. Like the pond leveler described above, the deceiver device is staked around its perimeter, and tall enough to prevent beaver from being able to place wood within the caged area. The mesh on the bottom of the cage

should be embedded into the streambed or angled inward for several feet to prevent beaver from placing wood from below. Smaller cages can also be constructed with a wire mesh floor to prevent beaver from tunneling under the fencing. As with the leveler, avoid creating seams on the floor where two adjoining sheets of wire fabric come together. Seams such as this can unintentionally ensnare animals. Avoid galvanized metal to limit leaching of zinc into the environment. Considerations and modifications for animal passage should be part of each beaver deceiver design. Blocking passage for medium to large sized aquatic mammals may force species such as beaver, otter or muskrat out of waterways and onto roadways. In some situations, it may be advantageous or necessary to incorporate a leveler pipe into beaver deceiver.

## 5.4 Removal via Non-Lethal Means

When habitat modifications and infrastructure protection methods are not fully effective at managing detrimental beaver activity, removal of a beaver group might be necessary. Given the benefits that beaver can provide in the region, non-lethal means of removal is preferable to lethal means. This plan outlines a series of non-lethal techniques to employ prior to considering either non-lethal or lethal removal (see Chart 1).

### 5.4.1 Trapping and Relocation

The ODFW beaver Relocation Requirements, the product of ODFW staff and the statewide beaver working group, direct the trapping and relocation of beaver in Oregon. At this time, virtually all suitable habitat within the City of Portland is occupied by beaver. Therefore, trapping and relocating beaver within the Portland metropolitan region is not an option because ODFW Requirements prohibit releases into areas already occupied by beavers. If relocations are approved with release sites beyond the Portland region, they are best conducted between August 1 and October 31. When multiple beaver are present in a colony, it is best to trap all members of the family. They should be held until all members of the family can be relocated together (within reasonable timeframes). Follow-up monitoring at release sites is essential to determine success of reintroduction efforts.

### 5.4.2 Evictions

Non-lethal trapping and relocation of beaver outside Portland is not a viable alternative at this time, but other options exist if beaver need to be moved a short distance from their current location. This situation could arise when beaver are located within infrastructure such as pipes or manholes and need to be moved before placing exclusion devices such as wire mesh or deceivers. Eviction generally involves moving animals very short distances (less than 1,000 feet) within the same property ownership. The intent with eviction is to move animal(s) within their own existing territories by “evicting” them from problematic den sites. By definition, eviction actions are not relocations and therefore not subject to ODFW’s Relocation Requirements. Eviction has not been standard practice, and each situation will likely be unique. Proposed techniques must be coordinated with, and authorized by, ODFW prior to implementation to ensure that applicable laws and regulations are adhered to. Evictions are likely best conducted between August 1 and October 31. Preventing re-entry is paramount, as the beaver are likely to return.

Potential methods could include the use of strobe lights or loud noises to encourage beaver to move out. Any methods used must not overly disturb other residents, either human or wildlife, and would be approved by ODFW prior to implementation.

## 5.5 Lethal Removal

In areas where repeated habitat modification and management techniques have not been successful, lethal removal might be appropriate. Contact the designated plan lead to contract a WCO to remove beaver. If removed beaver are located in a pipe or other item of infrastructure, use measures to prevent re-entry by other beavers, if possible.

## 5.6 Unexpected Beaver Encounters

If during the course of routine maintenance, beaver are encountered in an enclosed space such as a culvert or pipe, staff members should not actively harass the beaver. If multiple points of egress are available to the beaver, it will likely exit the area. If personnel are blocking the only exit for the animal(s), personnel should exit and allow the animals to leave. In circumstances where newborn kits are present and not mobile (usually occurring between April and June), personnel should exit the area and contact the designated plan lead for further instructions.

## 6. CONCLUSIONS

While there is no one-size fits all solution to dealing with beaver in our urban environment, there are several alternatives that can be used to work with them. Given the benefits provided by beaver, their presence should be encouraged in those areas that do not pose a risk to infrastructure. When their presence becomes a problem for proper maintenance or operation of systems, steps outlined above can be taken to dissuade, mitigate, or remove beaver. Steps to be taken can include vegetation management, in-water habitat modifications, short-distance evictions, relocation, and lethal removal. The attached flowchart (Chart 1) helps personnel decide the best course of action. The designated plan lead for this effort is available to assist personnel when questions or unanticipated scenarios arise.

