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Clackamas County
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Clackamas County
Forest Management Plan

2018

Prepared by

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CLACKAMAS
COUNTY

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Introduction

We believe that forests are key to the quality of life in Clackamas County. Some of the most productive forest land in the world is found here. Over 75% of Clackamas County supports growing forests which provide fish and wildlife habitat, clean water and air, and recreation opportunities. Responsibly managed forests also provide jobs, wood products, and revenues that support our communities. These forests provide environmental, social, and economic benefits that reach well beyond their boundaries.

The Clackamas County Forest Program's mission is to manage county owned forest lands in an environmentally, socially and economically responsible manner. The program serves as a bridge between the people of Clackamas County and their forest land by:

- **Serving as stewards of the land:** operating with a long-term view that appreciates the ecological, recreational, and aesthetic value of forest lands;
- **Acting as a good neighbor:** ensuring that the County's forest lands create economic benefit, and promoting responsible forest management and informed policy recommendations; and
- **Providing a sustainable source of revenue for the county:** reducing the tax burden for citizens, while affording them access to parks and a connection to the forest.

In order to ensure success, the program tracks overall forest growth and timber volume on county managed lands over a trailing ten-year average, incorporating any timber sales and harvests. This enables us to monitor progress against our goal of increasing the value of the timber resources while still allowing the flexibility to make timber sales in a financially and environmentally responsible manner. Another key success metric of the program is providing revenue in excess of operating expenses over a five-year average. This maximizes the economic benefit of county forest lands and allows the program the ability to undertake revenue-generating activities when it is most profitable and responsible to do so. Proceeds from the Forest Program are to be used to support the operations and maintenance of Clackamas County Parks, maintaining and enhancing their value as a resource for county residents and park users. Integration of ecological, social, and economic considerations is required for successful long-term management of forests. Sustainable forest management can be described as the capacity of forests to maintain their health, productivity, diversity, and overall integrity in the context of human activity and use. To this end the Management Objectives of the Forest Program are:

- Forest lands owned and managed by Clackamas County will be managed to protect and enhance natural resources now and into the future.
- Public input and involvement in management activities will be sought to foster mutually-beneficial relationships with neighboring property owners, land managers and the community.
- Resource management projects will be designed to be fiscally responsible to the taxpayers of Clackamas County.
- The County Forest program will enhance the value to local economies by employing local contractors, and producing products that can be milled at local sawmills whenever possible.
- Revenue currently generated is almost entirely from timber harvests. However, other sources of revenue will be considered in the future, should an alternative market develop.

Current Conditions and Operations

Forest Management Categories

Clackamas County owns 4,284 acres of Parks and Forest lands. Those lands were divided into three property categories that were developed during a public process in 1995-96. These three categories are still currently used to determine management goals for the forests on each property. Table 1 lists the Parks and Forest properties by category designation.



Category 1 lands are for a use other than scheduled timber production. Forests on these properties are managed so they are aesthetically pleasing, safe, accessible and in some cases, educational for the recreating public. Most of these properties are well-known County parks that have been in existence for decades, but there are also less-developed parks and other natural areas that are not deemed suitable for timber production at this time. Developed parks in Category 1 include Barton, Carver, Eagle Fern, Feyrer, Hebb, Metzler, and Wilhoit. Trees are removed in the parks only if necessary for facility expansion, public safety (for example removing hazardous trees), and for general forest health. There are 949 acres or 22% of County-owned forested lands are in this category.

Category 2 is used to designate properties that are currently managed by County Parks and Forest but have been determined to no longer fit into either Category 1 or Category 3. Until these lands are sold or traded, they may be managed in the same manner as Category 3 lands. When they are sold, additional property will be purchased to replace the potential income-generating asset lost from the sale of those properties. There are currently 139 acres in Category 2 which is 3% of the County forest land base.



Category 3 lands are managed with the goal of having healthy forests that produce timber on a sustainable level, protect natural resources, and contribute to jobs in rural communities. Timber sales are designed to comply with and in many cases exceed standards required by the Oregon Forest Practices Act. All of the County's Category 3 forests are second-growth forests that regenerated after logging or fires. There are currently 3,196 acres of Category III forests which is 75% of the County forest land base.

