

City of Scappoose Forest Stewardship Plan

Located in Columbia & Washington Counties, Oregon

Prepared by

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Introduction

This document has been written to update a forest management plan from 2001. Since that time, the City has sold one property (the “Mountain View tract”) and conducted several harvests, including most recently in 2014. The City properties with forest management needs are the Gourlay Creek tract of approximately 310 acres, which is the location of one of the City’s water intakes, and the Vista tract of 76 acres located just outside the City limits and containing a water distribution tank.

The current plan is designed to accomplish several objectives:

1. Provide an up-to-date forest inventory
2. Produce high quality maps based on updated technologies
3. Reaffirm the City’s management objectives
4. Establish long-term goals and a sustained yield approach for timber management

History/overview

The Gourlay Creek tract is the primary parcel in the City’s ownership. The City has had a water intake structure of some kind on Gourlay Creek since the 1920s. The ownership was put together over time. A survey from 1958 (Survey #1113) shows Taxlot #1800 being owned by Theodore Hansen at the time. **Table 1** lists the city’s forested taxlots.

The Gourlay Creek intake is one of three surface water intakes that provide water for the City. The others are located further west on the mainstem of South Scappoose Creek and Lazy Creek, another tributary of South Scappoose Creek. The City does not own any land around these other intakes. **Figure 1** shows the locations of these intakes and the Scappoose properties.

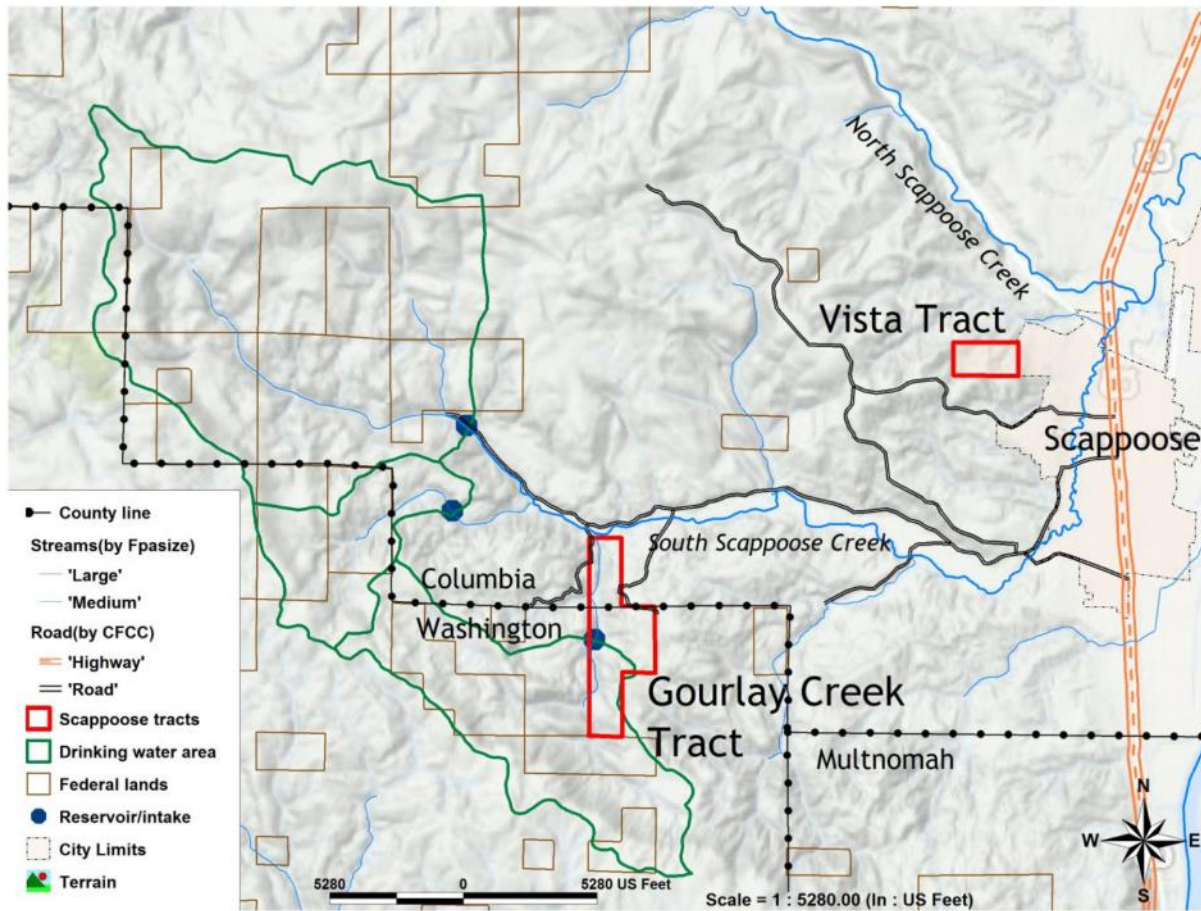
The Gourlay Creek tract has been somewhat actively managed over the decades. Many portions of the property were harvested in the 1950s, based on the current ages of some of the stands. More recently, since the early 1980s, a series of clearcuts has occurred, in combination with some thinnings.

The Vista tract currently holds two water tanks that provide direct gravity flow to the City. The tanks are located on the easternmost part of the tract. The remaining portion of the property has not been actively managed but contains an informal trail network. The recent Scappoose Parks Plan (City of Scappoose 2017) identifies the Vista tract as having excellent potential for providing additional recreational opportunities to the community in the form of hiking trails and viewpoints.

Table 1. Forested taxlots owned by the City

Tract	County	Legal	Taxlot	Acres
Gourlay Cr.	Columbia	3N2W, Section 17	1700	39.00
Gourlay Cr.	Columbia	3N2W, Section 17	1800	39.70
Gourlay Cr.	Columbia	3N2W, Section 17	1801	0.30
Gourlay Cr.	Washington	3N2W, Section 20	600	160.00
Gourlay Cr.	Washington	3N2W, Section 20	800	80.00
Vista	Columbia	3N2W, Section 11	100	76.61

Figure 1. Vicinity map



The following pages contain maps for each tract, including:

- 1) Aerial photos
- 2) Lidar bare earth with management zones
- 3) 10-ft contour topography

Scappoose Gourlay Creek tract - 2016 aerial photo



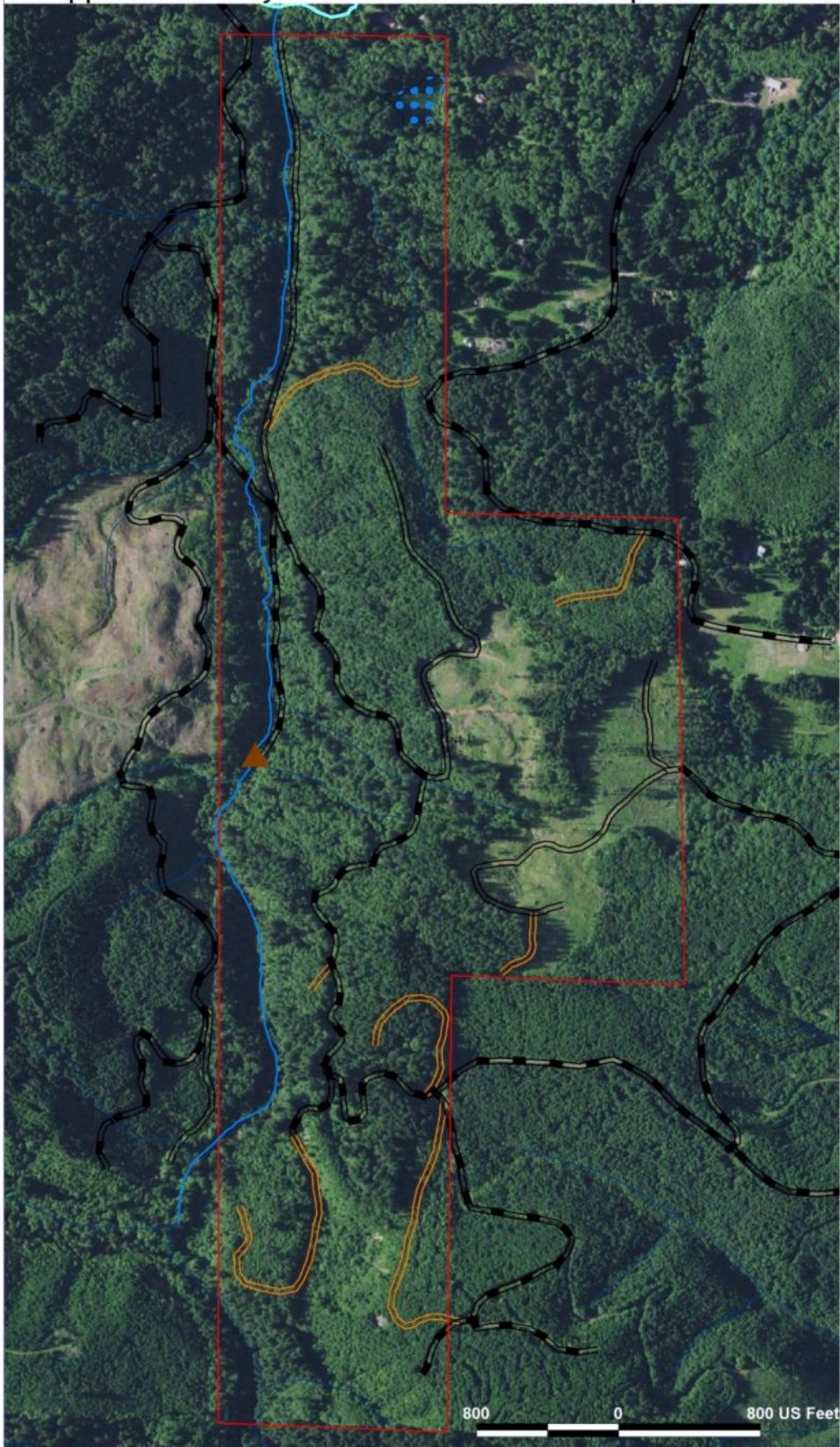
Legend

- ▲ Reservoir/intake
- Streams_UTM(by Fpazize)
 - 'Large'
 - 'Medium'
 - 'Small'
- TRACTS
- ROADS(by Type)
 - ≡ 'Paved'
 - ≡ 'Rock'
 - ≡ 'Dirt'
 - ≡ 'Old grade'
- ⊞ Pond
- 📷 2016 aerial



800 0 800 US Feet

Scale = 1 : 800.00 (In : US Feet)

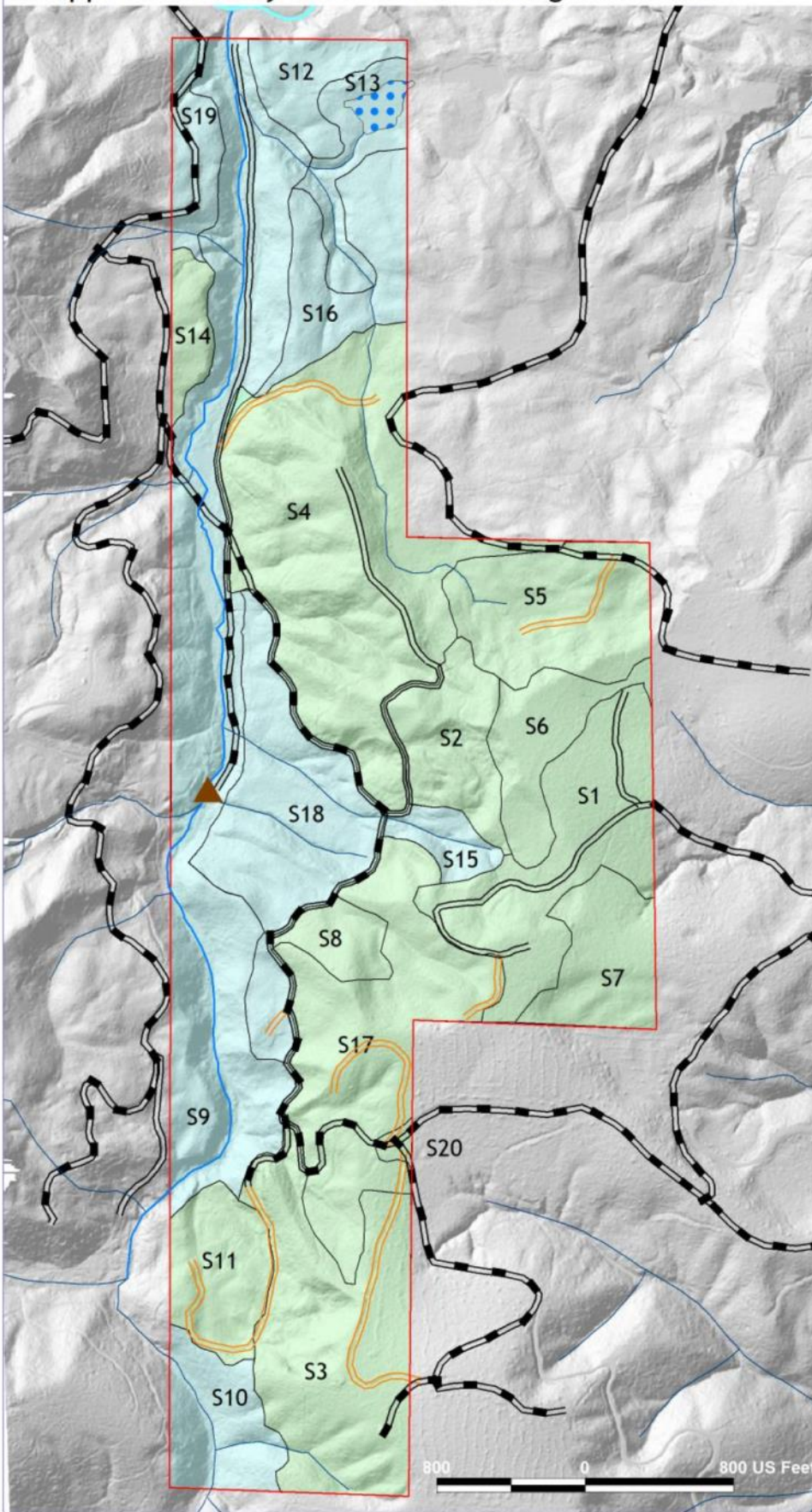


Scappoose Gourlay Creek tract - Management zones



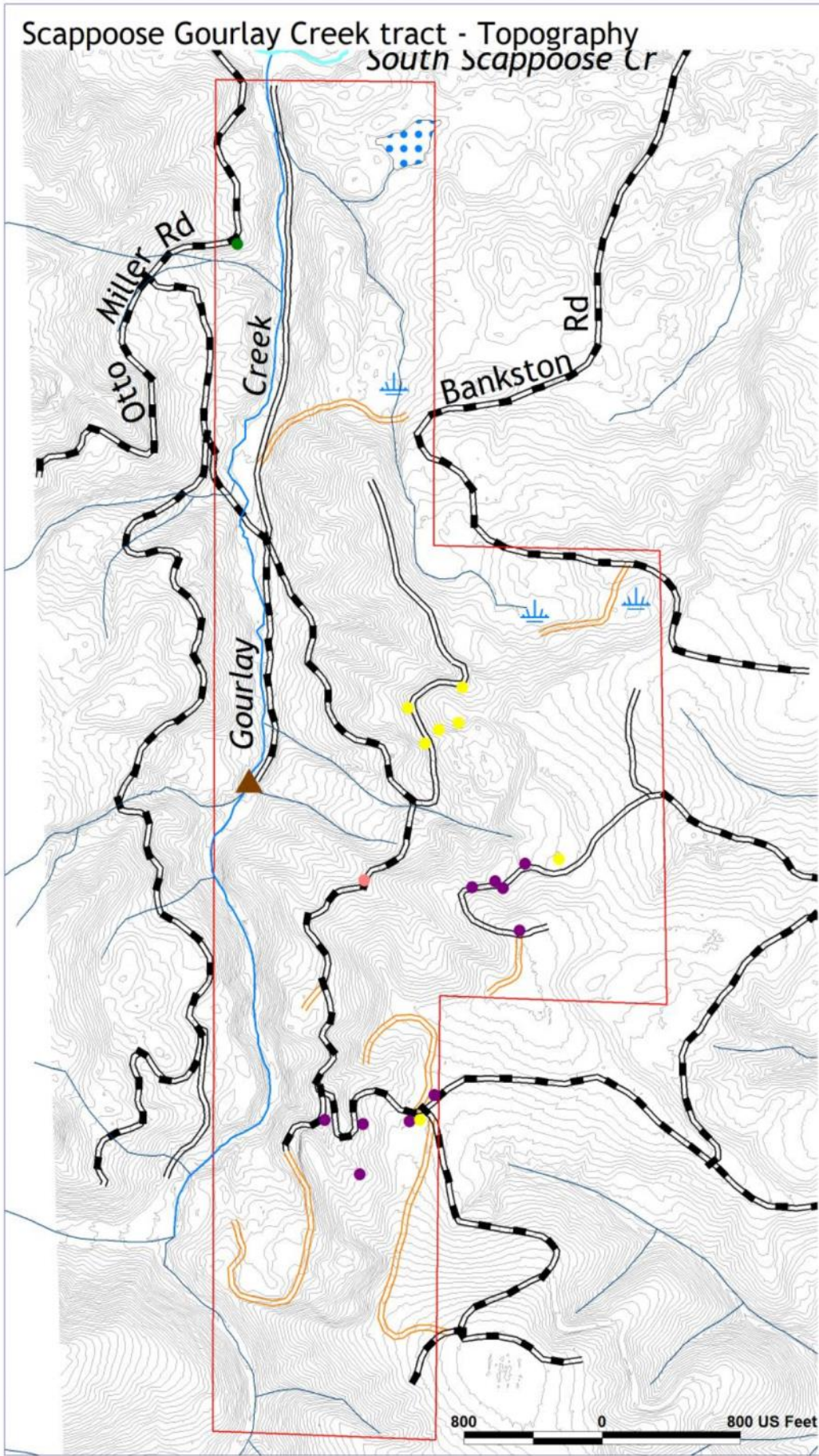
Legend

- Reservoir/intake
- Streams_UTM(by Fpsize)
 - 'Large'
 - 'Medium'
 - 'Small'
- TRACTS
- ROADS(by Type)
 - 'Paved'
 - 'Rock'
 - 'Dirt'
 - 'Old grade'
- Pond
- STANDS
 - 'Mgmt'
 - 'Reserve'
- SCAPPOOSE_BE.JPG



Scale = 1 : 800.00 (In : US Feet)