**Table 1. Summary of Actions and Regulatory Approvals and Consultations in City of Portland.**

*Note: the City of Portland coordinates all natural resource permit activities through its Streamlining Committee, with representatives from Oregon Department of Environmental Quality, the Oregon Department of Fish and Wildlife (ODFW), the Oregon Department of State Lands (DSL), the U.S. Army Corps of Engineers (Corps), the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, and the Portland Bureau of Development Services.*

Action	Regulatory Approvals and Consultations
Harassment (hazing)	ODFW annual permit required
Den or dam material removal from pipe or pipe inlet	No permit or consultation
Dam breaching <sup>1, 2, 3</sup>	Inform ODFW District Wildlife Biologist if in a stream, channel or wetland
Dam removal <sup>1, 3, 4, 5</sup>	<ol style="list-style-type: none"> <li>1. Inform ODFW District Wildlife Biologist</li> <li>2. If migratory fish present, consult ODFW District Fish Biologist</li> <li>3. Consult ODFW Regional Conservation Biologist</li> </ol>
Deceiver or pond leveler <sup>3, 6, 8</sup>	<ol style="list-style-type: none"> <li>1. Inform ODFW District Wildlife Biologist</li> <li>2. Consult ODFW Regional Conservation Biologist</li> <li>3. If migratory fish present, consult ODFW District Fish Biologist</li> <li>4. State removal/fill permit required in Essential Salmon Habitat</li> <li>5. Consult Corps if Waters of the U.S.</li> <li>6. Consult with Portland Bureau of Development Services</li> </ol>
Eviction/Relocation	ODFW permit required, contact District Wildlife Biologist
Lethal trapping on public lands <sup>1</sup>	No permit if by state licensed Wildlife Control Officer
Lethal Control/Kill Permit <sup>7</sup>	ODFW annual permit required
Lethal trapping on private land by property owner	No permit

Notes:

1. For protection of human life, infrastructure, real property or transportation facilities from a direct and demonstrable threat (OAR 141-085-0530(9)).
2. “Breaching” is defined as creating small notches in dam with hand tools to immediately lower water levels.
3. No agency notification required for dam breaching, dam removal or placement of flow devices in constructed stormwater facilities, such as sediment retention ponds or bioswales.
4. Power excavation: remove the dam from the top down in layers, scraping off six inches to one foot of material at a time. Allow flow to clear before continuing with next layer. This reduces the potential for flooding, scour or large sediment plumes downstream. Use site-appropriate sediment control best management practices.
5. Avoid beaver kit season April-June. In cases with breeding frogs or salamanders, amphibian egg mass salvage requires ODFW permit; contact Regional Conservation Biologist.
6. Consult with DSL on removal-fill if larger or more substantial structures than those described in this plan are proposed in Waters of the State.
7. Issued to BES for unintentional harm to animals that may occur as result of maintenance activities.
8. Consult with City of Portland Bureau of Development Services on Title 24.50 Flood Hazard Areas. Flow devices may require “no rise” analysis in FEMA mapped floodway, streams or channels. Within mapped 100-year floodplain, flow device materials do not meet the definition of “fill” within Title 24.50 and no consultation is required.

## 7. DEFINITIONS/REGULATIONS

"**Damage**" means the loss of or harm inflicted on land, livestock or agricultural or forest crops (ORS 498.012 and OAR 635-435-0005(2)).

"**Public Nuisance**" means loss of or harm inflicted on persons, gardens, ornamental plants, ornamental trees, pets, vehicles, boats, structures, or other personal property (ORS 498.012).

"**Predatory Animal**" means coyotes, rabbits, rodents and feral swine which are or may be destructive to agricultural crops, products and activities (ORS 610.002 & 610.105). This definition is applicable where wildlife is taken under the authority of one who owns, leases, occupies, possesses or had charge or dominion over the land. Beavers, muskrats, western gray squirrels (*Sciurus griseus*), gophers, mountain beaver (boomer) marmot, nutria, and porcupine causing damage on private property are defined as predatory animals under ORS 610.002.

"**Protected Wildlife**" means any species that meets any of the following definitions: "game mammals" as defined in OAR 635-045-0002, "game birds" as defined by OAR 635-045-0002, "furbearers" as defined in OAR 635-045-0002, "threatened and endangered species" as listed in OAR 635-100-0125, or "nongame wildlife protected" as defined in OAR 635-044-0130 or is otherwise protected by statute or law.

"**Furbearing mammal**" means, beaver, bobcat, fisher, marten, mink, muskrat, otter, raccoon, red fox and gray fox (ORS 496.004).

"**Furbearers**" are beaver, bobcat, fisher, marten, mink, muskrat, otter, raccoon, red fox, and gray fox (OAR 635-045-0002(33)).

"**Eviction**" is used in this plan to describe trapping and moving beaver short distances, generally less than 1000 feet and within both the same property ownership and the animal's home territory. Note that United States Department of Agriculture Wildlife Services (USDA-WS) generally defines this action as "relocation".