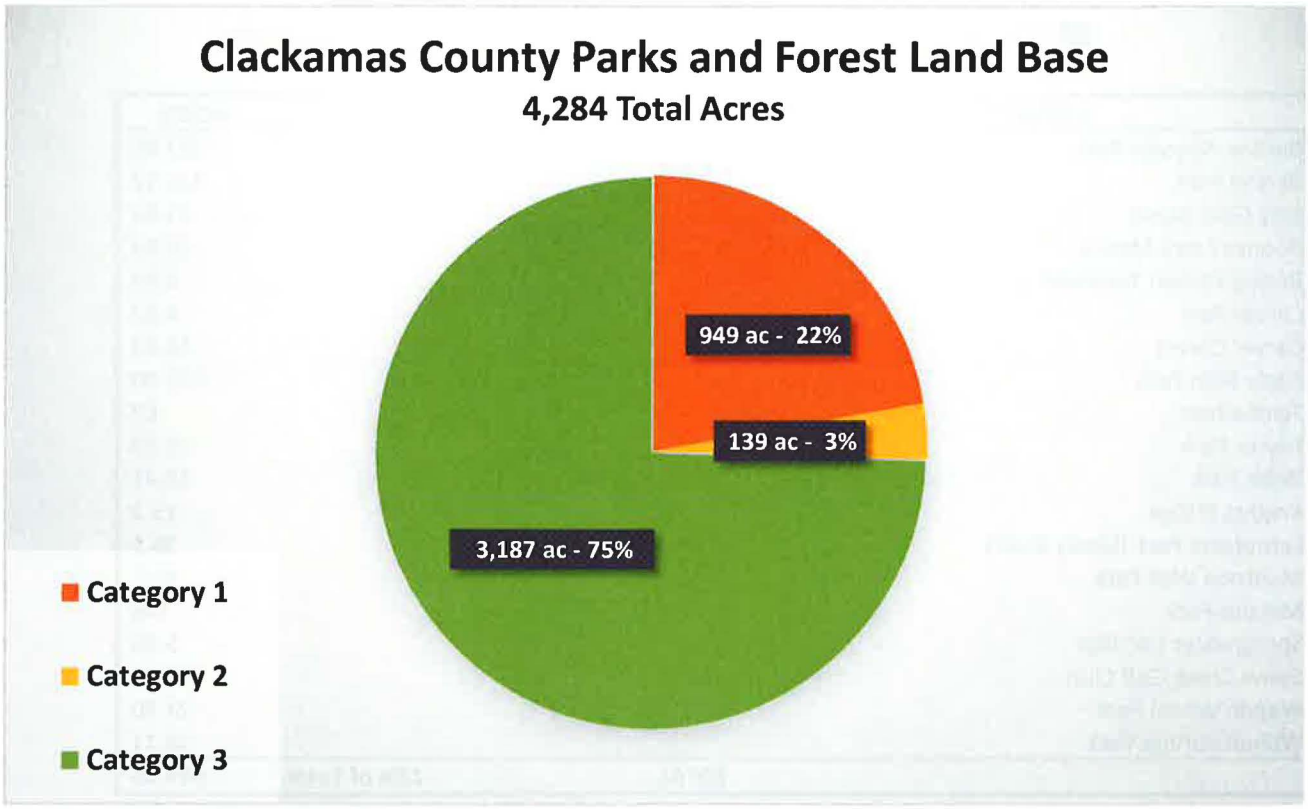
2017 Clackamas County Parks & Forest Land by Category

CATEGORY 1 TRACT			ACRES
Barlow Wayside Park			103.65
Barton Park			122.12
Billy Goat Island			21.82
Boones Ferry Marina			12.49
Boring Station Trailhead			6.46
Carver Park			4.62
Carver Curves			18.63
Eagle Fern Park			171.00
Feldheimer			.67
Feyrer Park			26.58
Hebb Park			13.41
Knights Bridge			15.2
Latourette Park (Sandy River)			36.5
Madrone Wall Park			45.5
Metzler Park			138
Springwater Corridor			5.00
Stone Creek Golf Club			165.00
Wagon Wheel Park			24.40
Wilhoit Springs Park			18.21
	TOTAL	**22% of Total**	**949.26**

