

Ecola Creek Forest Reserve Stewardship Plan



Prepared for the City of Cannon Beach

by

Trout Mountain Forestry

in association with

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MIG Inc.

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Introduction

Environmental context

Located approximately one-mile from the Pacific Ocean, the Ecola Creek Forest Reserve (ECFR) covers approximately 1,040 acres and is owned by the City of Cannon Beach. The Reserve sits at the lower end of the Ecola Creek watershed, a 22 square mile basin that drains directly into the Pacific Ocean and includes the town of Cannon Beach. With a maximum elevation of 3,075 feet, the headwaters of the watershed are steep and mountainous. The West Fork and North Fork of Ecola Creek run separately through the Reserve and converge in a large valley bottom before passing through the City. Because of the watershed's steep gradient, stream flow in Ecola Creek fluctuates greatly and is

generally high from October to April and low from July through September.



Over 95 percent of the lands in the watershed are managed for industrial timber production, with private land ownership over the last few decades passing from Crown Zellerbach, to Willamette Industries, to the Weyerhaeuser Company, and to the Campbell Group, a timber investment firm. In 2005, Weyerhaeuser sold a portion of the upper watershed to Stimson Lumber. Harvest activity continues on lands adjoining the Reserve.

The Ecola Creek stream system contains exceptionally high quality habitat for salmonids. The parcel also includes a 19-acre stand of old-growth cedar, in which individual trees may be as old as 800 years or greater.

Cannon Beach draws its primary water supply from a groundwater source located within the Reserve near the West Fork of Ecola Creek. The 800 to 1,000 gallons per minute provided by these three springs are adequate for the town's resident population of 1,700 throughout most of the year.

During the peak summer tourist season, when over 10,000 people can occupy the town, a secondary, surface-water source is utilized to augment water needs. The water is withdrawn from the West Fork of Ecola Creek and passes through a sand filtration plant. Both the withdrawal point and the filtration plant are located in the Reserve. A 2001 Source Water Assessment by Oregon's Department of Environmental Quality found a higher relative risk of contaminants to the surface-water source from forestry operations by then-owner Willamette Industries. Ecola Creek has been identified as a

high priority stream for streamflow restoration by the Oregon Department of Fish and Wildlife and the Oregon Water Resources Department.

The water resources of the Reserve are critically important to the community of Cannon Beach, which relies on the Reserve for its drinking water. In addition, the fish and wildlife habitat provided by the streams is remarkably good. The overall goal of forest stewardship will be to maintain or improve the current water resources. The Ecola Creek Watershed Assessment (Parker *et al.* 2001) contains extensive data and a detailed discussion of key water issues, including stream hydrology, land use, City water use and water rights, and streamflow restoration priority areas within the watershed.

History of the property

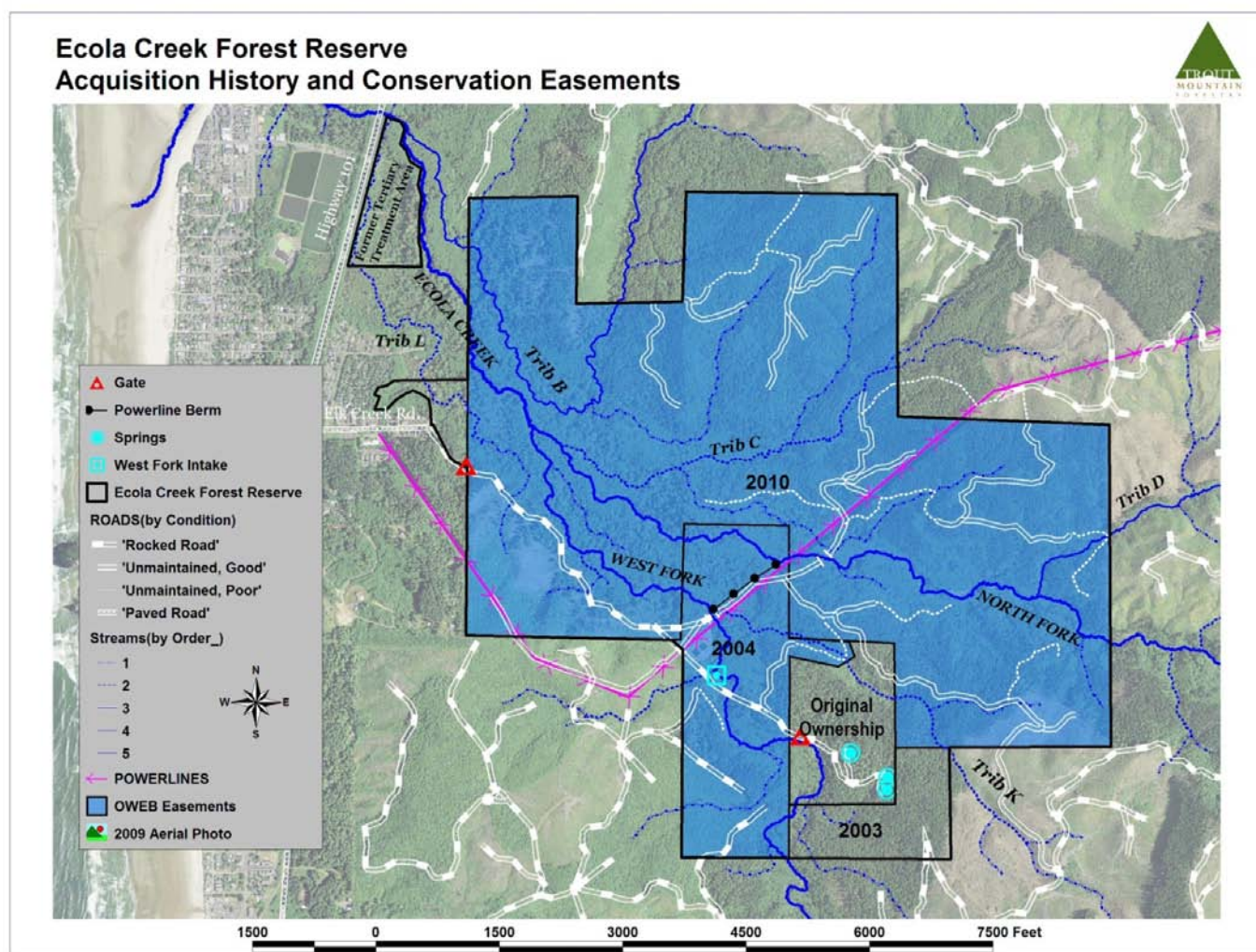
The City has owned a 60 acre parcel surrounding the springs since the 1960s. Beginning in the early 2000s, the City recognized the long-term need to protect its municipal drinking water supply from any adverse impacts of nearby industrial forest management, and began discussions with neighboring landowners with the purpose of acquiring additional acreage.

In 2003, an adjoining 40-acre parcel was acquired from the Weyerhaeuser Company, and in 2004 an additional 120 acre parcel was acquired, also from Weyerhaeuser (Fig. 1). The City developed a Stewardship Plan in 2006 for the then-220 acre ownership that clearly identified the overall management philosophy, standards and guidelines, and a five-year implementation schedule. The current plan borrows heavily from the 2006 plan (Sims 2006) and replaces it as the guiding management plan for the unified ownership.

In 2010, the City, through a complex transaction, acquired 805 acres of land immediately to the north of its holdings at the time, known as the Ecola Tract, owned by the Oregon Department of Forestry (ODF). This land includes the access road to the water treatment facility, as well as land to the north of the North Fork Ecola Creek. ODF designated the Ecola Tract as an “older forest structure” zone, meaning it was being managed to allow for the development of late successional forest characteristics (Oregon Department of Forestry 2001). This property had been publicly owned since the 1960s. Prior to that, it was privately owned by a family logging company, which logged much of the area in the 1950s and 1960s.

The Reserve also includes two small parcels of land with a total area of approximately 12.5 acres located in the vicinity of Elk Creek Road. For purposes of developing the management plan, the City included an approximate 24 acre parcel that was the location of the former tertiary treatment component of the City’s wastewater treatment system. This parcel is not contiguous with the Forest Reserve, but is downstream and has frontage on Ecola Creek. These additional areas, as well as the City’s original 60 acre parcel and the 40 acre parcel acquired from Weyerhaeuser in 2003, are not encumbered by conservation easements.

Figure 1. Acquisition history and conservation easements



OWEB conservation easements

The Oregon Watershed Enhancement Board (OWEB) provided a critical role in the City's acquisition of the Reserve. OWEB funding helped the City acquire the 120 acre parcel from Weyerhaeuser in 2004, and the 805 acre parcel from ODF in 2010 (Fig. 1). Each of these acquisition areas are therefore encumbered by conservation easements that protect specific conservation values on those parcels and prohibit certain activities. The ECFR Acquisitions and Easements Map shows the locations and boundaries of the areas covered by the two easements. Both easements are included in the appendix.

The easements limit the uses of the parcels to those consistent with the restoration, preservation, and protection of the following conservation values:

- a. Healthy watershed function;
- b. Coastal forest and forested riparian habitats, including the preservation of remnant temperate-climate rainforest;
- c. Native fish and wildlife habitat, including:
 - i. Habitat for native resident and anadromous salmonid species, such as populations of coho salmon, steelhead, chum salmon, searun cutthroat trout, and Pacific lamprey;
 - ii. Habitat for native terrestrial and avian species;
- d. Current or historic wetlands.

The easements further require that the City develop a management plan to enhance, protect, and preserve these conservation values. OWEB must review and approve the management plan and any updates to the plan.

Forest management plan development process

The City convened a Citizens Advisory Committee in the spring of 2011, which began meeting regularly and discussing policies for the Reserve. In the fall of 2011, the City hired a team of consultants led by Trout Mountain Forestry to provide expertise on natural resource management and to work with the Committee to develop a written plan for City Council and OWEB approval. Drafts of the plan were reviewed by OWEB during both the summer and fall of 2012.

The overall approach to planning and policy making used in developing this plan was for the consulting team to present a summary of the current inventory information on a wide range of natural resources, conduct limited additional inventory work, then present a range of management alternatives for the Committee to consider. The consulting team provided expertise and recommendations on forest restoration, fish habitat, wildlife habitat, and recreation. Policy recommendations were made by the Citizens Advisory Committee and City staff.

Planning team

- Rainmar Bartl, City Planner
- Citizens Advisory Committee
- Trout Mountain Forestry
 - Barry Sims, Project Manager
 - Scott Ferguson and Mike Messier, Foresters
- Steve Trask, Bio-Surveys: Fisheries expertise
- Brenda McComb, OSU: Wildlife expertise

- Dean Apostol, MIG: Recreation planning and community involvement expertise
- Trout Unlimited: GIS and Mapping

Table 1. Advisory Committee Members

| Name |
|---|
| Bob Reid, Chair |
| Rich Bertellotti |
| Steven Blakesley |
| Scott Davis |
| Bruce Francis |
| Nadia Gardner |
| Barbara Knop, Vice Chair |
| Bob Lundy |
| Doug Ray |
| Mike Stanley |
| Sam Steidel, Ex-Officio Member, City Council |
| Rainmar Bartl, City Planner |

Public involvement

In order to ensure that the plan reflects the interests of the community, public involvement was solicited and engaged in several ways. Three public meetings were held to present initial findings and draft recommendations. The firm of MIG was retained to develop and implement a survey to gauge public opinion on issues of concern. The survey was mailed to every resident, was posted online and was available in hard copy at the Cannon Beach City Hall. The results of the opinion survey are discussed in Section 5. A summary report is included in Appendix A. In addition, the City of Cannon Beach posted a number of documents and a summary of the planning process on its official website. Finally, the advisory committee held 18 formal meetings, all of which were open to the public.

Management statement and planning goals

In 2005 the City Council adopted a statement of management philosophy and a series of four planning goals. These policies guided the development of the 2006 plan, they were modified slightly in 2011 after the acquisition of the Ecola Tract from ODF, and adopted by the City Council in September of 2011.

Management statement

The City will manage the Ecola Creek Forest Reserve to restore the ecological integrity of the forest ecosystem and its constituent aquatic and riparian habitats. The City will also manage the Reserve to preserve and enhance municipal water quality. Passive recreation opportunities will be provided for in a manner that is compatible with the goals of restoring the forest ecosystem and the protection of City's municipal water supply. The management plan for the Ecola Creek Forest Reserve will have the following general goals.

Planning Goals

1. PROTECT AND RESTORE THE LOW ELEVATION COASTAL TEMPERATE RAINFOREST

Restore ecologically functional forest habitats that support species and ecological processes found within late-successional conifer forests on the northern Oregon Coast.

Reduce fragmentation of late-successional conifer forest landscapes by partnering with others to increase connectivity among similar forest landscapes in our area.

2. PROTECT MUNICIPAL WATER QUALITY

Preserve the integrity of existing springs and in-stream water intakes.

Protect municipal water quality through measures that reduce stream sedimentation and enhance the water filtration properties of stream associated wetland areas.

3. PROTECT AND ENHANCE SALMON HABITAT

Preserve existing floodplain forests, riparian wetlands, and side-channel habitats.

Restore salmon habitat through such actions as the restoration of historically degraded riparian wetlands and side-channel habitat, and the identification and stabilization of upland sources of erosion.

4. FOSTER COMMUNITY INVOLVEMENT WITH THE FOREST RESERVE

Facilitate opportunities for public education, focusing on the Forest Reserve's unique ecosystem.

Facilitate opportunities for passive recreation within the Forest Reserve that are compatible with general goals 1, 2, and 3, above.

Independent certification

The Reserve is eligible for certification under standards developed by the international Forest Stewardship Council (FSC). The FSC standards address environmental, social, and economic issues, and FSC certification is widely recognized as the most credible forest certification system by conservation groups around the world.

Landowners can either have their own FSC certificate, or participate through a group. Annual audits by an FSC-accredited certifier are conducted to ensure that each landowner/ member of the group is in full compliance with the FSC standard.

The proposed goals and objectives for the Ecola Creek Forest Reserve are consistent with the FSC standards. Ongoing participation in the FSC program will ensure a system of independent auditing to verify compliance with these standards.

Generally, the standards proposed in this plan exceed the minimum requirements of the FSC Standard. The FSC Standard contains more than 50 pages of specific Principles, Criteria, and Indicators that are used during audits to verify compliance. It is available online at www.fscus.org. The ten principles are included in Appendix C, along with a more detailed assessment of attributes of the ECFR that receive particular attention in the standards.

Natural resources and key management issues

Forest habitat

The Reserve consists of five primary forest habitat types, ranging from young conifer plantations to old growth cedar (Figure 2, Table 2). The forest vegetation and ages are largely an artifact of past management practices, which have included clearcut logging through most of the property. The dominant forest type is a naturally regenerated hemlock and spruce forest ranging in age from 40 to 60 years. This forest came back in after the upland portions of the property were logged in the mid-20th century.

The second most prevalent type consists of dense alder stands, also 40-60 years in age, which developed naturally in the floodplain terraces. Alder regenerates very well in disturbed soils after natural disturbances such as landslides, as well as soil disturbance caused by tractor logging, which was the predominant logging method at the time. Underneath the canopy of alder is a large number of spruce, growing slowly in the shade of the alders; recent windstorms have blown down some alders and provided light to these understory spruce, allowing them to grow up into the main canopy.



Old-growth western red cedar in the ECFR. This tree is 500-1000 years old and has had its top broken off many times throughout its life.

The goal of management of the Reserve forests is to promote the development of older forest characteristics. Neither of these dominant forest types are very old (i.e, less than 60 years) and they are not providing unique forest habitat at this point, although the stands are beginning to exceed typical commercial forestry rotation ages. However, there are two types of older forest found on the Reserve. In the area surrounding the springs, there is an old growth cedar stand, with a component of mixed age hemlock. These cedar trees are at least 500 years old, and possibly as much as 1,000 years old. They are in their last stages of life, with most having dead tops and less than 50% live crowns. However, due to cedar's resistance to rot, they may persist in this condition for many decades or even centuries.

Table 2. Forest habitat types found on the ECFR

| | Acres | % of total |
|---------------------------------|-------|------------|
| Hemlock/Spruce 40-60 yrs | 552.4 | 52.6 |
| Riparian Alder/Spruce 40-60 yrs | 338.1 | 32.2 |
| Hemlock/Spruce 0-15 yrs | 85.7 | 8.2 |
| Open Wetland* | 28.2 | 2.7 |
| Spruce 100+ yrs | 23.8 | 2.3 |
| Cedar/Hemlock 50-300+ yrs | 18.8 | 1.8 |
| Facilities | 3.4 | 0.3 |

*Wetlands have not been formally surveyed.

The other older forest type consists of spruce groves in the floodplain, with trees ranging in age from 100 to 140 years. These trees have attained very large diameters and are beginning to exhibit “old growth” characteristics.

Together, these older forest types comprise only 4% of the total area of the reserve. A primary goal of forest management and restoration is therefore to enhance the old forest characteristics of the younger forest types. The forest structural elements that are lacking in these younger stands that would contribute to greater forest biodiversity and stability are:

- Vertical heterogeneity
- Horizontal heterogeneity
- Dead wood

Vertical heterogeneity is the diversity of canopy layers in the forest (Fig. 3). In many managed forests, a single canopy layer (age class) dominates the site, with relatively little understory vegetation.



Large Sitka spruce in the ECFR developing a long, complex canopy with large branches – an ecologically important characteristic of “old growth” trees.

Figure 2. Forest habitat types

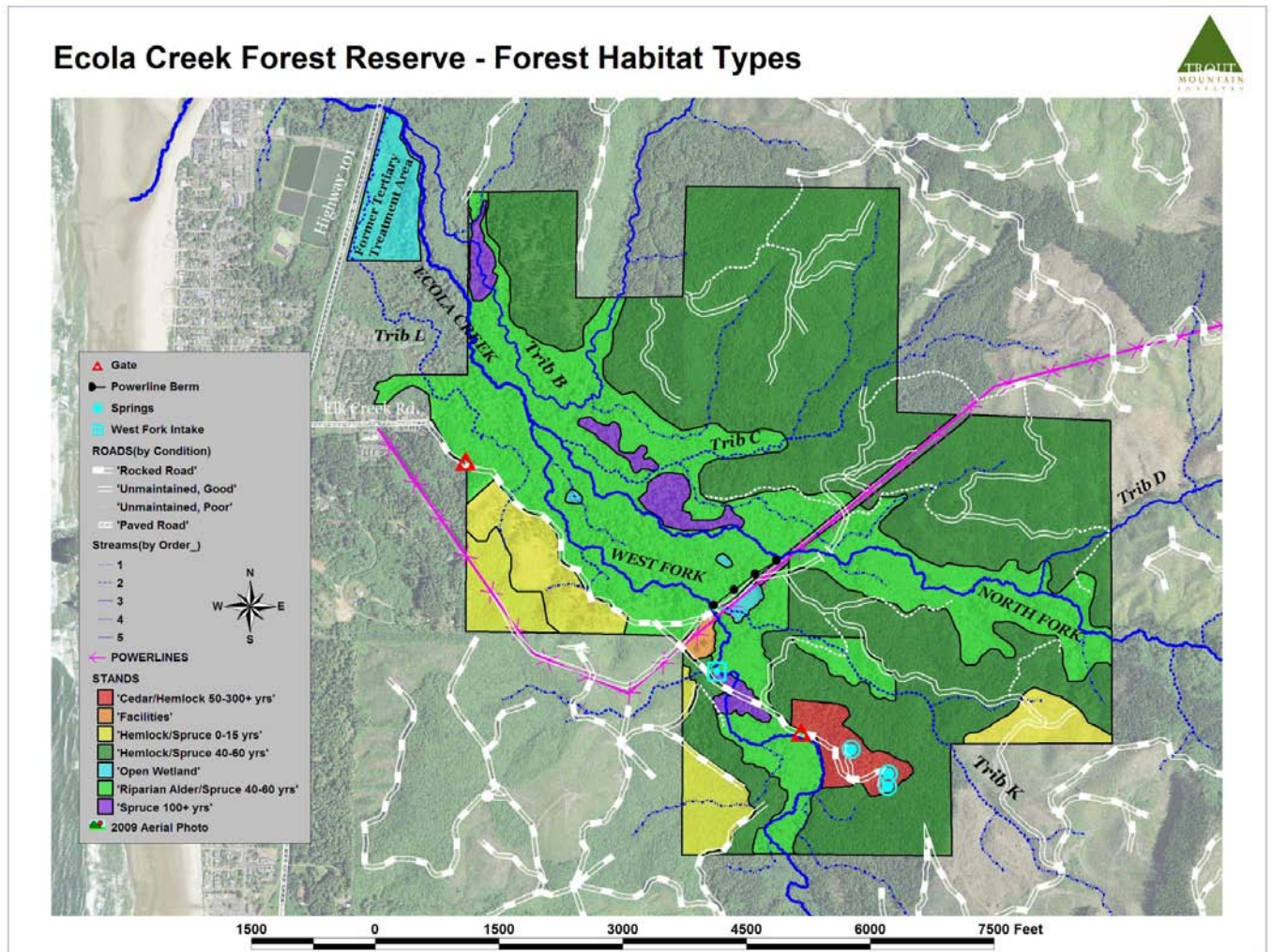


Figure 3. Vertical diversity (above) and vertical uniformity (below) in forest stands (modified from Hayes and Burris 2006)

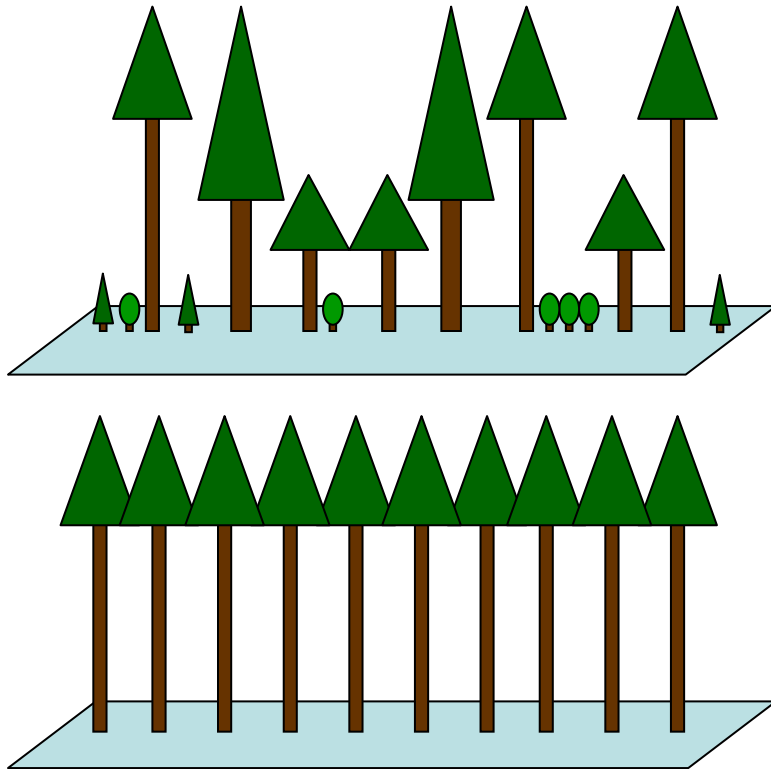
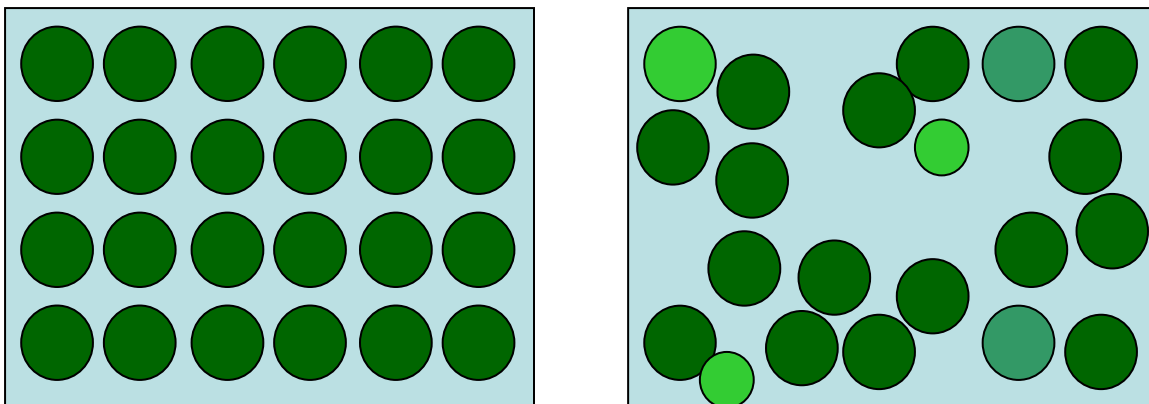


Figure 4. Horizontal distribution of forest vegetation. Simple (left) and complex (right) (modified from Hayes and Burris 2006)



Horizontal heterogeneity is the degree to which the trees are spatially grouped in a non-uniform way (Fig. 4). For example, inclusion of areas of hardwoods or shrubs and patchy distribution of trees contributes significantly to the number of ecological niches the forest contains. This is a key driver of biodiversity (Hayes and Burris 2006). Figures 3 and 4 compare vertical and horizontal vegetation distribution patterns.

Dead wood (snags and down logs)

Snags and down wood provide necessary nesting, caching, roosting, and hiding sites for a variety of birds, mammals, and amphibians. Presence of snags in particular is correlated with biological diversity, because more than 50 species of birds and mammals in Oregon use snags for nesting, feeding, and shelter (Logan 2002). In general, the larger the snag, the greater are the opportunities for the use by a variety of wildlife species. Large quantities of snags and down wood are a defining characteristic of “old growth”.

Managed forests in Northwest Oregon typically have very few snags and down logs because of the potential commercial value for sawlogs and pulp, as well as safety and operational considerations.

In 2006, the 220 acre southern portion of the property, consisting of the original ownership and the 2003 and 2004 acquisitions from Weyerhaeuser, was surveyed for snags and down logs, and very small quantities were found. For example, the average quantity of down wood was 5.86 dry tons per acre. In general, this is a very low quantity relative to what would be expected in unmanaged coastal forests, and is attributed to the logging history of the site. The down wood was also typically very decayed, further diminishing its wildlife habitat value.



Since that time, severe winter windstorms, most notably the gale of December 2007, have created natural disturbance throughout the Reserve, ranging from individual trees blowing over or snapping off, to blowdown patches several acres in size (Fig. 5). The Oregon Department of Forestry subsequently conducted some salvage operations on the Ecola Tract, harvesting down and damaged trees. Generally, their operations left more down logs and snags than an industrial forest operation, reflecting the more diverse management objectives on state forests.

Stewardship activities conducted by the City to implement the 2006 plan have also enhanced the snag and down wood component in selected areas of the southern 220

acre portion of the property. This included some snag and down wood creation in floodplain alder stands in conjunction with cedar planting.

Aerial photography and LiDAR imagery was used to create a map showing areas severely affected by these recent windstorms (see Figure 5). Based on extensive field reconnaissance, these areas contain high numbers of snags and down wood.

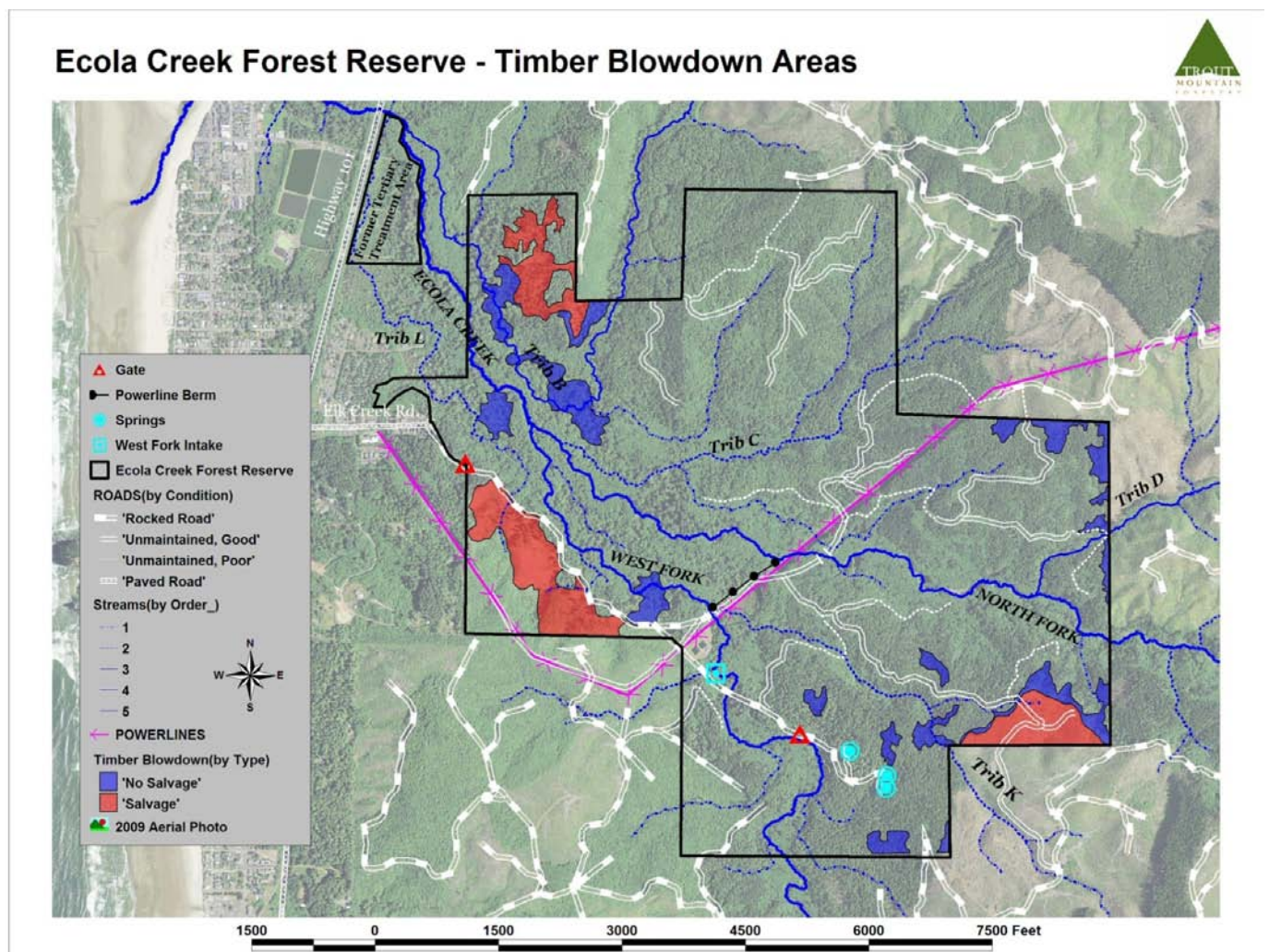
In addition, the Reserve was surveyed to identify areas of blowdown that could supply large woody debris (LWD) for planned stream restoration work on Ecola Creek. The LWD Placement Map shows the locations of down wood resources identified by those surveys. Because hemlock breaks down relatively quickly in in-stream LWD placements, the surveys were focused on identifying down spruce of sufficient size for long-term, stable LWD placements. Because there is far more down hemlock than spruce in the ECFR, additional sources of spruce have been identified, including standing spruce in areas that could be lightly thinned to further stand development objectives, and spruce from adjacent properties. Additional discussion of this project is provided later in this document.