Scappoose Gourlay Creek tract - Topography
 South Scappoose Cr



Legend

- ▲ Reservoir/intake
- Invasive plants(by Name1)
 - 'English ivy'
 - 'Nonnative laurel'
 - 'Scotch broom'
 - 'blackberry'
- Streams_UTM(by Fpsize)
 - 'Large'
 - 'Medium'
 - 'Small'
- TRACTS
- ROADS(by Type)
 - == 'Paved'
 - 'Rock'
 - 'Dirt'
 - 'Old grade'
- Scappoose_10ft
- ⊙ Pond
- ⊕ Wet area



800 0 800 US Feet

Scale = 1 : 800.00 (In : US Feet)

Scappoose Vista tract - 2016 photo

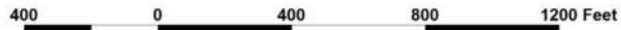


Legend

-  TRACTS
-  Water tanks
- ROADS(by Type)**
 -  'Paved'
 -  'Rock'
 -  Dirt roads/trails
- Streams_UTM(by Fpa**
 -  'Small'
-  2016 photo



Scale = 1 : 400.00 (In : Feet)



Scappoose Vista tract - Management zones



Legend

- TRACTS
- Water tanks
- ROADS(by Type)
 - 'Paved'
 - 'Rock'
 - Dirt roads/trails
- STANDS
 - 'Nature Park'
- Streams_UTM(by Fpa)
 - 'Small'
- Vista bare earth



Scale = 1 : 400.00 (In : Feet)

400 0 400 800 1200 Feet



Scappoose Vista tract - Topography



Legend

- TRACTS
- Water tanks
- ROADS(by Type)
 - 'Paved'
 - 'Rock'
 - Dirt roads/trails
- Invasives(by FIELD1)
 - 'English holly'
 - 'English ivy'
 - 'Scotch broom'
 - 'blackberry'
- Streams_UTM(by Fpaside)
 - 'Small'
 - Blow down
 - Water_tower_10ft



Scale = 1 : 400.00 (In : Feet)

400 0 400 800 1200 Feet



Management objectives

The City has multiple objectives in managing its forest properties. These include, in order of priority:

1. Protect and enhance water quality and quantity
2. Generate income from timber harvesting on a sustainable basis
3. Provide diverse forest and riparian habitats for fish and wildlife
4. Provide recreational opportunities for the citizens of Scappoose when compatible

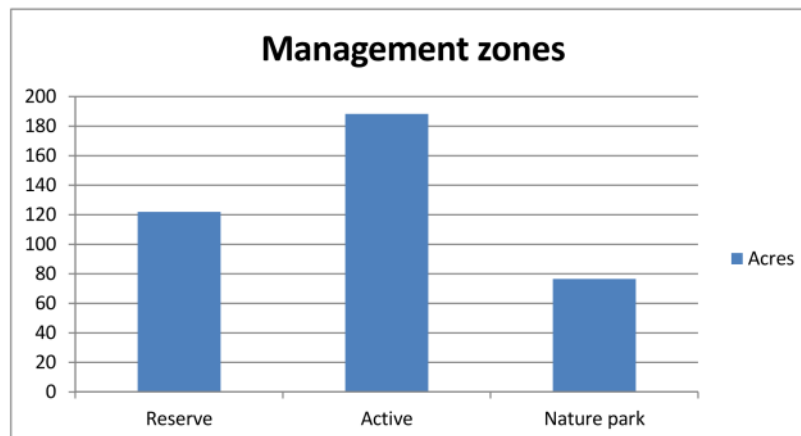
Management zones

In order to help the City accomplish its objectives for its forest properties, it is important to recognize that not every objective can be achieved, much less maximized, on every acre. There is a balance that must be struck, given the resources of the forest and the competing demands. In order to facilitate wise decision-making about forest uses, we have divided the forest into three primary management zones:

1. Reserve and riparian: These are areas along Gourlay Creek that provide protection to the City’s water intake and other water resources, as well as nearby upland stands that are older and provide a diversity of habitats for wildlife.
2. Nature park/recreation: This zone encompasses the Vista tract. Due to its proximity to neighborhoods and potential for recreational uses, it has been designated as a nature/recreation tract in the City’s Parks plan (2017).
3. Active management: These areas will be managed for timber production on long rotations with additional protections that exceed state rules.

The distribution of acres among these management zones is presented in **Figure 2**.

Figure 2.



Forest Resources Inventory

The following sections characterize the various forest resources present on the City's forested properties, including soils, water, vegetation, and roads. Accompanying maps identify key features. The major focus of the inventory is on vegetation, especially trees, but also including distribution of non-native invasive plants. Inventory plots were only placed in stands in the active management zone, since reserve and nature park areas will not be managed for timber production.

Methods

Inventory methods were as follows. Every stand was visited and conditions assessed on the ground. In addition, we made abundant use of remote sensing information. This includes aerial photography and Lidar data. Lidar data allows for the production of ground surface images, accurate topographic contour data, and tree height images.

We relied on Oregon Department of Forestry (ODF) stream layers for stream classification. ODF stream locations were corrected using Lidar-derived topographic layers and bare earth images.

Data collected specifically for this plan include a timber inventory of merchantable stands in the active management zone; stocking survey of pre-merchantable stands in the active management zone; and invasive species locations discovered during the course of field work.

For each stand of merchantable timber, sample transect lines were laid out in a systematic fashion, and variable radius sampling was carried out at fixed intervals along the sample transects. At each sample point, a pink flag was tied to a stick and placed in the ground, and pink flagging was hung from nearby vegetation. A Relaskop was used to tally trees, a diameter tape was used to measure tree diameters, and a laser rangefinder was used to measure tree heights. Defect was estimated visually based on external indicators such as forked tops, conks, crown damage, etc. Heights were measured and defect estimated on more than 50% of the sampled trees.

The data were entered into the Forest Projection and Planning System (FPS) software and compiled, and a copy of the data files is maintained at the Trout Mountain Forestry office. **Appendix A** shows the location of the inventory plots. Forty-four plots were installed on 74 acres of merchantable stands, for an average plot density of one per 1.7 acres.

For pre-merchantable stands, lines were laid out in a similar method, but 1/50th acre fixed radius plots were used instead to measure stems, recording species and diameters. Forty-two plots were measured on 85.8 acres, for an average plot density of one per 2.0 acres.

Soils

The following descriptions are summarized from the USDA Web Soil Survey. Maps and related information are found in **Appendix B**.

Table 2. Soil types

Gourlay Creek			
Map Unit Symbol	Map Unit Name	Acres	Percent
6D	Bacona silt loam, 3 to 30 percent slopes	31.8	10.3%
22C, 22D	Goble silt loam, 3 to 30 percent slopes	3.3	1.0%
48F, 49E	Scaponia-Braun silt loams, 3 to 60 percent north slopes	140.5	45.2%
7E	Cascade silt loam, 20 to 30 percent slopes	3.9	1.3%
18E, 18F	Goble silt loam, 2 to 60 percent slopes	131.0	42.2%
Total		310.5	100.0%
Vista			
Map Unit	Map Unit Name	Acres	Percent
10C, 10D	Cascade silt loam, 8 to 30 percent slopes	37.6	49.0%
14D	Cornelius silt loam, 15 to 30 percent slopes	2.5	3.3%
49E	Scaponia-Braun silt loams, 30 to 60 percent north slopes	13.1	17.1%
50E	Scaponia-Braun silt loams, 30 to 60 percent south slopes	4.8	6.2%
70E	Xerochrepts, steep	18.7	24.4%
Total		76.7	100.0%

USDA soil series descriptions

Bacona: consists of deep, well drained soils that formed in eolian material mixed with colluvium weathered from sedimentary rock.

Goble: consists of moderately deep to a fragipan, moderately well drained soils that formed in silt loess over old alluvium of mixed origin.

Scaponia-Braun: consists of deep and moderately deep, well drained soils that formed in colluvium weathered from siltstone.

Cascade: consists of moderately deep to a fragipan, somewhat poorly drained soils that formed in silty materials.

Cornelius: consists of moderately deep to a fragipan, moderately well drained soils that formed in silty loess-like materials.

Xerochrepts: consists of well drained soils on steep or very steep escarpments that formed in a mixture of silt, sand, and an accumulation of material that has moved downslope.

Water Resources

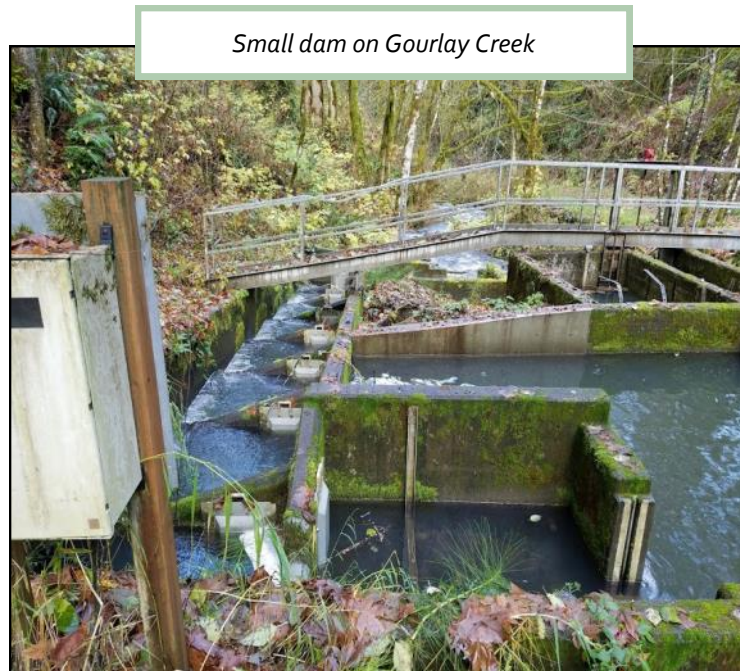
Managing for water quality and quantity is an important objective for the City of Scappoose, particularly upstream of its water intakes. Key water resources include:

Gourlay Creek tract

This property includes more than one river mile of Gourlay Creek, a medium fish-bearing stream, as well as numerous small tributaries. Gourlay Creek enters South Scappoose Creek just north of the tract's northern boundary.

On Gourlay Creek, the City has a small dam with a fish ladder and water intake, and from this location there is a pipeline buried along the service road that delivers water to the City.

Finally, there is a shallow pond covering just over an acre located in the northeastern corner of the property.



Small dam on Gourlay Creek

Vista tract

This tract is mostly upland forest habitat, with two small non-fish bearing streams occurring in two separate small canyons. Both flow north into North Fork Scappoose Creek. The property also holds two large water storage tanks that provide water storage capacity for the City.

Other water resources

In addition to the water intake on Gourlay Creek, the City has water intake facilities on Lazy Creek and South Fork Scappoose Creek. The City does not own any land upstream of these facilities.

Roads and access

This section addresses roads, points of access, and property boundaries.

Gourlay Creek tract

This property has one major point of access, which is a rocky road that joins Otto Miller Rd to the south of its junction with Dutch Canyon Rd. There is a heavy duty locking gate at this location. The main road then proceeds onto City property, crosses Gourlay Creek on a bridge, and works its way up the relatively steep slope on the east side of the creek, exiting the property in the southeast.

Bankston Rd provides limited access to the northeastern portions of the property. There are no good established roads stemming off Bankston Road into the property.

For access to the central-eastern portion of the property, the City has historically used the neighboring road system, which provides access into Stand 1.

The other significant road is the maintenance road along the length of Gourlay Creek. This road is used by City staff to inspect and repair the water line which is buried there, as well as to access the dam for maintenance.

Issues that have been identified during field work for this plan include:

- Poor condition of some culverts, especially immediately east of Gourlay Creek on the main road in its steep climb out of the riparian area. Several of these pipes appear deformed and could be leaking. In the short term, additional surface rock could prevent further damage to these pipes until replacement is necessary.
- Road repair needed to access Stand 11. The road bed here has slumped since the 1999 harvest that occurred in the adjacent Stand 3. A road rebuilding project is recommended to stabilize this road and allow for future access.
- Unauthorized use of the northern portion of the maintenance road by ATVs. It was apparent that some ATV use has occurred, entering the property from the north. Although no resource damage was observed, the lack of boundary signage or gates here is doing nothing to deter unauthorized access. In the northeastern corner of the property there are old vehicles abandoned along a roadway that may be on County land.

Vista tract

The only vehicular access at this time is via NW Bella Vista Drive. As the road enters the City property here, there is a locked gate, and a paved but little used road continues up to the water tanks. Past the water tanks, the road becomes an unsurfaced trail, but one that has apparently supported vehicles in the past. This road is currently the preferred option for access for forest management purposes. However, due to its steepness, it may pose issues for

loaded log trucks. If this road ends up not being suitable for log hauling, the second option is to access the property via Luma Vista Drive, a county road that provides good access to the southern boundary of the property. An access road could be extended onto the county property from Luma Vista, and a log landing could be cleared for the initial thinning.

Wildlife habitat

There are a variety of habitats on the property supporting a diverse range of species. The following information is anecdotal and based on field observations; no formal wildlife surveys have been conducted.

The older forests provide habitat required by numerous native woodpeckers, bats, and owls. The size of the property and remoteness of some of its canyons provide potential habitat for larger predators such as mountain lions, bears, and bobcats. The high quality streams provide habitat elements for a wide range of species. The ponds and wet areas are likely providing habitat for a variety of amphibians. Deer and probably also elk are using the property.

The combination of diverse native shrubs, hardwoods and conifers is providing habitat for a wide range of native and migratory songbirds as well.

Overall, habitat opportunities are good for a diverse mix of wildlife species, including both common and more elusive species.

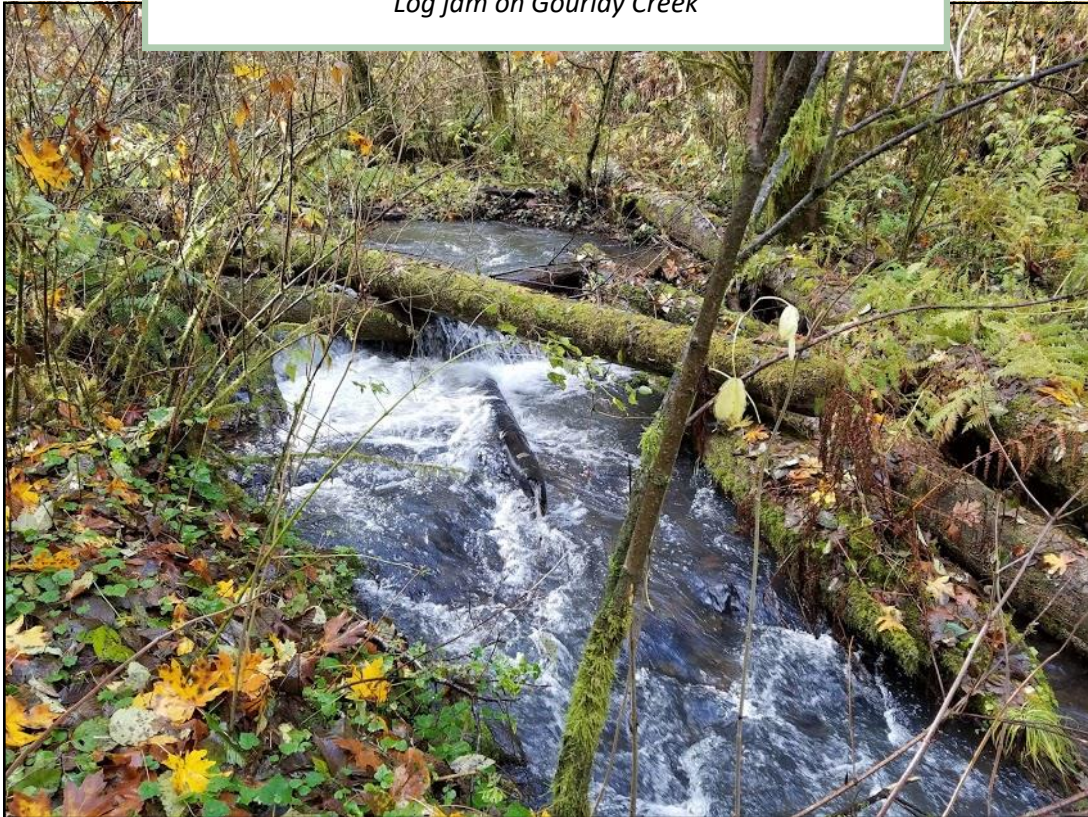
Snags (standing dead trees) provide necessary nesting, caching, roosting, and hiding sites for a variety of birds, mammals, and amphibians. Presence of snags is correlated with biological diversity, as more than 50 species of birds and mammals use snags for nesting, feeding, and shelter (OFRI 2012). In general, larger snags have greater opportunities for use by a variety of wildlife species. Down logs are also important habitat elements for a range of species. There are a few snags and down logs in the older stands on the property. The areas that were harvested since the 1980s are generally lacking in snags and down wood. Creation and retention of snags and woody debris over time will further enhance wildlife habitat on the property.

Fish Habitat

In general, fish habitat on Gourlay Creek has followed a similar trajectory to other streams in the watershed and the rest of western Oregon. Harvest of original old growth timber and subsequent removal of woody debris from streams has simplified and channelized the streams, resulting in reduced habitat opportunities for Coho salmon and other fish species (Trask 2011).

Approximately 10 years ago, a wood placement project was implemented on Gourlay Cr. These habitat structures are still in place and have captured gravels and created pools, both important for fish habitat.

Log jam on Gourlay Creek



The riparian forest along Gourlay Creek is primarily comprised of alder, which does not provide long-lasting woody debris. Planting of conifers along the stream would provide a better long-term source for woody debris recruitment into the stream system.

Presently, the City removes accumulated silt and gravel behind its impoundment structure on Gourlay Creek, and disposes of it in upland locations on site. According to Trask (2011), such material is an important contributor to natural stream processes downstream, and should be allowed to re-enter the stream system.

Threatened and Endangered Species

According to the Oregon Department of Forestry, there are no threatened or endangered species on or near the properties that might affect forest management.

Vegetation

The native old-growth forest on these tracts was likely a mix of Douglas-fir, western redcedar, bigleaf maple, and western hemlock, with diverse native shrubs, canopy gaps from windthrow, and trees of various ages.

The current condition includes some stands that are approaching this older forest condition, as well as numerous plantations in areas that have been logged.

In general, there is an abundance of hardwoods, particularly bigleaf maple and red alder, on the properties. While hardwoods have been maligned in the past as “weeds”, the lumber and log markets for these species have developed, and alder prices, for example, are currently competitive with Douglas-fir. The chief difference from a timber management standpoint is that per acre yields are typically much lower for hardwoods, owing mainly to the far greater heights attainable by native conifers.