CATEGORY 2 TRACT			ACRES
Cedar Flats			10.46
Emigrant Trail (potential sale to private party)			62.00
Hoodland Park			3.96
Hunchback Leftovers			15.78
Sandy Cliffs (Potential sell to The Nature Conservancy)			46.50
	TOTAL	**3% of Total**	**138.70**

CATEGORY 3 TRACT			ACRES
Bittner Creek			39.80
Boulder Creek			338.52
Brightwood East			116.91
Brightwood Pit			14.09
Cedar Ridge			73.22
Clackamas Quarry			18.00
Dooghie Road			59.09
Elwood Quarry			79.12
Family Camp			97.82
Fernwood Quarry			69.67
Hillock Burn			208.15
Hoopes Road			20.20
Sandy Transfer			23.96
Wildcat			2,037.53
	TOTAL	**75% of Total**	**3,196.13**

GRAND TOTAL	**4,284.09**



Forest Inventory

There have been five comprehensive inventories of forested properties since the early 1980's. The two conducted in the 1980's included forested acres of parks. The remaining inventories only included the properties that were designated as Category 3 at the time. Table 2 displays the standing volume found during each of these inventories. Appendences B and C have detailed maps and inventory data of each of the stands that were inventoried in 2017. Please refer to these if more detail is needed for each individual stand.