In summary, the property can be said to have a significant dead and down wood resource, far higher than on surrounding privately owned timberlands. Utilization of some of these down trees for stream restoration work would not adversely impact the overall down wood resource in a significant way. The snags and down wood are primarily comprised of trees in the 40 to 60 year old age class. As the stands mature over time, this cohort of dead wood will age, decay, and breakdown. Old growth forests typically contain dead wood of larger sizes, representative of the size of mature trees. The overall goal remains to continue growing trees of much larger diameters, which will provide down wood of greater longevity and more diverse habitats. Dead wood can best be viewed as a dynamic resource that is constantly decaying, but periodically replenished by natural disturbance events or active stewardship projects.

Forest health and wildfire risk

The retention of blown down trees for ecological reasons is a concept that may appear counterintuitive. Many people that live in forested communities are concerned about the risk of wildfire, and the spread of insects or diseases from concentrations of dead wood. While these concerns are understandable, they are often based on experiences from drier forest types, such as Eastern Oregon, where forest fires and disease epidemics are an annual threat. The Reserve lies in a region with abundant annual rainfall and relatively few forest diseases that can potentially cause epidemic tree mortality. Although forest fires do periodically occur in Northwestern Oregon (i.e., the Tillamook Burns), they require a very specific set of conditions.

Figure 5. Timber blowdown areas



The National Park Service at the nearby Ft. Clatsop Unit of the Lewis and Clark National Historic Park recently conducted a detailed analysis of fire risk, made more relevant after the 2007 windstorm blew down approximately 200 acres of hemlock stands. Their conclusion was that the risk of fire from the down wood was relatively small (NPS 2004; NPS 2011). Generally, the risk is highest when the fine fuels, such as conifer needles and fine branches, are dry but not significantly decayed, which typically is the first and second summers after the trees have died/blown down (Agee 1993). Landowners with concern about fire risk can manage the fine fuels component by cutting conifer branches on down trees so that the fine fuels are in contact with the ground, which helps them retain moisture, speeds decomposition, and eliminates fuel ladders.

Some level of vehicular access to all major sectors of the property for managing fuel concentrations and monitoring forest conditions would be prudent. Although the risk of wildfire in the Reserve is very low, the right combination of factors including concentration of fuels, prolonged hot and dry weather, and potential sources of ignition (i.e., people), could create conditions that would allow a wildfire to get started. Because of the potential catastrophic effect of wildfire on the City's drinking water supply, this issue must be addressed; because the risk is very low, the level of access and monitoring may be fairly light.

Restoration thinning approach

These characteristics of older forests – vertical and horizontal heterogeneity and dead wood – normally develop naturally over very long time periods. When a forest is young and uniform as a result of clearcut logging, the attainment of these qualities, which are so important for wildlife habitat diversity, is further delayed. Stand manipulations such as thinning and snag creation are tools that can be used to accelerate the development of these older forest characteristics (Puettmann et al. 2009).

The overall goal of forest management in the Ecola Creek Forest Reserve is to restore old growth characteristics. Records of what the forest looked like prior to commencement of logging by white settlers are spotty, but the general understanding is that the forest displayed the following characteristics (Kohm and Franklin 1997):

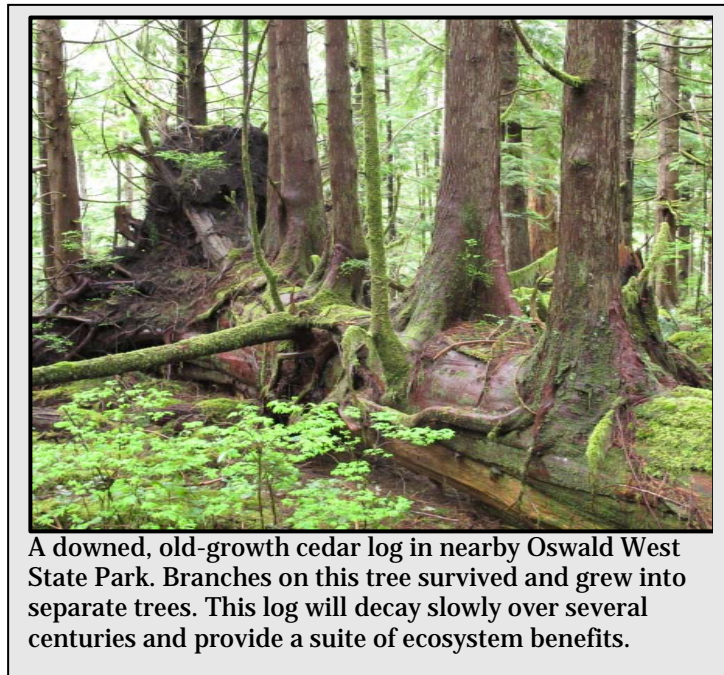
- There were some very large, very old trees of a mix of species, including spruce, cedar, and hemlock. The oldest trees could have been 300 years or more for hemlock, 500 years or more for spruce, and 800 years or more for cedar.
- There were some very large down logs on the forest floor and in the stream channels, providing nurse logs for regeneration, and habitat for a wide variety of species. Large snags persisted for many decades, even after high intensity fires.
- The forest contained trees of a wide variety of ages. The eventual collapse of even just one large old growth tree would create a gap in the canopy that would stimulate the growth of native shrubs and regeneration of tree species. Periodic wind events helped maintain a patchy distribution of old trees and gaps with younger trees.
- Large areas of trees of the same age were relatively rare. Recovery after fire generally spanned several decades, resulting in a more uneven age distribution.
- There was an absence of invasive plants such as non-native blackberries, holly, and ivy.

The forest restoration techniques recommended in this plan have been carefully designed to take relatively "unnatural" young and uniform stands of trees, and place

them on a trajectory that is more likely to result in the desired conditions. The primary method is to reduce the tree density from what is desirable for timber production, to what is most likely to create large, wind-firm, older trees. The second consideration is to break up the even distribution of trees on the landscape by introducing patchiness that mimics natural wind disturbance.

Forest landowners in the Pacific Northwest with conservation objectives have been experimenting with thinning for several decades now. Some notable examples include Oregon's Siuslaw National Forest, which has implemented a thinning program to reduce tree densities in areas designated as Late Successional Reserves, and The Nature Conservancy, which has been thinning in young conifer plantations on its Ellsworth Creek Reserve property in southwestern Washington (the Advisory Committee for this plan has had a guided tour of the Ellsworth Creek Reserve). The nearby Ft. Clatsop unit of the Lewis and Clark National Historic Park has recently embarked on a thinning program to restore its forests to the conditions that existed when the Lewis and Clark party encountered Oregon's North Coast in 1805.

Every landowner has different circumstances, a different set of priorities, and varied forest conditions. There is no single "right way" to manage a forest to enhance older forest qualities. The City of Cannon Beach has endeavored to learn from these and other examples to fashion an approach that addresses the long-term goals for the Reserve, and that is appropriately scaled and fine-tuned for the local forest conditions and community expectations.



Restoration thinning is primarily undertaken to diversify young even-aged stands and enhance diameter growth; a secondary benefit is the creation of new dead wood both in the form of snags and down logs. The USDA Forest Service Pacific Northwest Research Station has developed a tool call the Decayed Wood Advisor (DecAID) to assist forest managers in developing and attaining dead wood goals for their forests (Mellen-McLean et al. 2012).

Generally speaking, the larger the tree, the more valuable it can be as a snag or down log, because larger dead wood provides potential habitat to more species, and it will persist for much longer. This suggests that, in a forest with relatively young (< 60 years) trees and little dead wood, a long-term approach should be taken to increase the dead wood component over time. For example, a 50 year old stand with 300 trees per acre

with an average diameter of 15 inches could be thinned several times, with each thinning providing successively larger diameter wood for snag and down wood enhancement. Periodic thinning with associated snag and down wood creation creates a more diverse dead wood pool since all wood will not be in the same decay class. Early thinnings may support the removal of some small diameter wood, since these smaller pieces have less ecological value. Forest managers must weigh the operational and ecological considerations. Removing some wood during restoration thinning can generate revenues that can be re-invested in forest stewardship work.

Restoration thinning projects in our region typically involve the removal of 20 to 50% of the standing timber volume, depending on stand age, stocking levels, and landowner objectives. (Apostol and Sinclair, 2006; Kohm and Franklin, 1997). Generally, the higher the removal rate, the greater the diameter growth in the residual trees. In coastal areas with high winds, a more conservative approach is probably warranted. However, operational costs can exceed revenue from log sales as the volume removal drops much below 20% for most young stands. On balance, a target harvest rate of 20-30% is probably appropriate for thinning in the Reserve.

Policy implications of thinning

Implementing a thinning program within a restoration and conservation framework calls for clear policies on removal rates, specification of circumstances where log removal can occur, and how to ensure that any income from log removals is redirected to other stewardship activities in the reserve.

An important component in understanding log removal potential is to have quantitative information about current timber volumes and growth rates. Based on various timber inventories that have been conducted on the parcels that now comprise the Reserve, we estimate the total standing timber volume to be 33.5 million board feet. Given the age of the stands and comparison with existing growth models and empirical yield tables (Arney et al 2008), an annual growth rate of approximately 3% is likely. This means that the forest is adding approximately 1 million board feet in net growth (new growth minus losses to mortality and rot) each year.

Restoration thinning projects can be designed to create bigger trees, more structural diversity, and more dead wood while allowing for some proportion of the trees cut to be removed to help cover thinning costs and contribute to other stewardship work on the reserve.

It is critically important to clearly define areas where log removal would be acceptable, and areas where log removal may pose certain risks that make it incompatible with given overall water protection objectives for the reserve. This primarily has to do with the location of the drinking water source areas and floodplain and riparian zones, since soil disturbance in these areas could jeopardize water quality.

A review of Oregon Department of Environmental Quality (DEQ) drinking source protection maps (Oregon Drinking Water Protection Program, 2012) for the City of Cannon Beach's municipal water system informed the development of a water catchment area map for the City (Figure 6). This, in turn, formed the basis for a map defining management zones (Figure 7). The goal in defining management zones is to establish broad parameters for allowable management activities, based on location within the Reserve. Areas within the water catchment zone, as well as riparian and floodplain zones, are designated as off-limits to most ground-disturbing activities due to their sensitivity. Soil disturbance in these areas could directly affect water quality and fish habitat. Upland areas that are outside of the drinking water catchment and riparian zones are less sensitive and would allow for forest restoration work that involves heavy equipment, provided other standards and controls are in place.

Finally, generating income from log sales can be beneficial if it is handled properly, but examples abound of communities that have come to see their forests primarily as a source of revenue. This is hardly likely in the case of the City of Cannon Beach; nevertheless, one obvious protective measure that could allay such concerns would be to restrict use of any funds generated from restoration thinning to other restoration and stewardship projects on the reserve, such as fish habitat enhancement projects, invasive species control, and the like.

Figure 6. DEQ-defined drinking water protection area

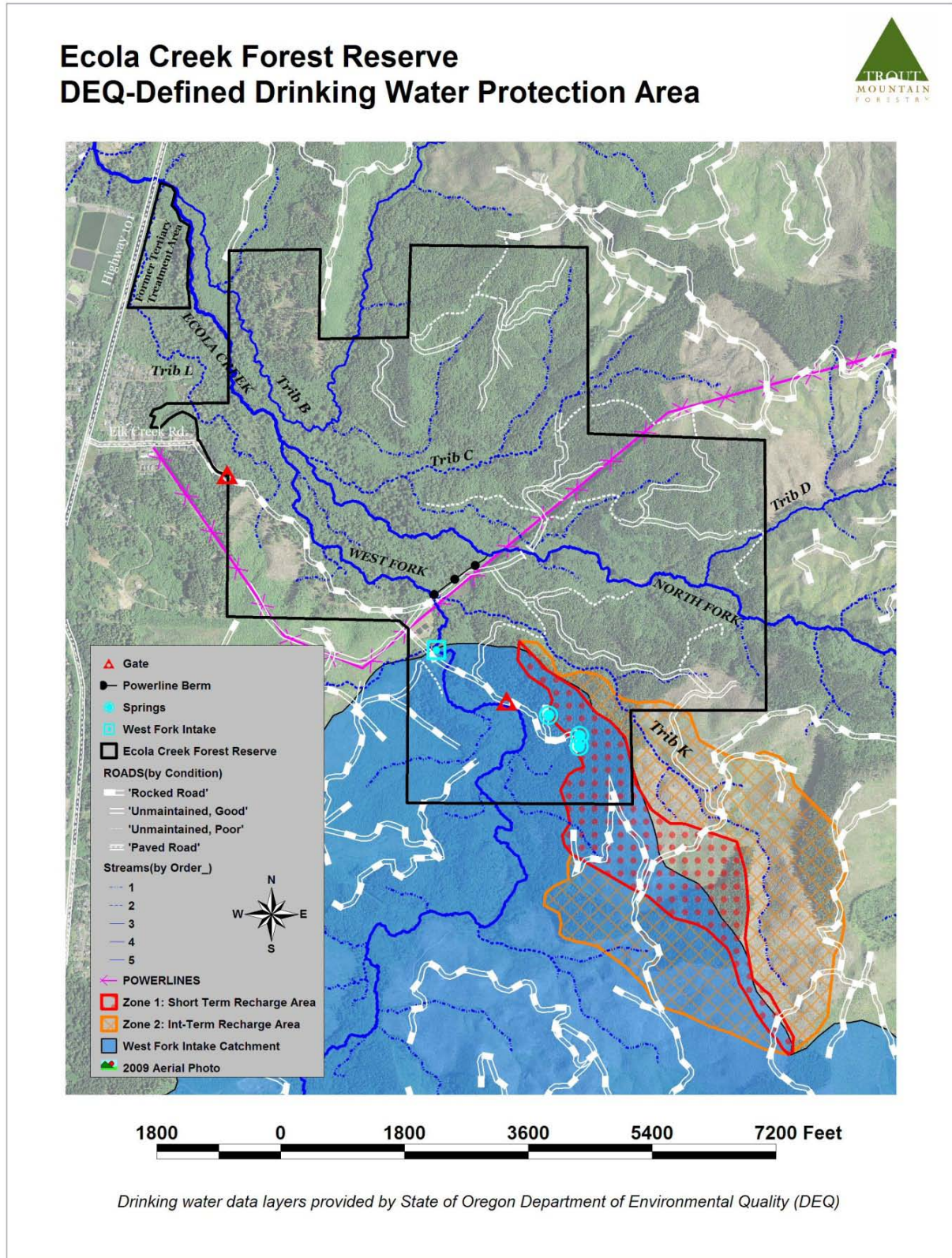
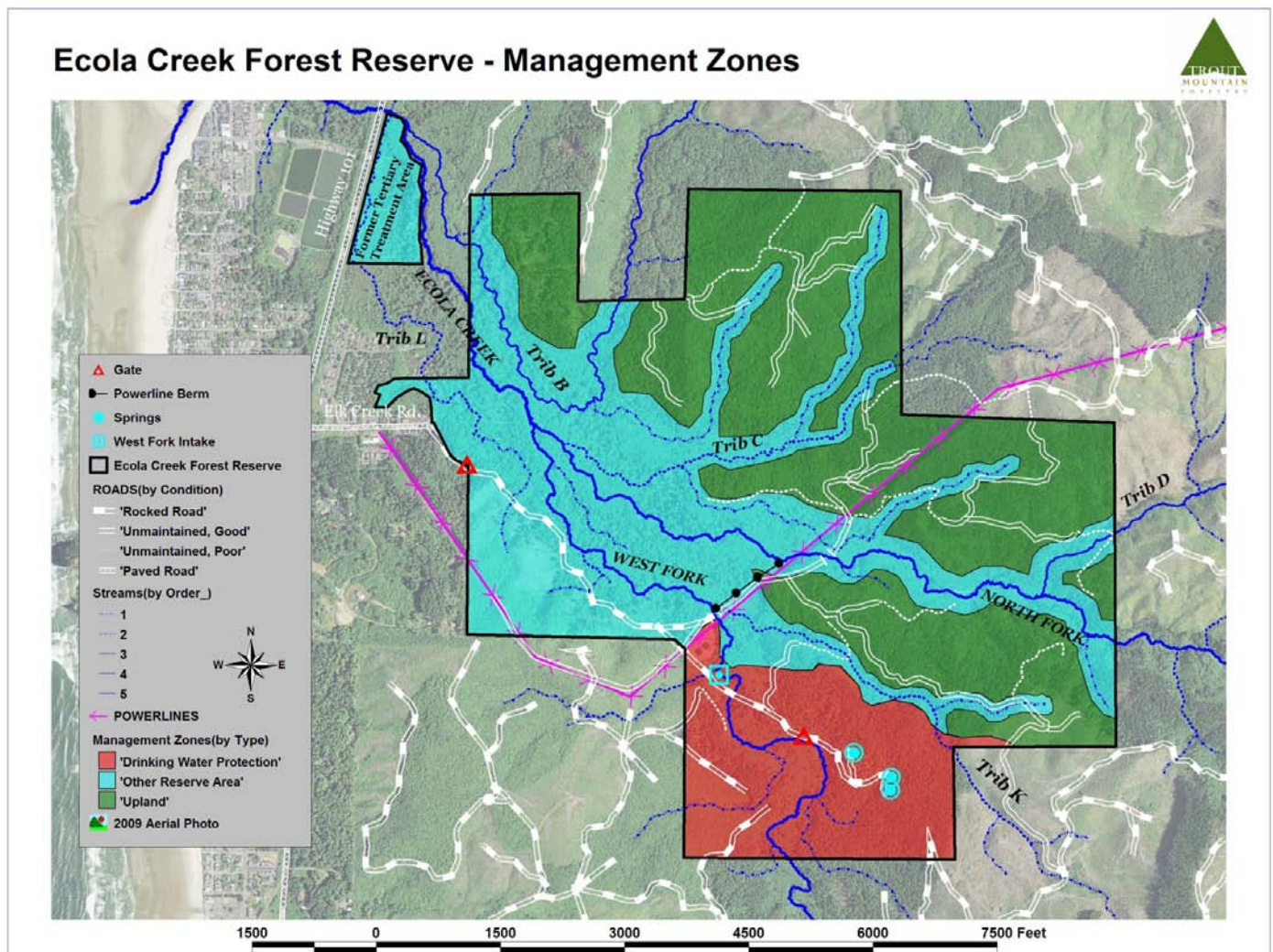


Figure 7. Management zones



Regeneration

Although the forest is primarily composed of even-age stands that originated after clearcut logging, there are indications in the understory vegetation of likely successional pathways for natural forest development. Forest development in coastal spruce/hemlock stands is characterized by wind driven disturbance and gap regeneration. This means that periodic wind events tend to blow down individuals or groups of trees. This provides additional snags and down wood, but also increased light to the forest floor, which stimulates the growth of new tree seedlings. Smaller openings

and thinnings will favor shade tolerant species, such as spruce and hemlock, while larger openings will allow species that require more sunlight, such as alder or Douglas-fir, to become established.

In 2006, a survey of tree regeneration in the understory of the southern 220 acre portion of the reserve found a general absence of cedar regeneration. Based on extensive field reconnaissance the general trends found on the 220 acre portion appear to hold true on the remainder of the property.

Table 3. Regeneration Density and Species Composition

| Regeneration per acre | | | |
|-----------------------|--------|---------|-------|
| Alder | Spruce | Hemlock | Cedar |
| 4.5 | 6.6 | 22.4 | 0 |
| 13.4% | 19.7% | 66.9% | 0.0% |

Note: Data based on surveys of a sub-sample of the Reserve

Table 3 summarizes the regeneration data. Most striking is the absence of cedar regeneration. Because the old growth cedar is one of the most distinctive features of the reserve, the failure of this species to successfully regenerate is a concern. The mature cedar trees are all in various stages of senescence, and as these trees decline in vigor, their ability to produce robust cone crops will be increasingly limited. This suggests that if cedar is to remain a vital component of the reserve over the long-term, artificial regeneration (planting) may be necessary. Again, while these data are from the City's 2006 Stewardship Plan and therefore are based on surveys of the 220 acre ownership at that time, subsequent informal surveying of the Ecola Tract acquisition confirms that cedar regeneration is extremely rare throughout the entire Reserve.

Although we do not have any concrete data on pre-settlement frequency of cedar, the presence on nearby industrial forestland of significant numbers of residual old-growth cedar stumps, which are very long lasting and easily identified in recent clearcuts, suggests that the lower Ecola watershed area may have been covered by as much as 20% cedar.

In the past five years, the City has conducted several tree planting efforts focused on establishing viable cedar trees both in upland hemlock and riparian alder stands. The City has utilized a variety of approaches. In larger areas of blowdown, 200 or more trees have been planted per acre, with no protective tubes or fencing. The City has planted approximately 2500 cedar seedlings and 200 Sitka spruce seedlings using this approach, in both



An old-growth cedar stump still visible in a 40-60 year old hemlock/spruce stand in the ECFR.

upland and riparian habitats. In riparian habitats, the City has also planted cedar seedlings and saplings and installed protective fencing around each individual tree to prevent animal damage. Both approaches appear to have been successful to some degree, although animal browsing has occurred on unprotected seedlings, while the majority of the protected trees have survived and thrived. Hence the proposed tree planting projects in this plan are designed to add relatively small numbers of trees, but to adequately protect them to ensure survival.

In the next planning period, the City will consider conducting a regeneration survey to assess property-wide regeneration patterns and the effects of restoration thinnings and plantings on overall regeneration.

Non-native plant species

Although not specifically surveyed for, numerous non-native plant species do occur in the Reserve and have been identified throughout the forest inventory process. The threat posed by these invasive species to native biodiversity is generally low at this point. Infestations are limited mainly to areas along roads. Forest interior areas show only limited sign of changes in native species composition due to spread of non-native species.

However, due to the aggressive nature and potential risk for increased occurrence of invasive plants, some limited control measures are recommended. Experience of land managers attempting to address threats posed by invasive species indicate that the best time to control is before the species has become ubiquitous in the forest.

Key species identified include:

Armenian blackberry (*Rubus armeniacus (discolor)*)
Scotch broom (*Cytisus scoparius*)
English ivy (*Hedera helix*)
English holly (*Ilex aquifolium*)
Tansy ragwort (*Senecio jacobaea*)
Japanese knotweed (*Fallopia japonica*)

In addition, herbaceous invasives present mainly in riparian areas have been documented. These include:

Japanese knotweed (*Fallopia japonica*)
Creeping buttercup (*Ranunculus repens*)
Self-heal (*Prunella vulgaris*)
Curly dock (*Rumex crispus*)
Velvetgrass (*Holcus spp.*)
Bluegrasses (*Poa spp.*)
Creeping clover (*Trifolium repens*)
Thistle (*Cirsium spp.*)

Of these species, the ones that pose the largest potential long-term threat are: English ivy and English holly, because they are tolerant of shady conditions and can spread through undisturbed forests and eventually displace native species; and Japanese knotweed, because it spreads along riparian habitats. While the City's policy has been to not allow herbicide application in the Reserve, exceptions have been made for these species due to the high threat to native biodiversity they pose, and the availability of low risk, targeted application techniques.

Fish and streams

While the loss of estuarine side channel and wetland habitats due to the urbanization of the City of Cannon Beach has eliminated some important habitat for salmonids, the overall system remains an outstanding example of low elevation coastal salmon habitat.

A summary of habitat and snorkel inventories conducted in the Ecola basin between 2005 and 2009 indicate the presence of approximately 46,731 m² of pool surface area for salmonid production in the combined North Fork and West Fork of Ecola Creek (Trask 2009). The highest production year for coho in that range of years (2005 – 2009) exhibited approximately 26,000 coho parr (summer, 2009). This is the “current condition” assessment of abundance. Comparing existing condition to potential, the Ecola basin is currently only producing coho parr at about 31% of its habitat capacity. Utilizing 1.8 coho/m² of pool habitat to represent a conservative (i.e., low) seeded to capacity target, we can extrapolate an overall target of approximately 84,000 summer coho parr as a measure of minimum capacity. This number also does not include the substantial additional capacity existing in high quality side channel habitats or tributaries of the North Fork or West Fork. In addition, it only reflects an estimate of summer parr. Smolt production (current and potential) would be much lower with modeling metrics suggesting current smolt production ~ 7,280 and potential smolt production ~ 23,520.

The primary issues are:

- Lack of returning adult salmon
- Lack of large conifer wood in the streams
- Decline of beaver populations
- Roads and culverts

Limiting factors analysis

Aquatic inventories conducted by Bio-Surveys between 2005 and 2009 suggest that the abundance of gravel (although not quantified) is not a seasonal habitat deficiency for coho, steelhead, chum or cutthroat trout; nor is it close to being so. Currently gravel resources are abundant and well supported by buried legacy conifer in the stream bed. In addition, floodplain connectivity during low winter flow profiles exhibits such a high level of function that the site qualifies as a coastal reference location. The abundance of

summer habitat is likely to be the primary seasonal habitat limitation if a formal analysis of limiting seasonal habitats were to be conducted and the basin was fully seeded.

If adult escapement were to recover to the level where fully seeded densities of juvenile salmonids were observed in early summer, then the abundance and quality of summer rearing habitat would become the primary limitation to production (this is currently not the case). A determination of a summer habitat limitation would invoke a critical review of three significant issues that would require consideration: 1) pinch period summer temperature profiles, 2) municipal water withdrawals that might impact water temperature and macro invertebrate production, and 3) the abundance of rearing surface area.

Summer temperatures

Because Ecola Creek currently maintains deep accumulations of porous mobile gravels, a significant, although unquantified, percentage of low summer stream flows are retained and migrate subsurface in the hyporheic zone. This underground stream mitigates for elevated surface temperatures and provides sporadic cold water refugia in the form of side channels and backwater habitats not influenced by surface flows.

High resolution continuous temperature monitoring has not been conducted in the Ecola Creek basin but multiple years of standardized point data has been collected by the Ecola Creek Watershed Council at four different locations. Their data from 2009 and 2010 reveals that summer temperatures in all sample locations never exceeded a peak temperature of 17.8° C. Most of this data was collected prior to midday and it is likely that continuous monitoring would observe a diurnal fluctuation that encompasses higher peak temperatures. It is also likely that because temperatures didn't exceed 15.5° C above the Highway 101 bridge during these years that minor upstream juvenile movements (common in salmonid life histories) would reward migrants with adequate temperature refuge in upstream reaches. Based on the brief interval that temperatures above 15° C were observed at any point in the Ecola Creek basin, it is unlikely that the peak average of 7 day maximum temperatures would be currently high enough or durable enough to create a temperature limitation for salmonids.

Municipal water withdrawals

During 2009 where overlapping data are available (fish abundance, temperature and water usage), the City of Cannon Beach was withdrawing an average of 0.82 cubic feet per second (cfs) in July and 0.92 cfs in August. These peak period rates of withdrawal utilized only 32% and 36% of their state Water Resources Department (WRD) registered water right of 2.6 cfs to supply and store municipal demand. All of the withdrawals came from an upslope spring capture system in the headwaters of the West Fork of Ecola Creek. Except for a two week period in 2010, all municipal withdrawals for the last 8 years have come from the spring source. In 2010 the spring resources were supplemented by a direct surface water withdrawal from the West Fork intake facility to meet peak demand. The City of Cannon beach also has a 1.5 cfs "conditional use" permit registered with WRD for use only when the spring sources are incapable of meeting demand.