Most of the property contains a healthy mix of native shrubs. There are, however, several invasive plants that are established on the properties. Control measures are recommended later in this plan.

The following stand descriptions and data tables summarize the results of the forest inventory. Stands not cruised are described in more central terms.

Forest Health

Insects and Disease

Generally, the forests on both tracts appear fairly healthy. There are no obvious insect or disease problems. There has been some blowdown in recent years, particularly on the Vista tract. Accumulated blowdown can lead to build up in the bark beetle population. This can lead to the phenomenon of mass attack, where beetles can attack healthy trees and overwhelm their defense mechanisms. Some retention of down logs and standing dead trees is beneficial and promotes biodiversity, but large accumulations can lead to insect outbreaks and increase the risk of wildfire, so they should be mitigated.

There are some obvious infestations of laminated root rot in the young plantations. One in particular was discovered in Stand 5. This disease spreads by root-to-root contact among Douglas-fir and other conifers. Hardwoods are immune, which is one reason why having some scattered hardwoods can promote forest health. Areas affected by laminated root rot should be planted to either hardwoods, or more resistant conifers, such as western redcedar.

Invasive Species

Most forest properties in western Oregon have at least a few invasive plants, which can displace native plants and reduce habitat value for wildlife. Presence and extent of invasives are influenced by ground disturbance, seed sources in the area, and vectors of seed dispersal.

It is important to distinguish non-native species from invasive species. A non-native plant may be relatively benign if it is not invasive. Invasive plants rapidly colonize certain habitats, such as disturbed soils or forest understories.

During the field work for this plan, a number of familiar invasive plants were noted. These locations were recorded using a GPS and are reflected on the map. This is not an exhaustive or systematic inventory of the invasive plants found on the property, but rather an indication of the relative distribution and magnitude of the problem. It is likely that further exploration,

especially along property boundaries and road edges, would locate additional infestations. The following are species of concern that should be controlled to prevent their spread.

- Non-native blackberries
- Scotch broom
- English ivy
- English holly
- Non-native laurel

Stand descriptions and data

Definitions

Aspect – direction toward which a slope faces

BA – basal area, a measure of tree size and density, given in square feet/acre

DBH – diameter at breast height (4.5 feet above ground)

MBF – one thousand board feet

Regeneration – seedlings of commercial tree species, typically in the understory of an older stand

Relative Density – a measure of stocking

Site Class – a measure of inherent forest productivity based on soils; range from I (highest) to IV (lowest) and measured by expected height of Douglas-fir at age 50

Slope – steepness measured in % (rise/run); 100% slope is equal to 45 degree angle

Stand – a homogeneous unit of forestland based on species composition, age, or other factors

Stocking – stand measurement relative to the optimal number of trees that a unit of forestland could grow

Timber volumes – given in board feet/acre net volumes are after deductions are made for apparent defect

TPA – trees per acre

City of Scappoose - Gourlay Cr tract stand map



Legend

Reservoir/intake

Streams_UTM(by Fpaside)

'Large'

'Medium'

'Small'

ROADS(by Type)

'Paved'

'Rock'

'Dirt'

'Old grade'

Pond

STANDS

'Mgmt'

'Reserve'

SCAPPOOSE_BE.JPG

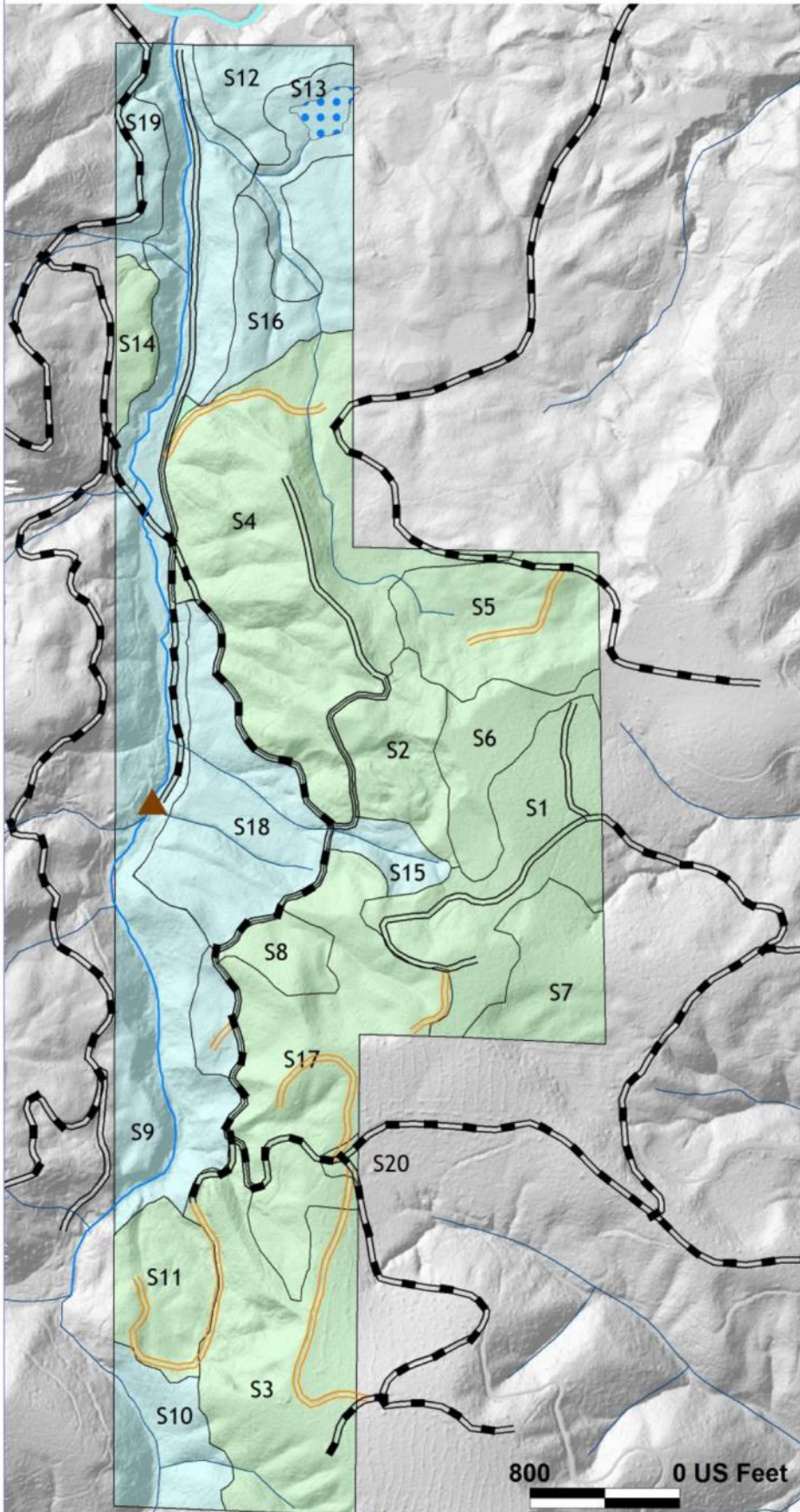
Stand table

Mgmt zone	Stand #	Acreage	Total	Description
Mgmt	1	21.0		2015 DF +
Mgmt	2	9.9		2015 DF +
Mgmt	3	28.4		2000 DF +
Mgmt	4	47.5		1990 DF
Mgmt	5	16.3		1985 DF
Mgmt	6	8.7		1982 DF/RA
Mgmt	7	9.9		1995 DF
Mgmt	8	4.1		Hardwood
Mgmt	11	9.7		Hardwood
Mgmt	14	3.7		Mixed
Mgmt	17	28.4		Conifer
Mgmt	20	0.7	188.2	Nonforest
Reserve	8	3.1		Hardwood
Reserve	9	54.6		Riparian
Reserve	10	9.3		Conifer
Reserve	12	6.3		Mixed
Reserve	13	7.6		Riparian
Reserve	15	3.5		Mixed
Reserve	16	11.6		Mixed
Reserve	18	20.2		Hardwood
Reserve	19	5.8	121.9	Mixed

Total Acreage: 310.1



02-23-2018



Gourlay Creek tract, Stands 1-20

Stand 1	Zone: Active management		
Site			
Area	Soils	Site Class	
21.0 acres	Goble silt loam	II (124)	
Aspect	Slope	Access	
North	5-40%	Via road network to east	
Timber			
Stand age	3	Timber type	Douglas-fir, western redcedar
Relative density	NA	Regeneration	350 DF, 20 RC

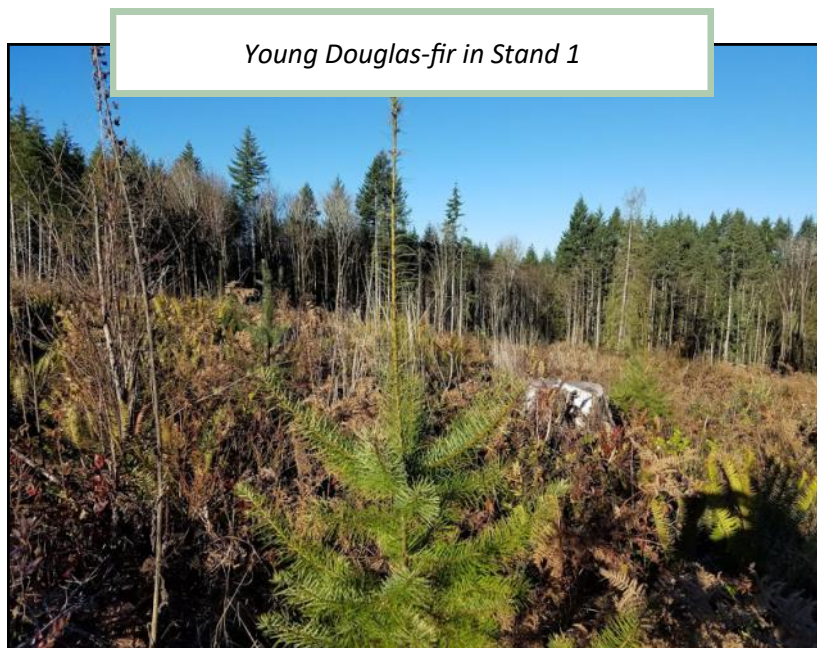
Description

This is one of two areas harvested in 2014. The site has gentle topography and was well stocked with high quality, approximately 80 year old timber at the time of the harvest. The stand had been thinned several times. Scattered large Douglas-fir were retained during harvest, providing a seed source for natural regeneration, as well as some large trees for long-term habitat diversity. Some of the cedar planted in 2015 died during the summer drought, and were replaced in 2016.

Stocking appears excellent, and trees will be free to grow as long as the maple sprouts are controlled. There seems to be a fair amount of deer and elk traffic, but neighborhood dogs are perhaps keeping them from browsing excessively in the area.

Recommendations

There are numerous patches of blackberry and scotch broom that are becoming established. These should be treated immediately to prevent their spread. Also, some of the maple stumps are sprouting vigorously and these should be cut to allow the planted trees to dominate the site. Both projects should take place in 2018.



Young Douglas-fir in Stand 1

Stand 2	Zone: Active management		
Site			
Area	Soils		Site Class
9.9 acres	Scaponia-Braun silt loam		II (130)
Aspect	Slope		Access
North, west	5-60%		Via main road
Timber			
Stand age	3	Timber type	Douglas-fir, western redcedar
Relative density	NA	Regeneration	350 DF, 20 RC

Description

This is one of two areas harvested in 2014. Conditions here are nearly identical to Stand 1. Terrain is a bit more rugged here, with some steeper slopes. There is a sizable scotch broom infestation along the road and at one of the landings.

Recommendations

Treatment of scotch broom along roads and landings, as well as cutting maple sprouts, is also recommended here in 2018.

Stand 3	Zone: Active management					
Site						
Area		Soils		Site Class		
28.4 acres		Goble silt loam		II (124)		
Aspect		Slope		Access		
West		5-100%		Via road network to east		
Timber volumes						
Stand age	19	Timber Type		Douglas-fir, hardwood		
Species	DBH	TPA	BA	Merch/acre	Net/acre	Total
Douglas-fir	4.7	546	67	NA	NA	NA
Red alder	5.1	54	8	NA	NA	NA
Bigleaf maple	5.1	139	20	NA	NA	NA
Western redcedar	18.0	4	7	NA	NA	NA
Western hemlock	5.0	15	2	NA	NA	NA
Total (average)	4.9	758	103	NA	NA	NA
Relative density	NA	Regeneration		See TPA data above		

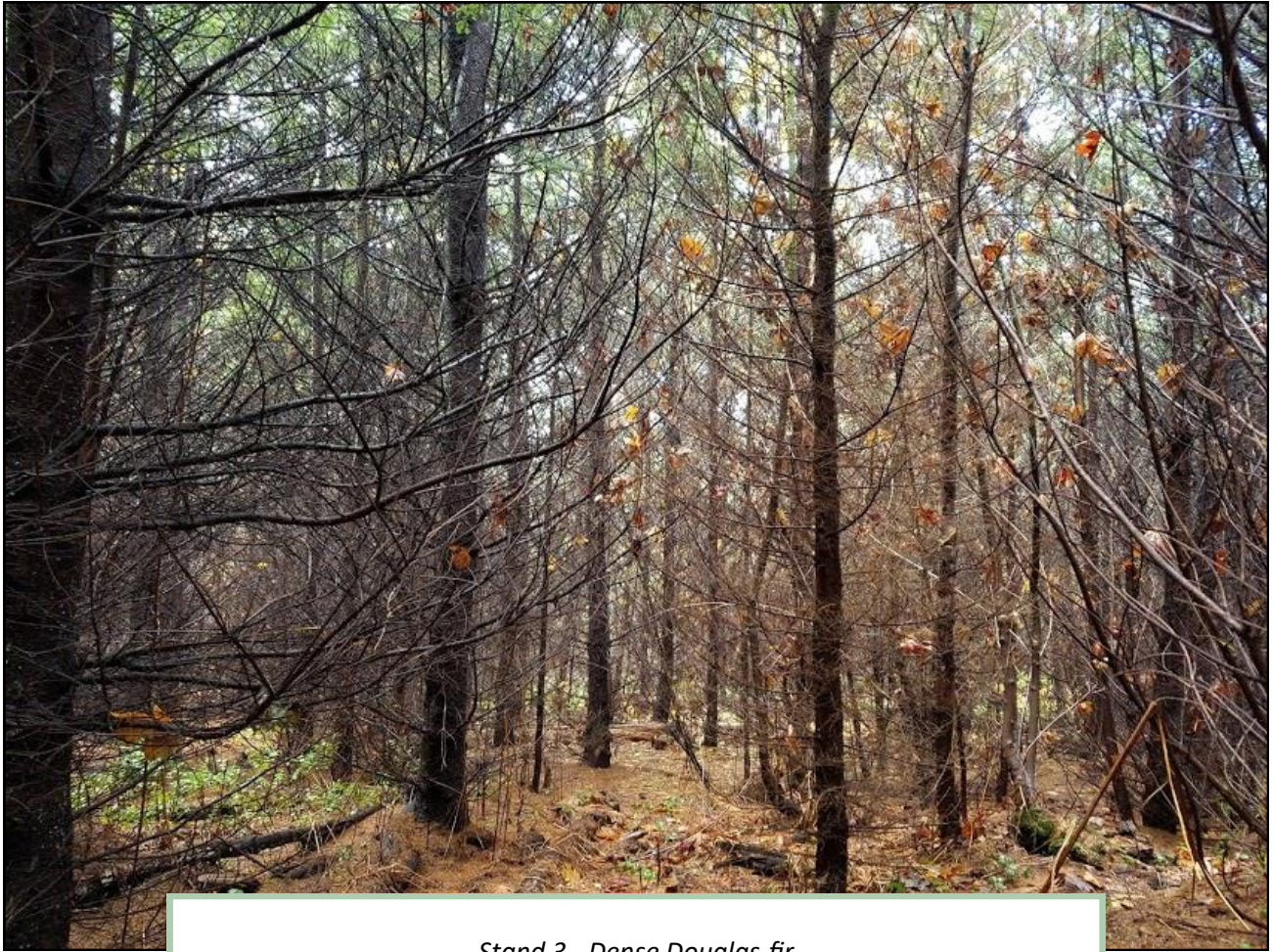
Description

This area was logged in 1999 and replanted in 2000. Tower yarding was used, and it appears that a road was built along the western boundary of this stand, at the bottom of the slope. This may have been to access the lower slopes for logging, or simply to use a machine as a portable tail-hold for the cable logging system. The condition of this road, and recommendations for repair, are included in the roads section. It appears that a major slide occurred in this stand 60 or more years ago. The slide deposited soil in what is now Stand 11, and the alder in that stand are approximately 60 years old.

In general, this stand is overstocked, with over 750 trees per acre. A precommercial thinning would be useful, especially in cutting back the maple stump sprouts.

Recommendations

Precommercial thinning to reduce stocking to 400 trees per acre is advisable, especially removing maple stump sprouts, which occupy lots of growing space and do not provide much timber or habitat value.



Stand 3 - Dense Douglas-fir

Stand 4	Zone: Active management					
Site						
Area		Soils		Site Class		
47.5 acres		Various		II (124)		
Aspect		Slope		Access		
West		30-60%		Via main road		
Timber volumes						
Stand age	28	Timber Type		Douglas-fir, hardwood		
Species	DBH	TPA	BA	Merch/acre	Net/acre	Total
Douglas-fir	10.7	134	84	NA	NA	NA
Red alder	9.5	12	6	NA	NA	NA
Bigleaf maple	4.4	260	28	NA	NA	NA
Western redcedar	5.8	8	1	NA	NA	NA
Cherry	4.5	8	1	NA	NA	NA
Total (average)	6.6	422	120	NA	NA	NA
Relative density	NA	Regeneration		See TPA data above		

Description

This area was logged in 1990 and replanted. Slopes are fairly steep, and most of the area was cable logged. There is a ridge-top trail that provides access from above to most of the stand. Areas with pure Douglas-fir appear reasonably well stocked. However, the amount of area affected by stump-sprouted maples is significant.

Recommendations

Maple clumps can be thinned or removed at the time of the first thinning. At that time, underplanting of shade-tolerant conifers, such as western redcedar, grand fir, and hemlock, can be done in the gaps created. A first thinning is not practical at this time, and because the steep slopes necessitate cable-logging, it will be 5-10 years before this is practical.