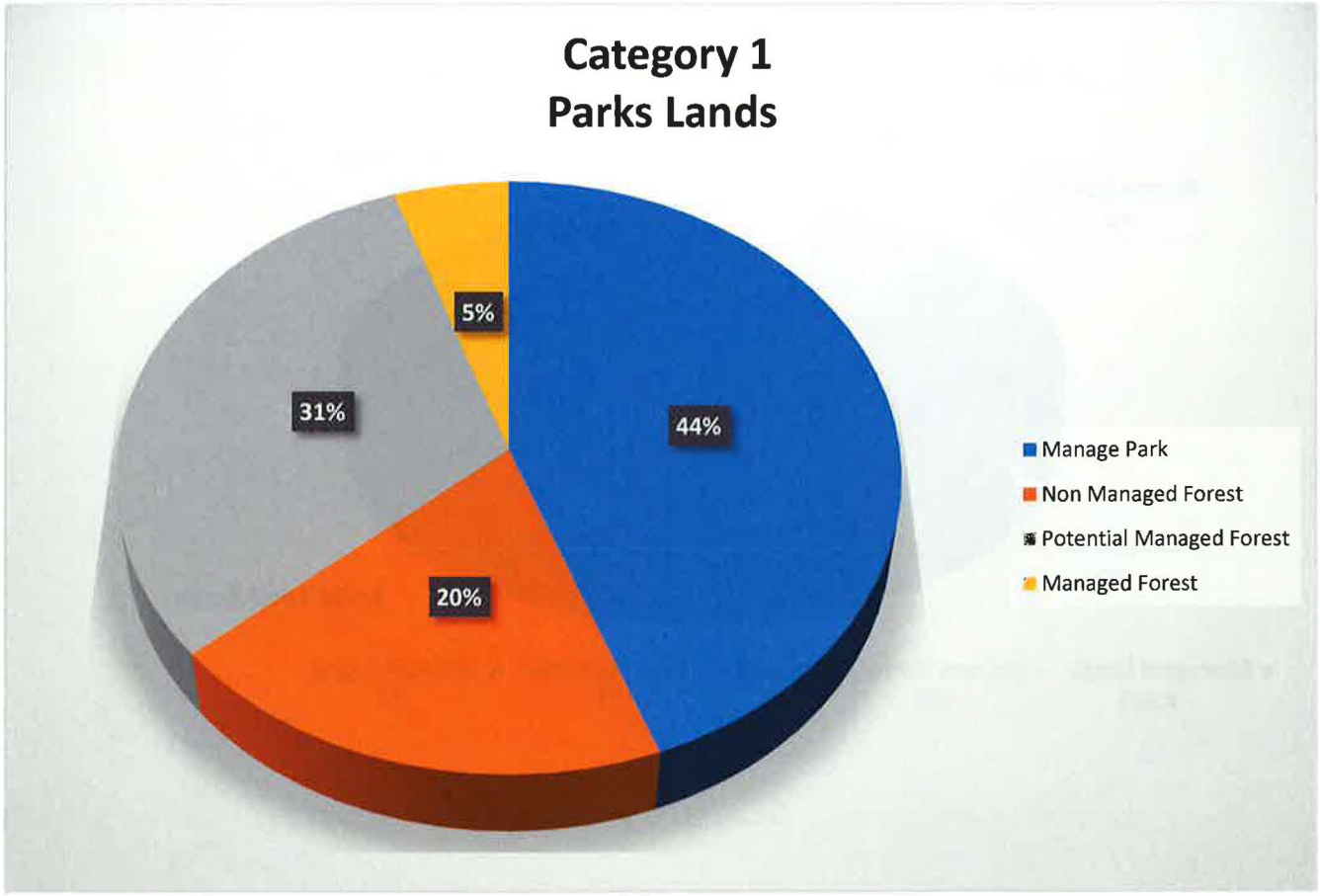
Clackamas County Forest Inventories

Year	Acres	Volume (MMBF = Million Board Feet)
1982	3,842	41.8
1986	3,582	36.4
1998	3,062	58.2
2006	3,051	58.8
2017	3,182	30.7

Category 1 Inventory

When inventorying the category 1 lands each parcel has been evaluated and divided up into four management designations:

- Managed Park (MP) - 420 ac - Developed areas that are currently being utilized for park activities.
- Managed Forests (MF) 49 ac - Areas which do not have any improvements, but have had forest management activities in the past. The goal of management activities would be to improve forest health and vigor and/or reduce fire fuels within the park.
- Potential Managed Forests (PMF) 296 ac - Areas that have not been managed in the past but could be managed to improve forest health and/or reduce fire fuels within the park.
- Non Managed Forest (NMF) 184 ac - Areas within a park that are not developed for park activities and do not have good potential to be managed forest stands.



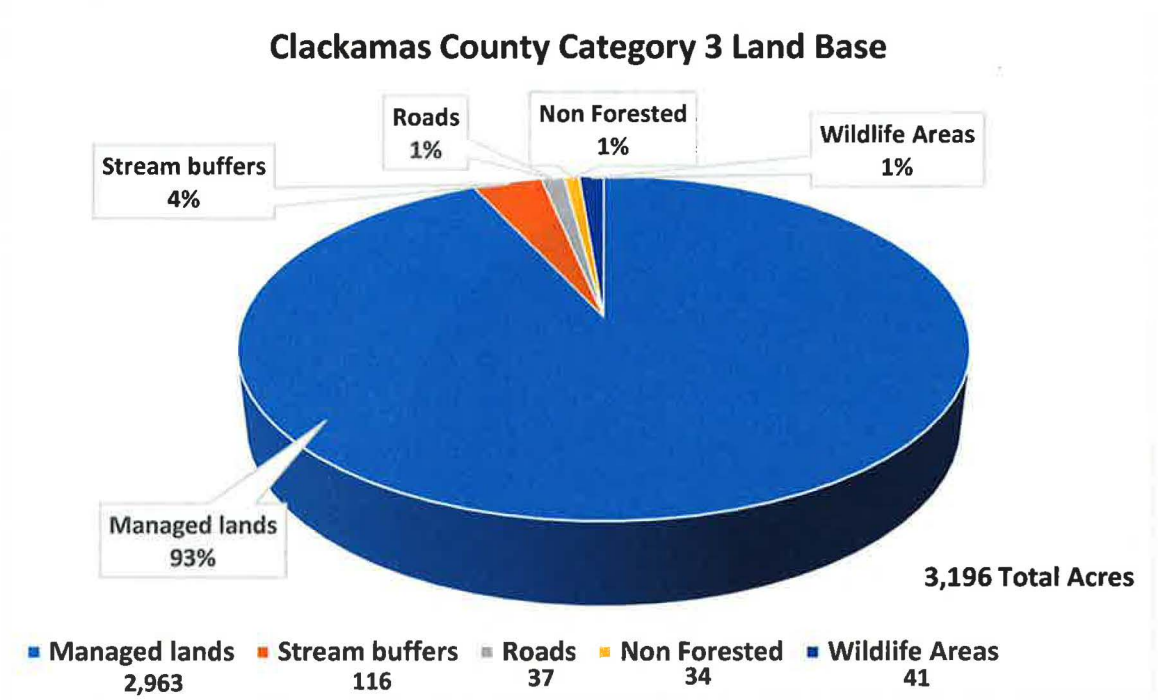
Only 5% (49 acres) of the parks forest lands has been commercially thinned for fuels reduction which was in Metzler and Madrone Wall parks. There are still 296 acres that could be managed for forest purposes to enhance the parks conditions. The 2017 forest inventory has 12.9 million board feet of timber in both the managed and potential managed forest lands. No inventory was taken in the Managed Park and Non Managed Forest lands. These lands will still be monitored for forest health conditions on a tree by tree basis and for fuels reductions when needed around potentially hazardous locations like the campgrounds where campfires and high traffic areas where there is an increase chance of a fires.