In 2009, the average stream flow for the period July 7 – August 5 in the North Fork Ecola Creek was 3.92 cfs. The average flow for the West Fork Ecola Creek during the same period was 4.84 cfs (after withdrawal). The average flows during the next sample period (August 6 – September 9) did not decline at similar rates. The North Fork monthly average was 3.79 cfs and the West Fork was also 3.79 cfs. The North Fork declined 3.3% and the West Fork declined 21.7%. This metric provides some sense of scale associated with the headwater spring withdrawal for that period (0.93 cfs).

The summer municipal consumption of these headwater flows was considered as a possible source of negative impact to salmonid production. By conducting a paired analysis of juvenile salmonid abundance in the North Fork and West Fork Ecola Creek for the 4 years of juvenile salmonid data available, 2005 – 06 – 08 – 09 (Trask 2009), we were able to compare the average pool rearing densities for all salmonid species between the North Fork (no withdrawal) and West Fork (Municipal withdrawal). Table 4 reviews the results of this comparison. Because steelhead and coho are anadromous and adult escapement has remained well below the levels required to fully seed the existing habitat, the inter sub basin comparisons for these species are inherently weak and subject to large swings in abundance associated with the ability of an adult to choose either fork for spawning. It is more likely that a response to any potential impact to production potential associated with water withdrawal would be observed in the difference in the rearing densities of resident cutthroat between subbasins.

Table 4 indicates that in 2 of the 4 years inventoried, the West Fork Ecola actually had higher average pool rearing densities for cutthroat than the control (North Fork Ecola). The West Fork Ecola also exhibited the highest average pool rearing density of all 4 inventoried years in 2009. The West Fork Ecola only had higher average rearing densities of coho and steelhead in 1 of 4 sampled years (2008). Again, until average summer pool densities increase to seeded levels in the 1.8 fish / sqm range for coho and .75 fish / m² range for steelhead and Cutthroat combined, the hypothesis of a potential impact from water withdrawal should not be tested utilizing these species.

Table 4. Comparison of Pool Rearing Densities in paired sub-basins of Ecola Creek

| Year | Stream | # Coho | Avg Pool Density | # Steelhead | Avg Pool Density | # Cutthroat | Avg Pool Density |
|------|----------|--------|------------------|-------------|------------------|-------------|------------------|
| 2005 | NF Ecola | 4,220 | 0.4 | 225 | 0.04 | 320 | 0.05 |
| | WF Ecola | 5,770 | 0.32 | 65 | 0.01 | 385 | 0.03 |
| 2006 | NF Ecola | 2,360 | 0.14 | 400 | 0.06 | 255 | 0.05 |
| | WF Ecola | 2,425 | 0.09 | 260 | 0.03 | 470 | 0.03 |
| 2008 | NF Ecola | 915 | 0.09 | 5 | 0.003 | 60 | 0.006 |
| | WF Ecola | 3,970 | 0.25 | 40 | 0.01 | 345 | 0.03 |
| 2009 | NF Ecola | 8,995 | 0.7 | 610 | 0.09 | 340 | 0.04 |
| | WF Ecola | 10,835 | 0.52 | 570 | 0.04 | 830 | 0.06 |

* Bold numerical values indicate the higher rearing density for each year and each species when comparing between the North Fork and West Fork Ecola Creek.

Abundance of rearing surface area

The abundance of pool and riffle surface areas can become a habitat limitation especially in small systems with barriers that limit distribution (Ecola Creek). Research conducted by Nickelson et al (1992) suggests that survival becomes highly density-dependent beyond 1.8 fish / m² of pool rearing surface area for coho salmon. High fish densities create competition for food, creates stress associated with defending territories, attracts predation and in general the fish exhibit a decline in condition and fitness. Therefore, when spawning gravels and complex off channel winter habitat is abundant as observed in Ecola Creek, it is likely that the abundance of pool rearing surface area during low summer flow regimes is the morphological limitation for at least coho and cutthroat production.

This scenario assumes that there are enough adults returning to the basin to seed the gravels available for incubation. The summer habitats available in Ecola Creek throughout the distribution of anadromous salmonids were consistently under-seeded during all of the 4 inventoried years reviewed in Table 4. This suggests that coho and steelhead production in the system is currently limited by inadequate adult escapement to seed the available spawning and rearing habitat and not the potential morphological limitation of summer habitat. (Escapement is defined as adult fish that “escape” ocean fisheries and return to spawn). Low spawner abundance is the current bottleneck for production.

Addressing low adult escapement is problematic because there are many potential causes. Coho from small dependent populations such as Ecola Creek are harvested at similar rates in mixed stock ocean fisheries as the much more abundant independent populations like the Nehalem. In years of high ocean abundance with more liberal ocean fisheries (higher harvest rates), the impacts to small coastal streams can be significant. When adult returns are low in fresh water, predation can also magnify the impacts on adult survival (otters, bears). In addition, a fresh water fishery in a small stream like Ecola Creek can be very effective at targeting and removing adult spawners. Consistently low adult escapement may even indicate a problem with illegal harvest. Most of these issues are beyond the control of property managers.

If escapement improves then summer habitat may become a limitation to salmonid production in the Ecola Creek system. Two factors play a large role in the development of additional summer rearing surface area once fry are available to seed these additional habitats: the abundance of large wood in the active channel and the abundance of beaver dams in associated side channels and tributaries on the Ecola Creek floodplain.

Woody debris in streams

Wood densities are high in Ecola Creek after the wind driven recruitment event of 2007. The majority of the new wood is alder. There is a general lack of downed conifer in the aquatic corridor for providing the long term support required to maintain the

complexity needed for high quality fish habitat. Without a foundation of large conifer in the streams to anchor this recently recruited alder, this rich wood resource will be swiftly leaving the stream as it breaks down in the stream channel (6 - 8 year window, with losses of stored wood and bedload beginning to accelerate by winter 2013). Bedload refers to the aggregate of silt, sand, gravel, cobble and boulders that make up the mobile components of a stream bottom.

Many Oregon Coast streams can be seen as simplified corridors exhibiting only remnant historical function. The process of simplification began 150 years ago with settlement and the riparian harvest of old timber classes that began soon after because streams



A debris jam in the ECFR creating channel complexity and increasing habitat diversity.

were flat and easily accessible. There has been no turning back and the extraction of resources has only accelerated. There has been a biological cost to stream networks from the loss of both hillslope and riparian wood resources. That large wood that used to end up in the stream channel from slope failures, blow down and fire toppled snags is no longer available from any source. As existing legacy wood decays and breaks down, there will be nothing left to replace it. When there is no wood complexity in the stream channel, the migratory bedload is not retained, it is

instead transported out of the system never to be recovered. Following the loss of bedload, entrenchment begins that isolates the channel from its floodplain.

This scenario has not occurred yet in Ecola Creek but it is underway. It's important to maintain instream wood complexity until the riparian corridor can heal long enough to contribute large woody debris (LWD) on its own.

The general lack of downed conifer in the Ecola Creek watershed is mirrored in the Reserve as well (Trout Unlimited, 2012). This shortage of large wood can be observed both in the active channel and within the riparian corridor (potential future recruits). Large woody debris in streams plays an important role in creating pools for fish habitat, trapping spawning gravels and nutrient rich bedload and providing the hydraulic control that initiates channel complexity leading to an interactive floodplain. Maintaining high wood densities in the active channel supports natural channel functions that result in the provision of important off-channel fish habitat.

Inventories conducted within the range of anadromy in Ecola Creek suggest that the existing conifer observed still functioning in the aquatic corridor is the legacy of an old growth spruce canopy toppled and buried on a uniform very low elevation deposition plain. Evidence suggests that a large volume of old forest was recruited to the forest floor episodically that is constantly being revealed within the meander belt of the active channel by horizontal erosion. Because of the exceptional current function that has

persisted, the stream continues to attempt to recruit fresh wood from the riparian area but the riparian area no longer is capable of delivering large conifers.

To address the observed short term deficiency of LWD, the Plan proposes to implement a large wood placement project to maintain the current level of high function. The concept is that the judicious placement of full spanning structures throughout the extent of potential floodplain interaction will guarantee continued high function for another 3 – 5 decades. This is an interim restoration strategy designed to maintain the status quo until conifers in the riparian corridor are old enough and large enough to maintain a full spanning position in the stream upon their recruitment (i.e., falling into the stream).

Utilizing the tools provided by the Trout Unlimited LiDAR based assessment and a ground truthing inventory conducted by Bio-Surveys, preliminary placement locations have been identified (see recommendations).

The final located sites included the following attributes:

- Exhibited the potential for maintaining or enhancing an interactive floodplain
- Displayed a current lack of wood complexity
- Would not interfere or compromise current zones of exceptional function
- Exhibited an extended time period before natural recruitment could occur
- Fit within the natural pool / riffle frequency pattern

Wood placements that span the full stream width will utilize conifer blow down in the 24 – 48 inch dbh size class from elsewhere on the reserve. These trees will be bucked from their upturned stumps and lifted tree length by helicopter for strategic placement. A minimum of 5 trees will be utilized in each full spanning log complex for building structure stability. Stability is a concern because of the risk of downstream impacts to infrastructure if a site fails during a winter flood event.

Beaver

Historically beaver were an abundant natural resource in Oregon's Coast Range watersheds. Beaver and salmon have coevolved and supported each other's existence. Salmon brought large quantities of ocean nutrients back to sterile fresh water habitats in the form of carcasses that ended up settling out in the slow deep water of beaver ponds. The nutrients fed the beaver's stream adjacent patches of willow and the beaver provided salmon with the highest quality winter and summer rearing habitat in the form of ponds that created a low velocity survival niche



Beaver dam on Tributary C of the North Fork of Ecola Creek.

in a steep mountainous coast range. Today remnant colonies exist within the Ecola Creek basin but their utilization of available habitats is very low. Even in the locations that exhibit a recent legacy of use, the evidence of recent dam building is low. The loss of early seral food sources, which are no longer generally available on the industrial forest landscape, and the competition from elk for the remaining early seral vegetation combine to limit the available food supply for beaver. Beaver attempting to make a living in one of these historic sites that offers the proper channel morphology for dam construction have to forage far from the water's edge for food and building materials and they are quickly preyed upon. Dam building in headwater stream reaches in a modern altered landscape has become unsuccessful through the filter of natural selection.

The historic contribution of beaver to the processes that used to support a vibrant salmonid population in Ecola Creek has been diminished. The storage of winter runoff, of nutrient rich sediments that supported a complex food web, of migratory spawning gravels has all been dramatically reduced from historic levels by the decline in beaver dam abundance. The vast impounded surface areas that provided the highest quality summer and winter salmonid rearing habitat have been reduced. The mitigation of elevated summer stream temperatures provided by beaver dams that stored winter flows as ground water across a saturated floodplain and delivered stratified cold water through their porous dams well into the summer months are functions that have all been altered. This factor coupled with the loss of headwater forests that also stored winter rains and delivered them as ground water to adjacent streams has created a critical condition for salmonid juveniles during mid-summer when air temperatures and direct solar impacts on exposed stream surfaces exacerbate temperature issues.

Informal surveys have found considerable evidence of recent beaver activity along tributaries of the North Fork Ecola Creek within the Reserve. Beaver populations can enhance fish habitat by creating additional pools and off-channel habitats, as well as by trapping and holding nutrients in the stream system. Further discussion of the potential benefits of beaver and strategies for enhancing beaver habitat are contained in the Wildlife section of the plan.

Roads and culverts

The existing unmaintained old logging roads pose a risk for accelerating slope failure rates. Background sediment levels appear to currently be low within the Ecola Creek basin with functional spawning gravels observed even to the head of tide. Gravels appear well aerated, not embedded, and are abundant. There is a great incentive to be proactive in protecting the current water quality observed by addressing legacy road issues. The primary concerns are failed cross culverts that result in super saturating the road prism causing slope failure and accelerated sediment delivery to the stream network from poorly cross-drained road beds.

The current road system includes about 3 miles of rocked roads that provide general all-weather access (Fig. 8). This includes the road that provides access to the City's water

system improvements, as well as roads that provide access to the Pacific Power power lines that serve Cannon Beach. The Reserve also contains several miles of unmaintained, mainly unsurfaced historic logging roads and trails.

Roads threaten ecosystem values mainly by delivering sediment to streams either through chronic erosion or episodic deposits through road failure/landslides.

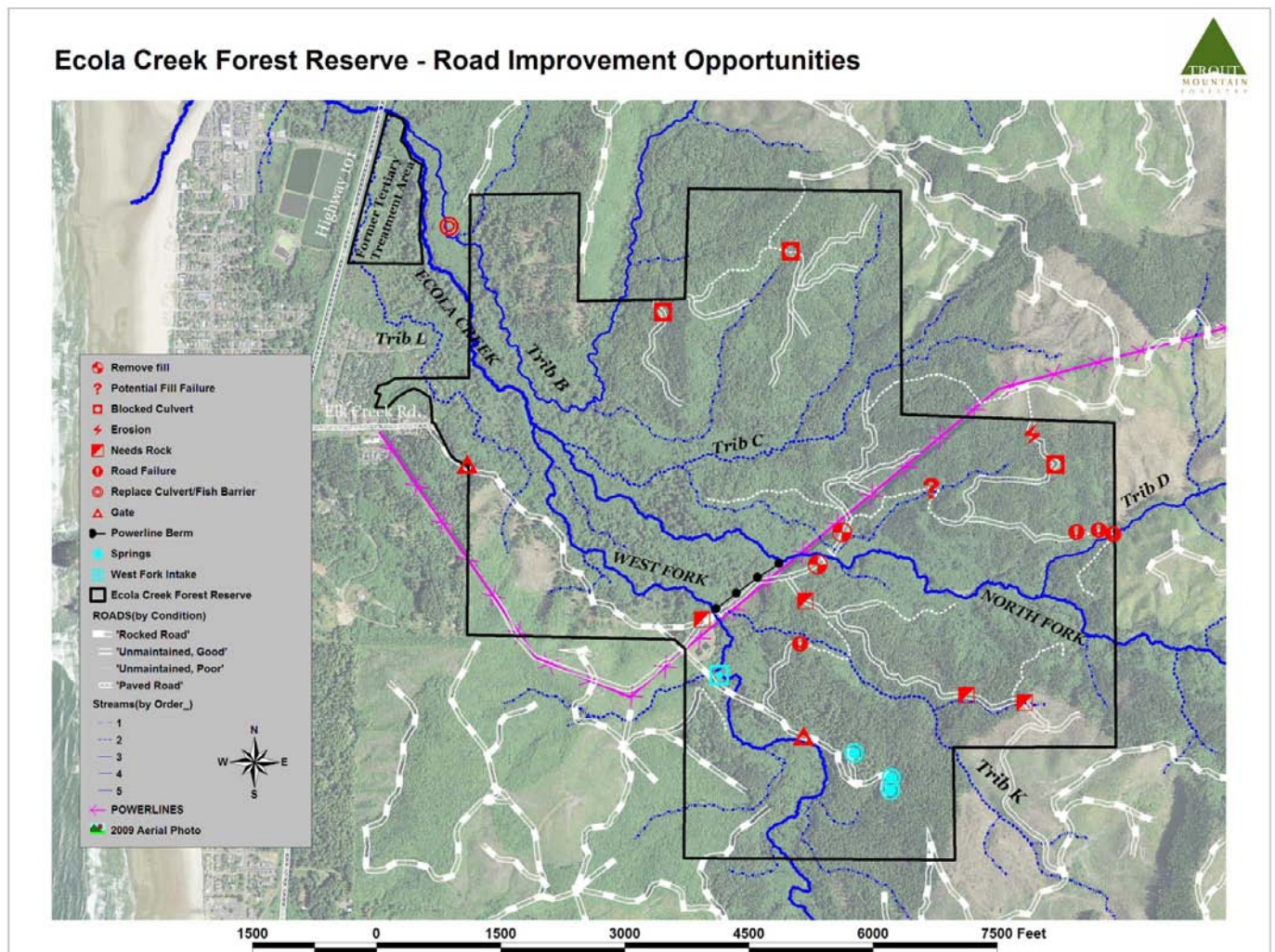
Common causes include

- Lack of rocked surface and ditches
- Damaged or plugged cross-road culverts
- Mid-slope or lower slope roads vs. ridgetops

At this point, known road issues include the following:

Possible fill failure: There is a section of road that crosses a tributary of the North Fork that includes fill across the draw where the fill could collapse over time, sending sediment into the stream. This area should be inspected to determine if the culvert is sized properly and is in good working condition; if not, it should be replaced (Fig. 8).

Figure 8. Road improvement opportunities



Blocked culverts and erosion: There are a number of locations where plugged culverts are preventing water from being directed across the road bed and instead water is flowing over the road, causing erosion of the road surface (see Roads Map).

Historic modifications in the floodplain area of the Reserve have altered physical characteristics and hydrology of the streams. In some cases these structures are clearly degrading habitat for fish. In others, the impacts are neutral or even positive. These structures need to be evaluated on a case-by-case basis. Strategic removal or modification of these structures is recommended. Access to the full complement of

spawning and rearing habitat is the key for encouraging the expansion of genetic diversity by providing new life history options.

The following is a brief analysis of several such modifications. Later in the document, specific recommendations for modifying, removing, or retaining these features are provided.

Double-culvert on Waterhouse Creek

At this location, immediately west of the Reserve boundary, an old road crosses Waterhouse Creek (Fig. 8). Two steel culverts remain in the stream channel. The road is no longer in use. The culverts have been observed to create seasonal barriers to the passage of fish. The current disposition of the culverts is less problematic than observed in 2009 when a large beaver dam was built on the culverts that blocked anadromous passage at least during low and mean winter flow regimes. The culverts provide an unnatural impediment to natural channel dynamics. Because they were initially undersized for the application, they increased the winter hydraulics below the crossing which dug a deeply incised trench below the crossing. Removing these pipes would allow the stream to readjust to its natural hydraulic controls. Removing these pipes is as much about restoring proper channel function as it is about guaranteeing long-term passage for migratory salmonids.



Remnant double culvert on Waterhouse Creek, a fish-passage barrier.

Powerline Dike

At this location, a dike was constructed in a North / South orientation that completely bisected a 300 ft wide floodplain terrace. The entire floodplain historically exhibited uniform low terraces (2 ft) and a legacy of a complex channel matrix that was linked to upslope spawning gravels in Tributary K. The construction of this dike that provided a road bed for accessing the powerline, transferred the tributary flow from the North Fork to the West Fork. In addition, the fill base for the road was excavated out of the floodplain terrace on the east side of the dike (road bed) creating an artificial wetland. Because this wetland continues to receive flow from Tributary K, the wetland currently exhibits exceptional year round function for rearing juvenile salmonids. It is also possible that adult coho utilize a brief zone of spawnable gravel near the head of the wetland as it transitions from floodplain to hillslope (unverified).

The wetland is in the process of eutrophication and undergoing a transition in seral stage from a slough sedge dominated wetland to a higher / drier willow marsh. The current trajectory offers an exceptional opportunity for encouraging beaver recolonization (planting forage species) that will result in building a stable community that can serve as a source for repopulating the watershed.



Diked wetland near powerline corridor.

Consideration was given to the loss of historical floodplain function that occurred as a result of this road bed construction. Even though the dike has diverted tributary flow, the resultant impoundment continues to be linked through ground water flow to its historical channel matrix on the west side of the dike. In addition, the extensive representation of an open canopied wetland brings dynamic diversity to the Reserve for many other species of wildlife. The current condition provides a much greater potential for salmonid production than the historical condition because of the large volume of off channel rearing surface area and the massive food potential that exists here from macroinvertebrate production. Restoring natural function with the removal of the dike could actually never be achieved because the open water wetland would also have to be filled. Fill material could not be replaced in the excavation in any fashion that would ever begin to resemble the historic channel matrix. This effort would expend large sums of money at great cost to aquatic processes.

Tertiary treatment ponds dikes

The benefits of increasing off channel rearing surface area for juvenile salmonids are extensive within the confines of the tertiary treatment lagoons. The current flow dynamics of the site are the fragments of a once functional intertidal wetland that was permanently altered by the construction of Highway 101 that bisected a complex matrix of channels and channel braids that drained a small subbasin SE of the current treatment plant location. Because the highway construction altered the site and changed its historical function, there is no feasible solution for restoring that function.

In later years, a tertiary treatment lagoon was constructed east of Highway 101 and adjacent to the mainstem of Ecola Creek near the head of tide. The remnant flow that emanates from this highly fractured subbasin currently maintains an off channel linkage to a large quantity of rearing surface area. Because the tributary flow here is minimal, a concentrated flow pattern is desirable for attracting juvenile salmonids during both summer and winter migrations out of the

mainstem of Ecola Creek. Unconsolidated flow (sheet flow), though beneficial for delivering sub yearling salmonids to this off channel habitat during high winter flow regimes, does not provide attraction or access for summer (juvenile salmonids need the safety and olfactory signal of consolidated flows for upstream migration).

It is unlikely that the abundance of winter habitat is a seasonal habitat limitation for salmonids in Ecola Creek and therefore removing the dike provides more of what is not needed and eliminates the utility of the existing habitat during summer (probable habitat limitation). In addition, dike removal does not achieve the recovery of natural function because of the restriction presented by Highway 101. In short, dike breaching to achieve additional rearing function is not necessary and may not be effective in achieving the desired outcome.

Wildlife habitat

With a reserve size of just over 1,000 acres, it is important to recognize that the ECFR alone is not large enough to provide habitat for all of the species native to the area. It is clear that an important goal of management is to ensure that the Reserve contributes to conservation of regional biodiversity. Given that as a goal, a commonly used approach to minimize the risk of loss of species from a management area is the use of a combination of coarse-, medium- and fine-filter management strategies. The filters are analogous to providing the conditions over a landscape that ‘catch’ species by providing the food, cover, and space needed for each species that could occur there. Habitat can be provided for many species by simply ensuring that there is a diversity of naturally occurring plant communities and successional stages in the management area. This approach is the coarse filter and it is applied to the landscape by describing the distribution of biophysical classes (e.g., vegetation classes, slope classes, stream classes, etc.) that occur in each forest, and documenting the arrangement and connectivity of these patch types. These current conditions are often compared with reference conditions to understand how either active management or natural disturbances and system recovery may move the system toward or away from a desired future condition.

In the Reserve, mid-successional hemlock, Sitka spruce and red alder stands dominate with small patches of diverse early successional conditions and patches of older Sitka spruce and western redcedar. Shrubby and herbaceous wetlands are also represented in the Reserve. Outside of the Reserve, simplified early successional and mid-successional conifer stands dominate. Hence in order to complement the surrounding landscape and provide patch types uncommon nearby, the objective is to ensure that the Reserve would likely recruit the following conditions into the future:

- Diverse early successional conditions following windthrow
- Old-growth Sitka spruce and western hemlock stands
- Western redcedar stands of various ages
- Early and late successional red alder stands
- Shrubby wetlands

Not all species will be ‘caught’ in the coarse filter that provides a diversity of patch types which are under-represented in the surrounding landscape. Some species require certain structural elements that must be present in plant communities and successional stages to ensure that they will likely persist in the management area. This would indicate using a medium-filter approach that considers the sizes, distribution, and abundance of structural elements such as snags, logs, hollow trees, and other within-stand structural elements distributed across each forest.

The DecAID model (Mellen-McLean et al. 2012) can be used to develop targets for snag and down wood that accommodate the full range of native species that rely on these elements for some portion of their life cycle. As an example, for Oregon’s north coast region, the model suggests that to maximize conditions under which species of log users such as western red-backed and pacific giant salamanders could occur in forests such as Ecola Creek, that 20% of the ground surface area be covered by dead wood. Similarly, 10-14 snags per acre > 20 inches dbh would represent optimal conditions for cavity nesting birds. Although this level of logs and snags is not needed on every acre, patches distributed throughout the Reserve should represent these conditions to provide the most potential for wildlife.

Even the medium-filter approach may not meet the needs for all species. Some species requiring special attention may have low reproductive rates, large territories, or have been adversely affected by habitat loss (or other factors) such that their populations are low enough that they are considered extremely rare. Consequently, a “fine filter” is constructed that maintains the coarse-filter structure and the medium-filter elements but takes special management actions to conserve the set of species identified for fine-filter consideration. It is this level of analysis that would typically be used for species of concern such as those identified in the Oregon Conservation Strategy and which occur in Reserve which should be the focus of a fine filter management approach. Species that MAY occur on the Reserve as listed in the Oregon Conservation Strategy (ODFW 2006):

- American marten (unlikely)
- California Myotis
- Fringed Myotis
- Long-legged Myotis
- Hoary bat
- Silver-haired bat
- Townsend’s big-eared bat
- Red Tree Vole
- Band-tailed pigeon
- Marbled murrelet (possible future recolonization)
- Northern spotted owl (possible, but barred owls are more likely)
- Olive-sided flycatcher
- Northwestern pond turtle (unlikely)
- Cope’s giant salamander (unlikely)
- Clouded salamander

- Coastal tailed frog
- Columbia torrent salamander
- Western toad

Several of these species are on the edge of or just outside of the geographic range of the species so although it may be possible that they could occur in the Reserve, it is unlikely (e.g., northwestern pond turtle, Cope's giant salamander, American marten). Others have likely been extirpated over the past century due to changes in the surrounding landscape from timber management and development (marbled murrelet, northern spotted owl), so depending on the future of the surrounding landscape these species might possibly recolonize.

The first step to taking any management actions specifically for these species is to monitor the site to determine if they occur there now. Recommendations are presented later in this plan for monitoring efforts led largely by the community to assess presence of these and other species.

Beaver recovery

Beaver have been a keystone species in riparian systems across much of North America for thousands of years. In the Oregon Coast Range, beaver are often restricted to building dams in certain geomorphic conditions that allow the dam to persist and create a pool even under high winter flows. Many beaver dams are washed out annually and on large streams and rivers, beavers do not build dams but instead use bank dens. Restoring a viable beaver population to the Reserve is highly desirable not only due to the effect that beaver dams have on habitat for salmonids, but also as a factor in providing pool habitat for many other species of amphibians (e.g., red-legged frogs), birds (e.g., wood ducks), and mammals (e.g., otter and muskrats). Beaver need year-round water, and in stream systems they most often build dams on 2nd and 3rd order streams with wide valley floors and gentle stream gradients. Cottonwood and willow are highly desirable food species, but they also eat herbaceous plants during the summer and the bark from vine maple, red alder, and salmonberry. In parts of western Oregon, streambanks have become dominated by invasive exotic grasses that out-compete native shrubs, and where grazing or browsing by cattle or elk occur, food availability, especially during winter may be restricted. Determining if herbivores are adversely affecting beaver food supplies would be a high priority prior to reintroduction of beaver into a system where food may be limiting.

Connectivity with larger landscape

Currently the Reserve is rather isolated by simplified young and mid-successional tree farms to the north, east, and south. As these plantations mature, connectivity will increase for many species capable of using homogenous conifer forests. For species of low mobility such as red tree voles, salamanders, and rare plants and molluscs, such connections can be essential for maintaining and recolonizing populations on the EFCR as part of a metapopulation structure.

Elk

There is anecdotal evidence to suggest that elk use of the Reserve, particularly in the floodplains, is fairly heavy. Although elk presence is desirable, elk grazing pressure can have significant impacts on other desirable elements of biodiversity. The first is that elk



Evidence of extensive elk grazing in riparian floodplain forest. Note the lack of an understory shrub community.

may be outcompeting beaver for forage, which could be limiting the beaver population. The second is that the forest restoration goal of increasing the amount of cedar on the reserve can be difficult to accomplish with heavy elk browse since elk preferentially eat cedar over most other species.

Exclosures can be constructed in riparian areas with coniferous, deciduous, and open overstories to understand the role that elk grazing is playing on establishment and growth of both trees and shrubs. An

exclosure study would create areas with high fencing that exclude elk and deer to see what grows in these areas. Growth of new vegetation in exclosures can be compared with growth in accessible areas

Monitoring

The list of species from the Oregon Conservation Strategy above for possible monitoring are not in priority order -- prioritizing what to monitor should be done collaboratively with stakeholders including citizens, ODFW, and interested organizations. Monitoring should occur both on the City property as well as in surrounding private lands if at all possible so that the contribution of the Reserve to regional biodiversity conservation can be better understood. It will be important to coordinate monitoring activities with educational opportunities, both for the community and for students in environmental programs at OSU and other universities.

Scientists/students can provide guidance to community members on methods and also maintain data, but it is the citizens doing the field work (the fun) that will engage them. Hence monitoring is separated into community-based and scientist-based categories:

Community-based surveys

Breeding and winter bird surveys can be conducted at randomly located points within each patch type using variable circular plot techniques (McComb *et al.* 2010). Using this technique a permanently marked point is visited 6 times between sunrise and 9:00 am in each patch type. All birds seen or heard are recorded and the distance from the point to the bird is estimated. From these data the density of birds by species can be estimated. Other species heard or seen walking between points can also be recorded on a separate list to develop a list of all species known to occur on the Reserve. Training in

species identification and distance estimation would be needed. Olive-sided flycatchers would be one of the fine-filter species that could be detected by this effort.