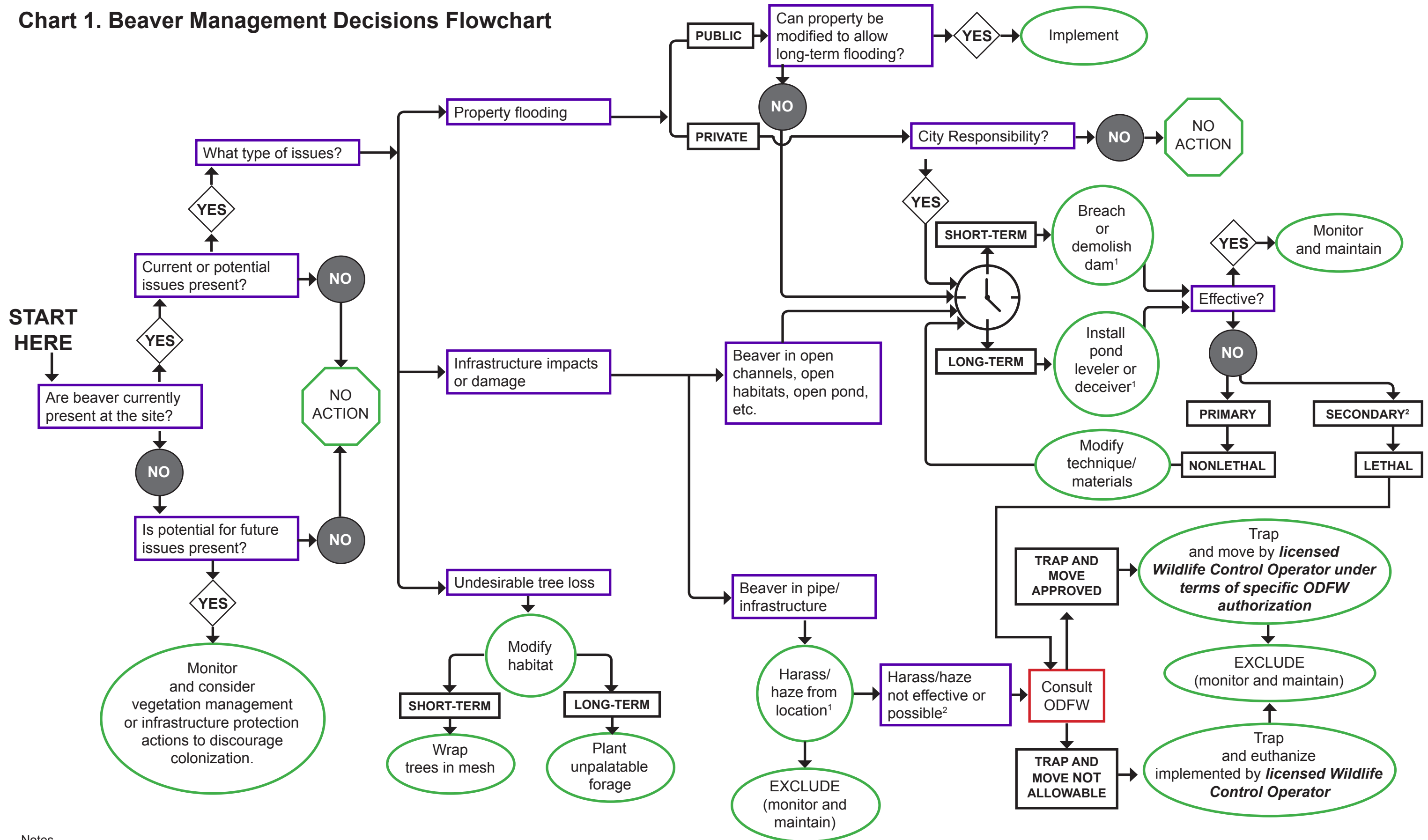
"**Relocation**" in this plan means trapping an animal and releasing it well outside its home range, likely across HUC 4 watershed basins or possibly across HUC 3 watershed basins. This definition is used to be consistent with the ODFW Beaver Relocation Requirements.

## 8. REFERENCES

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- UDWR. 2010. Utah Beaver Management Plan: 2010-2020. DWR Publication 09-29. Salt Lake City, Utah. 33 pp.
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- Whatcom County. 2009. BMP Factsheet #8: Beaver Dam Management. Whatcom Conservation District. Whatcom County, Washington. 4 pp.
- Wheaton, J.M. 2013. Recommendations for an Adaptive Beaver Management Plan for Park City Municipal Corporation. September 2013. Logan, Utah. 30 pp.



**Chart 1. Beaver Management Decisions Flowchart**



Notes

<sup>1</sup> Refer to Table 1 Summary Actions, Regulatory Approvals and Consultations in City of Portland.

<sup>2</sup> Contact designated plan lead.