Category 2 Inventory

There are five category 2 parcels that have been inventoried for a rough estimate of the timber volume present. All the stands inventoried are between 35 and 100 years old with the majority being over 70 years in age. Some of the stands are very well stocked and growing well. A few areas are of poorer site indexes which can be seen in the volume per acre summaries. As of 2017 there is a total of 2.93 million board feet (mmbf) growing in the category 2 stands, three-quarters of which is Douglas-fir.

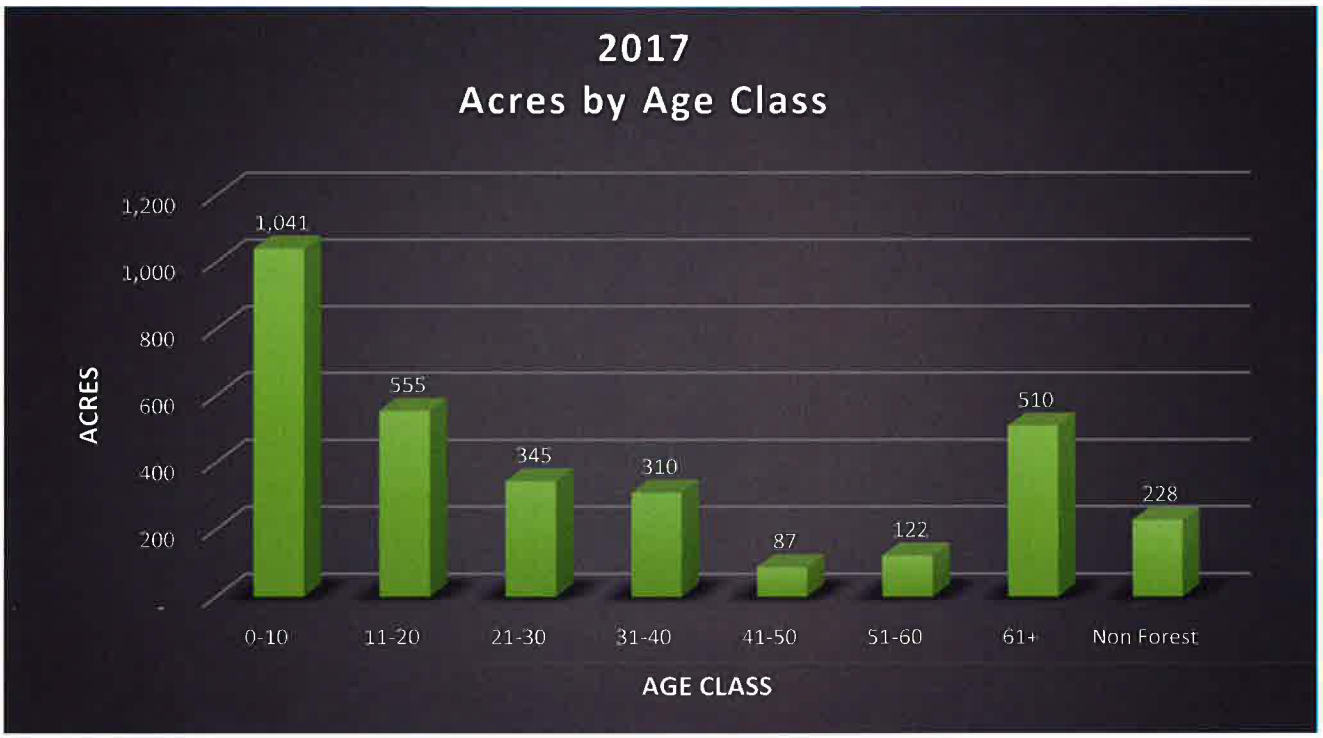
Category 3 Inventory

The 2017 inventory divided the category 3 land base into five management designations. The Managed Lands designation covers 93% of all category 3 lands. Stream Buffers (4%), Roads (1%), Non Forests (1%) and Wildlife Areas (1%) comprise the remaining management designations.