Time-constrained searches for amphibians could be conducted at randomly located plots in each habitat type. Two people spend 30 minutes searching under cover objects and through the littler layer for amphibians during the spring as temperatures warm. Cover objects must be carefully removed and replaced intact. This is a simple technique and the only training necessary is in species identification. Some amphibian species will likely be detected during fish surveys as well.

Medium to large mammal surveys could be conducted using motion sensitive cameras. Reconyx trail cameras cost approximately \$550 and can be moved to new locations regularly. One camera can record up to 40,000 images so it can be left out for over year. Citizens could move them from patch type to patch type to record occurrence of mammals along trails, streams, or other areas where animals are likely to focus their movements. It is important to note that these cameras also record human activity and have an infrared flash that records animals at night.

Scientist-based surveys

Some surveys are best conducted by consulting biologists or university or agency scientists. Marbled Murrelet surveys, for instance, require strict adherence to protocols. Similarly, searches for red tree vole nests typically follow strict protocols. Many of the bat species that are listed in the fine filter management approach are also difficult to sample. Anabat recorders can be used to detect different genera of bats, especially along streams and roads, and edges of patches, but these devices cost \$2500 and require interpretation of sonograms to identify species. Alternatively mist nets can be used to capture bats for identification, but only trained biologists should attempt to remove a bat from a mist net, and s/he should be vaccinated against the rabies virus. Hence there are several high interest species that would be desirable to monitor, but such monitoring is not practical for most community members and would be expensive for the City. Nonetheless, students from the OSU Fisheries and Wildlife Department could be employed at a relatively low cost to conduct some of these more technically challenging surveys.

See: http://www.dfw.state.or.us/conservationstrategy/docs/document_pdf/b-statewide_6.pdf for more information on monitoring.

Existing human-made features

The area contains a network of roads, water collection and conveyance structures, a water filtration plant, and a powerline. This section primarily addresses access and roads.

Access

Access to the Reserve from the west is by way of Elk Creek Road. This is the primary access to the Reserve. This road is gated at the end of Elk Creek Road, restricting public vehicular use of the Reserve. There is parking for approximately four vehicles in an informal parking area at the end of Elk Creek Road. A portion of this parking area may be located on Cannon Beach Christian Conference Center land.

All of the other points of access to the Forest Reserve require crossing private property, primarily Campbell Group timberlands. Gates are located at all the entry points onto Campbell Group property. Access to the southwestern portion of the Forest Reserve is from one of two road spurs off the Campbell Group's Warren Mainline. The distance from the gate to the Reserve is approximately one mile. There is no direct public access to the Warren Mainline. The road that connects the US Highway 101 interchange, at Tolovana Park, with the Warren Mainline is across private property. It does not appear that the public has an access right across this private property.

A spur road from Burn Road, which can be reached from the Tolovana Mainline, accesses the southeast corner of the Forest Reserve. Burn Road is accessed from the Tolovana Mainline, which has access onto U.S. Highway 101.

The northeastern portion of the Forest Reserve can be accessed from Spur 45 and several other spur roads off the Vollmer Creek Mainline. The Vollmer Creek Mainline is accessed from Old Timers Road, which has access onto U.S. Highway 101.

The northwestern portion of the Forest Reserve can be accessed from Waterhouse Road, which has access onto U.S. Highway 101.

The following describes the Campbell Group's policy with regard to public access to its forestlands public access:

In general, timberlands managed by the Campbell Group are open to the public during daylight hours for non-motorized recreational use. Prohibited activities include, but are not limited to, motor vehicle use (including ATVs and dirt bikes), blocking gates, camping, campfires, dumping, removing firewood, ferns, mosses or other forest products or items, and engaging in any illegal activities. However, The Campbell Group reserves the right to limit, restrict or prohibit access to its lands at any time, and may discontinue public access without giving advance notice. Timberlands are closed where there are active forestry or harvest operations and during periods of high fire danger, and "Area Closed" signs will be posted at road access points. During hunting season, The Campbell Group may open certain gates to hunters.

Roads

Within the Reserve there are operational gravel-surfaced roads, powerline access right of way roads, and abandoned historic logging roads. The main access road is an operational gravel road beginning in the western portion of the Reserve and leads past the water treatment facilities to the springs. Generally, this road is in good working condition and requires periodic rocking to maintain desirable surface characteristics and stability. It is approximately one mile in length.

The Pacific Power powerline that crosses the Reserve is accessed from a number of roads. East of the West Fork of Ecola Creek, a powerline access road is built on a constructed berm. This road is located within the recorded Pacific Power powerline right-of-way. There are several other roads that provide access to the powerline. These roads are generally only utilized in an emergency. The first of these roads is a spur from the Burn Road on Campbell Group property. This road permits access to powerline improvements between the West Fork and the North Fork of Ecola Creek. Two other roads provide access to the portion of the powerline located north and east of the North Fork of Ecola Creek. These roads are accessed from the Vollmer Creek Mainline on Campbell Group property. One of these service roads is located on the northwest side of the power line and one is located on the southeast side of the powerline.

Old logging roads are numerous and cover many areas of the property. Their approximate locations are recorded on the Road Network map. Presently they are used, if at all, for very limited recreational purposes only. They are unmaintained, and have some erosion issues that are discussed elsewhere in this document.



A plugged cross-drain culvert allowing water to cross a road surface in the NE part of ECFR.

Powerline

The Pacific Power service to Cannon Beach crosses the Reserve. The length of the powerline within the reserve is approximately 5,550 feet. The powerline right-of-way width is 100 feet. In the past, this fairly narrow powerline right-of-way has resulted in power service interruptions to Cannon Beach during wind storms as a result of trees falling on the line. The City and Pacific Power have a working relationship and have recently hired an arborist to identify trees outside of the right-of-way that are at high risk of interrupting power during a windstorm, and then removing those trees.

Water system improvements

Several improvements related to the City's water use are present on the Reserve. These include:

- The Sand Filtration Plant constructed in 1994
- The rip rap protecting the water intake to the Sand Filtration Plant and temperature probe
- The bridge crossing the West Fork
- The spring boxes and other features at the springs themselves

Further description of these features is contained in the Ecola Creek Watershed Assessment (Table 6.9 and Figure 6.3) (Parker *et al.* 2001).

Public opinion survey results

In October 2011, the City of Cannon Beach mailed a survey to all property owners and residents and provided the same questions in an online form. Both forms included information about the City Council's adopted goals for the forest reserve and a map of the site location.

Over the course of three weeks 474 total responses were received. Most responded to the survey on paper, with 128 taking advantage of the online form. A summary of the results is provided in the Appendix.

Generally, natural functions of the Reserve, including clean water, fish and wildlife habitat and open space preservation were deemed the most critical by respondents to the survey. Below are some key findings from the survey. These findings informed the development of policies and recommendations on a wide range of issues.

- The results of the community survey indicate that 63% of the respondents visited the Reserve at least once in the previous year; with 15% indicating they visited the Forest Reserve ten or more times a year. Cannon Beach residents were much more likely to be frequent visitors (21% vs. 9%), while respondents from other areas were much more likely to have never visited (44% vs. 26%).
- The results of the community survey indicate hiking/walking was the main activity of those using the Reserve during the past year. For those that visited the Reserve in the previous year, the following were the main activities reported: hiking/walking, 66%; hunting, 13%; nature observation/photography, 9%; biking, 5%; fishing, 3%; and equestrian 1%. Residents of Cannon Beach were more likely to engage in hiking/walking and less likely to engage in hunting as a main activity.

- In response to a question regarding “does anything keep you from using the Ecola Creek Forest Reserve more often,” most respondents indicated they were able to use the Forest Reserve as often as they desired (48%); 9% responded that the Reserve was difficult to get to or get around within; and 5% responded that the Reserve does not support activities that the respondent desired.
- Oregon Department of Fish and Wildlife regulations permit fishing subject to restrictions. Based on the results of the community survey, there is limited fishing activity.
- There are presently no restrictions on hunting in the Ecola Tract. Hunting is prohibited in the existing 220-acre Ecola Creek Forest Reserve. The no hunting provision is only posted at information kiosk. In response to a question regarding the level of hunting activity in the Forest Reserve, Herman Biederbeck, District Biologist with the Oregon Department of Fish and Wildlife stated that there were no estimates based on survey information; his sense was that the level of hunting activity was low.
- In response to the question on how valuable each of the functions of the Forest Reserve were to the respondents, the functions of clean water, wildlife habitat, open space/natural preservation, and fish habitat were rated as much more essential than recreation. Respondents ranked the following functions as essential: clean water, 83%; wildlife habitat, 64%; open space/natural preserve, 60%; fish habitat, 56%; and recreation, 29%.
- In response to the question asking the respondent to rate a variety of recreational uses as to their appropriateness for the Forest Reserve, the following activities were rated high, as follows: hiking/walking, 79%; nature observation/photography, 66%; fishing, 22%; biking, 18%; hunting, 15%; and horseback riding, 8%. Conversely, the following activities were rated as not appropriate: hunting, 48%; horseback riding, 31%; Biking, 19%, fishing, 11%; nature observation/photography, 1%; and hiking/walking, 1%.
- The survey included a question regarding a list of possible management actions in the Forest Reserve, providing the respondent a range of responses, strongly support, support, neutral, object, and strongly object. The evaluation of the results included a weighted score calculated by multiplying the number of responses in each answer choice (Strongly Support, Support, Neutral, Object and Strongly Object) by a value ranging from 2 to -2 and then adding all of these scores together for the sub-question. This score was intended to be a reference value to indicate the level of support, taking into account all response values. Natural system enhancements, such as salmon habitat improvements and improvements to the ecological functioning of the forest, rated highest overall. The only recreation action that resulted in a net positive score was the construction of walking trails. Allowing hunting was the least supported activity, but was slightly more supported if restricted to a portion of the Forest Reserve.

- The survey included a question regarding funding priorities for the implementation of the management plan. The results were tabulated in two ways, the number of #1 rankings and a weighted score that was derived by assigning a value of 7 to 1 (from #1 ranking to #7) and adding up all scores to a total weighted score. The number of #1 ranking were as follow:

| | |
|--|-----|
| Actively improving the ecological function of the forest | 128 |
| Improving salmon habitat | 106 |
| Providing walking trails | 89 |
| Improving wildlife habitat | 44 |
| Providing opportunities for hunting | 38 |
| Providing trails for bicycle use | 12 |
| Providing improvements for horse use | 2 |

The weighted scores were as follows:

| | |
|--|------|
| Improving salmon habitat | 2222 |
| Improving wildlife habitat | 2140 |
| Actively improving the ecological function of the forest | 2124 |
| Providing walking trails | 1947 |
| Providing trails for bicycle use | 1075 |
| Providing opportunities for hunting | 816 |
| Providing improvements for horse use | 736 |

Policies, objectives, and guidelines

Forest habitat

Policies

The first priority in managing the Reserve is to protect and restore the low elevation coastal temperate rainforest of Ecola Creek. Because the Reserve is in a watershed primarily consisting of industrially managed forestland, the conservation of mature stands of trees takes on special significance. Diverse early successional habitat is another type that is rare in the surrounding landscape. Structural elements in the forest that influence biodiversity, such as vertical and horizontal stand structure and snags and down wood, will be retained and enhanced.

Objectives

- Create older forest habitat and work toward connectivity with other nearby remnants of older forest.

- Ensure that cedar remains a vital component of the ecosystem.
- Control invasive, non-native plant species as much as possible.
- Create snags to enhance wildlife habitat in areas without such habitat.
- Create down wood through forest restoration projects.
- Provide additional habitat and food supplies for beaver and become a receiving location for relocated beaver if needed.
- Study the effect of elk grazing on forest vegetation.
- Conserve adjacent forest land, through acquisition or easements if necessary.
- Ensure that the risk of catastrophic wildfire remains low.
- Undertake community and scientific wildlife surveys and monitoring.

Guidelines

- Manual removal techniques will be utilized to control invasive species. Herbicides will only be used to control invasive species in circumstances where the threat to biodiversity is great and where other control techniques have proven ineffective, such as the control of knotweed.
- No chemical animal browse repellants will be used to protect planted seedlings. Instead, physical barriers such as fencing will be used.
- Utilize DecAID and other resources to develop short and long-term targets for snags and down wood.
- Logs resulting from forest thinning operations may only be removed in areas that have been designated low risk for soil disturbance and water quality impacts, and provided the targets for dead wood retention have been met. A forest zoning map has been developed that identifies these areas.
- To minimize the risk of catastrophic wildfire, some legacy dirt roads may be upgraded to ensure vehicular access for firefighting. In some instances, small sections of new road may be constructed to facilitate access and connect existing road segments. New road segments or road upgrades will be located and designed to minimize ecological impacts and to conserve the property's conservation values. To the extent practical, the City will consider their potential for use as part of a trail network.
- Log removals resulting from forest thinning operations in the Reserve shall never exceed half of estimated annual total timber volume growth for the entire Reserve in any given year.

- Any proceeds from log sales resulting from forest thinning operations shall be directed to a City account exclusively to fund restoration projects in the Reserve.
- Any possible ground disturbing activities such as those involved in stream restoration work or forest thinning shall be conducted during the dry season.
- Small-scale natural disturbances, such as blow down, that are less than 5 acres in size may be treated as a normal forest process not necessitating intervention.
- Blow down or other disturbances larger than 5 acres should be assessed on a case-by-case basis, depending on type of disturbance and location in the Reserve, for potential to increase the risk of catastrophic wildfire. The assessment will consider fuel concentrations, flammability, potential ignition sources, accessibility, and fire weather.
- During fire season, Oregon Department of Forestry (ODF) industrial fire precaution levels will be observed and all relevant regulations followed. The City will exercise additional caution and monitor local conditions, and if such conditions warrant additional voluntary restrictions over and above ODF restrictions, they will be implemented.
- In the event that fuel loads as a result of such large-scale disturbances pose an unacceptable risk to the long-term viability of the community drinking water system, fuels management and risk mitigation measures such as cutting, chipping, redistributing, or removing woody debris may be necessary.
- In the event of a wildfire that threatens the community drinking water system, the first priority will be the containment of the fire.
- The City will maintain ongoing discussions with neighboring landowners, regularly advocating for conservation of strategic nearby parcels through acquisition, easements, or other means.
- The City will work with Pacific Power to identify and remove hazard trees adjacent to the powerline in order to reduce the risk of damage to the powerline during windstorm events, and will coordinate vegetation management activities to minimize the spread of invasive plants
- Forestry, fisheries, and wildlife professionals will be involved in planning restoration efforts.

Municipal water quality

Policies

The maintenance of an ecosystem that produces a consistent supply of high quality water is of critical importance to the well-being of the community of Cannon Beach. No activities will be undertaken that have any demonstrable risk to the water supply.

Objectives

- Protect the springs from any adverse effects of management or recreation activities.
- Treat the forest area surrounding the springs and the drainage area upstream of the water intake on the West Fork as a water catchment area.
- Seek conservation of mature forest and riparian areas within the Ecola Creek watershed to minimize long-term risks to water quality in the watershed.

Guidelines

- Public vehicular access to the Reserve will not be allowed.
- The water catchment areas both for the springs and the West Fork water withdrawal area have been clearly defined (Fig. 6). Extra caution will be applied to any proposed activities within this area to ensure no adverse impacts to the water supply. Signage at the gate at the base of the hill to the springs will limit entry to pedestrians only.
- Public access for recreation purposes will be reviewed to ensure its compatibility with maintaining the City's high quality water sources.
- Manual removal techniques will be utilized to control invasive species. Herbicides will only be used to control invasives in circumstances where the threat to biodiversity is great and where other control techniques have proven ineffective, such as the control of knotweed.
- The City will work with Pacific Power to ensure that vegetation within its powerline easement is managed by mechanical means.

Fish habitat

Policies

The North and West Forks of Ecola Creek contain important fish habitat that will be preserved and enhanced, including floodplain forests, riparian wetlands, and side channel habitats. A combination of short-term and long-term strategies will be utilized

to ensure a consistent supply of large conifer wood is added to the streams to enhance fish habitat and maintain floodplain connectivity.

Objectives

- Initiate large wood placement projects to ensure short-term supply of these elements in the stream system.
- Reestablish conifer trees in alder-dominated riparian areas to help stabilize floodplain soils and provide future sources of durable large woody debris for streams.
- Ensure that roads that are possible sources of sediment delivery to streams have appropriate water drainage structures to minimize the risk of sediment delivery.
- Minimize the construction of new roads for access or forest restoration purposes. Design these roads to have minimum impacts on the landscape.
- Restore a strong presence of beaver on the landscape to recover the ecosystem service benefits their dam building provides for fish, amphibians, birds and mammals.

Guidelines

- No soil disturbing activities, including heavy equipment operation, will be conducted within 200 feet of any streams, except for maintenance of existing roads or for restoration projects that have been designed to minimize soil disturbance.
- Recreational uses that may conflict with fish production goals will be restricted.
- Remove, repair, or replace nonfunctioning culverts on historic, abandoned logging roads.
- Ensure that access roads have proper drainage, including any needed culverts, ditching, waterbars, and adequate rock surfacing to minimize the risk of erosion during wet weather.
- Road improvements such as culverts and grading should be made gradually over time as access to different areas is established for restoration thinning purposes.
- Fisheries professionals will be involved in planning restoration efforts.

Public use and recreation

Policies

Management of the Reserve must carefully balance the need to maintain the Reserve's natural functions, including clean water, fish and wildlife habitat, and open space preservation, with the interest of the community to have access to and recreate in the Reserve. Because of the importance of the protection of the community's water sources, water quality protection necessarily takes priority. However, the City will plan for passive, non-motorized, low impact recreation within the Reserve.

Objectives

- Allow modes of recreation that are fully consistent with water quality, forest health, and fish and wildlife policies and objectives.
- Develop trails gradually in a phased approach, in part in order to carefully gauge public use and its impact.
- Allow educational groups to use the area for conservation education.
- Foster community involvement in monitoring and restoration efforts.
- Connections with other trails within Cannon Beach will be facilitated as appropriate.

Guidelines

General

- Public access is restricted to daytime only (i.e. no camping).
- Dogs must be kept on a leash or be under voice command at all times. Dog owners are responsible for removing waste.
- No discharge of firearms, except as provided for in the hunting guideline.
- No smoking.
- Periodic monitoring of recreational use levels and impacts will be conducted by the City, including the Parks and Community Services Committee to assess compliance with regulations and to assess the extent of negative impacts, such as litter, vandalism, or erosion associated with increased recreational use.

Motorized vehicular uses

- Public motorized vehicular use, including off-road vehicles and all-terrain vehicles, is prohibited.
- Vehicular access for City workers or contractors for public works or restoration purposes is allowed.

Consumptive uses

- Fishing within the Reserve is permitted subject to Oregon Department of Fish and Wildlife regulations.
- For the next five years, the hunting policy is as follows: Hunting is by permit only and is limited to deer and elk. Hunters must use either bow and arrow, or shotgun with slugs. The permitted hunting area is restricted to the northern portion of the Reserve, specifically the area north of the North Fork of Ecola Creek and north of the main stem of Ecola Creek (see Figure 9).
- No commercial or recreational trapping of fur bearing animals.
- Gathering forest products, such as mushrooms, is permitted for personal use only. No commercial harvest is allowed.

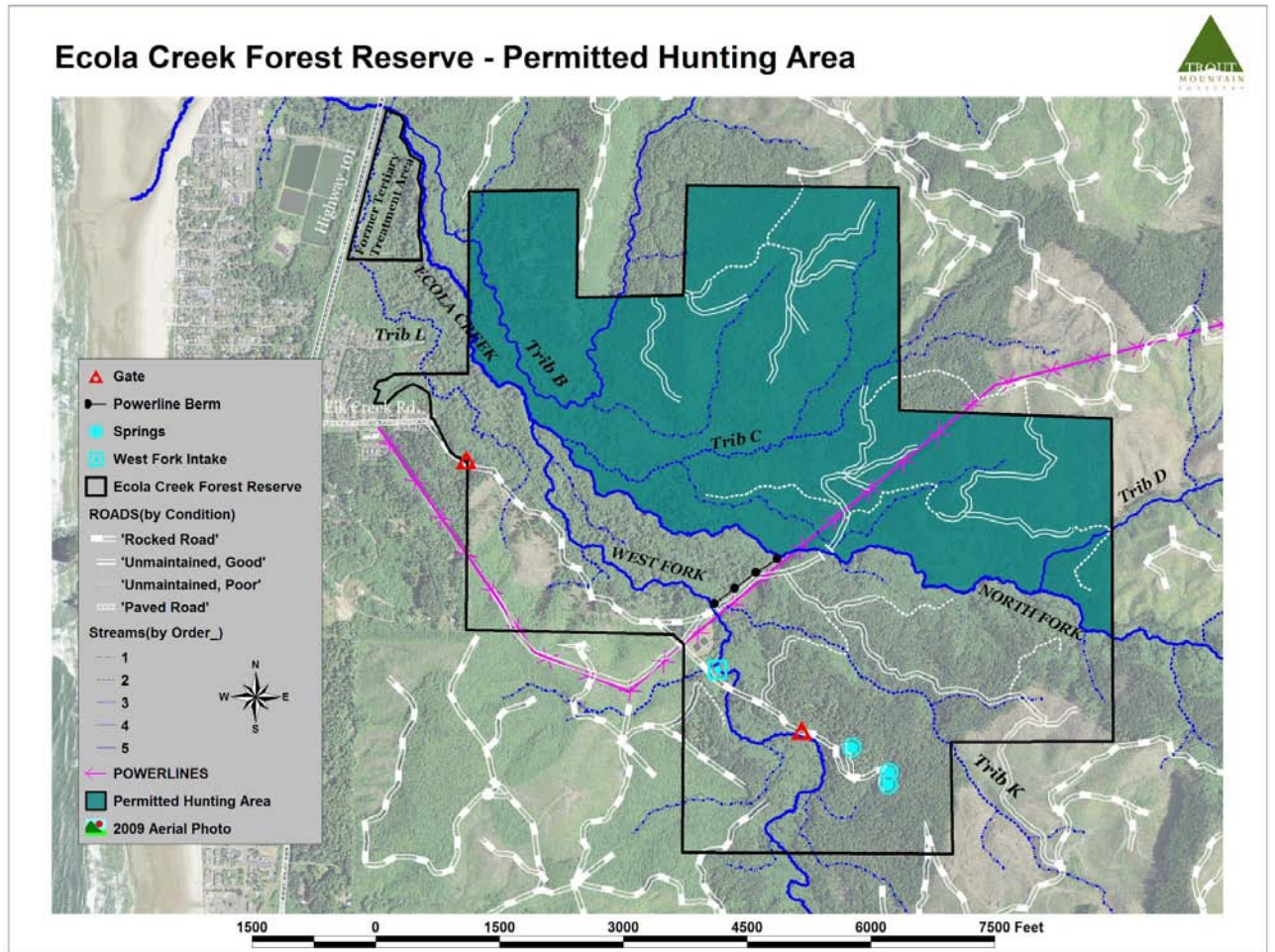
Bicycle use

- Bicycle use is restricted to existing hard surfaced roads and the old logging roads that are identified in the plan as unmaintained but in good condition.
- Bicycles are restricted from the springs area, beginning at the yellow gate on the road accessing the springs.
- There is no limitation on times of year when the West Fork or the North Fork of Ecola Creek can be crossed by bicycles.

Equestrian use

- Equestrian use is restricted to existing hard surfaced roads and the old logging roads that are identified in the plan as unmaintained but in good condition.
- Equestrian use is restricted from the springs area, beginning at the yellow gate on the road accessing the springs.
- There is no limitation on times of year when the West Fork or the North Fork of Ecola Creek can be crossed by horses.
- No commercial equestrian use, i.e. guided tours, horse rentals, etc.

Figure 9. Permitted hunting area



Trails

- The evaluation of the scope of future trail development needs to consider the Forest Reserve's planning goal with regard to passive recreation, namely that such development is compatible with the plan's resource protection and restoration goals.
- Future trail siting and design will be subject to review by OWEB staff and must ensure that trails do not adversely impact the property's conservation values.
- From a long range trail planning standpoint, there is a benefit to having portions of the Forest Reserve without trail improvements.
- Generally, utilize existing road surfaces to establish trail locations in order to minimize land disturbance.
- Where feasible trails should be looped. In certain circumstance the development of a looped trail may require the development of newly improved areas. Such new trail sections should be designed to minimize the need for land disturbance.
- The design of roads required for forest thinning should give consideration to their potential use as trails after the forest operation is completed.
- The City will develop an operational plan that describes appropriate maintenance activities, such as downed tree removal, for existing unmaintained roads that are described in the plan as being in good condition.
- The design of forest thinning should give consideration to the potential for the placement of logs that can be utilized for bridges across streams.
- The location and development of trails needs to be mindful of potential conflicts with the City's water supply infrastructure.
- Given site specific circumstances, both single purpose and multi-purpose trails are appropriate.
- Bridge crossings of the West Fork of Ecola Creek and the North Fork of Ecola Creek will maximize the potential for trail development and use, recognizing that this represents both a potentially positive and a potentially negative factor. A ford crossing of either or both streams will not preclude specific trail development and use. If bridges are desired, their scale should be kept as small and rustic as possible, consistent with sound engineering principles.
- The scope of future trail development needs to give consideration to the plan's policy with respect to hunting, and vice-versa.

- Monitor any informal trails so that they do not develop in a manner that creates potentially adverse impacts on natural resources such as wetland areas or streambanks.
- Develop an education and outreach program for the trail system, e.g., maps and signs.

Improvements

- Evaluate the need for additional parking at the first five-year update.
- Evaluate the need for a public restroom at the first five-year update.
- Evaluate the need or desirability of additional trail improvements, pedestrian and multi-purpose, at the first five-year update.

Public education

Policies

The City shall partner with organizations that have an environmental education mission in order to create opportunities for environmental education centered on the physical and biological characteristics of the Reserve and the goals for its preservation and restoration.

Plan administration

Policies

The City will develop a flexible management framework for the Reserve that provides for protection of key resources. Funding for implementation of stewardship activities will come from multiple sources, including grants, the City's general fund, and revenue generated from restoration thinning projects.

Objectives

- Use an adaptive management approach involving monitoring of conditions in the Reserve and ongoing citizen involvement.

Guidelines

- The plan will be reviewed and updated every five years.
- The City Council will designate the Parks and Community Services Committee to assist City staff and the Council in the implementation of the plan, including

necessary plan updates.

- In its yearly evaluation of the proposed action items and timelines, the Council may modify, as necessary, those action items and timelines.
- The City will seek Forest Stewardship Council (FSC) certification as a means to independently verify conformance with internationally recognized standards for exemplary forest management and protection of high-conservation value forest attributes.

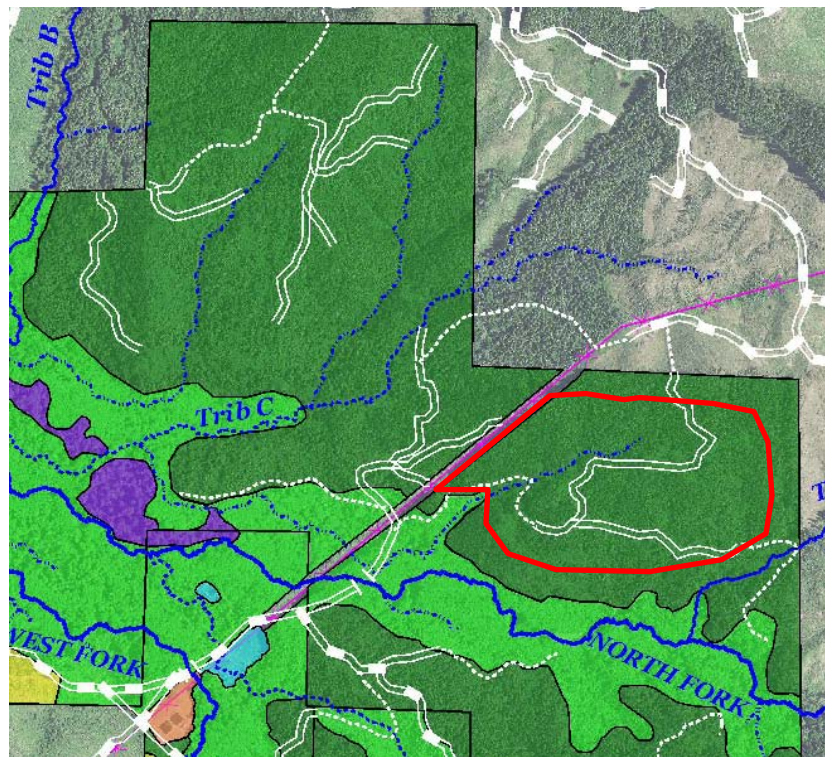
Management recommendations

Forest restoration

Action #1 – Conifer thinning. Conduct a pilot conifer thinning project to begin restoring older forest characteristics in dense 40-60 year old hemlock stands.