Stand 5		Zone: Active management				
Site						
Area		Soils		Site Class		
16.3 acres		Goble silt loam		II (124)		
Aspect		Slope		Access		
North, west		5-40%		Via Bankston road		
Timber volumes						
Stand age	33	Timber Type		Douglas-fir, hardwood		
Species	DBH	TPA	BA	Gross/acre	Net/acre	Total
Douglas-fir	11.3	140	98	12,360	11,645	189,809
Red alder	9.2	72	34	3,161	1,982	32,315
Bigleaf maple	11.2	36	24	1,773	1,251	20,389
Total (average)	10.7	248	156	17,294	14,878	242,512
Relative density	48	Regeneration		None		

Description

This area was logged in 1982 and subsequently replanted. It features a fairly well stocked Douglas-fir plantation, with patches of alder and maple in the central and southwestern portions of the stand, apparently associated with wetter soils.

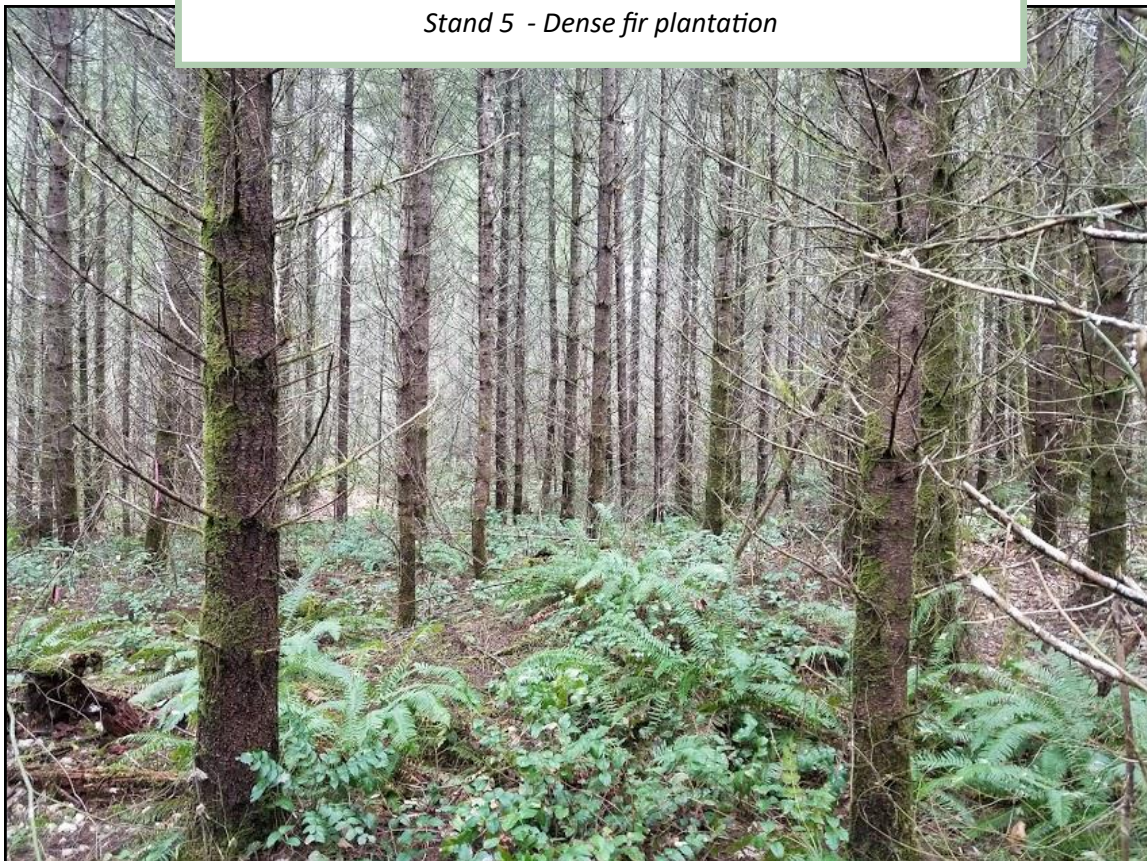
Recommendations

This area should be thinned within the next few years. A landing will need to be developed off Bankston Rd.

Stand 5 - Alder patch



Stand 5 - Dense fir plantation



Stand 6	Zone: Active management					
Site						
Area		Soils		Site Class		
8.7 acres		Goble silt loam		II (124)		
Aspect		Slope		Access		
North, west		5-50%		Via Bankston road		
Timber volumes						
Stand age	36	Timber Type		Douglas-fir, hardwood		
Species	DBH	TPA	BA	Gross/acre	Net/acre	Total
Douglas-fir	14.8	42	50	7,371	7,003	60,924
Red alder	15.9	12	17	1,947	1,713	14,907
Bigleaf maple	18.2	33	59	5,286	2,834	20,737
Total (average)	16.3	87	126	14,604	11,100	96,568
Relative density	31	Regeneration		None		

Description

This area was logged in 1982 and subsequently replanted. It contains some areas that are well stocked with fir, as well as areas with maple and alder. Some blowdown has occurred since the adjacent stands were harvested in 2014. In general, the stand is understocked.

Recommendations

This area should be thinned when the adjacent Stand 5 is treated, within the next few years. At that time, mature hardwoods can be harvested and the resulting canopy gaps planted with shade-tolerant conifers.

Stand 7	Zone: Active management					
Site						
Area		Soils		Site Class		
9.9 acres		Goble silt loam		II (124)		
Aspect		Slope		Access		
North, east		5-20%		Via road network to east		
Timber volumes						
Stand age	23	Timber Type		Douglas-fir, hardwood		
Species	DBH	TPA	BA	Gross/acre	Net/acre	Total
Douglas-fir	9.4	213	103	NA	NA	NA
Red alder	5.8	113	20	NA	NA	NA
Bigleaf maple	6.0	288	56	NA	NA	NA
Total (average)	7.1	613	180	NA	NA	NA
Relative density	NA	Regeneration		See TPA data above		

Description

This area was logged in 1993 and subsequently replanted over several years. It contains some areas that are well stocked with fir, as well as areas with maple and alder. As the table above shows, and despite cutting of maples twice in the 1990s, it still has a very high percentage of maple sprouts, which will not provide long-term timber or habitat value.

Recommendations

This area should be pre-commercially thinned to reduce the percentage of maple in the stand. This work should be done in 2018.

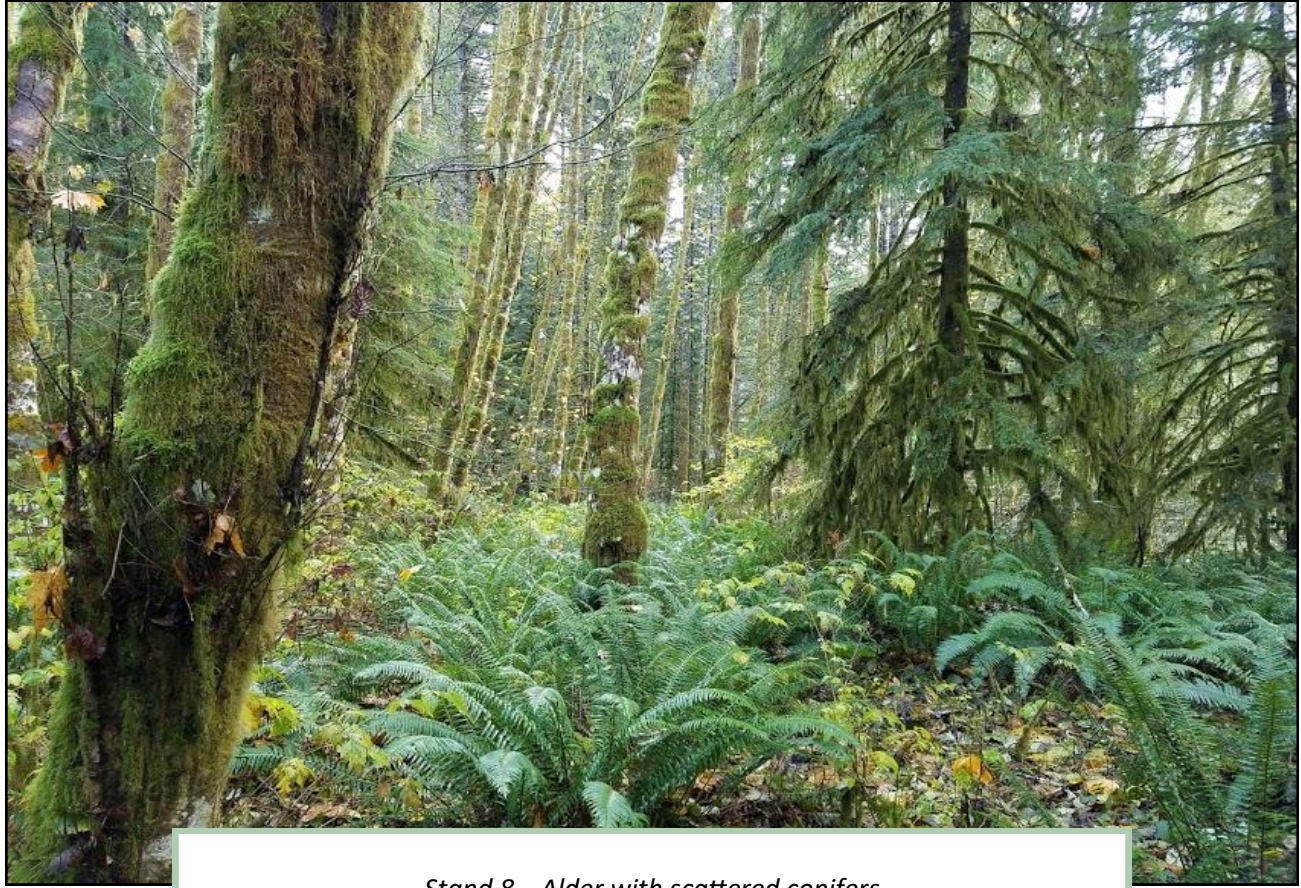
Stand 8	Zone: Active management					
Site						
Area	Soils			Site Class		
4.1 acres	Goble silt loam			II (124)		
Aspect	Slope			Access		
North, west	5-50%			Via main road		
Timber volumes						
Stand age	60	Timber Type		Hardwood		
Species	DBH	TPA	BA	Gross/acre	Net/acre	Total
Douglas-fir	23.0	3	8	1,631	1,549	11,155
Red alder	13.6	116	118	14,174	12,234	88,084
Bigleaf maple	17.6	35	59	6,549	4,592	33,065
Western redcedar	38.0	1	8	1,131	712	5,124
Western hemlock	26.5	4	17	3,556	2,650	19,082
Total	15.5	160	210	27,041	21,737	156,510
Relative density	53	Regeneration		None		

Description

Alder is the dominant species on this patch on the east side of the main road. The stand is approximately 60 years old, and includes a considerable amount of maple, as well as scattered conifers.

Recommendations

Alder is a relatively short-lived species and volume growth essentially stops in most stands by age 60 or sooner. At this stage, crown breakage and mortality often lead to development of dense brush undergrowth in the absence of advance regeneration, especially when species such as salmonberry are present. This area should be harvested within the next five years, with retention of some of the largest conifers for seed and habitat. The area is steep, and should be cable logged uphill in conjunction with thinning in Stand 17.



Stand 8—Alder with scattered conifers

Stand 9	Zone: Reserve/riparian		
Site			
Area		Soils	Site Class
54.6 acres		Scaponia-Braun silt loam	II (130)
Aspect		Slope	Access
North, east, west		5-100%	Via main road
Timber			
Stand age	60-100	Timber type	Mixed
Relative density	NA	Regeneration	NA

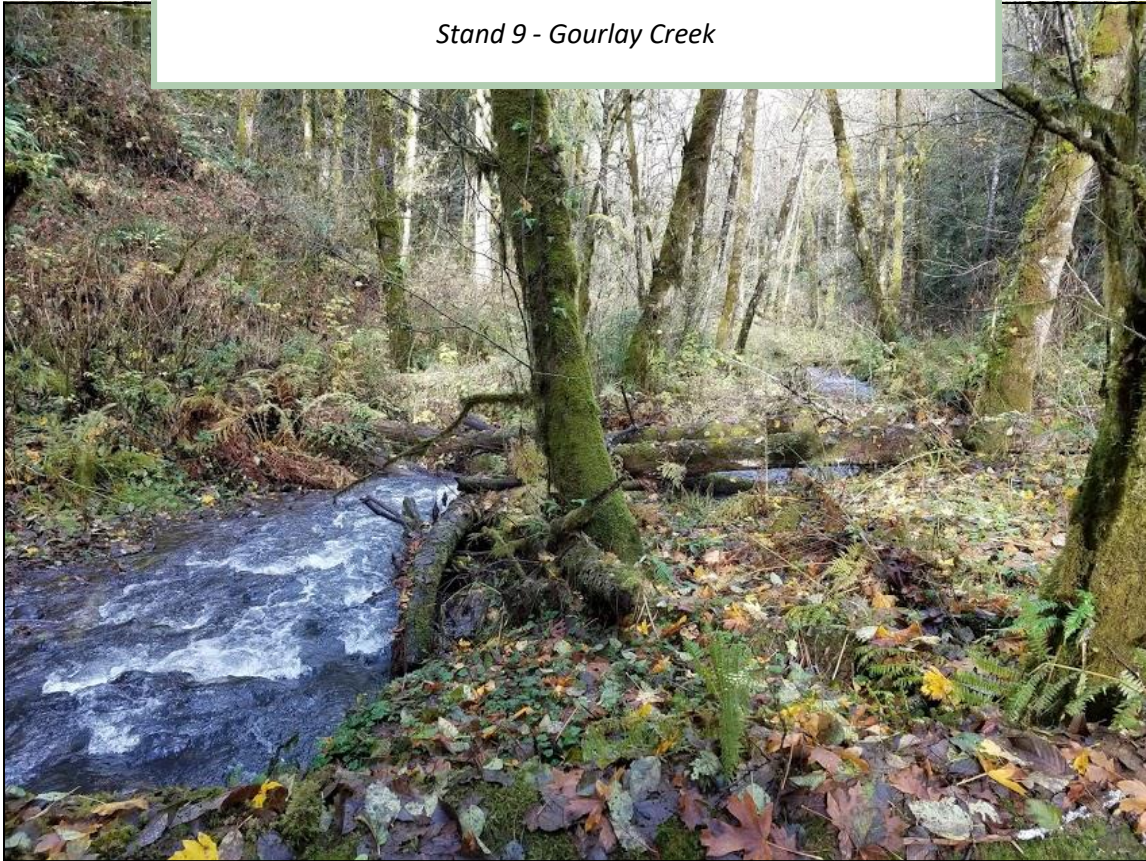
Description

This is the primary reserve area, extending the full length of Gourlay Creek on the property and encompassing all the major riparian habitat, as well as some adjacent upland stands that contain older mixed conifer forest. The riparian forest is nearly pure alder, while the adjacent slopes contain a mix of species. There is a maintenance road that runs parallel to the creek, providing access to the buried pipeline.

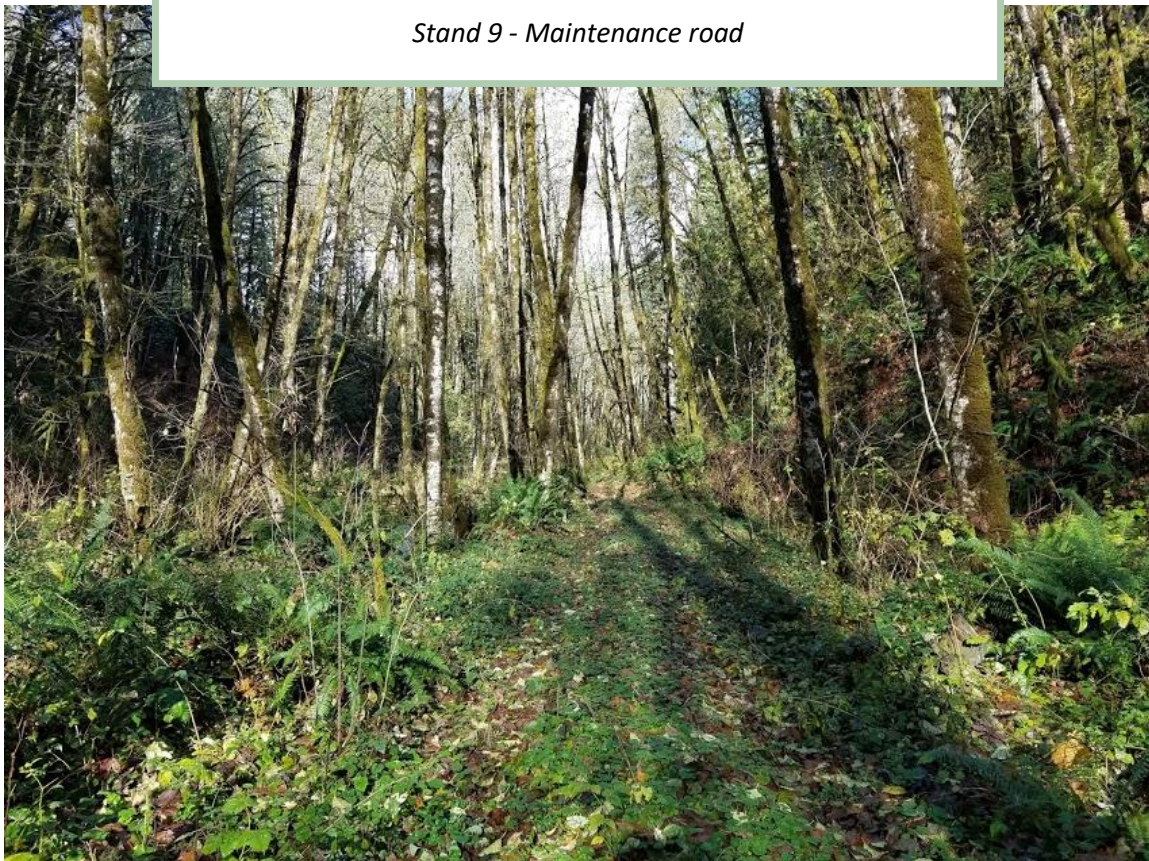
Recommendations

As a reserve area, no timber management will be undertaken here. Restoration work could include cedar plantings, road maintenance, and transfer of gravels from the dam to locations downstream, all of which are discussed elsewhere in this plan.