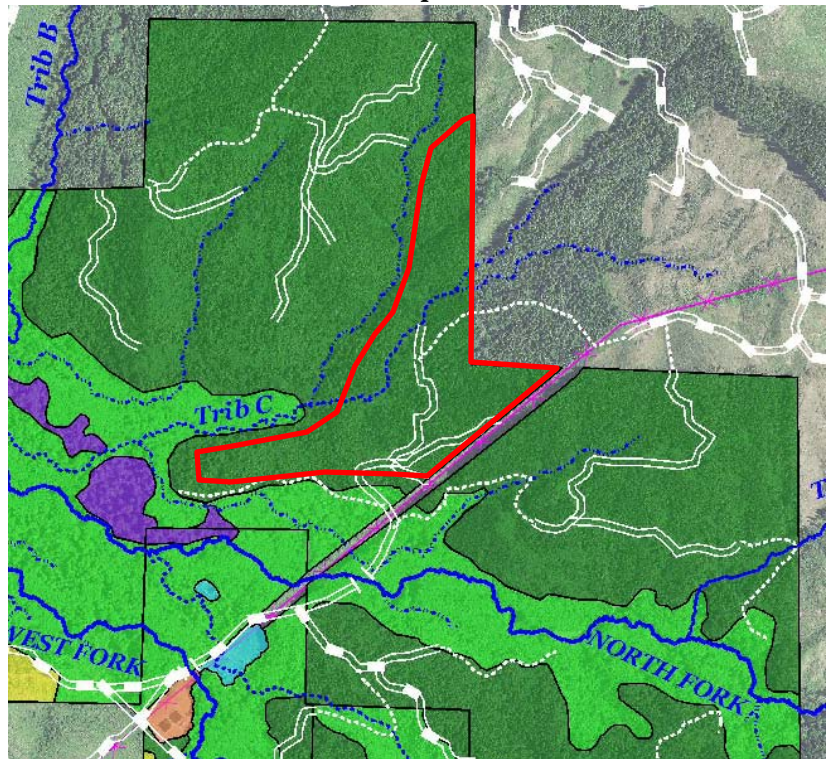
- a. Rationale: Accelerate the development of older forest characteristics (see Forest Habitat section). The immediate goals are to reduce the number of trees per acre from 350 to 225, to increase the average tree diameter from 14 to 17 inches, and to add the equivalent of ½ truckload/per acre of down wood to the forest floor in areas that are deficient.

- b. Proposed location. This area, approximately 60 acres in size in the northeastern portion of the reserve, is well outside of the water catchment areas and is easily accessible by existing logging roads on the adjacent ownership to the north. Based on forest inventory data, analysis of aerial



photography and field reconnaissance, it is relatively uniform and dense.

- c. Snag and down wood creation – The area should be surveyed for snags and down wood, and targets should be developed for additional snag and down wood recruitment from the project.
- d. Harvest parameters –Thinning will be primarily from below, cutting hemlock to release other species, with a target thinning rate of 20-30% depending on stand conditions on an acre-by-acre basis. Trees to be thinned will be marked in advance. Depending on existing levels of down wood, the project could retain approximately 120 MBF in additional down woody debris. Some portion of the harvest volume could be staged for use in in-stream wood placement projects, depending on timing.
- e. Access and roads - A road use agreement would be needed with the Campbell Group, and some improvements to the roads, including regrading, replacing a plugged culvert, and applying some rock would be necessary. Further examination of the condition of the fill and culvert in the western portion of the project area would be conducted, and additional improvement work, including culvert replacement, may be needed.
- f. Timing – the project could be designed and planned during the winter of 2012-2013, with implementation during the summer of 2013.
- g. Cost/income. The project could potentially generate \$30,000 - \$50,000 in net income, depending on project parameters and log markets. Logs produced could be used as landowner contribution elements in a grant-funded large wood placement project.



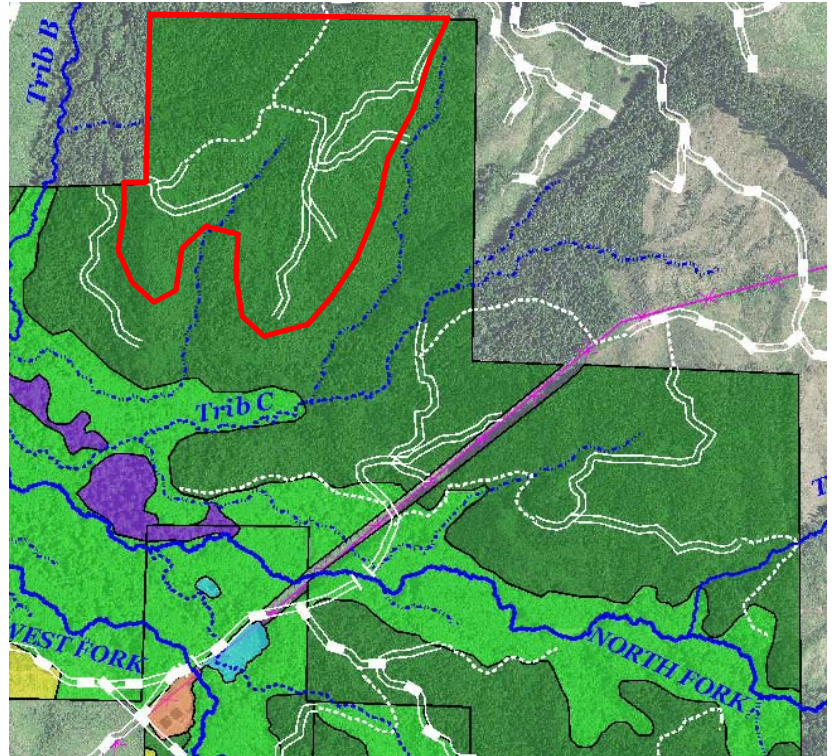
Action #2 – Conifer thinning. Based on the outcome of Action #1, additional conifer thinning projects could be located in the north-central portion of the reserve.

- a. Rationale: Accelerate the development of older forest characteristics (see Forest Habitat section). The immediate goals are to reduce the number of trees per acre from 350 to 225, to increase the average tree diameter from 14 to 17 inches, and to add the equivalent of ½ truckload/per acre of down wood to the forest floor in areas that are deficient.
- b. Proposed location. This area, approximately 50 acres in size in the northeastern portion of the reserve, is well outside of the water catchment areas and is potentially accessible by existing logging roads on the adjacent ownership to the north. Based on forest inventory data, analysis of aerial photography and field reconnaissance, it is relatively uniform and dense.
- c. Snag and down wood creation – The area should be surveyed for snags and down wood, and targets should be developed for additional snag and down wood recruitment from the project.
- d. Harvest parameters –Thinning will be primarily from below, cutting hemlock to release other species, with a target thinning rate of 20-30% depending on stand conditions on an acre-by-acre basis. Trees to be thinned will be marked in advance. Depending on existing levels of down wood, the project could retain approximately 100 MBF in additional down woody debris. Some portion of the harvest volume could be staged for use in in-stream wood placement projects, depending on timing.
- e. Access and roads - A road use agreement would be needed with the Campbell Group, and some significant road improvements would be needed (dashed line in project area on map). The majority of the improved road would be on Campbell Group land, so cooperation would be essential. It is also possible that these upgrades would not be necessary, and that existing access routes could be used. Further examination of road conditions is necessary.
- f. Timing – the project could be implemented later in the five year planning period.
- g. Cost/income. The project could potentially generate \$30,000 - \$40,000 in net income, depending on project parameters and log markets. This includes the cost of road repairs and upgrades. Logs produced could be used as landowner contribution elements in a grant-funded large wood placement project.

Action #3 – Conifer thinning.

Based on the outcome of Actions 1 and 2, additional conifer thinning projects could be located in the north-central portion of the reserve.

- a. **Rationale:** Accelerate the development of older forest characteristics (see Forest Habitat section). The immediate goals are to reduce the number of trees per acre from 350 to 225, to increase the average tree diameter from 14 to 17 inches, and to add the equivalent of $\frac{1}{2}$ truckload/per acre of down wood to the forest floor in areas that are deficient.
- b. **Proposed location.** This area, approximately 100 acres in size in the north portion of the reserve, is well outside of the water catchment areas and is potentially accessible by existing logging roads on the adjacent ownership to the north. Based on forest inventory data, analysis of aerial photography and field reconnaissance, it is relatively uniform and dense.
- c. **Snag and down wood creation** – The area should be surveyed for snags and down wood, and targets should be developed for additional snag and down wood recruitment from the project.
- d. **Harvest parameters** –Thinning will be primarily from below, cutting hemlock to release other species, with a target thinning rate of 20-30% depending on stand conditions on an acre-by-acre basis. Trees to be thinned will be marked in advance. Depending on existing levels of down wood, the project could retain approximately 150 MBF in additional down woody debris. Some portion of the harvest volume could be staged for use in in-stream wood placement projects, depending on timing.
- e. **Access and roads** - A road use agreement would be needed with the Campbell Group, and some significant road improvements would be needed (dashed line in project area on map). In addition, a plugged culvert would need to be replaced.
- h. **Timing** – the project could be implemented later in the five year planning period.



- f. Cost/income. The project could potentially generate \$50,000 - \$75,000 in net income, depending on project parameters and log markets. This includes the cost of road repairs and upgrades. Logs produced could be used as landowner contribution elements in a grant-funded large wood placement project.

Action #4. Upland cedar planting #1. Because cedar is so under represented, the conifer thinning projects represent an opportunity to plant cedar in recently thinned areas to capture the increased light and growing space.

- a. Rationale. Cedar is relatively rare throughout the Reserve and especially in the northern portions of the property. Based on experience over the past five years planting cedar in the southern portion of the property, a combination of high volume, low-cost unprotected plantings and relatively fewer but higher cost protected plantings maximizes the chances for success.
- b. Proposed location. The approximate 60 acre thinning area from Action #1 above.
- c. Planting plan. Plant 10 large cedar seedlings per acre and protect each with wire fencing. Plant an additional 100 unprotected seedlings per acre.
- d. Access. Crews can utilize the roads established by the thinning project to transport materials and work on the site.
- e. Timing. The winter after Action #1 is complete (2013-2014)
- f. Cost/income. Depending on planting stock and fencing materials, this action would cost about \$5,000 - \$10,000.

Action #5. Upland cedar planting #2.

- a. Rationale. Cedar is relatively rare throughout the Reserve and especially in the northern portions of the property. Based on experience over the past five years planting cedar in the southern portion of the property, a combination of high volume, low-cost unprotected plantings and relatively fewer but higher cost protected plantings maximizes the chances for success.
- b. Proposed location. The approximate 50 acre thinning area from Action #2 above.
- c. Planting plan. Plant 10 large cedar seedlings per acre and protect each with wire fencing. Plant an additional 100 unprotected seedlings per acre.
- d. Access. Crews can utilize the roads established by the thinning project to transport materials and work on the site.
- e. Timing. The winter after Action #2 is completed
- f. Cost/income. Depending on planting stock and fencing materials, this action would cost about \$5,000 - \$10,000.

Action #6. Upland cedar planting #3.

- a. Rationale. Cedar is relatively rare throughout the Reserve and especially in the northern portions of the property. Based on experience over the past five years planting cedar in the southern portion of the property, a combination of high volume, low-cost unprotected plantings and relatively fewer but higher cost protected plantings maximizes the chances for success.

- b. Proposed location. The approximate 100 acre thinning area from Action #3 above.
- c. Planting plan. Plant 10 large cedar seedlings per acre and protect each with wire fencing. Plant an additional 100 unprotected seedlings per acre.
- d. Access. Crews can utilize the roads established by the thinning project to transport materials and work on the site.
- e. Timing. The winter after Action #3 is complete
- f. Cost/income. Depending on planting stock and fencing materials, this action would cost about \$10,000 - \$15,000.

Action #7. Floodplain alder thinning to release spruce

- a. Rationale: The floodplain areas are deficient in conifers that will provide long-term woody debris inputs to the stream.
- b. Proposed location. Alder floodplain areas of the Ecola Tract (former ODF property).
- c. Cutting plan. Cut or make snags from approximately 30-50 alder trees per acre to strategically release established spruce trees. All trees would be left on site for woody debris and habitat.
- d. Access. Chainsaw crews can access remote areas on foot.
- e. Timing. Can occur at any time other than the driest summer months, when fire danger could be an issue.
- f. Cost/income. This should cost around \$300/acre to plan for and implement, and there are several hundred acres that could benefit from the treatment. Suggested scope for the first five years would be at least 50 acres, which would cost \$15,000.

Action #8. Young stand thinning (PCT)

- a. Rationale: This item is carried over from the 2006 plan. These areas were harvested and planted to hemlock and spruce 10 to 15 years ago. Since that time, abundant natural regeneration of alder and hemlock have contributed to very high stem densities. Without intervention, the stand will enter a prolonged period of stem exclusion, where very little understory development will take place. By actively controlling stem density and species composition, results more favorable to biodiversity objectives can be attained.
- b. Proposed location: 10-15 year old plantations in southern portion of the property, approximately 19 acres in size.
- c. Treatment plan: Reduce stem densities from 600 to 300/acre, favoring cedar (if present), alder, spruce, and shrubs, and cutting mostly hemlock.
- d. Access. Easily accessible from adjoining Campbell Group roads, or on foot from the main access road on the Reserve.
- e. Timing. Needs to happen within the next 5 years, or costs increase and opportunities to retain biodiversity are diminished.
- f. Cost. Approximately \$5,000.

Action #9. Invasive species control

- a. Rationale: Limiting the spread of invasive species in the Reserve is important because uncontrolled invasives can threaten ecosystem health and require much more expensive intervention later on.
- b. Plan: Monitor for English ivy, English holly, and Japanese knotweed, and remove infestations as soon as is practical either with manual/mechanical means, or, subject to City Council approval, targeted, low-risk herbicide application techniques.

Fish habitat and water quality enhancement

Action #10. Large woody debris placement

A comprehensive and strategic approach to enhancing large woody debris in the basin has been facilitated by the completion of Trout Unlimited's assessment (Trout Unlimited 2012), which used remote sensing data to identify areas in the basin that are likely to be deficient in large woody debris recruitment over time. Bio-Surveys, LLC utilized this assessment as a foundation for developing a site specific LWD placement project in May 2012.

The proposed large woody debris placement sites are displayed in the Proposed In-stream Woody Debris Placement Opportunities map (Fig. 9) along with the location of blown down conifer identified in the ground truthing effort. The majority of the wood placement would be accomplished with a helicopter (Action 10A), with a much smaller project (Action 10B) relying on an excavator.

Action #10A: Helicopter placement would require a heavy lift Chinook (25,000 lb lift capacity) helicopter and a preliminary bucking crew to prepare downed spruce on the Reserve to be lifted from their upturned stumps and swung into pre-determined locations (see map). Operations, structure design and final placement would be facilitated by a biological contractor.

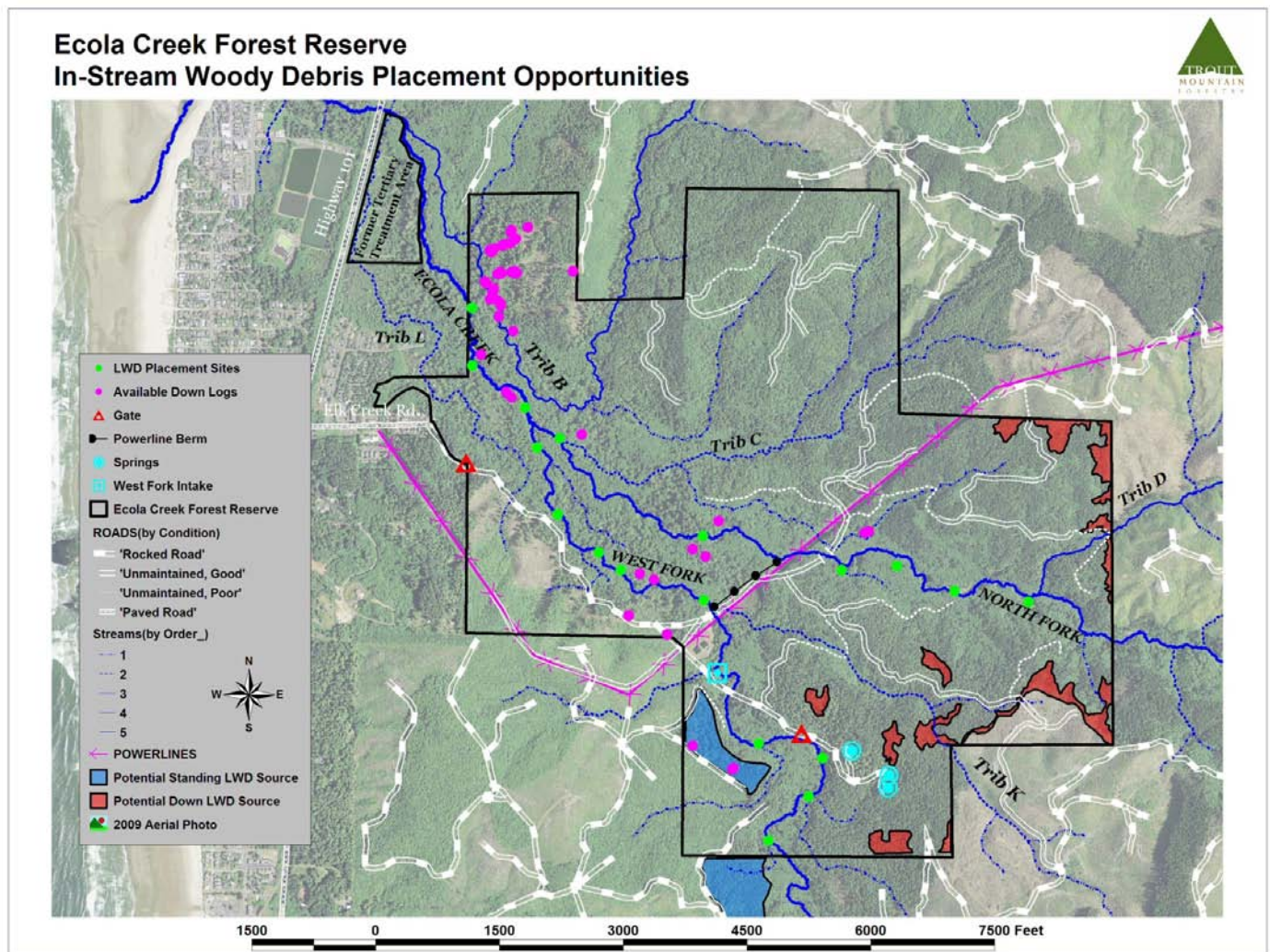
Action #10B: Tributary B (Waterhouse Creek) has a very short section of spawnable habitat which is the primary seasonal habitat limitation for salmonids within this tributary. A strategic wood placement project in its headwater reach within the Reserve could nearly double the availability of spawning gravel resources and immediately boost salmonid production. This is an excavator accessible site.

Trees for placement in Waterhouse Creek would be strategically thinned from adjacent upslope stands. Tree dimensions appropriate for this site would be 24 ft long and 16-20" dbh. Access to the site is currently provided by a logging spur directly to the west of the stream corridor.

- a. Rationale: To enhance off channel winter habitat and to arrest channel degradation in Ecola Creek by creating long lasting log jams at strategic locations designed to boost floodplain interaction.

- b. Location. Throughout the Reserve
- c. Plan. To move 100 dead and down large diameter spruce trees from nearby locations on the Reserve to 19 strategically located placement sites on the North Fork, West Fork, and main stem of Ecola Creek. Additional smaller diameter wood from restoration thinning projects could be used to round out the placements. On Waterhouse Creek, thin and yard to stream side approximately 20 conifer (spruce preferred). Place 20 trees in 4 five-log complexes designed to scour pools and to trap and sort spawning gravels.
- d. Access. Most of the work would be accomplished using a helicopter to move the trees and place them in pre-defined locations. Waterhouse Creek (Action 10B) would be treated with an excavator and could be accomplished independently of the much larger effort required for the helicopter placement.
- e. Timing. Securing grant funding is critical to this project going forward. The initial step involves writing a grant application for OWEB, then shopping the project around to other potential funders, which could include Trout Unlimited, Jubitz Foundation, USFWS, Ecotrust, and others. Timing depends on funding cycles and success of the grant writing, but could be as early as 2013 for Action 10A. Action 10B could occur later during the planning period, perhaps 2015.

Figure 10. In-stream woody debris placement opportunities



Action #11. Culvert removal

- a. Rationale: Multiple surveys have identified the presence of a failed culvert on Tributary B (Waterhouse Cr) just downstream of the Reserve boundary. The removal of this pair of side by side culverts would restore complete access to the extensive habitats existing on the Ecola Creek floodplain as this stream traverses the Reserve ownership.
- b. Plan: Work with neighboring landowner in NW portion of the property to remove culverts on Waterhouse Creek that block fish passage. This is a small project and would likely cost less than \$5,000. However, the site is just outside the City's

ownership and so the City would need to pursue a partnership with the private landowner.

Action #12. Road inventory and assessment

- a. Rationale: The City currently has a basic map and assessment of the road network and key problems with the road system. As restoration projects begin to be implemented and portions of the road network see some increased use, a more formal road inventory is desirable. External funding will be sought for this action item.
- b. Plan: A systematic inventory would provide more detailed maps of the road system and provide a systematic assessment of current conditions and needed repairs based on an up-to-date understanding of the current and planned utilization of different road segments. It would identify road segments that should be decommissioned to minimize potential for erosion. It would lead to the development of a prioritized list of road improvement and decommissioning projects, with cost estimates for repairs. Estimated cost for this assessment is \$10,000 - \$20,000.

Wildlife habitat

Action #13. Beaver forage recovery

- a. Rationale: Tributaries B and C of the North Fork of Ecola Creek both contain a significant legacy of beaver utilization (historic dams, currently abandoned). There is evidence to suggest that the current lack of a viable food source may be limiting their continued proliferation. These habitats are classified as off channel and low gradient and fit the physical habitat parameters that beaver require (Suzuki and McComb 1998). A beaver forage recovery plan that incorporated protected plantings of preferred forage species could be extremely beneficial
- b. Plan: Identify two locations with good potential for beaver recovery. Cut alder as needed to create <50% canopy cover to allow for good shrub growth. Plant willows and vine maple, build enclosure over ¼ acre area (50' x 200'). Estimated costs \$12,500 for site selection, design, materials, and installation for two enclosure areas. Identify and map other locations with good potential for beaver recovery where impromptu and volunteer plantings could be done to further enhance beaver habitat.

Action #14. Beaver relocation

- a. Rationale: Providing beaver habitat does not guarantee that beaver will find the habitat, so the City should explore beaver relocation in lieu of natural migration of beaver.
- b. Plan: The City will work with wildlife scientists to assess the advantages and disadvantages of beaver relocation, including an assessment of forage availability, suitability of habitat, and potential for disease introduction. If, on balance, beaver relocation is recommended, the City can become a receiving location for the “adopt – a beaver program.”

Public use and recreation

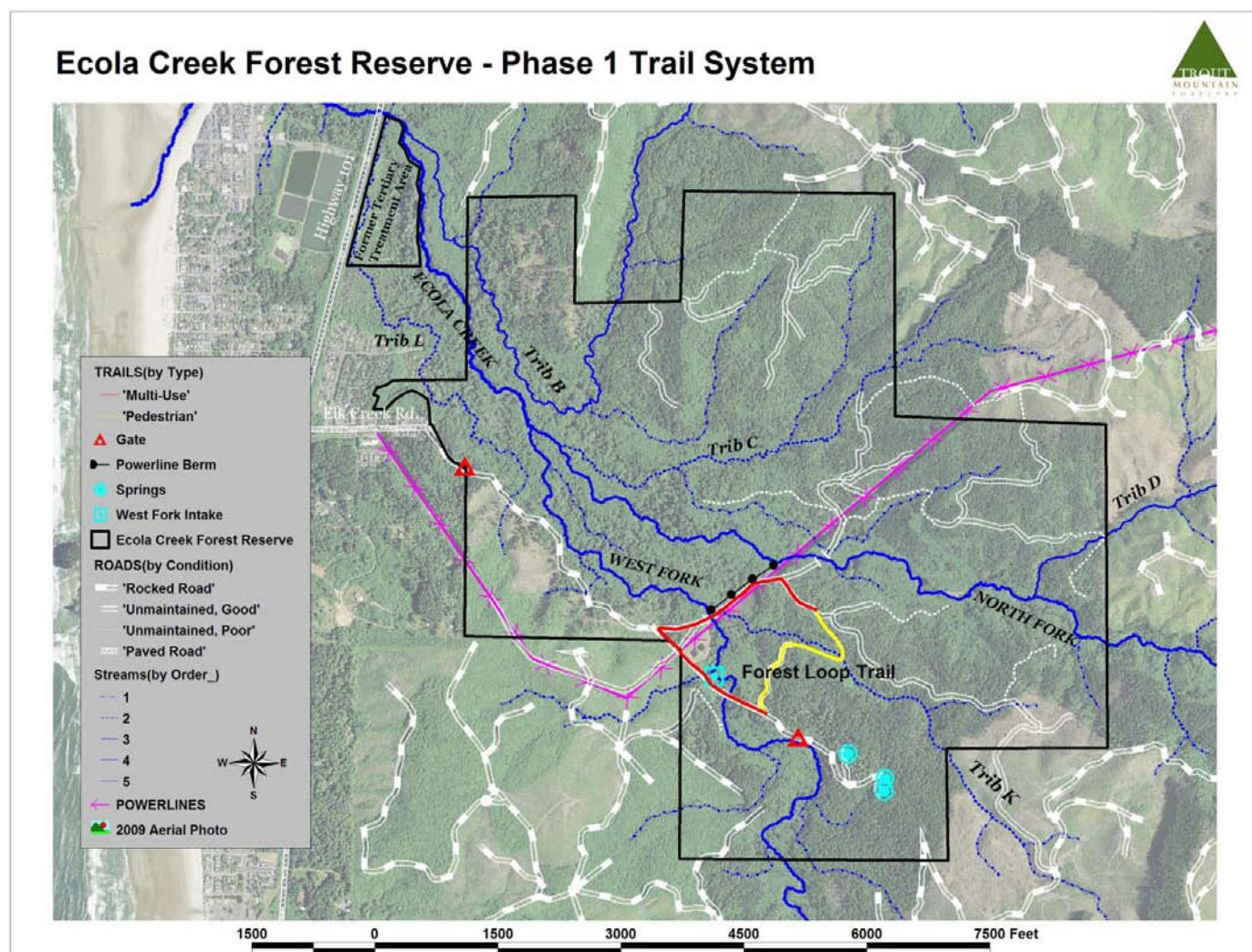
Action #15. Parking: Conduct a usage study within the 5-year plan period and use as a basis for determining the need and potential location for a more formal parking area. For now leave the gate where it is.

Action #16. Review fishing regulations. The City will participate in the Oregon Department of Fish and Wildlife’s next administrative review of sport fishing regulations with the objective of preserving and improving the native fish populations in Ecola Creek and may request the closure of fishing for steelhead, or other restrictive regulations, if there is evidence that current regulations are contributing to the reduction of the native fish population.

Action #17. Education on fish and enforcement of regulations. The City will undertake an educational program regarding the potential adverse impacts on Ecola Creek salmon stocks from consumptive uses of those stocks, including posting ODFW fishing regulation signs adjacent to the creeks. The City will also request that ODFW and/or the Oregon State Police game enforcement officers periodically monitor fishing activities on Ecola Creek.

Action #18. Install entry gates. To limit potential unauthorized motor vehicle use into the Reserve from the north and south, install entry gates in the vicinity of Spur 45/Vollmer Creek Mainline and the unnamed spur road leading to the Reserve from Burn Road. Estimated cost: \$14,000.

Figure 11. Phase 1 Trail System



Action #19. Construct a pedestrian loop trail. Construct a pedestrian-only loop trail, the “Forest Loop Trail.” Initially, the trail’s crossing of the West Fork of Ecola Creek will be by means of a ford (Fig. 11). Final trail design will include consideration of bank improvements to minimize the potential for erosion. Before proceeding to consideration of a bridge crossing, the use of the trail will be analyzed. If after analysis it is determined that a bridge crossing is appropriate, its scale should be kept as small and rustic as possible, consistent with sound engineering principles.

Action #20. Public restroom study. Evaluate the need for permanent public restrooms at the first five year update. Consider placing a portable toilet near the entry gate, if determined to be necessary prior to the first plan update.

Action #21. Entry kiosk. Install a kiosk near the entry gate to provide information about the forest reserve and the code of conduct. Estimated cost: \$3,000

Action #22. Additional signage. Post adequate signage around the perimeter of the property reflecting the policy on hunting.

Action #23. FSC certification. The City will seek FSC certification for the Reserve.

Implementation timeline

- 2012 Develop OWEB grant for large woody debris placement (Action #10)
 - Begin review of fishing regulations (Action #16)
 - Education on potential fishing impacts (Action #17)
 - Invasive species monitoring and control – ongoing (Action #9)
 - Install perimeter hunting signage (Action #22)
- 2013 Build entry kiosk (Action #21)
 - Build gates (Action #18)
 - Implement the first conifer thinning project (Action #1)
 - Implement large woody debris placement using helicopter (contingent on securing grant from OWEB) (Action #10A)
 - Culvert removal (contingent on cooperation by neighboring landowner) (Action #11)
 - Attain FSC certification for the Reserve (Action #23)
- 2014 Plant cedar in conifer thinning area (Action #4)
 - Build beaver forage areas (Action #13)
 - Thin young stands (Action #8) Develop Forest Loop Trail (Action #19)
- 2015 Cut alder in floodplain to release spruce (Action #7)
 - Conduct road inventory and assessment (Action #12)
 - Additional conifer thinning project (Action #2)
 - Implement large woody debris placement using excavator (Action #10B)
- 2016 Relocate beavers (Action #14)
 - Plant cedar in conifer thinning area (Action #5)
 - Additional conifer thinning project (Action #3)
- 2017 Study recreational use of the reserve and potential need for additional parking and restrooms (Action #15 and #20)
 - Plant cedar in conifer thinning area (Action #6)

References

- Agee, J.K. 1993. *Fire Ecology of Pacific Northwest Forests*. Washington, D.C.: Island Press, 493 p.
- Apostol, D., and M. Sinclair, eds. 2006. *Restoring the Pacific Northwest: The Art and Science of Ecological Restoration in Cascadia*. Island Press, Washington, DC.
- Arney, James D., Kelsey S. Milner, and Brian L. Kleinhenz. 2008. *Biometrics of forest inventory, forest growth, and forest planning*. Corvallis OR: Forest Biometrics Research Institute, 363 p.
- Hayes, J. and F. Burris. 2006. *Wildlife and Stewardship Planning*. Presentation at Oregon Forest Stewardship Planning Workshop, Jan.31, 2006, Veneta, OR.
- Kohm, K.A. and J.F. Franklin, eds. 1997. *Creating a Forestry for the 21st Century: The Science of Ecosystem Management*. Island Press, Washington, DC.
- Logan, R. 2002. *Oregon's Forest Protection Laws*. Oregon Forest Resources Institute, Portland, OR.
- Mellen-McLean, Kim, Bruce G. Marcot, Janet L. Ohmann, Karen Waddell, Susan A. Livingston, Elizabeth A. Willhite, Bruce B. Hostetler, Catherine Ogden, and Tina Dreisbach. 2012. *DecAID, the decayed wood advisor for managing snags, partially dead trees, and down wood for biodiversity in forests of Washington and Oregon*. Version 2.20. USDA Forest Service, Pacific Northwest Region and Pacific Northwest Research Station; USDI Fish and Wildlife Service, Oregon State Office; Portland, Oregon.<http://www.fs.fed.us/r6/nr/wildlife/decadid/index.shtml>
- McComb, B., Zuckerberg, B., Vesely, D., Jordan, C., 2010. *Monitoring Animal Populations and Their Habitats: A practitioner's guide*. CRC Press, Boca Raton, FL.
- National Park Service. 2004. *Lewis and Clark National Historical Park, Fort Clatsop Fire Management Plan*. [Astoria, Or.]: U.S. Dept. of the Interior, National Park Service.
- National Park Service. 2011. *Lewis and Clark National Historical Park, Fort Clatsop Unit, Forest Restoration Plan Environmental Assessment*. [Astoria, Or.]: U.S. Dept. of the Interior, National Park Service.
- Nickelson, T. E., M. F. Solazzi, S. L. Johnson, and J. D. Rodgers. 1992a. *An approach to determining stream carrying capacity and limiting habitat for coho salmon (Oncorhynchus kisutch)*. In *Proceedings of the coho workshop*. Edited by L. Berg and P.W. Delaney. Nanaimo, B.C., May 26-28, 1992. pp. 251-260.
- Oregon Department of Fish and Wildlife. 2006. *Oregon Conservation Strategy*. Salem, OR: Oregon Department of Fish and Wildlife.

Oregon Department of Environmental Quality. 2012. Oregon Drinking Water Protection Program. Portland, OR. <http://www.deq.state.or.us/wq/dwp/results.htm>

Parker, S. et al. 2001. Ecola Creek Watershed Assessment: A Living Document.

Puettmann, Klaus J., K David Coates, and Christian Messier. 2009. A critique of silviculture: Managing for complexity. Washington, DC.: Island Press, 189 p.

Sims, Barry, 2006. Ecola Creek Forest Reserve Stewardship Plan. Portland, OR: Ecotrust.

Suzuki, Nobuya, and W. McComb, 1998. Habitat classification models for beaver (*Castor Canadensis*) in the streams of the Central Oregon Coast Range. Northwest Science, Vol. 72, No. 2, pp. 102-110.

Trask, S.P. 2009. Rapid Bio-Assessment of Coastal Coho ESU Ocean Tributaries. OWEB Final Report Document for Grant # 208-1050.

Trout Unlimited. 2012. An assessment of coho, steelhead, and coastal cutthroat trout habitats in Ecola Creek, Oregon. Boise, ID.

Appendix A: Opinion Survey Summary Report



Ecola Creek Forest Reserve Community Survey Results

The City of Cannon Beach is currently working on a management plan for the Ecola Creek Forest Reserve. The management plan will encompass both the existing 220-acre Ecola Creek Forest Reserve and the recently acquired 805-acre Ecola Tract. In October 2011, the City of Cannon Beach mailed a survey to all property owners and residents and provided the same questions in an online form. Both forms included information about the City Council's adopted goals for the forest reserve and a map of the site location, detailing the 220 and 805 acre tracts.

Over the course of three weeks 474 total responses were received. Most responded to the survey on paper with 128 taking advantage of the online form.

Responses by Type

| | |
|------------------|-----|
| Online Responses | 128 |
| Paper Forms | 346 |
| Total: | 474 |

This summary includes the tabular results, presented as counts and as the percentage of the total number of respondents, as well as observations and analysis by the planning team. In some cases, the data is also presented in chart form to illustrate findings that stood out as important in preliminary analysis. The results are presented in the order questions were asked. Answer choices are sorted to highlight the top responses, except where sorting would confuse the order of responses. The original position of sorted answer choices is included in parentheses. In addition to the total results, questions were analyzed for major variation between responses from Cannon Beach ZIP codes and others. Where these major variations exist, they are noted in the bulleted analysis.

A full list of responses to open-ended questions and a copy of the survey instrument is provided in Appendix A.

1. First please tell us your zip code

| ZIP Code | Total | Percentage |
|-------------|-------|------------|
| 97110 | 205 | 43% |
| 97145 | 22 | 5% |
| Other | 206 | 43% |
| Blank | 40 | 9% |
| Grand Total | 474 | 100% |

- This question is intended to provide a way to filter responses based on residence in or outside of Cannon Beach.
- For this summary, ZIP codes 97110 and 97145 will be combined as "Cannon Beach Residents" and Other and blank responses will be referred to as "Other."
- Roughly half of responses come from within Cannon Beach ZIP codes.
- Other ZIP codes included:
 - 97138 (Seaside, Gearheart)
 - 97034, 97035 (Lake Oswego)
 - 97102 (Arch Cape)
 - 97007 (Beaverton)
 - 97229, 97212, 97219 (Portland)

2. Is Cannon Beach your:

| Answer | Count | Percentage |
|----------------------------|-------|------------|
| Secondary Home (2) | 218 | 46% |
| Primary Home (1) | 180 | 38% |
| Place to Visit (3) | 46 | 10% |
| No answer | 30 | 6% |
| Non completed ¹ | 0 | 0 |

- Some respondents who provided a Cannon Beach zip code may be indicating the address of a second home.

3. How familiar are you with the Ecola Creek Forest Reserve, either the existing 220-acre tract or the 805-acre Ecola Tract? Please check one.

| Answer | Count | Percentage |
|-----------------------|-------|------------|
| Familiar (1) | 156 | 33% |
| Somewhat Familiar (2) | 193 | 41% |
| Not Familiar (3) | 96 | 20% |
| No answer | 29 | 6% |
| Non completed | 0 | 0 |

- Most respondents (74%) are at least somewhat familiar with the Ecola Creek Forest Reserve.
- Residents of Cannon Beach generally had a higher familiarity with 85% at least somewhat familiar.

4. How have you gained familiarity with the Ecola Creek Forest Reserve? Please check all that apply.

| Answer | Count | Percentage ² |
|---------------------------------------|-------|-------------------------|
| Newspaper or Other Media (4) | 229 | 48% |
| Word of Mouth (1) | 199 | 42% |
| Other Sources of City Information (3) | 119 | 25% |
| City of Cannon Beach Meetings (2) | 78 | 16% |
| Other | 66 | 14% |
| City Web Site (5) | 61 | 13% |

- The newspaper and word of mouth have reached nearly half of the respondents.
- The City website has played a relatively small role in informing respondents.
- Residents of Cannon Beach had gained more information from City meetings, the newspaper and word of mouth than non-residents.

¹ "Non completed" indicates that the respondent did not see this question or abandoned the survey before reaching this page, compared to "No answer" where the respondent skipped the question but completed subsequent questions.

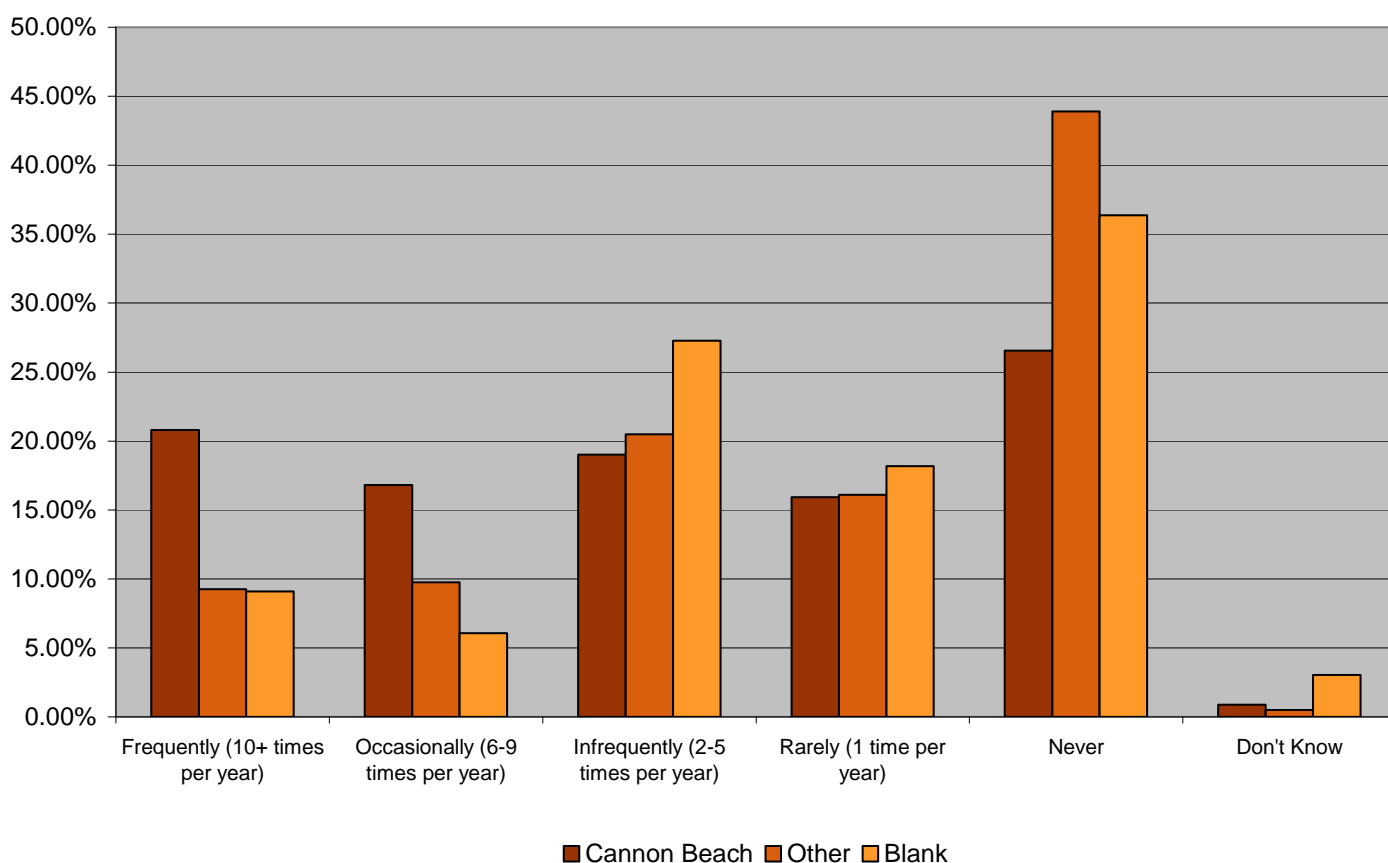
² Because more than one response is allowed, the count adds up to more than the total responses. The percentage is still calculated based on the total responses (474), indicating how many respondents checked that answer choice.

5. In the past 12 months, how often have you or a family member visited the Ecola Creek Forest Reserve. Please check one.

| Answer | Count | Percentage |
|---------------------------------------|-------|------------|
| Frequently (10+ times per year) (1) | 69 | 15% |
| Occasionally (6-9 times per year) (2) | 60 | 13% |
| Infrequently (2-5 times per year) (3) | 94 | 20% |
| Rarely (1 time per year) (4) | 75 | 16% |
| Never (5) | 162 | 34% |
| Don't Know (6) | 4 | 1% |
| No answer | 7 | 1% |
| Non completed | 3 | 1% |

- 63% of respondents have visited at least once in the past year.
- Cannon Beach residents were much more likely to be frequent visitors (21% vs. 9%), while respondents from other areas were much more likely to have never visited (44% vs. 26%).

Question 5: Frequency of visits by ZIP code category



6. If you or your family have never visited, or rarely visited, the Ecola Creek Forest Reserve, why not? Please check all that apply.

| Answer | Count | Percentage |
|--|-------|------------|
| Don't know what is available (3) | 99 | 21% |
| Don't know how to get there (2) | 71 | 15% |
| Did not know it was there (1) | 68 | 14% |
| Not interested in available activities (4) | 26 | 5% |
| Other | 62 | 13% |

- Lack of information about the reserve is a reason respondents are not visiting the reserve.
- Most of the “Other” responses indicated that respondents were too busy, with a few indicating that limited physical ability kept them away.

7. In the past 12 months, in your visits to the Ecola Creek Forest Reserve, which one of the following was your *main* activity? Please check one.

| Answer | Count | Percentage |
|------------------------------------|-------|------------|
| Hiking/Walking (1) | 166 | 35% |
| Hunting (6) | 33 | 7% |
| Nature Observation/Photography (3) | 23 | 5% |
| Biking (2) | 13 | 3% |
| Other | 9 | 2% |
| Fishing (5) | 7 | 1% |
| Horseback Riding (4) | 2 | 0% |
| No answer | 223 | 47% |
| Non completed | 0 | 0% |

- Hiking/Walking is clearly the main activity of most respondents.
- The large number of “No answer” responses is in part due to the people who have not visited the forest reserve.
- Residents of Cannon Beach were more likely to engage in Hiking/Walking and less likely to engage in Hunting as their main activity.

8. In the past 12 months, in addition to the main use of the Ecola Creek Forest Reserve you listed above, which *other* activities did you undertake? Please check all that apply.

| Answer | Count | Percentage |
|------------------------------------|-------|------------|
| Nature Observation/Photography (3) | 150 | 32% |
| Hiking/Walking (1) | 140 | 30% |
| Biking (2) | 52 | 11% |
| Fishing (5) | 47 | 10% |
| Hunting (6) | 34 | 7% |
| Horseback Riding (4) | 5 | 1% |
| Other | 46 | 10% |

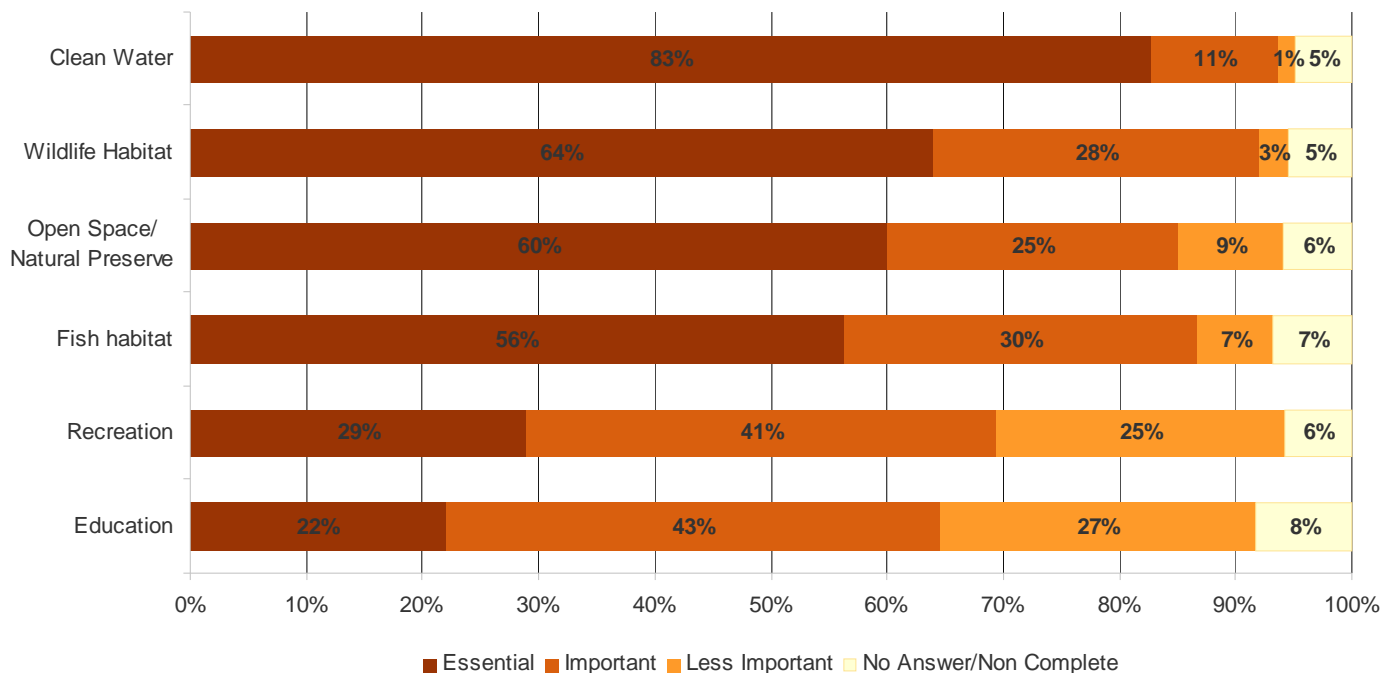
- There is a close connection between hiking/walking and other activities, particularly Nature Observation/Photography.
- This question allowed for any answer to be selected, even if it had been chosen in the prior question.
- 24 of the respondents indicating Hunting in this question did not indicate it as their primary activity in the prior question.
- Other responses included berry picking, mushroom harvesting and educational visits.

11. How valuable is each of the following functions of the Ecola Creek Forest Reserve to you?
Please check one box per row.

| | Essential | Important | Less Important | No Answer/ Non Complete |
|---------------------------------|------------|------------|----------------|----------------------------|
| Clean Water | 392 83% | 52 11% | 7 1% | 23 5% |
| Wildlife Habitat | 303 64% | 133 28% | 12 3% | 26 5% |
| Open Space/ Natural Preserve | 284 60% | 119 25% | 43 9% | 28 6% |
| Fish Habitat | 267 56% | 144 30% | 31 7% | 32 7% |
| Recreation | 137 29% | 192 41% | 118 25% | 27 6% |
| Education | 104 22% | 202 43% | 129 27% | 39 8% |

- The natural functions, including clean water, fish and wildlife habitat and open space preservation were the most critical.
- Recreation and Education had the largest portion of respondents indicating they are less important functions.
- Looking at the results filtered by ZIP code, Cannon Beach residents placed a slightly higher value on recreation and education than the total results. This shift does not change the relative ranking of these results.

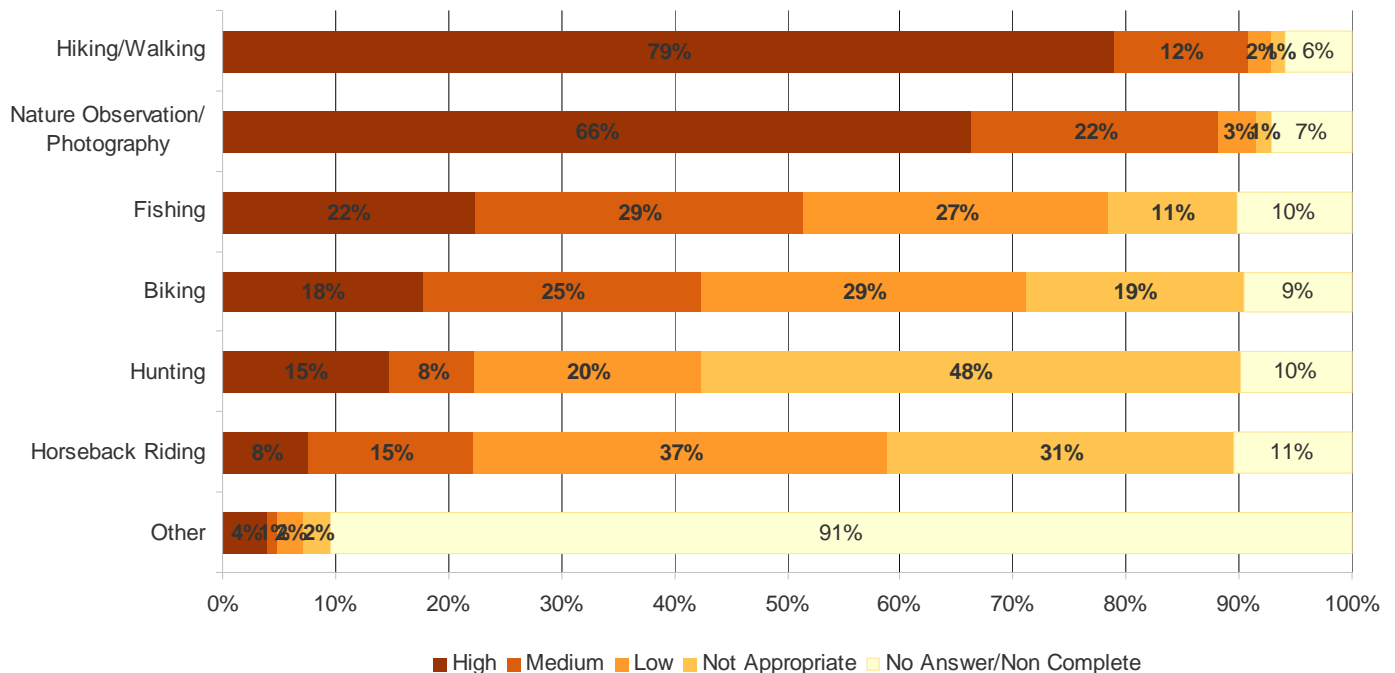
Question 11: How valuable are the following functions?



12. Please consider the following recreational uses and rate them based on what you consider to be appropriate uses for the Ecola Creek Forest Reserve. Please check one box per row.

| | High (4) | Medium (3) | Low (2) | Not Appropriate (1) | No Answer/Non Complete |
|-----------------------------------|-------------|---------------|------------|---------------------------|------------------------------|
| Hiking/Walking | 374 79% | 56 12% | 10 2% | 6 1% | 28 6% |
| Nature Observation/Photography | 314 66% | 104 22% | 16 3% | 6 1% | 34 7% |
| Fishing | 106 22% | 138 29% | 128 27% | 54 11% | 48 10% |
| Biking | 84 18% | 117 25% | 136 29% | 92 19% | 45 9% |
| Hunting | 70 15% | 36 8% | 95 20% | 226 48% | 47 10% |
| Horseback Riding | 36 8% | 69 15% | 174 37% | 145 31% | 50 11% |
| Other | 19 4% | 4 1% | 11 2% | 11 2% | 429 91% |

Question 12: Rate appropriateness of each recreation activity



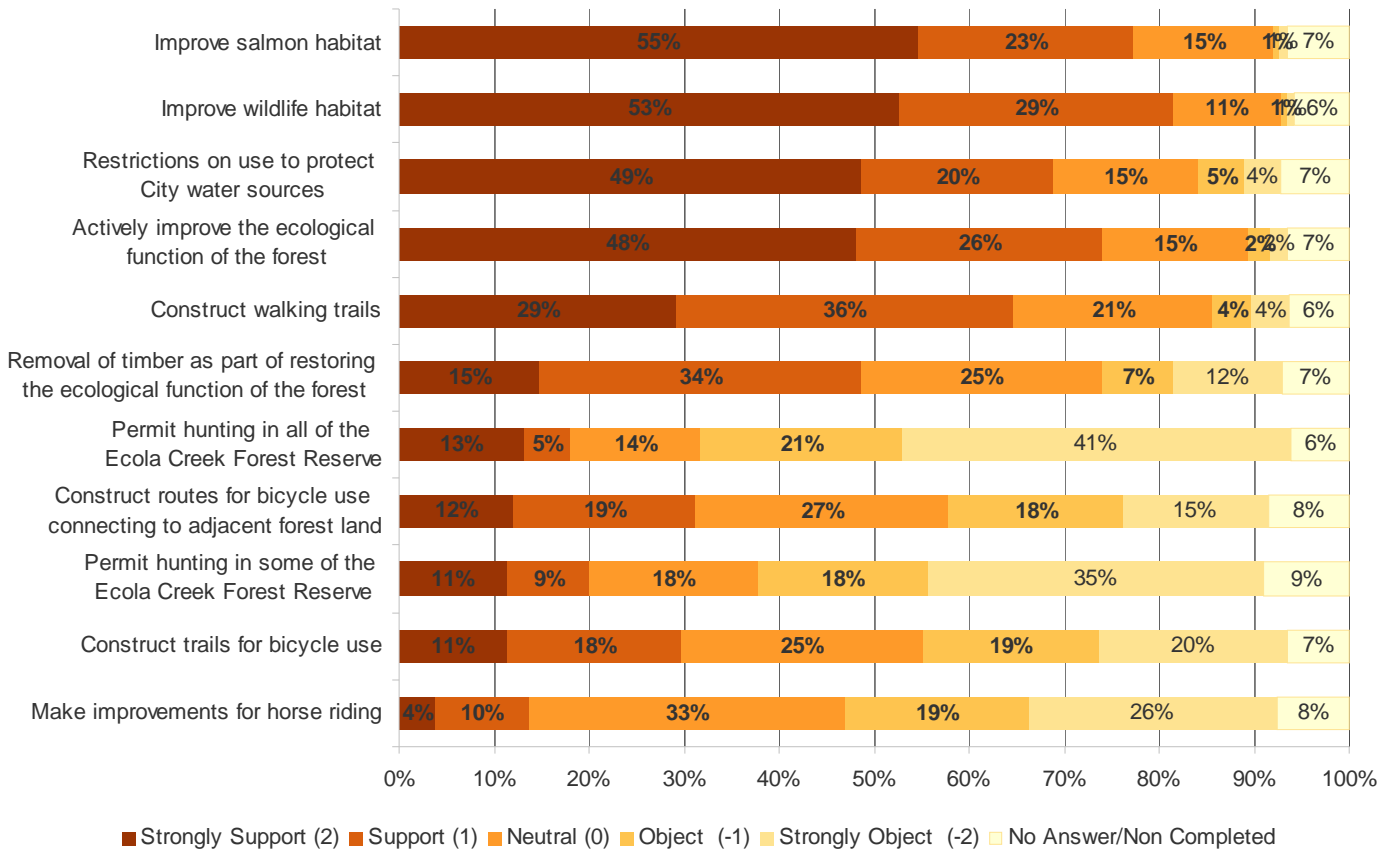
- Results of this question should be considered in the context that recreation functions were rated relatively low in the important functions tested in Question 11.
- Top responses match closely to what respondents are doing now (questions 7 and 8).
- Nearly half of all respondents indicated hunting as “Not Appropriate.”

13. For each item in this list of possible management actions in the Ecola Creek Forest Reserve, please indicate your support. Please check one box per row.

| | Strongly Support (2) | Support (1) | Neutral (0) | Object (-1) | Strongly Object (-2) | No Answer/Non Completed | Weighted Score |
|--|-------------------------|----------------|----------------|----------------|-------------------------|-------------------------|----------------|
| Improve wildlife habitat | 249 53% | 137 29% | 54 11% | 3 1% | 4 1% | 27 6% | 624 |
| Improve salmon habitat | 259 55% | 107 23% | 70 15% | 3 1% | 4 1% | 31 7% | 614 |
| Actively improve the ecological function of the forest | 228 48% | 123 26% | 73 15% | 11 2% | 8 2% | 31 7% | 552 |
| Restrictions on use to protect City water sources | 231 49% | 95 20% | 73 15% | 23 5% | 18 4% | 34 7% | 498 |
| Construct walking trails | 138 29% | 169 36% | 99 21% | 19 4% | 19 4% | 30 6% | 388 |
| Removal of timber as part of restoring the ecological function of the forest | 70 15% | 161 34% | 120 25% | 35 7% | 55 12% | 33 7% | 156 |
| Construct routes for bicycle use connecting to adjacent forest land | 57 12% | 91 19% | 126 27% | 87 18% | 73 15% | 40 8% | -28 |
| Construct trails for bicycle use | 54 11% | 87 18% | 120 25% | 88 19% | 94 20% | 31 7% | -81 |
| Make improvements for horse riding | 18 4% | 47 10% | 158 33% | 91 19% | 124 26% | 36 8% | -256 |
| Permit hunting in some of the Ecola Creek Forest Reserve | 54 11% | 41 9% | 84 18% | 85 18% | 167 35% | 43 9% | -270 |
| Permit hunting in all of the Ecola Creek Forest Reserve | 62 13% | 23 5% | 65 14% | 101 21% | 194 41% | 29 6% | -342 |

- Evaluation of these results included a weighted score calculated by multiplying the number of responses in each answer choice (Strongly Support, Support, Neutral, Object and Strongly Object) by a value ranging from 2 to -2 and then adding all of these scores together for the sub-question. This score is meant to be a reference value to indicate the level of support, taking into account all response values.
- Natural system enhancements such as wildlife and salmon habitat improvements, improving the ecological function of the forest and restrictions to protect water quality rated highest overall.
- The only recreation action that resulted in a net positive score is the construction of walking trails.
- Allowing hunting was the least supported activity, but was slightly more supported if restricted to a portion of the reserve.
- The results are presented in chart form on the next page.