Stand 9 - Gourlay Creek



Stand 9 - Maintenance road



Stand 10	Zone: Reserve/riparian		
Site			
Area		Soils	Site Class
9.3 acres		Goble silt loam	II (124)
Aspect		Slope	Access
Variable		40-80%	None
Timber			
Stand age	60	Timber type	Douglas-fir
Relative density	NA	Regeneration	NA

Description

Occupying the far southeastern corner of the property, Stand 10 features a steep canyon with a small fish-bearing stream (unnamed). A dense stand of Douglas-fir approximately 60 years old blankets both sides of the canyon. Access for management purposes would be somewhat challenging, and due to the steep slopes, and the presence of a fish-bearing stream, this area is being zoned as reserve/riparian.

Recommendations

As a reserve area, no timber management will be undertaken here. There do not appear to be any problems with invasives, and there are no roads within the stand boundaries.

Stand 11	Zone: Active management					
Site						
Area		Soils		Site Class		
9.7 acres		Goble silt loam		II (124)		
Aspect		Slope		Access		
North, west		5-30%		Via main road		
Timber volumes						
Stand age	60	Timber Type		Hardwood		
Species	DBH	TPA	BA	Gross/acre	Net/acre	Total
Douglas-fir	18.4	15	28	5,945	5,648	54,784
Red alder	12.8	164	146	20,184	17,302	167,832
Bigleaf maple	21.0	2	6	815	610	5,919
Western redcedar	19.0	3	6	256	243	2,360
Western hemlock	9.2	24	11	1,307	1,241	12,042
Total	13.1	209	196	28,507	25,045	242,935
Relative density	54	Regeneration		None		

Description

This is another alder-dominated stand, similar to Stand 8, but even more heavily stocked. The stand lies on soils that were deposited from a slide that occurred to the east. Based on the age and appearance of the stand, it appears the alder became established on the exposed soils after the slide.

Recommendations

Alder is a relatively short-lived species and volume growth essentially stops in most stands by age 60 or sooner. At this stage, crown breakage and mortality often lead to development of dense brush undergrowth in the absence of advance regeneration, especially when species such as salmonberry are present. This area should be harvested within the next five years, with retention of some of the largest conifers for seed and habitat. The area is easily loggable with ground-based equipment; however, the access road is in poor condition and needs to be reconstructed.

Stand 12	Zone: Reserve/riparian		
Site			
Area		Soils	Site Class
6.3 acres		Bacona silt loam	II (124)
Aspect		Slope	Access
Variable		10-40%	Not established
Timber			
Stand age	40	Timber type	Mixed
Relative density	NA	Regeneration	NA

Description

There is no established access to this area and it is being included in the reserve zone partially for this reason, but also because it is adjacent to other reserve areas. The stand features a mix of hardwood and conifer, of slightly younger age than other similar stands on the property. There are several trails that are apparently being lightly used by neighbors. The property line is not clearly marked and it appears there are some abandoned vehicles that may be on City property.

Recommendations

The City should consider having the northern property line surveyed, and if abandoned vehicles are on the City property, they should be removed.

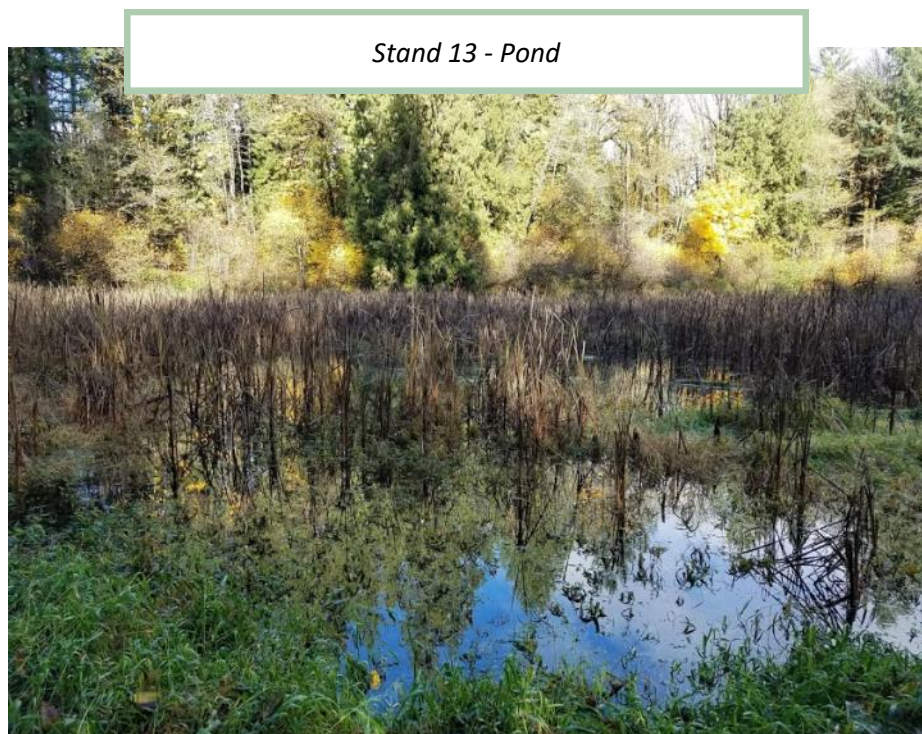
Stand 13	Zone: Reserve/riparian		
Site			
Area	Soils	Site Class	
7.6 acres	Bacona silt loam	II (124)	
Aspect	Slope	Access	
Variable	5-80%	Not established	
Timber			
Stand age	40-80	Timber type	Mixed
Relative density	NA	Regeneration	NA

Description

This area consists of riparian zones around a pond and a small, non fish-bearing tributary of Gourlay Creek. The pond shows up on old survey maps as a “lake” and the water resources are discussed in that section of this plan. Species include alder, Douglas-fir, and maple. The terrain is relatively level around the pond, but the stream buffer to the south is quite steep.

Recommendations

The area will be treated as a reserve/riparian area. No management activities are needed at this time.



Stand 14	Zone: Active management					
Site						
Area		Soils		Site Class		
3.7 acres		Bacona silt loam		II (124)		
Aspect		Slope		Access		
South, north		5-20%		Via main road		
Timber volumes						
Stand age	80-100	Timber Type		Hardwood		
Species	DBH	TPA	BA	Gross/acre	Net/acre	Total
Douglas-fir	32.9	9	54	14,687	13,222	48,923
Red alder	9.9	69	36	4,936	4,343	16,070
Bigleaf maple	20.8	46	109	16,010	11,931	44,143
Western redcedar	36.6	5	36	4,201	3,766	13,934
Western hemlock	19.6	17	36	5,936	5,456	20,185
Total	18.5	146	272	45,771	38,718	143,256
Relative density	63	Regeneration		None		

Description

This small area is immediately adjacent to the main access road between the gate and the Gourlay Creek Bridge. Terrain is gentle and the stand boundary occurs where the slope begins to steepen down towards the creek. A mix of species occurs here. The large maple that dominate much of the site may have figured grain, while the conifer trees contain a lot of timber volume.

Recommendations

This area will be actively managed because it is so accessible and on gentle topography. A regeneration harvest is prescribed, with retention of a few large conifers. Maple trees should be treated at the stump to prevent resprouting, and the area can be planted to cedar and hemlock due to the small opening size and relative scarcity of those species elsewhere on the property.

Stand 15	Zone: Reserve/riparian		
Site			
Area		Soils	Site Class
3.5 acres		Scaponia-Braun silt loam	II (130)
Aspect		Slope	Access
West		20-90%	Via main road
Timber			
Stand age	80	Timber type	Mixed
Relative density	NA	Regeneration	NA

Description

This area surrounds a small, non fish-bearing tributary of Gourlay Creek near the center of the property. The forest is mixed, with scattered older Douglas-fir, maple, cedar, alder, and hemlock. Some blowdown has occurred, and the forest is beginning to have a primordial, old forest look. Terrain is very steep in places.

Recommendations

The area will be treated as a reserve/riparian area. No management activities are needed at this time.

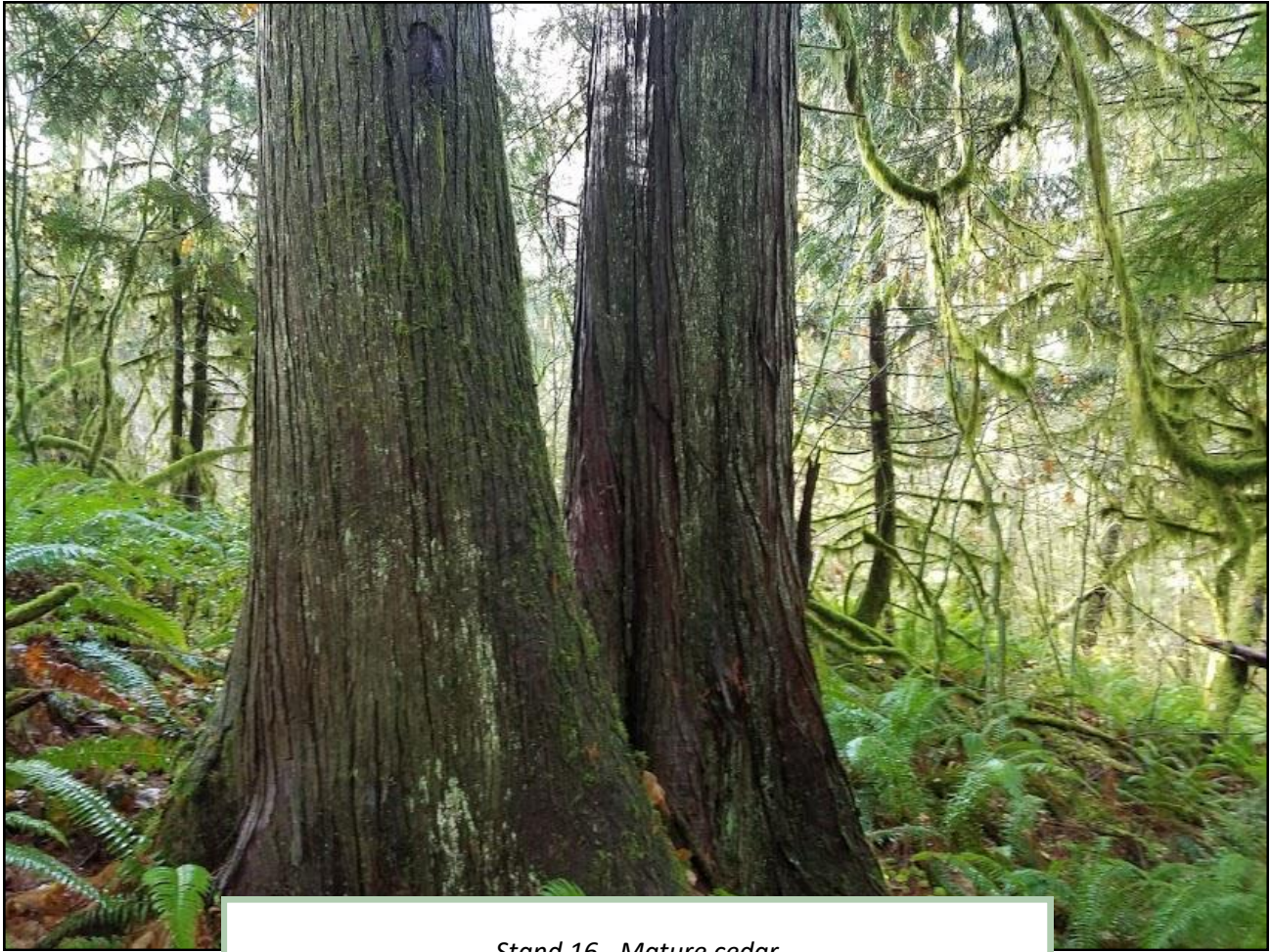
Stand 16		Zone: Reserve/riparian	
Site			
Area		Soils	Site Class
11.6 acres		Scaponia-Braun silt loam	II (130)
Aspect		Slope	Access
North		10-30%	Not established
Timber			
Stand age	100	Timber type	Mixed
Relative density	NA	Regeneration	NA

Description

This stand is on relatively gentle terrain just north of the Stand 4 clearcut. At the time of that harvest in 1990, there was support in the community for leaving Stand 16 to develop into older forest for habitat. The stand currently has a mix of Douglas-fir, cedar, maple, and alder, with the older conifer in the 100 year old range. There is some laminated root rot affecting the Douglas-fir, and many of the other conifers have various defects, such as conks, forked or broken tops, and the like.

Recommendations

The area will be treated as a reserve/riparian area. No management activities are needed at this time. If the city revisits its allocation of reserve/active management areas in a future update of this plan, this could be a candidate for active management simply based on the accessibility of the area and the gentle topography.



Stand 16 - Mature cedar

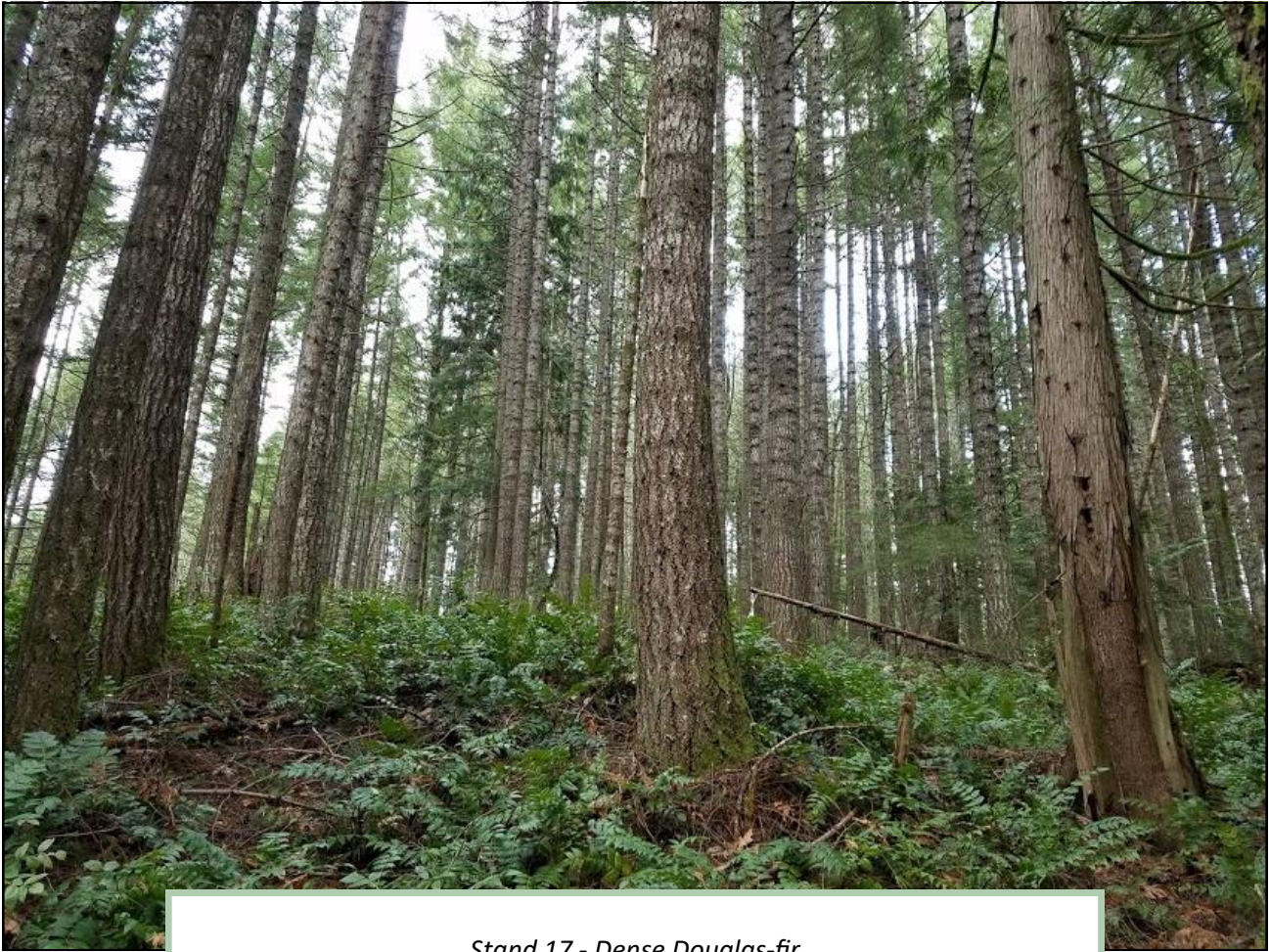
Stand 17	Zone: Active management					
Site						
Area		Soils		Site Class		
28.4 acres		Goble, Scaponia-		II (130)		
Aspect		Slope		Access		
West		10-80%		Via main road		
Timber volumes						
Stand age	60-120	Timber Type		Douglas-fir		
Species	DBH	TPA	BA	Gross/acre	Net/acre	Total
Douglas-fir	20.1	93	205	36,601	33,938	963,842
Red alder	10.0	32	18	1,383	1,217	34,572
Bigleaf maple	16.8	10	15	1,632	1,060	30,116
Western redcedar	22.2	3	9	671	421	11,945
Total	18.1	138	246	40,287	36,636	1,040,476
Relative density	67	Regeneration		DF, WH, RC		

Description

This is the most valuable remaining stand of Douglas-fir timber on the property. It is well stocked with nearly pure fir and it contains several age classes. There are a few scattered older trees, approximately 120 years old. These were left at the time the older stand was cut. The rest of the stand is generally either 60 or 80 years old (not mixed). There are some indications that accessible portions of the stand have been thinned in the past, but it has been many years. In the southern portion of the stand (south of the main access road), heavy thinning has resulted in Douglas-fir regeneration in the understory, along with some blackberry infestations. Elsewhere, weeds are at a minimum, and there are a few scattered hemlock and cedar trees in the understory.

Recommendations

This area should be thinned in the near future to maintain vigorous growth and health of the stand. While portions of the stand can be logged using ground-based equipment, there are numerous steep slopes that will require cable-logging. A small yarder or “Yoader” would be ideal due to the number of settings required. There is some potential to build a road that would connect to the existing road system in Stand 1, thereby eliminating the need to utilize the property to the east for access to Stands 1, 6, and 7.



Stand 17 - Dense Douglas-fir

Stand 18	Zone: Reserve/riparian		
Site			
Area		Soils	Site Class
20.2 acres		Scaponia-Braun silt loam	II (130)
Aspect		Slope	Access
West		20-50%	Via main road
Timber			
Stand age	60-100	Timber type	Hardwood
Relative density	NA	Regeneration	NA

Description

Alder and maple dominate this site between the reservoir access road along Gourley Creek and the main access road. There are also scattered Douglas-fir and cedar.

Recommendations

The area will be treated as a reserve/riparian area. No management activities are needed at this time.

Stand 19	Zone: Reserve/riparian		
Site			
Area		Soils	Site Class
5.8 acres		Scaponia-Braun silt loam	II (130)
Aspect		Slope	Access
East		10-80%	Via Otto Miller Rd.
Timber			
Stand age	60-100	Timber type	Mixed
Relative density	NA	Regeneration	NA

Description

This area features mature maple and alder, along with scattered conifer, on both sides of Otto Miller Road in the northwestern corner of the property.

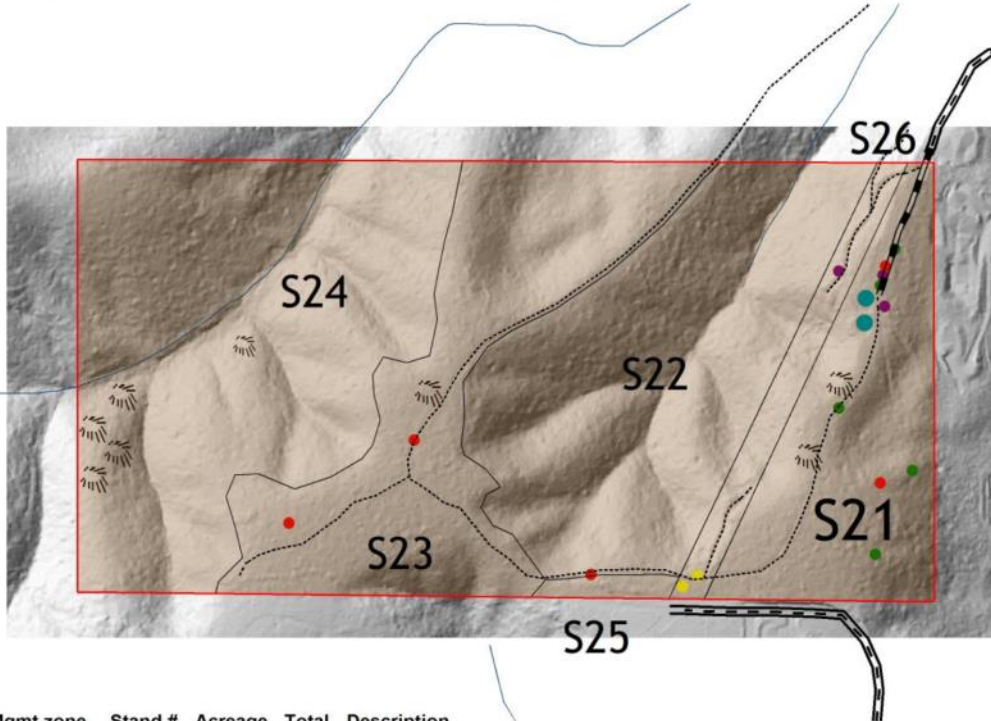
Recommendations

The area will be treated as a reserve/riparian area due to the steep slopes leading down to Gourlay Creek, and the high visibility of this area. There is an infestation of English ivy along the road right of way which should be eliminated before it can spread further into the forest.

Non-forested areas

Stand 20 is a non-forested area available for log landings, vehicle turnaround, etc.

Scappoose Vista tract - Stand map



Legend

- TRACTS
- ROADS(by Type)
 - ▬ 'Paved'
 - ▬ 'Rock'
 - Water tanks
 - Dirt roads/trails
- STANDS
 - 'Nature Park'
- Invasives(by FIELD1)
 - 'English holly'
 - 'English ivy'
 - 'Scotch broom'
 - 'blackberry'
- Streams_UTM(by Fpasize)
 - 'Small'
- Blow down
- Vista bare earth

Mgmt zone	Stand #	Acreage	Total	Description
Nature Park	21	11.5		Douglas-fir/cedar
Nature Park	22	19.8		Douglas-fir/maple
Nature Park	23	15.9		Douglas-fir/maple
Nature Park	24	25.7		Douglas-fir
Nature Park	25	0.6		Nonforest
Nature Park	26	3.0	76.6	Powerline

Total Acreage: 76.6

Scale = 1 : 400.00 (In : US Feet)



Vista tract, Stands 21-26

Stand 21	Zone: Nature park		
Site			
Area	Soils	Site Class	
11.6 acres	Cascade silt loam	II (117)	
Aspect	Slope	Access	
East	10-40%	Via Bella Vista Dr.	
Timber			
Stand age	55	Timber type	Douglas-fir, maple, and cedar
Relative density	NA	Regeneration	Cedar

Description

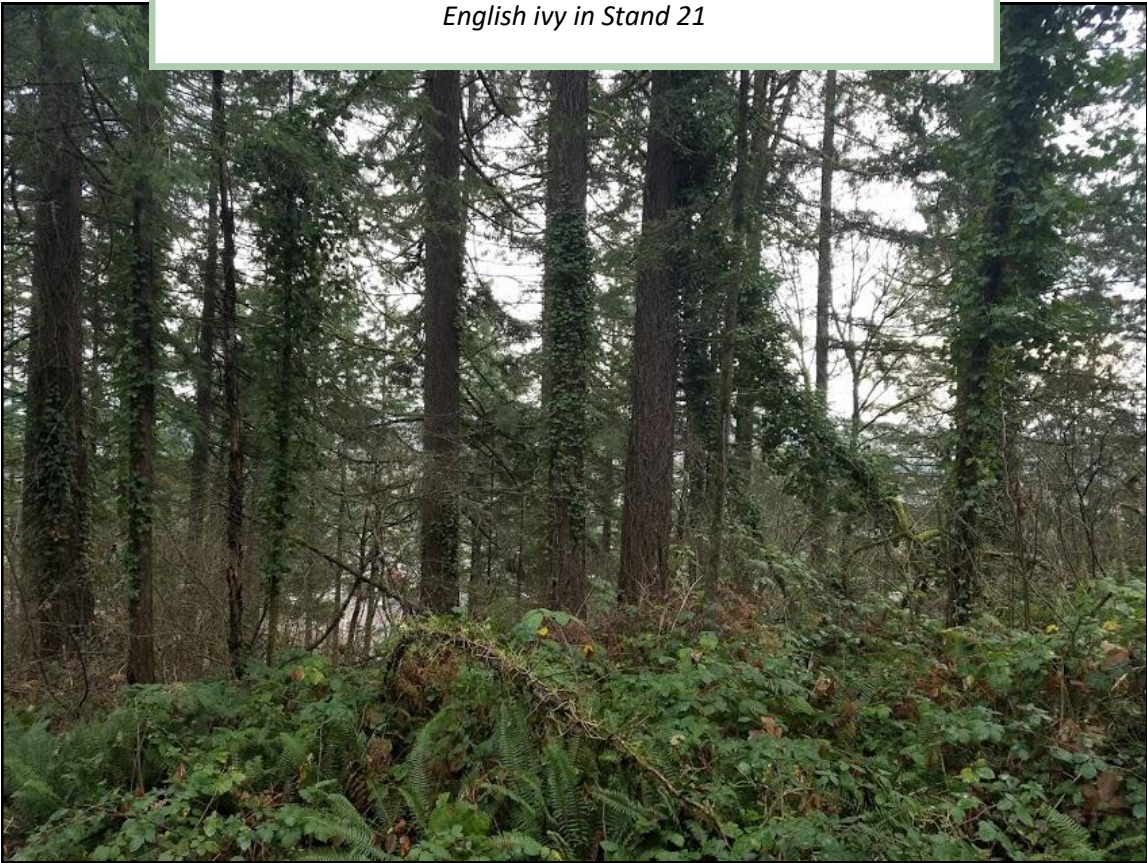
This is the sliver of forest on the east side of the BPA powerline. It contains the two water tanks, as well as the only existing access road that enters the property. Douglas-fir dominates the site, aged 55 years, with scattered maple and some western redcedar. Stocking is highly variable, ranging from dense stands to open brushy areas. The cedar is generally clustered in the southwestern corner, and some natural regeneration of cedar is occurring. There are significant invasive plant infestations here, especially English ivy, blackberry, and to a lesser extent English holly.

Some blowdown has occurred here in recent years. The down trees appear to have had healthy root systems, so it does not appear to be related to root rot.

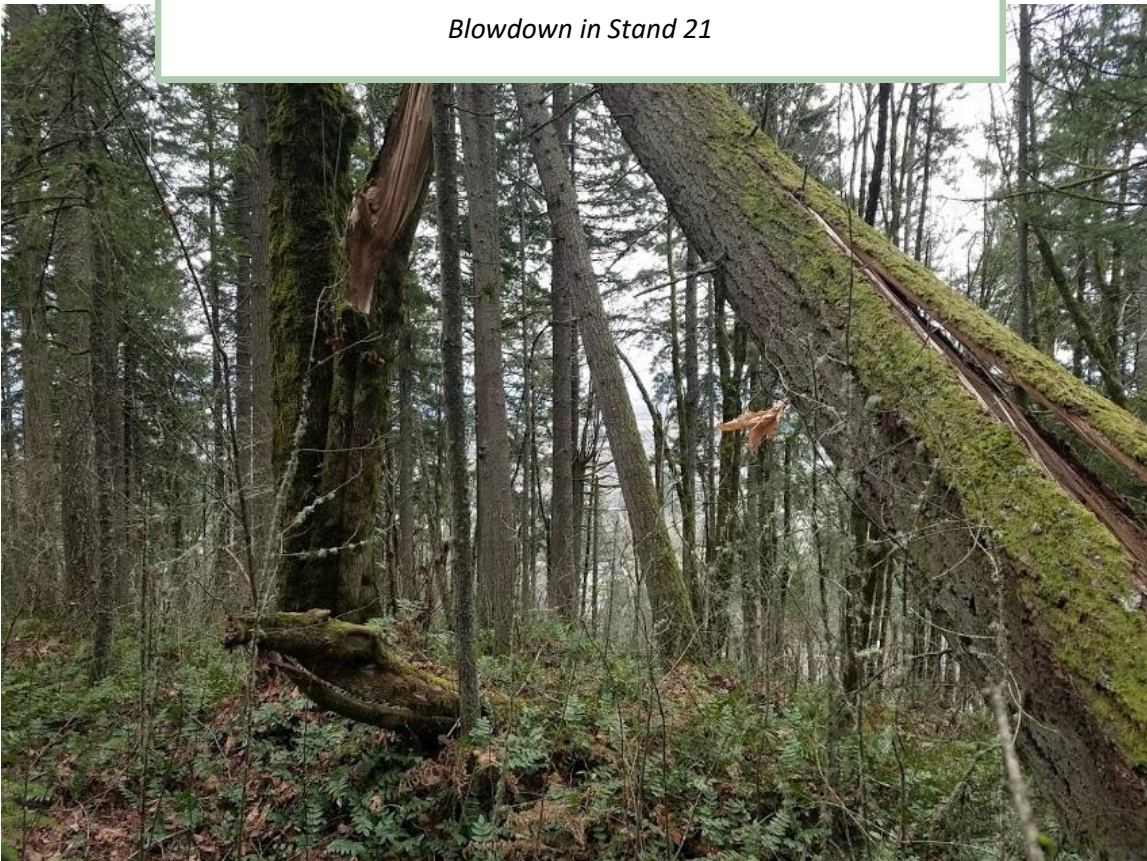
Recommendations

As this property is likely to serve as a hiking/nature park, there is the potential to create a viewpoint looking to the east, where the Columbia River and some of the Cascade peaks could be seen. Careful siting of this location could help screen neighboring homes. Prior to unveiling public access, a light thinning is recommended to remove potential hazard trees, thin overstocked areas, and set the stand up for many years of low maintenance. Prescription would be thinning from below (taking smaller trees), removing about 30% of the stems and about 20% of the standing volume.

English ivy in Stand 21



Blowdown in Stand 21



Stand 22	Zone: Nature park		
Site			
Area		Soils	Site Class
19.8 acres		Cascade silt loam/ Xerochrepts	II (117)
Aspect		Slope	Access
North		30-60%	Not established
Timber			
Stand age	55	Timber type	Douglas-fir, maple, and cedar
Relative density	NA	Regeneration	Cedar

Description

This stand is also about 55 years old, with Douglas-fir, lots of maple, and some cedar. The terrain is generally steep, leading down to a small stream.

Recommendations

More accessible areas, such as the southern third of this stand, can be thinned to prepare the site for public use. The focus would be reducing density in overstocked patches of Douglas-fir, while generally leaving the maples alone. Hardwoods are much more fire-resistant than conifers, so from a public safety standpoint, this is a good long-term strategy for this site.

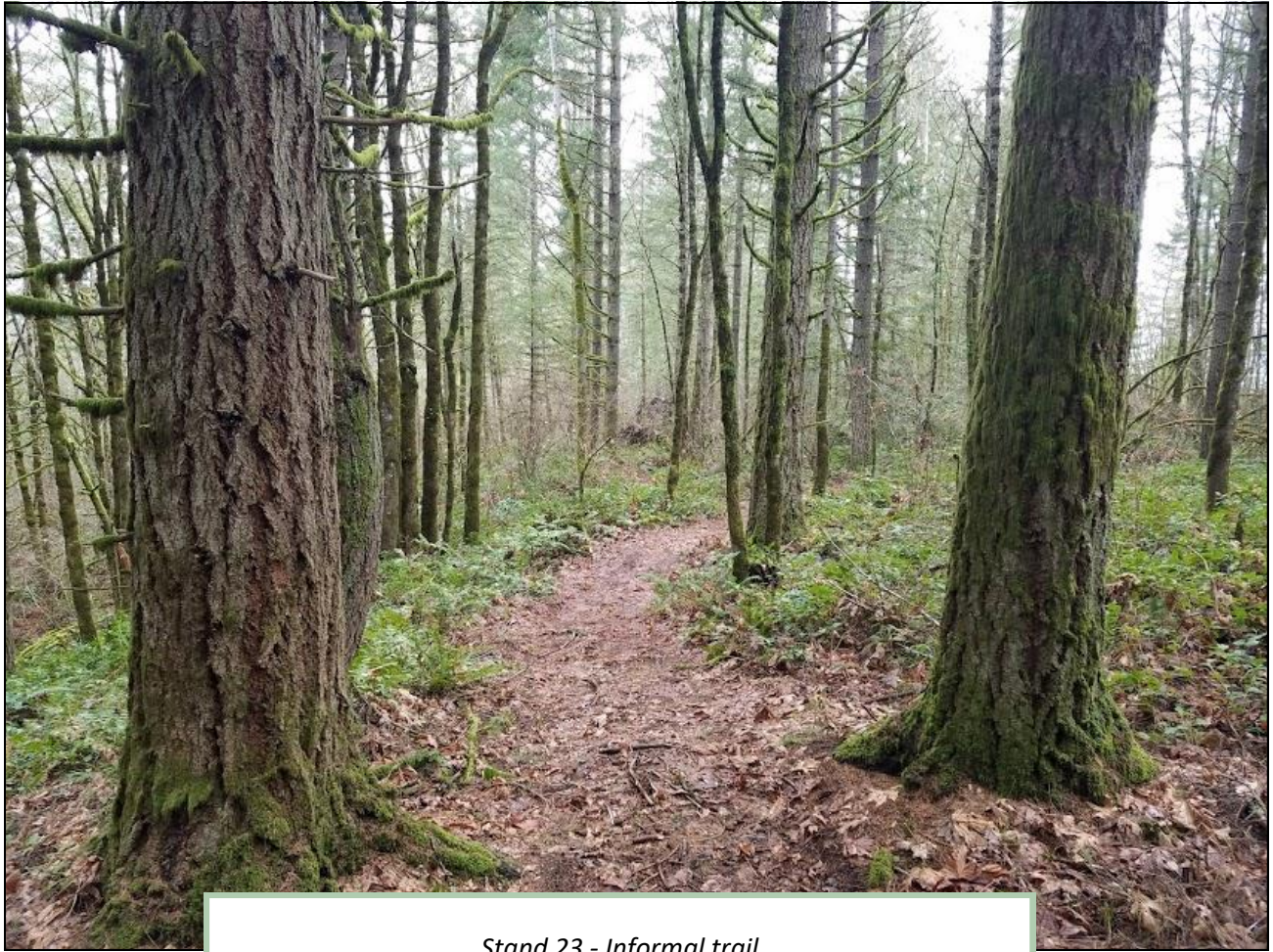
Stand 23	Zone: Nature park		
Site			
Area		Soils	Site Class
19.8 acres		Cascade silt loam/ Xerochrepts	II (117)
Aspect		Slope	Access
North		5-60%	Not established
Timber			
Stand age	55	Timber type	Douglas-fir, maple, and cottonwood
Relative density	NA	Regeneration	None

Description

Douglas-fir with scattered maple dominate here. There is a small area with cottonwood near a trail junction. This area has moderate terrain, with a steep section to the north. An old road grade leads to the northeast along the boundary with Stand 22.

Recommendations

This area could be lightly thinned to prepare for public access.