Question 13: Support for management actions



14. Funding for possible actions to implement the management plan will be limited, so the City must prioritize the expenditure of funds. Keeping this in mind, please rank in order of importance the following potential actions, ranking the most important as 1, the second most important as 2 and so on.

| Answer | Number of #1 rankings | Weighted Score |
|--|-----------------------|----------------|
| Improving salmon habitat (a) | 106 | 2222 |
| Improving wildlife habitat (b) | 44 | 2140 |
| Actively improving the ecological function of the forest (c) | 128 | 2124 |
| Providing walking trails (d) | 89 | 1947 |
| Providing trails for bicycle use (e) | 12 | 1075 |
| Providing opportunities for hunting (g) | 38 | 816 |
| Providing improvements for horse use (f) | 2 | 736 |

- Weighting the answer choices for this question involved assigning a value of 7 to 1 (from #1 ranking to #7) and adding up all scores to a total weighted score.
- The number of times each answer was selected as a first choice is also displayed.
- More respondents indicated “Actively improving the ecological function of the forest” as their #1 choice, but “Improving salmon habitat” ranked the highest in total weighted score.
- The most important activities closely match the support indicated in Question 13, with natural system enhancements taking the top priority.

- This question was open-ended, allowing people to write their own response.
- To quickly analyze the responses to this question, a word cloud has been created that shows each word that appeared in the responses, scaled to indicate how frequently it was mentioned.



- Most comments were providing emphasis on specific points covered in questions, such as feelings about access for hunting.
- A number of comments carried a theme of minimizing the amount of resources spent.

**Appendix B: Ecola Creek Forest Reserve Conservation
Easements**

After recording, return to:

[Melissa Leoni
Oregon Watershed Enhancement Board
775 Summer St. NE #360
Salem, Oregon 97301]

CONSERVATION EASEMENT

This Conservation Easement is entered into pursuant to ORS 271.715 to 271.795 this ____ day of _____, 2004, between the City of Cannon Beach (hereinafter “Grantor”) and the State of Oregon, acting by and through its Oregon Watershed Enhancement Board, an agency of the State of Oregon, as holder (hereinafter “Grantee”).

RECITALS:

- A. The Grantor is a local government in Clatsop County, Oregon;
- B. The Grantor is the sole owner in fee simple of certain real property described in Exhibit A (“the Property”);
- C. The Property possesses natural, scenic, educational, recreational, and fish and wildlife values (collectively called “Conservation Values”, as further described in Section 3, below) of great importance to the Grantor and to the citizens of the State of Oregon;
- D. Grantee is an agency of the State of Oregon whose statutory mission is to provide funding to support the acquisition of lands and waters, or interests therein from willing sellers, for the purpose of maintaining or restoring watersheds, habitat and native salmonids. Interests in these lands and waters may be held by local, state and federal agencies, tribes, not-for-profit land conservation organizations, state institutions of higher education, independent not-for-profit institutions of higher education or political subdivisions of this state, as long as the entity continues to use the land or water for the purposes specified under section 4b, Article XV of the Oregon Constitution;
- E. The Grantor has purchased the Property with funds provided, in part, by the Grantee. In exchange for the receipt of such funds, the Grantor has agreed to grant to Grantee a conservation easement as provided in this Agreement;

F. Grantee has publicized and held public meetings in compliance with ORS 271.735 and has thereafter determined that the purchase of a conservation easement is in the public interest;

G. ORS 541.375(9) requires that real property acquired with funds from the Watershed Improvement Grant Fund be used for purposes specified under section 4b, Article XV of the Oregon Constitution, attached as Exhibit B;

H. The purpose of this Conservation Easement is to ensure that the Property will continue to be used for purposes specified under section 4b, Article XV of the Oregon Constitution, in satisfaction of the requirements of ORS 541.375(9), to protect the Conservation Values enumerated in Section 3 of this Easement, and to accomplish the goals described by Grantor in its grant application to Grantee (No. 205-001), upon which basis Grantee awarded Grantor funding to assist with acquisition of the Property.

AGREEMENT

1. Grant of Conservation Easement. In consideration of \$185,000.00 (the “Funds”), and of the mutual promises, terms, conditions, restrictions and undertakings herein set forth, Grantor hereby voluntarily grants and conveys to Grantee a conservation easement in perpetuity upon the Property of the nature and character and to the extent hereinafter set forth.

2. Obligations of the Grantor. The Grantor shall:

- a. Preserve and protect the Conservation Values of the Property (as described in Section 3, below), in perpetuity, preserving its predominantly natural, scenic, forested, and open space condition;
- b. Take all actions necessary to insure that the Property is used and managed in a manner consistent with the Conservation Values described in Section 3, below;
- c. Take all actions necessary to insure that the Property is not used in violation of the use restrictions contained in Section 4, below; and
- d. Prepare a proposed management plan and implement an Approved Management Plan as provided in Section 6, below.

3. Specific Conservation Values. The uses of the Property are limited to those consistent with section 4b, Article XV of the Oregon Constitution and the restoration, preservation and protection of the Conservation Values identified below. Grantor and Grantee have identified the following specific Conservation Values that shall be preserved, protected, and enhanced under this Easement:

- a. Healthy watershed function;

- b. Coastal forest and forested riparian habitats, including the preservation of remnant temperate-climate rainforest;
 - c. Native fish and wildlife habitat, including:
 - i. Habitat for native resident and anadromous salmonid species, such as populations of coho salmon, steelhead, chum salmon, searun cutthroat trout, and Pacific Lamprey,
 - ii. Habitat for native terrestrial and avian species; and
 - d. Current or historic wetlands located on the Property.
4. Prohibited Actions. Except as expressly permitted in Section 5, any activity on the Property, or use of the Property, inconsistent with the purposes of this Conservation Easement or detrimental to the Conservation Values in Section 3 is expressly prohibited, and the Grantor agrees not to engage in or permit any such activity or use. By way of example, the following activities and uses are explicitly prohibited, except to the extent expressly permitted in the Approved Management Plan, described in Section 6, or approved in writing by Grantee, which approval shall not be unreasonably withheld:
- a. Division. Any division, partition or subdivision of the Property is prohibited.
 - b. Commercial Activities. Commercial or industrial activity is prohibited.
 - c. Construction. All construction, improvements and/or other man-made modifications such as buildings, structures, fences, roads and parking lots are prohibited, except for:
 - i. Temporary fences built for the protection of trees and vegetation.
 - ii. Maintenance of existing roads to allow restoration, preservation, and protection of the Conservation Values identified in Section 3 of this Easement.
 - iii. Construction, improvements and/or man-made modifications approved in writing by Grantee, which approval shall not be unreasonably withheld.
 - d. Cutting Vegetation. Any cutting of trees or vegetation is prohibited, except for the purpose of noxious weed control, removal of danger trees, or obstructions to permitted roads.
 - e. Land Surface Alteration. Any mining, quarry, gravel extraction, grading, excavation, or alteration of the land surface is prohibited.

- f. Dumping. Waste and unsightly or offensive materials are not allowed and may not be accumulated on the Property.
- g. Water Courses. Natural water courses, lake shores, wetlands or other water bodies may not be altered.
- h. Off-Road Vehicles. Except for vehicles needed to facilitate implementation of the Approved Management Plan, motorized off-road vehicles such as snowmobiles, dune buggies, all-terrain vehicles and motorcycles may not be operated on the Property. Off road bicycle trails may not be developed on the Property.
- i. Firearms. No shooting of firearms, guns, rifles, for professional or recreational purposes on or from the Property is allowed.
- j. Hazardous Materials. The owner of the Property or land manager shall not, by any act or omission, cause, contribute to or exacerbate a release of hazardous substances on or about the Property. As used herein, the term "Hazardous Substances" includes, without limitation, any material or substance that is (i) defined as a "hazardous substance" under any federal, state or local law, including oil; (ii) asbestos; (iii) fertilizers, herbicides, pesticides, and their residues; and (iv) nuclear or radioactive materials. The Grantor shall promptly notify Grantee of the presence or release of Hazardous Substances in, on, or about the Property, whether caused or discovered by the Grantor or any other person or entity. The Grantor shall take any action required by law to contain, remove, and remediate the Hazardous Substances. In addition, the Grantor shall take all appropriate actions to contain, remove or remediate the Hazardous Substances to the extent necessary to protect the Conservation Values identified in Section 3 this Conservation Easement. The Grantor shall cooperate fully with any investigation, removal or remedial action on or about the Property and shall not hinder or delay entry to, investigation of, or removal or remedial action on the Property by EPA, DEQ or their authorized representatives.

If Hazardous Substances are found or released on the Property, the Grantor shall keep Grantee informed on a quarterly basis about the progress of any actions to remove, remediate, or contain Hazardous Substances on the Property, or decisions that no removal, remediation or containment will be necessary.

- k. Billboards. Billboards and signs are prohibited. Signs may, however, be displayed to state:
 - i. the name and address of the Property.
 - ii. the owner's name.
 - iii. the area protected by this Conservation Easement.

- iv. prohibition of any unauthorized entry or use.
- v. restoration activities implemented.

Signs may also be displayed for educational purposes consistent with protection of the Conservation Values described in Section 3 of this Easement.

1. No domestic, exotic or farm animals of any type are allowed on the Property unless expressly permitted in writing by Grantee and consistent with enhancement, preservation, or protection of the Conservation Values described in Section 3 of this Easement.
5. Permitted Actions. The Property may be used for the activities described in the Grantor's grant application, including watershed restoration activities, educational activities, and passive, low-impact recreational use such as hiking and walking trails, in a manner consistent with section 4b, Article XV of the Oregon Constitution, the Conservation Values listed in Section 3 of this Easement, and the Approved Management Plan.
6. Management Plan.
- a. Grantor shall prepare a proposed management plan to enhance, protect and preserve the Conservation Values on the Property.
 - b. Grantor shall submit its proposed management plan to Grantee for approval no later than June 30, 2006.
 - c. If Grantor fails to submit an acceptable management plan to Grantee by August 30, 2006, Grantee will have the right, but not the obligation, to prepare its own management plan, or contract with a third party to prepare an acceptable management plan, and Grantor will pay all Grantee costs and expenses for the preparation of such plan. Such remedy shall be in addition to any other remedies provided for in Section 9, below.
 - d. After a proposed management plan has received final approval by Grantee, or has been prepared by Grantee pursuant to Section 6(c) above, (the "Approved Management Plan"), Grantor will manage the Property in a manner consistent with the terms of the Approved Management Plan and this Conservation Easement.
7. Duration, Burdens, and Benefits. The covenants and restrictions of this Conservation Easement are binding on the Grantor and its successors and assigns, and shall run with the Property in perpetuity. The benefits of this Conservation Easement are in gross and are assignable, but only to an eligible holder specified in ORS 271.725(1).
8. Grantee's Right Of Entry And Inspection. Grantee shall have the right, in a reasonable manner and at reasonable times, to enter and inspect the Property to determine

compliance with this Conservation Easement. Except in the case of an emergency, Grantee shall attempt to give the Grantor prior notice, which may be by telephone.

9. Grantee's Remedies.

- a. Notice of Violation; Corrective Action. If Grantee determines that a violation of the terms of this Easement or the Approved Management Plan has occurred or is threatened, Grantee shall give written notice to the Grantor of such violation and demand corrective action sufficient to cure the violation and, where the violation involves injury to the Property resulting from any use or activity inconsistent with the purpose of this Easement or the Approved Management Plan, to restore the portion of the Property so injured to its prior condition in accordance with a plan approved by Grantee.
- b. Management Plan. If an Approved Management Plan is not adopted by September 30, 2006, or if the Grantor fails to properly implement the Approved Management Plan, then Grantee will have the right, but not the obligation to:
 - i. Prepare a management plan as provided in Section 6(c), above;
 - ii. Perform, or cause to be performed, the obligations under the Approved Management Plan, in which case i) the Grantor will reimburse Grantee for all costs incurred thereby and ii) grant to Grantee or its designees a license to enter the property and perform the duties under the Approved Management Plan; and/or
 - iii. Require the Grantor to repay to Grantee the grant amount (\$185,000), which shall bear interest from the effective date of this Agreement at the rate provided for in OAR Chapter 695, as amended from time to time. Upon repayment to Grantee, Grantee will release this Conservation Easement and the Grantor's obligations hereunder.
- c. Legal Action. If the Grantor fails to cure the violation within thirty (30) days after receipt of notice thereof from Grantee, or under circumstances where the violation cannot reasonably be cured within a thirty (30) day period, fails to begin curing such violation within the thirty (30) day period, or fails to continue diligently to cure such violation within the thirty (30) day period, or fails to continue diligently to cure such violation until finally cured, Grantee may alternatively:
 - i. Bring an action in equity in a court of competent jurisdiction to enforce the terms of this Easement or Approved Management Plan, to enjoin the violation, ex parte as necessary, by temporary or permanent injunction, and to require the restoration of the Property to the condition that existed prior to any such injury; or

- ii. Bring an action to recover damages for violation of the terms of this Easement or injury to any Conservation Values protected by this Easement, including, without limitation, damages for the loss of scenic, aesthetic, or environmental values.
- iii. In addition, Grantee shall be entitled to recover damages for costs or expenses incurred due to the failure of the Grantor to perform its obligations under the Approved Management Plan.
- d. Emergency Enforcement. If Grantee, in its sole discretion, determines that circumstances require immediate action to prevent or mitigate significant damage to the Conservation Values of the Property, Grantee may pursue its remedies under this Section 9 without prior notice to the Grantor or without waiting for the period provided for cure to expire.
- e. Scope of Relief. Grantee's rights under this Section 9 apply equally in the event of either actual or threatened violations of the terms of this Easement. The Grantor agrees that Grantee's remedies at law for any violation of the terms of this Easement are inadequate and that Grantee shall be entitled to the injunctive relief described in Section 9(c), both prohibitive and mandatory, in addition to such other relief to which Grantee may be entitled, including specific performance of the terms of this Easement, without the necessity of proving either actual damages or the inadequacy of otherwise available legal remedies.
- f. Remedies Cumulative. Grantee's remedies described in this Section 9 shall be cumulative and shall be in addition to all remedies now or hereafter existing at law or in equity.
- g. Attorney Fees. In any action or suit to enforce any right or remedy under this Agreement the prevailing party shall be entitled to recover its reasonable attorneys' fees and costs. Grantee's obligation under this Section 9 is subject to the limitations of Article XI, section 7 of the Oregon Constitution.
- h. Forbearance. Forbearance by Grantee to exercise its rights under this Easement in the event of any breach of any term of this Easement by the Grantor shall not be deemed or construed to be a waiver by Grantee of such term or of any subsequent breach of the same or any other term of this Easement or of any of Grantee's rights under this Easement. No delay or omission by Grantee in the exercise of any right or remedy upon any breach by the Grantor shall impair such right or remedy or be construed as a waiver.
- i. Waiver of Certain Defenses. The Grantor hereby waives any defense of laches, estoppel, or prescription.

- j. Acts Beyond Grantor's Control. Nothing contained in this Easement shall be construed to entitle Grantee to bring any action against the Grantor for any injury to or change in the Property resulting from causes beyond the Grantor's control, including, without limitation, fire, flood, storm, natural earth movement, and trespassers (although the Grantor shall take reasonably prudent actions to prevent trespasser access to the Property). In addition, the Grantor shall not be responsible for any prudent action, taken by the Grantor under emergency conditions to prevent, abate, or mitigate significant injury to the Property resulting from such causes.

10. Rights Of Action Against Third Parties. Grantee may bring any action it deems necessary or prudent against third parties if, in its good faith judgment, it believes such third parties' actions may impair the Conservation Values identified in Section 3 above.

11. Notices. For purposes of this agreement, notices may be provided to either party, by personal delivery or by mailing by First Class Mail a written notice to that party at the address shown below, or at such other address as a party may instruct by notice given the other pursuant to this paragraph. Service will be complete upon the earlier of delivery or 2 business days after depositing the properly addressed notice with the U.S. Postal Service with sufficient postage.

GRANTOR:

City Manager
City of Cannon Beach
PO Box 368
Cannon Beach, OR 97110
(503) 436-1581

GRANTEE:

Executive Director
Oregon Watershed Enhancement Board
775 Summer Street, NE
Salem, OR 97301-1290
(503) 986-0186

12. Maintenance or Repair, Taxes or Assessments. Grantee shall have no obligation or liability for maintenance or repair of the Property, or for the payment of any real estate taxes or assessments levied on the Property.

13. Indemnification. Grantor and Grantee acknowledge that each is insured with respect to tort liability by the State of Oregon Insurance Fund, a statutory system of self-insurance established by ORS chapter 278 and subject to the Oregon Tort Claims Act (ORS 30.260 to 30.300). Each party agrees to accept that coverage as adequate insurance of the other party with respect to personal injury and property damage. Grantor and Grantee each shall be responsible for any negligent acts or omissions of its own employees or agents under this conservation easement.

14. Severability. In the event any provision of this Conservation Easement is determined by a court to be void and unenforceable, all other terms of this Conservation Easement shall remain valid and binding.

15. Assignment or Disposal. The Grantor may not assign or transfer its rights or delegate its responsibilities under this Conservation Easement or sell, lease, exchange, or otherwise dispose of the Property without prior written approval from OWEB, which

approval shall not be unreasonably withheld. Such approval will not be granted if a profit, as defined by OWEB in OAR Chapter 695, as amended from time to time, will result from conveyance of the Property. The foregoing notwithstanding, the Grantor may grant other conservation easements on the Property, without the necessity of obtaining the prior approval of OWEB, so long as such conservation easements are consistent with and advance the protections of the Conservation Values described in Section 3 of this Easement, the management goals for the Property as specified in the Grantor's grant application (#205-001), and Section 4(b), Article XV of the Oregon Constitution.

16. Dispute Resolution. If there is a dispute regarding the use restrictions contained in this Conservation Easement or assignment or transfer of the Property, prior to Grantee seeking to enforce the terms of the Easement, the parties shall meet, negotiate in good faith, and attempt to resolve amicably any controversy or any disputed claim by any party against any other party arising under or related to this Conservation Easement. If the parties are unable to resolve the matter themselves they shall confer in good faith with respect to resolving the matter through mediation with a mutually acceptable, qualified third party. Each party shall share the cost of mediation equally.

17. Modification. This Conservation Easement may not be modified, changed, amended, deleted or eliminated without the express written consent of both parties, their successors or assigns.

18. Oregon Law: This Conservation Easement will be construed in accordance with Oregon Law.

19. Liberal Construction: This Conservation Easement shall be liberally construed in favor of maintaining the Conservation Values of the Property, as described in Section 3, above.

IN WITNESS WHEREOF, the Grantor and Grantee have executed this Conservation Easement on this ____ day of _____, 2004.

Accepted by City of Cannon Beach as Grantor:

By: _____

Its: _____

STATE OF OREGON)
) ss.
County of _____)

The foregoing instrument is acknowledged before me this ____ day of _____, 2004, by _____, of _____, on its behalf.

NOTARY PUBLIC FOR OREGON

My commission expires: _____

Accepted by OWEB as Grantee:

By: _____

Its: Acting Director

STATE OF OREGON)
) ss.
County of _____)

The foregoing instrument is acknowledged before me this ____ day of _____, 2004, by _____, of _____, on its behalf.

NOTARY PUBLIC FOR OREGON

My commission expires: _____

EXHIBIT A

IN CLATSOP COUNTY, OREGON

TOWNSHIP 5 NORTH, RANGE 10 WEST OF THE WILLAMETTE MERIDIAN:

SECTION 28: THE **SW¹/₄SW¹/₄** **LESS AND EXCEPT** THAT PORTION THEREOF LYING WITHIN PARCEL 1 OF PARTITION PLAT NO. 1994-022 RECORDED MAY 24, 1994 IN BOOK 2 AT PAGE 27, CLATSOP COUNTY PLAT RECORDS;

SECTION 32: THAT PORTION OF THE **NE¹/₄NE¹/₄NE¹/₄** LYING NORTHEASTERLY OF THE NORTHEASTERLY RIGHT OF WAY LINE OF THAT 30 FOOT WIDE ACCESS, UTILITY, AND WATERLINE EASEMENT CREATED ON PARTITION PLAT 1994-022 FOR THE BENEFIT OF THE CITY OF CANNON BEACH;

SECTION 33: THAT PORTION OF THE **NE¹/₄NW¹/₄** DESCRIBED AS FOLLOWS:
 BEGINNING AT A POINT WHICH IS THE WEST ONE-SIXTEENTH CORNER COMMON TO SECTIONS 28 AND 33, TOWNSHIP 5 NORTH, RANGE 10 WEST, SAID POINT BEING MARKED BY A BRASS CAP;
 THENCE SOUTH 89°28'08" EAST, ALONG THE NORTH LINE OF SAID SECTION 33, A DISTANCE OF 709.73 FEET;
 THENCE SOUTH 22°14'49" EAST A DISTANCE OF 288.30 FEET;
 THENCE SOUTH 42°34'05" WEST A DISTANCE OF 125.07 FEET;
 THENCE NORTH 72°37'01" WEST A DISTANCE OF 769.39 FEET, MORE OR LESS, TO A POINT ON THE WEST LINE OF SAID **NE¹/₄NW¹/₄**;
 THENCE NORTH ALONG SAID WEST LINE A DISTANCE OF 135.66 FEET TO THE **POINT OF BEGINNING**;

THE **W¹/₂NW¹/₄** **LESS AND EXCEPT** THAT PORTION THEREOF LYING WITHIN PARCEL 1 OF PARTITION PLAT NO. 1994-022 RECORDED MAY 24, 1994 IN BOOK 2 AT PAGE 27, CLATSOP COUNTY PLAT RECORDS.

EXHIBIT B

Oregon Constitution Article XV

Section 4b. Use of net proceeds from state lottery for salmon restoration and watershed and wildlife habitat protection. Moneys disbursed for the public purpose of financing the restoration and protection of wild salmonid populations, watersheds, fish and wildlife habitats and water quality from the fund established under Section 4 of this Article shall be administered by one state agency. At least 65 percent of the moneys will be used for capital expenditures. These moneys, including grants, shall be used for all of the following purposes:

- (1) Watershed, fish and wildlife, and riparian and other native species, habitat conservation activities, including but not limited to planning, coordination, assessment, implementation, restoration, inventory, information management and monitoring activities.
- (2) Watershed and riparian education efforts.
- (3) The development and implementation of watershed and water quality enhancement plans.
- (4) Entering into agreements to obtain from willing owners determinate interests in lands and waters that protect watershed resources, including but not limited to fee simple interests in land, leases of land or conservation easements.
- (5) Enforcement of fish and wildlife and habitat protection laws and regulations. [Created through initiative petition filed March 11, 1998, and adopted by the people Nov. 3, 1998]

After recording, return to:
Oregon Watershed Enhancement Board
Policy and Oregon Plan Section
775 Summer Street NE, Suite 360
Salem, OR 97301-1290

CONSERVATION EASEMENT

This Conservation Easement ("**Easement**"), is granted by the City of Cannon Beach ("**Grantor**") to the State of Oregon, acting by and through its Oregon Watershed Enhancement Board, ("**OWEB**"). It is executed by Grantor and accepted by OWEB on April 3 2012, 2012 (the "**Effective Date**").

RECITALS

- A. Grantor is an Oregon municipal corporation.
- B. Grantor is the sole owner in fee simple of certain real property located in Clatsop County, Oregon, described in Exhibit A ("**the Property**").
- C. The Property possesses natural, scenic, educational, recreational, and fish and wildlife habitat values (collectively "**Conservation Values**," described in Section 3, below) of importance to Grantor and to the citizens of the State of Oregon.
- D. OWEB is an agency of the State of Oregon directed under Article XV, Section 4b of the Oregon Constitution and is authorized under Oregon Revised Statutes (ORS) 541.375(9) to allocate funding to local, state, and federal agencies, tribes, not-for-profit land conservation organizations and trusts, state institutions of higher education, independent not-for-profit institutions of higher education, and political subdivisions of this state for land acquisition projects that, in the judgment of OWEB, further the goal of protecting or restoring wild salmonids, fish and wildlife habitat, watersheds, or water quality in Oregon.
- E. Grantor will receive funds from OWEB as reimbursement of a portion of the purchase price paid by Grantor when it acquired the Property. In exchange for the receipt of such funds, Grantor is willing to grant this Easement to OWEB under ORS 271.715 to 271.795.
- F. The purpose of this Easement is to ensure that the Property will continue to be used for purposes specified under Article XV, Section 4b of the Oregon Constitution, in satisfaction of the requirements of ORS 541.375(9), to protect the Conservation Values of the Property, and to accomplish the goals stated in this Easement and described by Grantor in its grant application to OWEB (No.

209-112) on file with OWEB, upon which basis OWEB has awarded funding to Grantor to assist with acquisition of the Property.

AGREEMENT

- 1. Grant of Easement.** In consideration of the receipt of \$1,400,000.00 (the “*Funds*”), Grantor hereby grants to OWEB a perpetual easement on the Property, subject to the terms stated below.
- 2. Rights of OWEB.** To accomplish the purpose of this Easement, OWEB may:
 - a. preserve and protect the Conservation Values of the Property;
 - b. enter the Property: (i) without notice if OWEB determines that immediate entry is required to prevent, terminate, or mitigate a violation of this Easement as provided in Section 8(b) below; and (ii) at any reasonable time after giving Grantor notice, which OWEB may give by telephone, to monitor Grantor’s compliance with and otherwise enforce this Easement; and
 - c. prevent any activity on or use of the Property that is inconsistent with the purpose of this Easement or the Conservation Values of the Property and require that Grantor restore the Property damaged by any inconsistent activity or use.

In exercising its rights under the Easement, OWEB shall not interfere with Grantor’s use and quiet enjoyment of the Property, except to the extent authorized under the Easement.

- 3. Conservation Values.** Grantor shall preserve, protect, and enhance the following Conservation Values:
 - a. Priority ecological systems:
 - i. Ecola Creek and tributaries (approximately 16 stream miles)
 - ii. Red alder and Sitka spruce lowland forested floodplain and wetlands (approximately 285 acres)
 - iii. Sitka spruce and western hemlock-dominated upland forest, 50-60 year-old age class (approximately 480 acres)
 - b. Habitat for priority species:
 - i. Coho salmon
 - ii. Steelhead
 - iii. Bald eagle
 - iv. Band-tailed pigeon
 - v. Great-blue heron
 - vi. Peregrine falcon
 - vii. Rufous hummingbird
 - viii. Willow flycatcher
 - ix. Red-legged frog

- x. Townsend's big-eared bat
 - c. Healthy watershed function: The streams are connected to the wetlands and floodplains in a broad valley floor. The connections attenuate high stream flows, afford off-channel habitat to salmon and steelhead, and filter sediment and other pollutants from the water.
 - d. The specific existing Conservation Values of the Property are documented in an inventory of relevant features of the Property, dated July 27, 2011, on file at the offices of Grantor and OWEB and incorporated into this Easement by this reference ("***Baseline Inventory Documentation***"). The Baseline Inventory Documentation consists of reports, maps, photographs, and other documentation that provide, collectively, a mutually agreed representation of inventoried relevant features of the Property at the time of this Easement. Grantor and OWEB intend the Baseline Inventory Documentation to serve as an objective informational baseline for purposes of monitoring Grantor's compliance with the terms of this Easement. Grantor and OWEB have reviewed and accepted the Baseline Inventory Documentation, as evidenced in the acknowledgement attached to this Easement as Exhibit B.
- 4. Prohibited Activities; Trespassers; Exceptions.** Grantor shall not use or authorize others to use the Property in any way that is inconsistent with Article XV, Section 4b of the Oregon Constitution, the Conservation Values of the Property, or the Approved Management Plan described in Section 5 below. Further, Grantor shall prevent unauthorized individuals from entering the Property and eject any trespassers discovered on the Property. In general, Grantor may use or authorize the use of the Property for recreation or education if this use does not impair the Conservation Values of the Property.

Any activity on the Property or use of the Property, inconsistent with the purpose of this Easement or detrimental to the Conservation Values is expressly prohibited, and Grantor shall not engage in or permit any such activity or use.