Stand 23 - Informal trail

Stand 24		Zone: Nature park	
Site			
Area		Soils	Site Class
26.0 acres		Cascade silt loam/ Xerochrepts	II (117)
Aspect		Slope	Access
North		20-60%	Not established
Timber			
Stand age	55	Timber type	Douglas-fir
Relative density	NA	Regeneration	None

Description

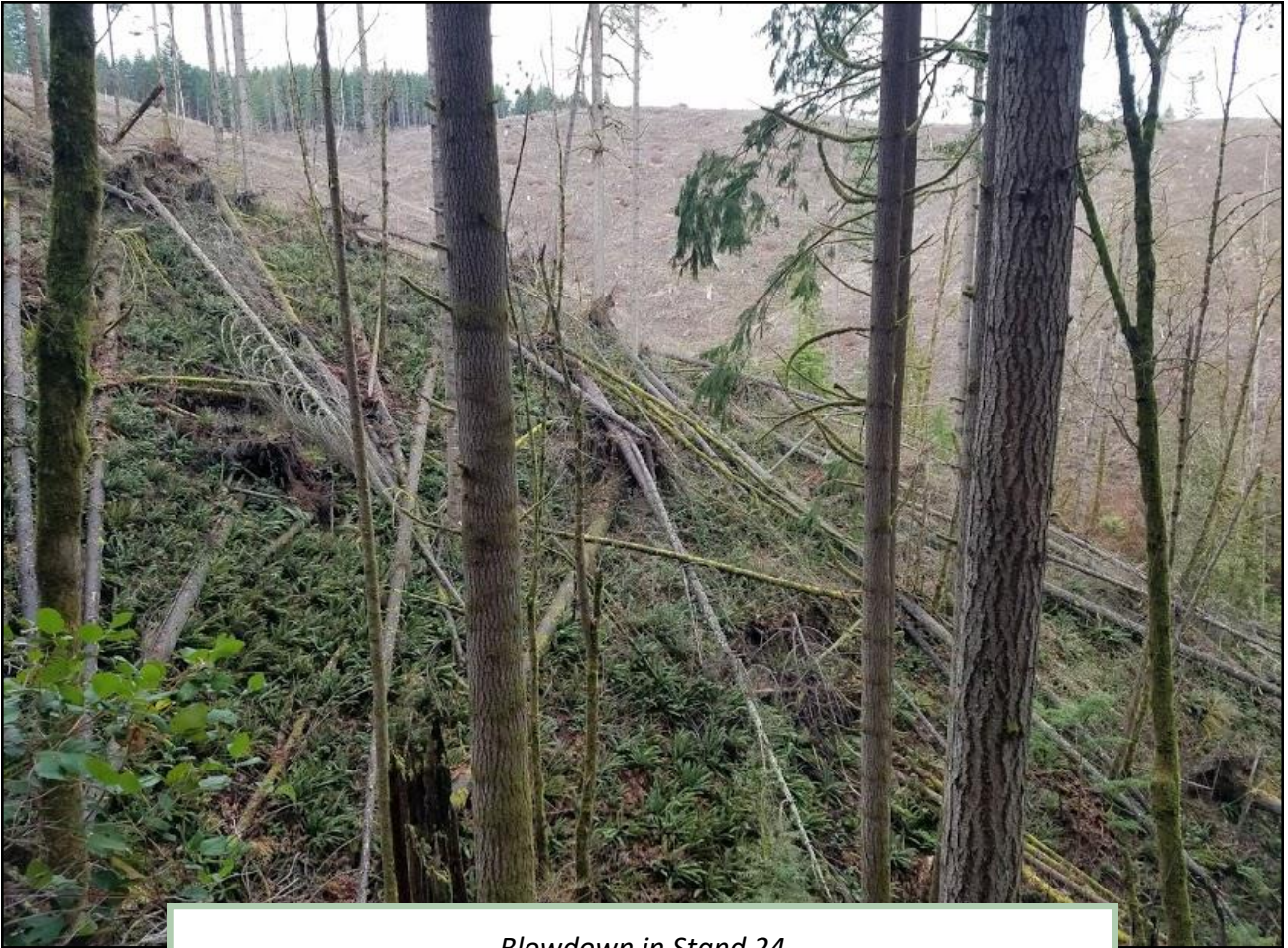
This is the rugged northwestern corner of the property, with a 55 year old stand of Douglas-fir. Stocking is generally dense, except for a patch of blowdown along the western property line, where the adjacent landowner recently clearcut.

Recommendations

Some blowdown salvage and thinning could help reduce overall fuel loads and fire risk as the property moves toward public access. A “Yoader” or small tower could access most of the steeper slopes while minimizing soil disturbance.

Stand 25 is a 0.5 acre area that is not forested along the south property line.

Stand 26 is a 2.9 acre powerline right-of-way that is maintained in a brushy condition.



Blowdown in Stand 24

Management policies

Reserves/riparian

No timber harvesting will be conducted here. Stands are allowed to develop naturally, with dead and dying trees falling into the streams to enhance fish habitat. Restoration projects could include:

1. Develop system to take gravels that accumulate at the dam and redeposit downstream to facilitate this natural process
2. Plant conifers along stream in areas that are hardwood dominated for long-term large wood recruitment into the stream.
3. Important priorities are maintaining or enhancing the water delivery infrastructure, including pipelines, service roads, etc.

Active management

Timber management on a long-term basis to produce high quality timber for local and regional markets. The target rotation age will be 70 to 80 years for Douglas-fir, and 50 to 60 years for alder. Harvesting will not exceed growth based on a rolling five-year average. **Figure 3** shows the current age class distribution of the active management areas of Gourlay Creek. Species diversity and forest health will be important priorities for management. A combination of even-aged and uneven-aged management will be utilized. Stream buffers will exceed Oregon rules, and some large trees, snags, and down wood will be retained at the time of harvest to provide habitat diversity. Income from harvesting can help support road maintenance and improvements, water system infrastructure, stewardship activities, as well as potential acquisition of additional forest properties in the City’s drinking water catchment areas. especially near the intakes.

Figure 3.

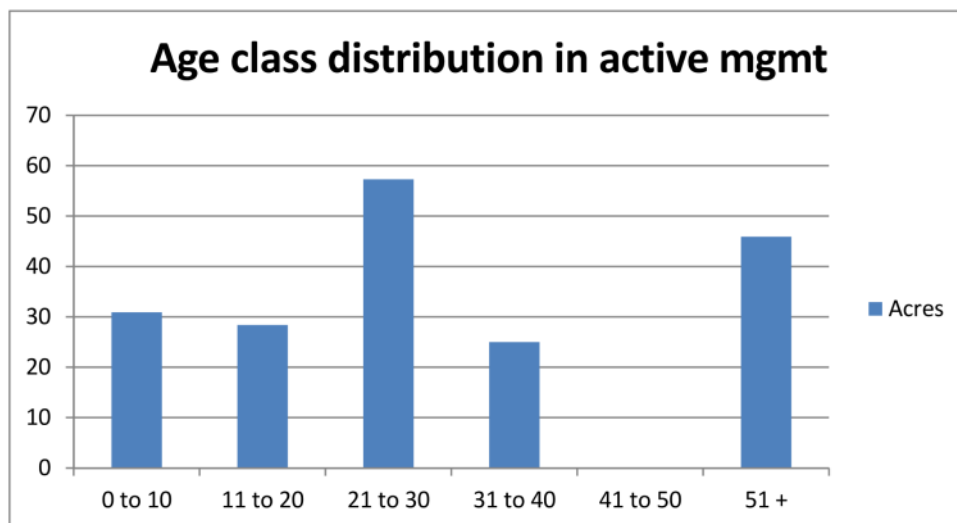


Table 3 records clearcut harvests that have occurred since the 1980's. In general, for a 70 to 80 year rotation, approximately 20 to 30 acres should be in each 10 year age class. However, there are currently 17 acres of mature alder (60 years old) that should probably be harvested soon, which will create a larger 0-10 year age class. Such imbalances are inevitable from time to time, so long as the landowner is fully aware of the long-term implications.

Table 3. Recent harvest history

Year	Acres	Stand #
1982	9	6
1985	16	5
1990	48	4
1993	10	7
1999	28	3
2014	31	1 & 2
Total	142	

Nature park/recreation

The Gourlay Creek tract is closed to public access to protect the City's water supply and infrastructure critical to its delivery. As identified in the City's parks plan, there is a need for additional parks and recreation opportunities for the citizens of the City and surrounding communities. The Vista tract has been identified as a potential nature park/recreation site, due to its proximity to neighborhoods, potential views, and mature forest setting.

There is currently an informal trail system on the Vista tract, and plans are underway for improving the trail system and providing for parking. Prior to formally opening the tract for public recreational access, it would be prudent to conduct a light thinning of the stands to remove dead and dying trees that could pose a hazard to hikers, as well as to promote a healthy forest condition. In addition, there is an area in the western part of the tract with heavy blowdown of mature timber. Wildfire risk is exacerbated by heavy fuel loads such as blowdown patches, and given the residential neighborhood setting, and the pending recreational use, it would be advisable to conduct a careful salvage of this blowdown.

After this initial thinning/salvage work, forest management will be generally limited to trail maintenance, hazard tree assessment and removal, and forest health monitoring, including monitoring for invasive plants.

Management recommendations

Forest management and sustained yield

Prudent timber management should be conducted in the active management area on Gourlay Creek to provide income, manage wildfire risk, and provide a diverse range of wildlife habitats. Harvesting should be carefully calibrated to ensure stability and sustainability over time.

Management of age class distribution is an important part of this, discussed above. In addition, establishing a sustained yield volume based on the inherent productive capacity of the forest is critical.

Based on an average Site Index of about 125 across all 188.3 acres of the active management zone, and based on the empirical yield tables of Chambers (1980), these sites should be capable of producing about 30,000 board feet per acre in Douglas-fir on a 50 year rotation. This amounts to 600 board feet per acre per year. Over 188.3 acres, this amounts to 112,980 board feet of potential timber volume growth each year. However, many of the stands are not fully stocked with Douglas-fir and some have a high percentage of basal area in maple and other species.

Based on all these factors, the average annual harvest volume from the Gourlay Creek tract should not exceed 100,000 board feet until the time of the next plan. This should be calculated as a rolling average over a five-year period. In the case of catastrophic events such as widespread tree mortality due to drought, insects, diseases, windthrow, fire or other calamity, such self-imposed limits may need to be exceeded for valid long-term stewardship and public safety reasons.

The Vista tract will not be managed for timber production. However, an initial light thinning and salvage of blowdown is recommended to reduce fuel loads and improve safety.

Vegetation management

Areas that are regenerated should be promptly and thoroughly replanted with site-appropriate species, including Douglas-fir, western redcedar, western hemlock, and red alder. Maple can be retained when it naturally regenerates; however, maple stump sprouts should be aggressively controlled. The best control would be to treat maple stumps at the time of harvest. Follow up control can be mechanical, or if needed, chemical. A balanced approach would be to allow natural maple regeneration from seed to be retained in the stand, while eliminating most stump sprouts.

Invasive species should be treated and such treatments monitored for effectiveness. Presence of key invasives are indicated on the maps. Control recommendations vary by species, and are included in **Appendix C**.

Road maintenance and improvements

While the road system is adequate for the level of use it receives, there are several projects that are recommended for the next few years to improve access and reduce risk of road failure or erosion.

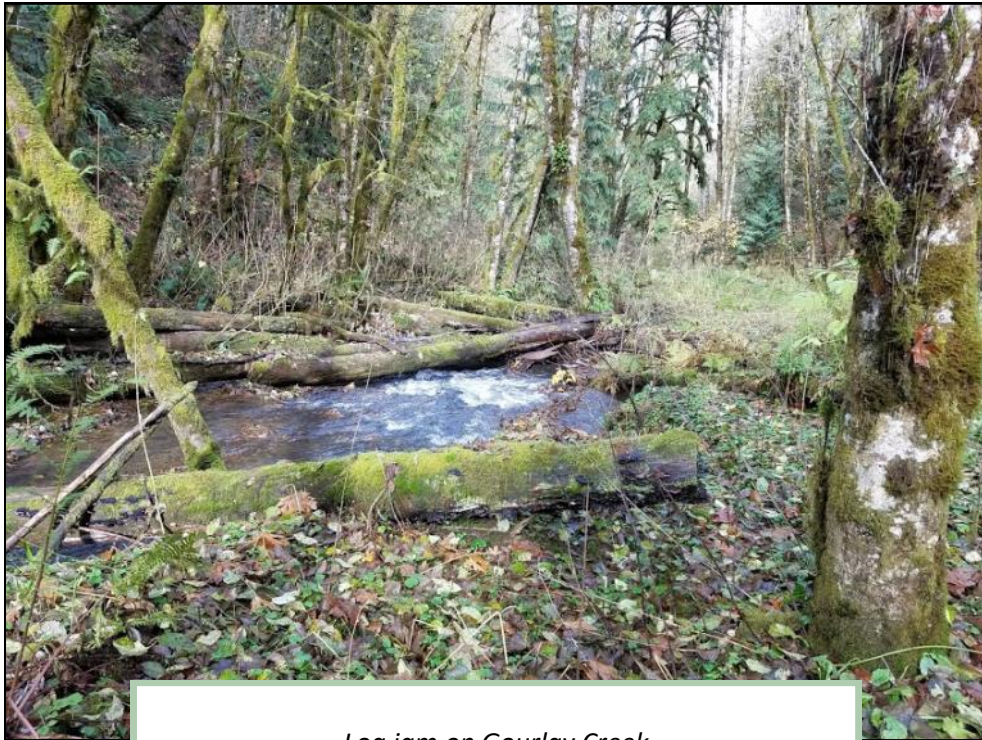
1. **Gourlay Creek main access road rocking.** Because the culverts in the steep section leading east from the Gourlay Creek bridge are partially deformed, an additional lift of crushed rock should be placed to ensure further damage doesn't occur. The length of road is about 1500'. At one load per station, this would amount to 15 loads.
2. **Access control on the maintenance road.** The northern property line at Gourlay Creek should be surveyed, marked and recorded. Once that is done, the boundary should be posted with signs indicating City property and no trespassing.
3. **Repair road to Stand 11.** This is a major road repair following a slump that occurred since this road was last used around 2000. The repair can be put out to bid with specifications, and should be completed prior to initiating the harvest in Stand 11.
4. **Vista tract access.** The road into the tract via NW Bella Vista Drive needs to be extended to provide suitable access to the property. This may require additional rock and grading. If this steep grade proves unsuitable for loaded log trucks, an alternative is to build an access road entering the property from Luma Vista Drive to the south.

Fish habitat and stream health

Streamside conifer planting

Gourlay Creek was the site of a fish habitat improvement project approximately 10 years ago. Large logs were placed in the stream at several locations to help capture gravels and create pools, both important features in the life cycle of fish. These engineered log jams are a temporary fix to the problem of a lack of large conifers along the riparian area, which would naturally contribute woody debris over time. Most of the streamside forest along Gourlay Creek is dominated by alder, which breaks down very quickly in the stream and does not provide the same effect as more durable Douglas-fir or western redcedar.

Planting of western redcedar, which is very shade tolerant, should be conducted at strategic locations along Gourlay Creek to help provide a long-term source of woody debris recruitment into the stream system.



Log jam on Gourlay Creek

Silt and gravel migration

As part of routine maintenance of the dam on Gourlay Creek and the other intake facilities on Lazy and South Scappoose Creeks, accumulated silt and gravels must be periodically removed from behind the dams to allow for normal dam function. This material has traditionally been deposited in upland locations; however, removal of this migratory silt and gravel material can deplete these resources downstream, so a program of re-introducing this material further downstream is recommended. A plan can be worked out in coordination with the Oregon Department of Fish and Wildlife to do so in a way that is not unduly disruptive to fish.

Schedule of activities

Timber Management		
2018	Light thinning/salvage operation on Vista tract	50 acres
	Thin Stand 17	26 acres
	Harvest alder in Stand 8	4 acres
2020	Harvest alder in Stand 11 (Road work needed)	10 acres
	Thin Stands 5 and 6	25 acres
2022	Harvest Stand 14	4 acres
Stewardship projects		
2018	Treat invasives on both properties: - Spring: Scotch broom - Late Summer: Blackberry - Fall: Ivy and holly	
	Cut maple sprouts in Stands 1, 2, 3, and 7	Approx. 70 acres
2019	Cedar planting along Gourlay Creek	
	Invasives monitoring	
	Replant Stand 8	
2020	Plantation and invasives monitoring (ongoing)	
2021	Replant Stand 11	
2023	Replant Stand 14	
Infrastructure		
2018	Work with ODFW to develop plan for silt and gravel on Gourlay Creek	
	Identify target parcels for acquisition and begin dialogue with landowners	
	Establish access into Vista tract	
	Add surface rock to main road on Gourlay Creek tract	
	Survey northern boundary line	
2019	Repair road to Stand 11	

References

- Chambers, C.J. 1980. Empirical Growth and Yield Tables for the Douglas-fir Zone. Washington Department of Natural Resources, Report No. 41, Olympia, WA.
- Hanley, D.P., D.M. Baumgartner, G.L. Thomasson. 1996. Forest Environment Pesticide Study Manual. Washington State University Cooperative Extension.
- OFRI. 2012. Oregon's Forest Protection Laws, Second Edition. Oregon Forest Resources Institute, Portland, OR.
- Trask, S. 2011. Limiting Factors Analysis, Scappoose Creek. Biosurveys, Alsea, OR.

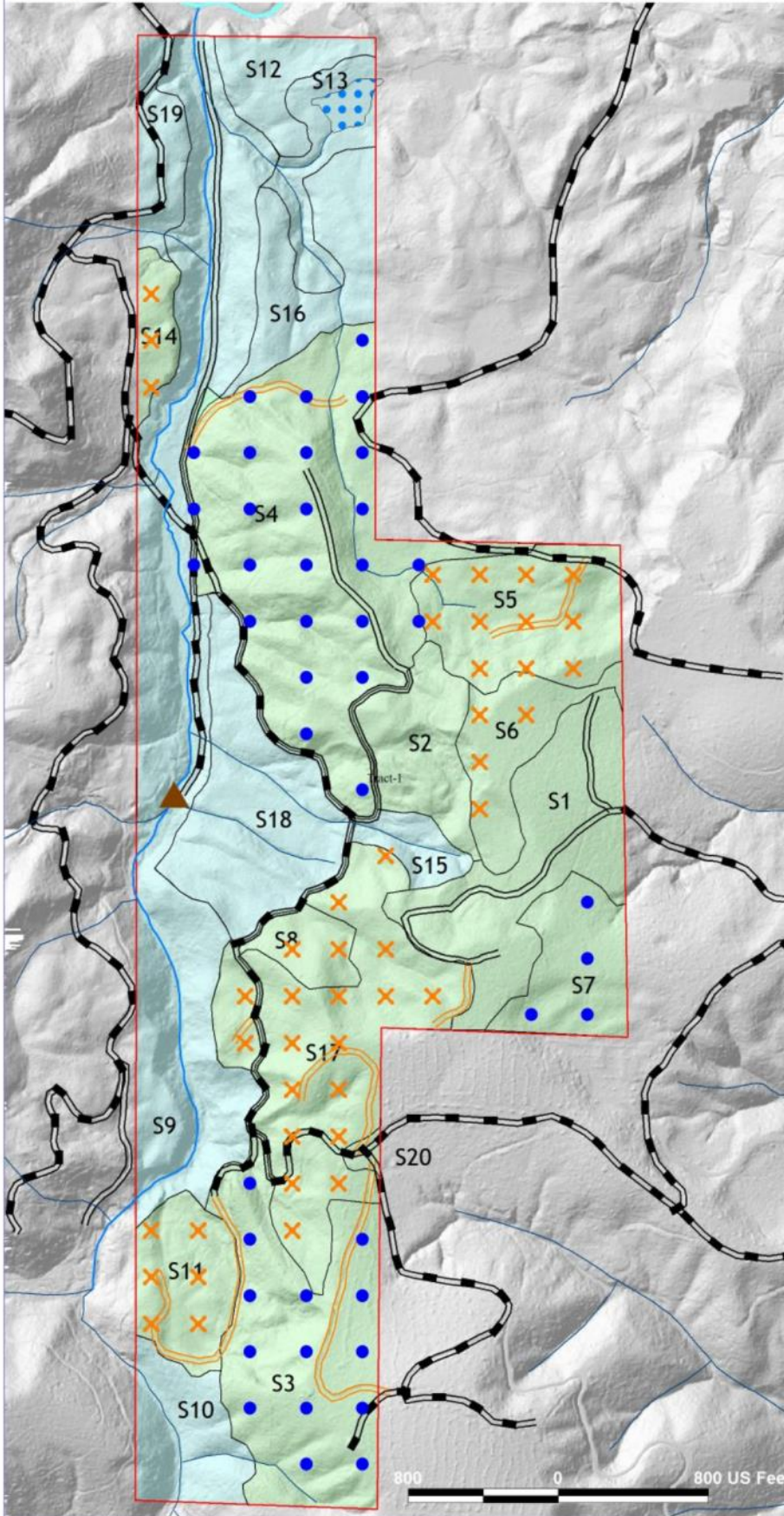
Appendix A: Forest inventory sample locations

Scappoose Gourlay Creek tract - Sample points



Legend

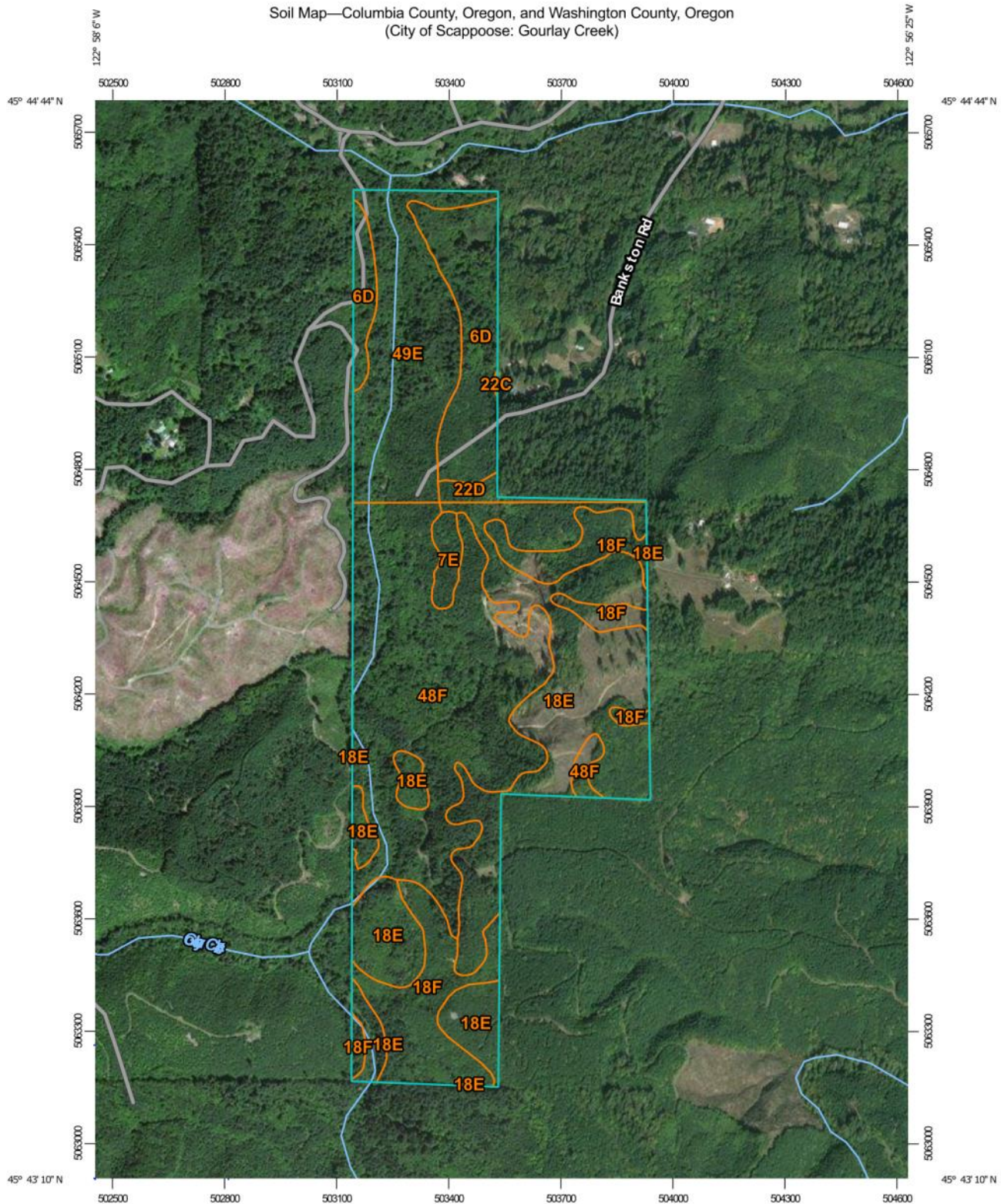
- ▲ Reservoir/intake
- Pre-merchantable timber sample points
- ✕ Merchantable timber sample points
- Streams_UTM(by Fpazise)
 - 'Large'
 - 'Medium'
 - 'Small'
- TRACTS
- ROADS(by Type)
 - ≡ 'Paved'
 - ≡ 'Rock'
 - ≡ 'Dirt'
 - ≡ 'Old grade'
- ☒ Pond
- STANDS
 - 'Mgmt'
 - 'Reserve'
- 📄 SCAPPOOSE_BE.JPG



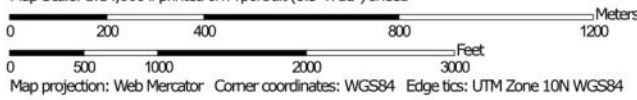
Scale = 1 : 800.00 (In : US Feet)

Appendix B: Soils maps

Soil Map—Columbia County, Oregon, and Washington County, Oregon
(City of Scappoose: Gourlay Creek)







































Map Scale: 1:14,000 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

Soil Map—Columbia County, Oregon, and Washington County, Oregon
(City of Scappoose: Gourlay Creek)

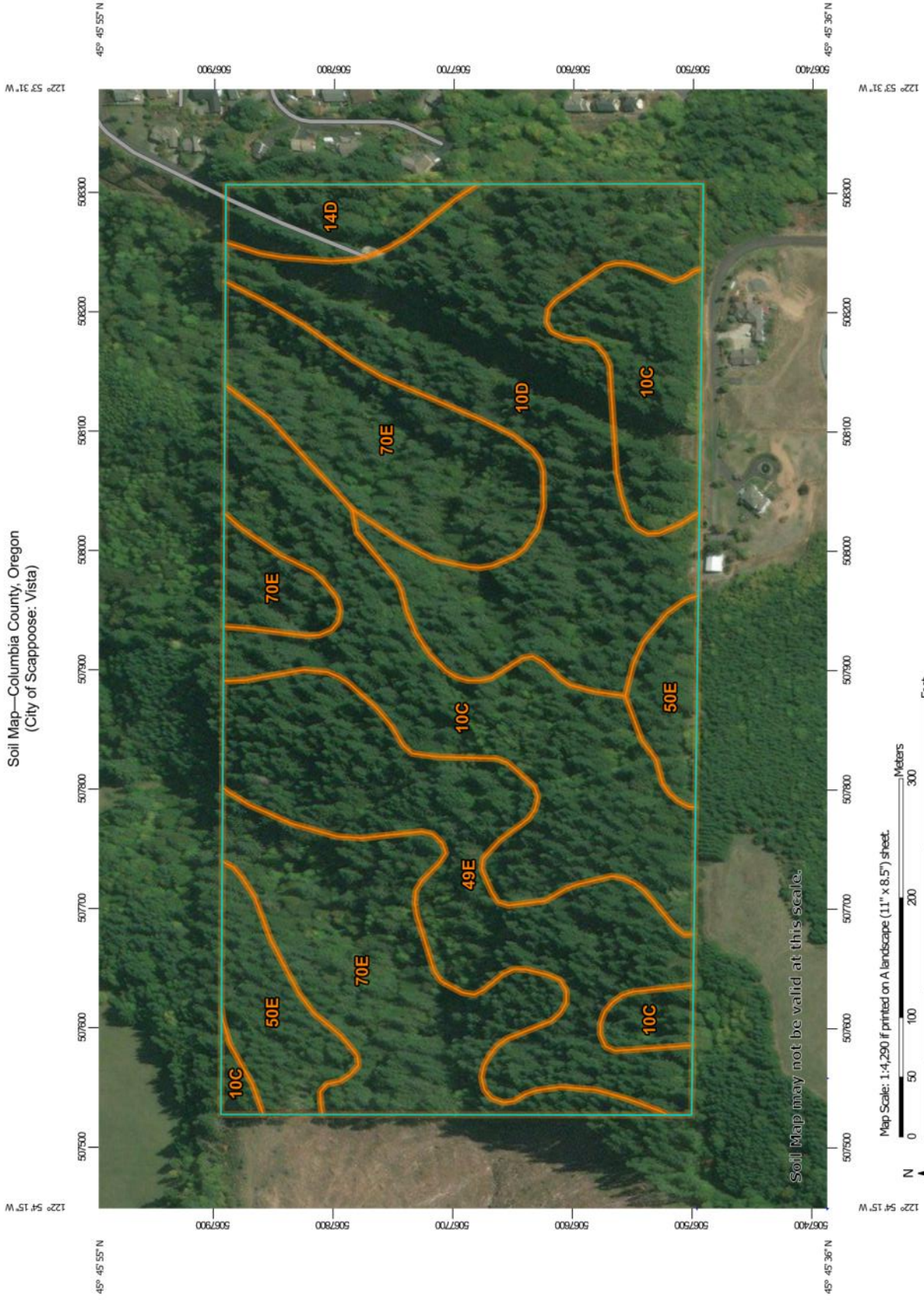
MAP LEGEND		MAP INFORMATION
<p>Area of Interest (AOI)</p> <p> Area of Interest (AOI)</p> <p>Soils</p> <p> Soil Map Unit Polygons</p> <p> Soil Map Unit Lines</p> <p> Soil Map Unit Points</p> <p>Special Point Features</p> <p> Blowout</p> <p> Borrow Pit</p> <p> Clay Spot</p> <p> Closed Depression</p> <p> Gravel Pit</p> <p> Gravelly Spot</p> <p> Landfill</p> <p> Lava Flow</p> <p> Marsh or swamp</p> <p> Mine or Quarry</p> <p> Miscellaneous Water</p> <p> Perennial Water</p> <p> Rock Outcrop</p> <p> Saline Spot</p> <p> Sandy Spot</p> <p> Severely Eroded Spot</p> <p> Sinkhole</p> <p> Slide or Slip</p> <p> Sodic Spot</p>	<p> Spoil Area</p> <p> Stony Spot</p> <p> Very Stony Spot</p> <p> Wet Spot</p> <p> Other</p> <p> Special Line Features</p> <p>Water Features</p> <p> Streams and Canals</p> <p>Transportation</p> <p> Rails</p> <p> Interstate Highways</p> <p> US Routes</p> <p> Major Roads</p> <p> Local Roads</p> <p>Background</p> <p> Aerial Photography</p>	<p>The soil surveys that comprise your AOI were mapped at 1:20,000.</p> <p>Please rely on the bar scale on each map sheet for map measurements.</p> <p>Source of Map: Natural Resources Conservation Service Web Soil Survey URL: Coordinate System: Web Mercator (EPSG:3857)</p> <p>Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.</p> <p>This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.</p> <p>Soil Survey Area: Columbia County, Oregon Survey Area Data: Version 14, Sep 19, 2017</p> <p>Soil Survey Area: Washington County, Oregon Survey Area Data: Version 15, Sep 19, 2017</p> <p>Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.</p> <p>Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.</p> <p>Date(s) aerial images were photographed: Sep 29, 2015—Sep 13, 2016</p> <p>The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.</p>

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
6D	Bacona silt loam, 3 to 30 percent slopes	31.8	10.3%
22C	Goble silt loam, 3 to 15 percent slopes	0.1	0.0%
22D	Goble silt loam, 15 to 30 percent slopes	3.2	1.0%
49E	Scaponia-Braun silt loams, 30 to 60 percent north slopes	45.6	14.7%
Subtotals for Soil Survey Area		80.7	26.0%
Totals for Area of Interest		310.5	100.0%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
7E	Cascade silt loam, 20 to 30 percent slopes	3.9	1.3%
18E	Goble silt loam, 2 to 30 percent slopes	93.0	30.0%
18F	Goble silt loam, 30 to 60 percent slopes	38.0	12.3%
48F	Scaponia-Braun silt loams, 30 to 60 percent north slopes	94.8	30.5%
Subtotals for Soil Survey Area		229.7	74.0%
Totals for Area of Interest		310.5	100.0%

Soil Map—Columbia County, Oregon
(City of Scappoose: Vista)



Soil Map—Columbia County, Oregon
(City of Scappoose: Vista)

MAP LEGEND		MAP INFORMATION	
Area of Interest (AOI)	Area of Interest (AOI)	Spoil Area	<p>The soil surveys that comprise your AOI were mapped at 1:20,000.</p> <div style="border: 1px solid black; padding: 5px;"> <p>Warning: Soil Map may not be valid at this scale.</p> <p>Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.</p> </div>
Soils	Soil Map Unit Polygons Soil Map Unit Lines Soil Map Unit Points	Stony Spot Very Stony Spot Wet Spot Other Special Line Features	
Special Point Features	Blowout Borrow Pit Clay Spot Closed Depression Gravel Pit Gravelly Spot Landfill Lava Flow Marsh or swamp Mine or Quarry Miscellaneous Water Perennial Water Rock Outcrop Saline Spot Sandy Spot Severely Eroded Spot Sinkhole Slide or Slip Sodic Spot	Water Features Streams and Canals Transportation Rails Interstate Highways US Routes Major Roads Local Roads Background Aerial Photography	
		<p>Please rely on the bar scale on each map sheet for map measurements.</p> <p>Source of Map: Natural Resources Conservation Service Web Soil Survey URL: Coordinate System: Web Mercator (EPSG:3857)</p> <p>Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.</p> <p>This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.</p> <p>Soil Survey Area: Columbia County, Oregon Survey Area Data: Version 14, Sep 19, 2017</p> <p>Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.</p> <p>Date(s) aerial images were photographed: Sep 29, 2015—Sep 13, 2016</p> <p>The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.</p>	

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
10C	Cascade silt loam, 8 to 15 percent slopes	18.5	24.1%
10D	Cascade silt loam, 15 to 30 percent slopes	19.1	25.0%
14D	Cornelius silt loam, 15 to 30 percent slopes	2.5	3.3%
49E	Scaponia-Braun silt loams, 30 to 60 percent north slopes	13.1	17.1%
50E	Scaponia-Braun silt loams, 30 to 60 percent south slopes	4.8	6.2%
70E	Xerochrepts, steep	18.7	24.4%
Totals for Area of Interest		76.7	100.0%

Appendix C: Invasive control measures

Exotic blackberries

Characteristics: These fast-growing plants thrive on disturbed soils. The seed is spread by birds and animals, but the plant expands mainly by new growth from established root systems. It forms dense thickets and over time dead canes accumulate, posing a fire hazard during dry conditions. Somewhat tolerant of shade, it will persist in young plantations for many years until complete canopy closure is established.

Harm: Displaces native plants and interferes with reforestation and restoration; blocks roads and trails, and can become a fire hazard.

Control methods:

Manual control options include cutting plants back with machetes, weedwhackers, or chainsaws, as well as digging up the root systems.

Mechanical methods include mowing.

Repeated cutting back of the plants does weaken them and they eventually may die, but it is a long and difficult process. Uprooting the plants is said to be relatively effective, but quite expensive and also results in site disturbance, which may invite other invasives such as Scotch broom.

Chemical control methods are well established and effective (Hanley et al. 1996). Late summer/early fall application of glyphosate or triclopyr are effective methods to kill the plants in the roots. Late summer is recommended because good foliar uptake of the chemical into the blackberry leaves occurs, while many other plants and trees have stopped or slowed growth due to drought stress at that time of the year. Once the plants have been killed, removal of the dead canes is desirable for aesthetic reasons as well as for access.

Scotch broom

Characteristics: This extremely fast growing plant aggressively colonizes disturbed soils and produces abundant seed, which remains viable in the soil for up to 50 years or more. It is slightly tolerant of shade, and will grow in stand openings and along southern edges of stands, but is primarily found in open areas. It can attain heights of 10 feet or more.

Harm: Displaces native plants and interferes with reforestation; blocks roads and trails; can become a fire hazard.

Control methods:

Scotch broom is quite difficult to control once it becomes established in an area due to the longevity of its seeds in the soil.

Mature plants (larger than 3/4" diameter at the base of the stem) can be cut, and the plant is likely not to resprout from the roots. If smaller plants are cut, they will likely resprout.

The plants can be uprooted with weed wrenches or other tools, but this creates an area of disturbed soil that is likely to have viable seed, which will germinate and immediately reoccupy the site.

Mowing is not a viable control method (unless it is done every year), since the small plants will simply resprout, and the larger plants are too tall to mow.

One strategy is to cut and remove the mature plants, and apply herbicide to the small plants. Triclopyr is very effective in controlling Scotch broom (Hanley et al. 1996). Ideal time for application is when the plants are flowering in May.

English holly

Characteristics: The seeds of this plant are spread by birds that eat the berries, where it becomes established in forest understories. It grows relatively slowly, but once plants reach maturity and begin producing berries, it can spread more quickly.

Harm: This plant can displace native understory vegetation, but is mostly a nuisance because of its spiny leaves.

Control methods: English holly can be cut, but it will resprout fairly aggressively. Repeated cutting is challenging, because the new sprouts can be difficult to cut with a chainsaw. Smaller plants can be fairly easily uprooted by simply pulling them out. Larger plants can be cut and then herbicide can be applied to the cut stump to kill the root system.

English ivy

Characteristics: This shade tolerant ground cover/vine can overtake forest understories and climb and threaten even mature trees. Seed is spread by birds; established communities spread by new vines and can rapidly expand.

Harm: Displaces native forest understory plants and can cover and damage forest trees.

Control methods: If it occurs as small patches on the ground, it can be removed through repeated pulling up of the plants from the roots. If a more established colony is found, vines should be cut off trees and the herbicide glyphosate can be applied to kill the plants. Larger vines should be cut and the exposed "stump" treated with herbicide to kill the roots.

Other control measures:

Clean equipment – Prior to any work involving heavy equipment, including mowers, dozers, logging equipment, etc., the equipment should be power washed to remove any weed seeds that may be on the equipment.