By way of example, the following activities on and uses of the Property are prohibited, except as noted below or in the Approved Management Plan described in Section 5 below:

- a. Division. Any division, partition or subdivision of the Property.
- b. Commercial Activities. Any commercial or industrial activity.
- c. Construction. Any construction, improvement or other man-made modification including buildings, structures, fences, roads and parking lots, except for:
 - i. boundary fences that are "wildlife friendly" as defined by the Oregon Department of Fish and Wildlife or a successor agency, providing opportunity for wildlife ingress and egress;

- ii. temporary fences built for the protection of trees and vegetation, including protection from wildlife damage, that are limited to isolated and small areas (individual trees or bushes) or small plantings (less than 1/5 of an acre); and
 - iii. maintenance of existing roads to allow preservation, protection, and enhancement of the Conservation Values.
- d. Vegetation. Any cutting or removal of trees or vegetation, except for the purpose of noxious weed control, removal of danger trees, or removal of obstructions to permitted roads.
- e. Land Surface Alteration. Any mining, quarry, gravel extraction, grading, excavation, or alteration of the land surface.
- f. Dumping. Any dumping or accumulation of waste or unsightly or offensive materials.
- g. Water Courses. Any alteration of natural water courses, lake shores, wetlands or other water bodies.
- h. Off-Road Vehicle Use. Use of any motorized off-road vehicles including snowmobiles, dune buggies, all-terrain vehicles or motorcycles, whether on or off existing roads, except for vehicles needed to facilitate implementation of the Approved Management Plan.
- i. Bicycles. Any operation of bicycles, except on existing roads.
- j. Firearms. Any discharging of firearms.
- k. Hazardous Materials. Any release of Hazardous Substances on or about the Property, or any act or omission, causing, contributing to, or exacerbating of any release of a Hazardous Substance. “**Hazardous Substances**” includes any material or substance that is defined as a “hazardous substance” under any federal, state or local law, oil, asbestos, fertilizers, herbicides, pesticides, or their residues. “**Release**” includes any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping or disposing into the environment, including abandoning or discarding barrels, containers or other closed receptacles containing any hazardous substance, but excludes the proper application of fertilizers, herbicide, and pesticide in accordance with the Approved Management Plan and all product and manufacturer instructions as to use and application rate and all applicable laws, rules, and permits.

Grantor shall promptly notify OWEB of the presence or release of Hazardous Substances in, on, or about the Property, whether caused or discovered by Grantor or any other person or entity. After notifying OWEB, Grantor shall take all action to contain, remove, and remediate the Hazardous Substances required by law or

necessary to protect the Conservation Values of the Property. Grantor shall cooperate fully with any investigation, removal or remedial action on or about the Property and shall not hinder or delay entry to, investigation of, or removal or remedial action on the Property by the Environmental Protection Agency (“**EPA**”), Oregon Department of Environmental Quality (“**DEQ**”), or their authorized representatives.

If Hazardous Substances are found or released on the Property, Grantor shall keep OWEB informed on a quarterly basis about the progress of any actions to remove, remediate, or contain Hazardous Substances on the Property, or directives by EPA, DEQ, or other authorities that no removal, remediation or containment will be necessary.

- l. Public Access. Any access by the public, except for enhancement, monitoring, education, or recreation activities authorized by Grantor that do not harm the Conservation Values.
 - m. Billboards and Signs. All billboards and signs, except signs that display the name and address of the Property, the owner’s name, the area protected by the Easement, prohibitions of any unauthorized entry or use, restoration activities implemented, public access rules, and educational content consistent with protection of the Conservation Values.
 - n. Domestic, Exotic or Farm Animals. All domestic, exotic, and farm animals of any kind, unless expressly permitted in writing by OWEB after it finds that allowing the animals is consistent with preservation, protection, and enhancement of the Conservation Values.
 - o. Cultural Resources. Any excavation, injury, destruction, removal, or alteration of any cultural resources on or about the Property, except for activity authorized by a permit issued under ORS 390.235 and undertaken in compliance with all state and federal laws related to archeological objects and sites and cultural resources as defined in ORS 358.905 and OAR 736-018-0020.
 - p. Applicable Law. Any activity not in compliance with any federal, state, and local law, regulation, or requirement applicable to the Property.
 - q. Liens or Easements. Granting or otherwise permitting any lien or easement to encumber or attach to the Property, which would allow activities inconsistent with the protection of the Conservation Values.
5. **Management Plan**. Grantor shall propose a management plan (“***Proposed Management Plan***”) that describes how Grantor shall preserve, protect, and enhance the Conservation Values of the Property. The Proposed Management Plan must be consistent with OWEB’s established guidelines for management plans, and address public access, invasive species control, restoration including but not limited to road

decommissioning, forest management, and coordination of power line maintenance. The Proposed Management Plan must include monitoring and evaluation activities and a schedule for implementation.

- a. Grantor shall submit the Proposed Management Plan to OWEB within 12 months after the Effective Date.
- b. Grantor and OWEB shall work together to revise the Proposed Management Plan, as appropriate, until the Proposed Management Plan is acceptable to Grantor and OWEB and has been approved by OWEB. When approved by OWEB, the Proposed Management Plan will then be an approved management plan ("**Approved Management Plan**"). OWEB shall not withhold its approval of a Proposed Management Plan unless it believes, in good faith 1) that the Proposed Management Plan inadequately addresses material issues related to the preservation, protection, and enhancement of the Conservation Values; and 2) that reasonable alternative provisions will result in better protection of the Conservation Values. If Grantor and OWEB do not agree on specific provisions of an Approved Management Plan within 18 months after the Effective Date, the parties shall resolve their disagreement using the dispute resolution process in Section 8 below.
- c. If Grantor fails to submit a Proposed Management Plan to OWEB within 12 months after the Effective Date, OWEB may prepare its own management plan, or contract with a third party to prepare a management plan which, upon being approved by OWEB, will become the Approved Management Plan. Grantor shall pay all of OWEB's costs and expenses for preparation of the plan.
- d. After the Proposed Management Plan or the plan prepared under Section 5(c) above has received final approval by OWEB, Grantor shall manage the Property in a manner consistent with the terms of the Approved Management Plan and this Easement.
- e. Grantor may propose changes to an Approved Management Plan at any time by submitting a written request to OWEB. OWEB shall endeavor to review and comment on the proposed changes within 60 days after receiving Grantor's proposed changes. OWEB shall approve or reject the proposed changes according to the standards set forth in Section 5(b) above. If OWEB fails to approve the proposed changes by the end of the 60-day period, the proposed changes are rejected. If Grantor and OWEB do not agree on specific provisions of the proposed changes, the parties shall resolve the dispute using the dispute resolution process in Section 8 below.
- f. Grantor shall not conduct any activities described in the Proposed Management Plan until OWEB either approves the Proposed Management Plan or OWEB expressly permits the specific activities in writing.

- g. Grantor shall obtain OWEB's prior written approval of any proposed activity on the Property not included in the Approved Management Plan. Grantor shall submit written notice of any proposed activity to OWEB not less than 75 days prior to the date Grantor intends to undertake the proposed activity. The notice shall describe the nature, scope, design, location, timetable, and any other material aspect of the proposed activity in sufficient detail to permit OWEB to judge whether the activity is consistent with the purpose of this Easement.
- 6. Duration, Burdens, and Benefits.** This Easement binds the Grantor, its successors and assigns, and runs with the Property in perpetuity. The benefits of this Easement are in gross and are assignable, but only to an eligible holder specified in ORS 271.725(1) or its successor provision.
- 7. Ecosystem Services Credits.** Grantor may, upon OWEB's written approval, sell mitigation credits, wetland credits, carbon credits, habitat credits, species credits, and other similar types of mitigation or conservation credits ("*Ecosystems Services Credits*") generated from the enhancement of Conservation Values beyond the values indicated in the Baseline Inventory Documentation. Grantor shall submit a written request for OWEB's approval at least 30 days prior to the next regularly scheduled public business meeting of OWEB's governing body. Grantor's request shall describe in detail (including as appropriate maps, photographs, inventories, or other documentation) how the enhanced Conservation Values exceed those described in the Baseline Inventory Documentation. Where applicable, Grantor's request shall also demonstrate how the sale of Ecosystem Services Credits complies with any restrictions associated with funding used to achieve the enhanced Conservation Values.
- 8. OWEB's Remedies.**
- a. Mediation of Disputes. The parties shall attempt to amicably resolve any disputes or disagreements through informal discussions, and may enter into non-binding mediation prior to resorting to litigation. If the parties agree to mediate a dispute, they shall select a mutually acceptable qualified third party mediator and each party shall share the costs of the mediator equally; each party shall bear its own costs for preparing for and attending the mediation. However, if OWEB in its sole discretion determines that informal discussions or mediation may not be fruitful or the resulting delay may otherwise threaten the Conservation Values, OWEB may at any time pursue any of the remedies available to it under this Section 8.
 - b. Notice of Violation; Corrective Action.
 - i. If OWEB determines that a violation of this Easement has or may have occurred or is threatened, OWEB may give written notice to Grantor of the violation and may demand:

- A. corrective action sufficient to cure the violation within 30 days; and,
- B. if the violation involves injury to the Property resulting from any use or activity inconsistent with the purpose of this Easement or the Approved Management Plan, restoration of the portion of the Property injured to its prior condition in accordance with a plan approved by OWEB.

However, if OWEB, in its sole discretion, determines that circumstances require immediate action to prevent or mitigate significant damage to the Conservation Values of the Property, OWEB may pursue its remedies under this Section 8 without prior notice to Grantor or without waiting for any cure period provided in a violation notice to expire.

- ii. If the parties fail to adopt an Approved Management Plan within 18 months after the Effective Date, or if Grantor fails to properly implement the Approved Management Plan, OWEB may:
 - A. prepare a management plan as described in Section 5(c), above;
 - B. perform, or cause to be performed, the obligations under the Approved Management Plan, and enter upon the Property for this purpose; and
 - C. recover from Grantor all costs incurred by OWEB as a result of OWEB performing or causing performance of the Approved Management Plan;
- c. Legal Action. If Grantor fails to cure a violation of the terms of this Easement within 30 days after receipt of notice from OWEB, or, if the violation cannot reasonably be cured within 30 days, fails to begin curing the violation within the 30-day period, or fails to continue diligently to cure the violation until finally cured, OWEB may:
 - i. enforce this Easement, enjoin the violation, ex parte as necessary, by temporary or permanent injunction, and require the restoration of the Property to the condition that existed prior to the violation or to the condition otherwise required by this Easement; or
 - ii. recover damages for violation of this Easement or injury to any Conservation Values protected by this Easement, including damages for the loss of scenic, aesthetic, or environmental values, or damages for the value of Ecosystem Services Credits sold by Grantor that are properly owned by OWEB; or
 - iii. recover the greater of the following from Grantor:
 - A. The Funds, together with interest from the Effective Date at the rate provided for in ORS 82.010, as amended from time to time. The required repayment amount will not exceed five times the Funds; or

- B. The Liquidation Value, which takes into account both increases and decreases in the fair market value of the Property over time, and is to be calculated as follows:
- a) the fair market value of the Property at the time the Liquidation Value is to be determined, as if unencumbered by the Easement, and unencumbered by any other lien or mortgage on the Property;
 - b) less the value (if any) of any capital improvements Grantor made to the Property after the Effective Date, if the improvements are otherwise permitted pursuant to Section 4 above;
 - c) multiplied by 54.7 %, which constitutes the percentage that the Funds bear to the fair market value of the Property as established by the appraisal prepared by Mason, Bruce and Girard, Inc. and dated April 28, 2011, on file at the offices of Grantor and OWEB (the “*Appraisal*”).

For example, if the fair market value of the Property at the time the Liquidation Value is to be determined is \$1,000,000, and the value of Grantor’s capital improvements made after the Effective Date is \$200,000, and OWEB’s grant equaled 54.7% of the fair market value of the Property as established by the Appraisal, the Liquidation Value is:

$$(\$1,000,000 - \$200,000) \times .547 = \$437,600.$$

Upon Grantor’s payment of the greater of the amounts calculated under Section 8(c)(iii)(A) and Section 8(c)(iii)(B) above, OWEB shall execute and record a document terminating its interest in this Easement.

- d. Equitable Relief. Grantor acknowledges that OWEB acquired this Easement to protect the Conservation Values, that injury to the Conservation Values cannot be adequately compensated with money damages, that OWEB’s remedies at law for any violation of the terms of this Easement are inadequate and that OWEB may pursue equitable relief in addition to any other remedies available to it.
- e. Release of Easement for Liquidation Value. If OWEB determines in good faith that the purpose of this Easement cannot be realized, OWEB shall, upon receipt of the Liquidation Value as defined in Section 8(c)(iii)(B) above, execute and record a document terminating its interest in this Easement.
- f. No waiver. The failure of OWEB to enforce any term of this Easement or the waiver of any violation or nonperformance of this Easement in one instance does not constitute a waiver by OWEB of that or any other term nor is it a waiver of

any subsequent violation or nonperformance. Any waiver, if made, is effective only in the specific instance and for the specific purpose given.

- g. Waiver of Certain Defenses. Grantor hereby waives any defense of laches, estoppel, or prescription.
- h. Acts Beyond Grantor's Control. Nothing in this Easement entitles OWEB to bring any action against Grantor for any injury to or change in the Property resulting from causes beyond Grantor's control. In addition, Grantor is not responsible for any prudent action it takes under emergency conditions to prevent, abate, or mitigate significant injury to the Property resulting from such causes.

9. Joinder in Actions Against Third Parties. Upon request by OWEB, Grantor shall join with OWEB in any action OWEB may deem necessary or prudent to bring against third parties to protect the Conservation Values of the Property.

10. Notice and Approval.

- a. Notice. Notices may be provided to either party by personal delivery or by mailing by First Class Mail a written notice to that party at the address shown below, or at such other address as a party may instruct by notice given the other pursuant to this paragraph. Service is complete after the earlier of delivery or 2 business days after depositing the properly addressed notice with the U.S. Postal Service with sufficient postage.

GRANTOR:
City Planner
City of Cannon Beach
PO Box 368
Cannon Beach, OR 97110
(503) 436-8040

OWEB:
Executive Director
RE: Grant #209-112
Oregon Watershed Enhancement Board
775 Summer Street NE, Suite 360
Salem, OR 97301-1290
(503) 986-0178

- b. OWEB's Approval. If OWEB's approval is required, OWEB shall, unless otherwise provided in this Easement, grant or withhold its approval in writing within 60 days after receipt of Grantor's written request. OWEB may withhold its approval only upon its good faith determination that the proposed action is inconsistent with the purpose of this Easement. If, at the end of 60 days, Grantor has not received notification of OWEB's approval, the request is denied.

11. Maintenance, Repair, Taxes and Assessments. OWEB has no obligation or liability for any maintenance or repair of the Property, or for the payment of any real estate taxes or assessments levied on the Property.

12. Indemnification. Grantor shall indemnify and hold OWEB and the State of Oregon and their officers, employees and agents harmless against all losses and liabilities arising out of or relating to the activities of Grantor or its officers, employees,

subcontractors or agents on the Property. To the extent permitted by Article XI, Section 7 of the Oregon Constitution and the Oregon Tort Claims Act, ORS 30.260 to 30.300, OWEB shall indemnify and hold Grantor and its officers, employees, and agents harmless against all losses and liabilities arising out of or relating to the activities of OWEB or its officers, employees, subcontractors, or agents on the Property.

13. Grantor Representations. Grantor represents that, after reasonable investigation and to the best of its knowledge:

- a. No Hazardous Substances exist or have been released, generated, treated, stored, used, disposed of, deposited, abandoned, or transported in, on, from, or across the Property.
- b. There are not as of the Effective Date any underground storage tanks located on the Property, whether presently in service or closed, abandoned, or decommissioned, and no underground storage tanks have been removed from the Property in a manner not in compliance with applicable federal, state, and local laws, regulations, and requirements.
- c. Grantor and the Property are in compliance with all federal, state, and local laws, regulations, and requirements applicable to the Property and its use.
- d. There is no pending or threatened litigation in any way affecting, involving, or relating to the Property.
- e. No civil or criminal proceedings or investigations have been instigated at any time or are now pending, and no notices, claims, demands, or orders have been received, arising out of any violation or alleged violation of, or failure to comply with, any federal, state, or local law, regulation, or requirement applicable to the Property or its use, nor do there exist any facts or circumstances that Grantor might reasonably expect to form the basis for any such proceedings, investigations, notices, claims, demands, or orders.
- f. There are no liens or easements on the Property that would allow activities inconsistent with protection of the Conservation Values.

14. Control. Absent a judicial decree or judgment providing otherwise, nothing in this Easement gives OWEB any right or ability to exercise physical or managerial control over the day-to-day operations of the Property, or any of Grantor's activities on the Property, or otherwise to become an operator with respect to the Property within the meaning of The Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), or ORS 465.255.

15. Severability. If any term of this Easement conflicts with governing law or if any provision is held to be invalid or unenforceable by a court of competent jurisdiction,

the parties intend (i) that the term be restated to reflect as nearly as possible the original intentions of the parties in accordance with applicable law, and (ii) that the remaining terms of this Easement remain in full force and effect.

- 16. Assignment or Disposal.** Grantor shall not assign or transfer its rights or delegate its responsibilities under this Easement or sell, lease, exchange, or otherwise dispose of the Property without OWEB's prior written approval, which OWEB shall not unreasonably withhold. After Grantor gives notice, OWEB shall consider transfer of the interest in land acquired with OWEB's assistance at the next regularly scheduled public business meeting of OWEB's governing body. In accordance with ORS 541.376, OWEB shall not consider approval of Grantor's request if a profit will result from conveyance of the Property. If Grantor plans to grant additional easements on the Property, or allow modification of easements or encumbrances pre-dating the Effective Date, Grantor shall provide 60 days prior written notice of the proposed easement to OWEB, and shall give OWEB an opportunity to consult on the proposed easement language.
- 17. Modification.** No amendment of this Easement is valid unless it is in writing and signed by both parties.
- 18. Condemnation.** If all or any part of the Property is taken by exercise of the power of eminent domain or acquired by purchase in lieu of condemnation, whether by public, corporate, or other authority, Grantor and OWEB shall act jointly to recover the full value of the interests in the Property subject to the taking or in lieu purchase and of all resulting direct or incidental damages. As between Grantor and OWEB, OWEB shall receive the Liquidation Value of the Property or portion condemned. After OWEB has received Liquidation Value, Grantor may recover from the proceeds, if any, its funds in the amount of \$1,170,000. After Grantor has recovered its funds, OWEB and Grantor shall pay from remaining condemnation proceeds, if any, all expenses reasonably incurred by Grantor and OWEB in connection with the taking or in lieu purchase from the amount recovered.
- 19. Governing Law.** This Easement is subject to the laws of the State of Oregon.
- 20. Liberal Construction.** The parties intend this Easement to be liberally construed in favor of maintaining the Conservation Values of the Property.

By its signature below, Grantor hereby grants this Conservation Easement to OWEB and its successors and assigns.

Grantor:

By: [Signature]

Its: MAYOR

STATE OF OREGON)
) SS
COUNTY OF Clatsop)

This instrument was acknowledged before me on April 3, 2012 by Mike Morgan.

[Signature]

Notary Public for Oregon

My commission expires: 6-13-14



OWEB approves and accepts this Conservation Easement in accordance with ORS 93.808:

By: [Signature]
Its: **Executive Director**

STATE OF OREGON)
) SS
COUNTY OF Marion)

This instrument was acknowledged before me on April 02, 2012 by Tom Byler.

[Signature]

Notary Public for Oregon

My commission expires: June 10, 2015



EXHIBIT A

LEGAL DESCRIPTION OF THE PROPERTY

The Northwest quarter (NW¼); the Southeast quarter (SE¼); the North half of the Southwest quarter (N½SW¼); and the Southeast quarter of the Southwest quarter (SE¼SW¼) of Section 28;

the Southeast quarter (SE¼); the South half of the Northeast quarter (S½NE¼); the Northwest quarter of the Northeast quarter (NW¼NE¼) of Section 29; and

the North half of the Northeast quarter (N½NE¼) of Section 33;

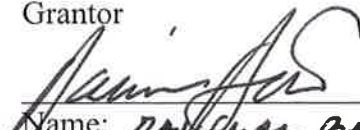
All in Township 5 North Range 10 West, Willamette Meridian, Clatsop County, Oregon.

EXHIBIT B

ACCEPTANCE AND ACKNOWLEDGEMENT OF BASELINE INVENTORY DOCUMENTATION

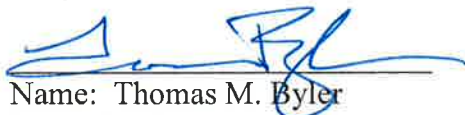
The undersigned hereby accept and acknowledge that the Baseline Inventory Documentation for the Ecola Creek Forest Reserve Addition Conservation Easement, Clatsop County, Oregon, prepared by Miriam Hulst of the Oregon Watershed Enhancement Board and dated July 27, 2011, is an accurate representation of the Property as of the date of grant of the Easement. The undersigned have received copies of the Baseline Inventory Documentation.

Grantor


Name: RACHAEL BURT
Title: CITY PLANNER

4/03/2012
Date

Oregon Watershed Enhancement Board


Name: Thomas M. Byler
Executive Director

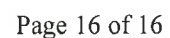
4/2/12
Date

CERTIFICATE OF APPROVAL OF CONVEYANCE
(ORS 93.808)

A copy of this Certificate may be affixed to, and recorded with, the conservation easement described above.

Title: Executive Director

Kelani C. Sullivan
Notary Public for Oregon
My commission expires: June 10, 2015



Appendix C: FSC Certification Supplement

FSC Management Plan Addendum

Ecola Creek Forest Reserve Stewardship Plan

The following additional management planning documentation is required to meet requirements for forest certification under Forest Stewardship Council (FSC) guidelines. To view the entire of FSC-US Forest Management Standards v1.0 visit:

www.fscus.org/standards_criteria/forest_management.php

FSC Principles

The ten FSC Principles require the forest owner or manager to do the following:

Principle 1: Compliance with laws and FSC Principles – to comply with all laws, regulations, treaties, conventions and agreements, together with all FSC Principles and Criteria.

Principle 2: Tenure and use rights and responsibilities – to define, document and legally establish long-term tenure and use rights.

Principle 3: Indigenous peoples' rights – to identify and uphold indigenous peoples' rights of ownership and use of land and resources.

Principle 4: Community relations and worker's rights – to maintain or enhance forest workers' and local communities' social and economic well-being.

Principle 5: Benefits from the forest – to maintain or enhance long term economic, social and environmental benefits from the forest.

Principle 6: Environmental impact – to maintain or restore the ecosystem, its biodiversity, resources and landscapes.

Principle 7: Management plan – to have a management plan, implemented, monitored and documented.

Principle 8: Monitoring and assessment – to demonstrate progress towards management objectives.

Principle 9: Maintenance of high conservation value forests – to maintain or enhance the attributes which define such forests.

Principle 10: Plantations – to plan and manage plantations in accordance with FSC Principles and Criteria.

High Value Conservation Areas

FSC standards require that management activities in high conservation value forests maintain or enhance the attributes that define such forests (FSC Principle 9). Areas defined as High Conservation Value Forests (HCVF) include those with: high biodiversity value, including rare, threatened, or endangered (RTE) species and their habitats; large landscape-level forests; rare ecosystems; critical nature-based services; local needs areas; local cultural identity areas.

The following practices are used for HCVF areas:

- An assessment of conservation values is conducted during management planning
- Consultations are conducted with experts and relevant stakeholders on HCVF location and appropriate management strategy
- Management of HCVF areas will emphasize the precautionary principle – if there is reasonable question that management will jeopardize HCVF values that area will be reserved from management
- All Old Growth Stands will be reserved from commercial management
- Management will use an adaptive management strategy, incorporating results of monitoring into future management
- A site specific monitoring plan is prepared for any operations within HCVF areas

Table 1: HCVF Areas on the Ecola Creek Forest Reserve

| Type | Description | Acres | Conservation Attribute | Conservation Approach | Experts Consulted |
|--------|-------------------|-------|------------------------------|---|--|
| HCVF-1 | Old Growth Forest | 19 | Old growth cedar and hemlock | Establish Reserve. No harvesting within Old Growth areas. | ODF, ODFW |
| HCVF-4 | Public watershed | 163 | Water quality, quantity | Establish reserves to protect water quality. | ODF, ODFW, Steve Trask (BioSurveys), Trout Unlimited |

Representative Sample Areas (RSAs)

FSC standards require that representative samples of existing ecosystems within the landscape be protected in their natural state, appropriate to the scale and intensity of operations and the uniqueness of the affected resources. (FSC Indicator 6.4).

The following practices are used in RSA analysis:

- Managers document the ecosystems that would naturally exist on the FMU, and assess their quality. The Ecola Creek Forest Reserve occurs within the Oregon and Washington Coast Ranges.
- Consultations occur with conservation organizations and Agencies; neighbors are consulted when RSA attributes cross property lines
- The status of regional protected properties is reviewed using the Oregon Natural Areas Plan 2010 for underrepresented plant communities.
- RSA stands of Medium or High quality that are underrepresented in the landscape are recommended for further study and possible inclusion in the Oregon Natural Areas Program.
- Management of RSAs is designed to perpetuate or enhance the conservation attributes of the stand.

Table 2: Proposed Representative Sample Areas on the Ecola Creek Forest Reserve

| Rare Plant Community | Acres | Protection Priority | Protected Areas in Landscape | Habitat Quality/Past Disturbance | Experts Consulted |
|--------------------------------|-------|---------------------|------------------------------|----------------------------------|--|
| Mature Sitka spruce floodplain | 24 | High | Minimal | Fair to good | ODF, ODFW, Steve Trask (Biosurveys), Trout Unlimited |

Chemical Use

In keeping with the goal of sustainable forest management and the desire to minimize the impact of chemicals on the flora and fauna of the forest, every attempt will be made to not use chemicals on the property.

The following are practices observed for chemical usage:

- Chemical use is prohibited, except in cases where invasive plants pose a threat to ecosystem health and manual removal methods are not practical
- No aerial application of forest chemicals is permitted
- Herbicides are applied only by licensed operators
- Records are kept of treatment prescriptions, spray records, and efficacy monitoring
- Incidences of spills or worker exposure to chemicals are recorded
- No herbicides are used that are: persistent, toxic or accumulate in the food chain; chlorinated hydrocarbons; banned by international agreement; or World Health Organization Type 1A and 1B pesticides

No chemical applications have occurred in the past 10 years.

Social Impact Evaluation

According to the FSC-US Forest Management Standard v. 1.0 (FSC Indicator 4.4.a), forest managers should understand the likely social impacts of management activities, and should incorporate this understanding into management planning and operations.

Social impacts include effects on:

- Archeological sites and sites of cultural, historical and community significance
- Public resources, including air, water and food (hunting, fishing, collecting)
- Public access to and use of the forest, and other recreation issues
- Aesthetics
- Community goals for forest and natural resource use and protection such as employment, subsistence, recreation and health
- Community economic opportunities

Impact Assessment

Forest management activities are designed for the purpose of transitioning young even-aged stands to older, more diverse conditions. All stewardship activities on the Reserve are carefully guided by a detailed management plan, and public values are of primary importance in developing the plan. For example, since the lands are a key source of drinking water for the City of Cannon Beach, the management plan clearly establishes that drinking water protection is the highest land management priority. In these planning processes, many groups are involved in providing input on management priorities and directions, including local watershed councils, state wildlife and forestry agencies, universities and researchers, and many others.

Following is a brief assessment of social impacts for the Ecola Creek Forest Reserve:

- The primary cultural value of the site is as a drinking water source. By protecting the lands for water quality, the forest management activities are contributing to an important community need, i.e., a reliable source of clean water. The social impact of producing municipal drinking water is substantially positive.
- The property is gated and signed to limit public access. Some forms of non-motorized recreation are allowed, including hiking, biking, and hunting. Extensive public meetings were held in 2011 and 2012 to develop a balance of allowed uses to ensure protection of the resources, while allowing for some access by the community.
- The property is managed using silvicultural techniques that have minimal negative impact on aesthetics. Generally, thinning and small forest openings are used and the appearance of these treatments closely resembles natural conditions such as those produced by scattered wind-throw events.
- The property will provide some limited employment opportunities for local logging contractors, road contractors, and related workers such as tree planters.

Stakeholder Consultation Process

Stakeholders for the Ecola Creek Forest Reserve include the citizens of Cannon Beach and surrounding communities, members of the City Council and City staff, agency regulators (ODF, ODFW), stewardship organizations such as the Ecola Creek Watershed Council and Trout Unlimited, the Oregon Watershed Enhancement Board (OWEB), and adjoining landowners such as the Campbell Group.

Input from the citizens and many of the other stakeholders is provided during the stewardship plan updates (every 5 years) via public meetings and a citizen planning committee. Consultation is done with ODF and ODFW via conversations and field visits with Stewardship Foresters and Fish Biologists. With Campbell Group (they border most of the Reserve) consultation consists of meetings and discussions regarding road use agreements and harvest planning. The City is working with the Ecola Creek Watershed Council on stream enhancement projects. OWEB holds two conservation easements on portions of the Reserve and reviews and approves plan updates and other major activities.