Acres by Age Class

Category 3 lands were divided into six 10-year age brackets and one 61+ year age bracket according to the age of forest stands growing on them. Of the category 3 lands, 61% are growing forest stands which are 0-30 years old. The largest age class are plantations 0-10 years old totaling 1,041 acres (32%). There are 555 acres of stands 11-20 years old (17%), 345 acres of stands 21-30 years old (11%), and 310 acres of stands 31-40 (10%). The 41-50 and the 51-60 year brackets have the lowest acres at 87 (3%) and 122 (4%) respectively. Rounding out the age classes are 510 acres of stands that are 61 years old or older (16%) and 228 acres of Non Forest (7%).



Species Mix by Age Class

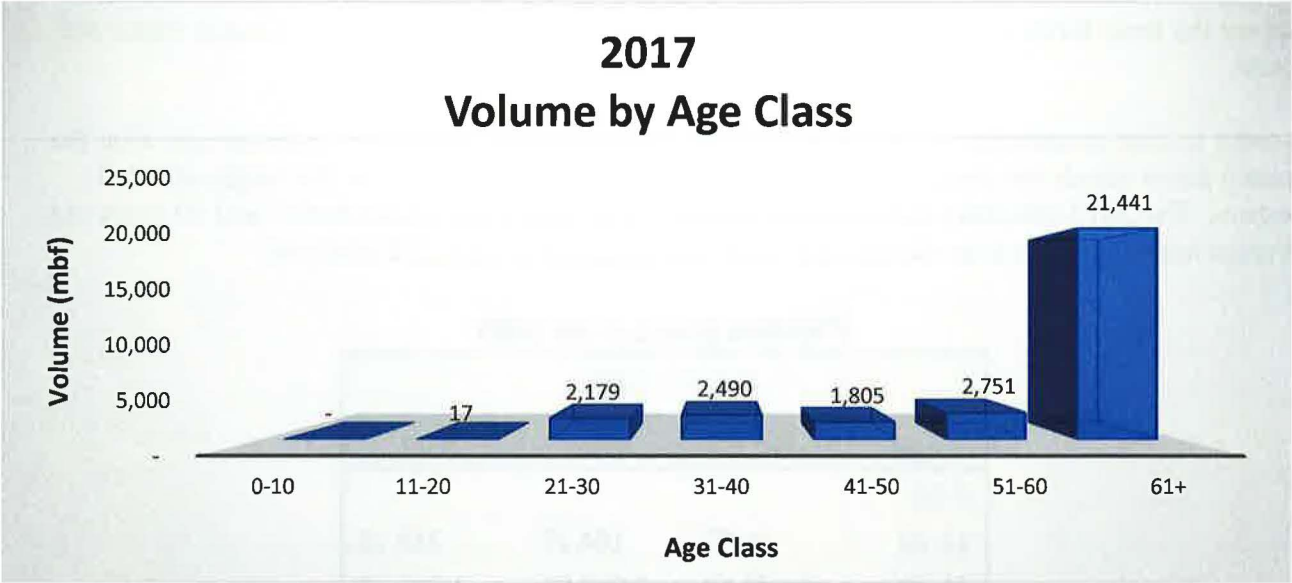
Stands up to 60 years old are predominantly Douglas-fir with a minor component of true firs, hemlock, cedar and mixed hardwoods. The older stands have a greater percentage of the hemlock/true fir component mixed within the stands. The species mix in the 61+ year old stands averages 63% Douglas-fir, 30% hemlock and true firs (white wood), 5% western red cedar and 2% mixed hardwoods.



	0-10	11-20	21-30	31-40	41-50	51-60	61+
Hardwood	-	-	68.44	170.34	408.31	128.07	362.02
Western Red Cedar	-	-	49.47	8.50	18.85	106.27	1,031.59
White Wood	-	2.40	554.37	495.53	267.38	127.96	6,175.11
Douglas-fir	-	14.57	1,566.01	917.16	2,322.81	875.77	13,159.27

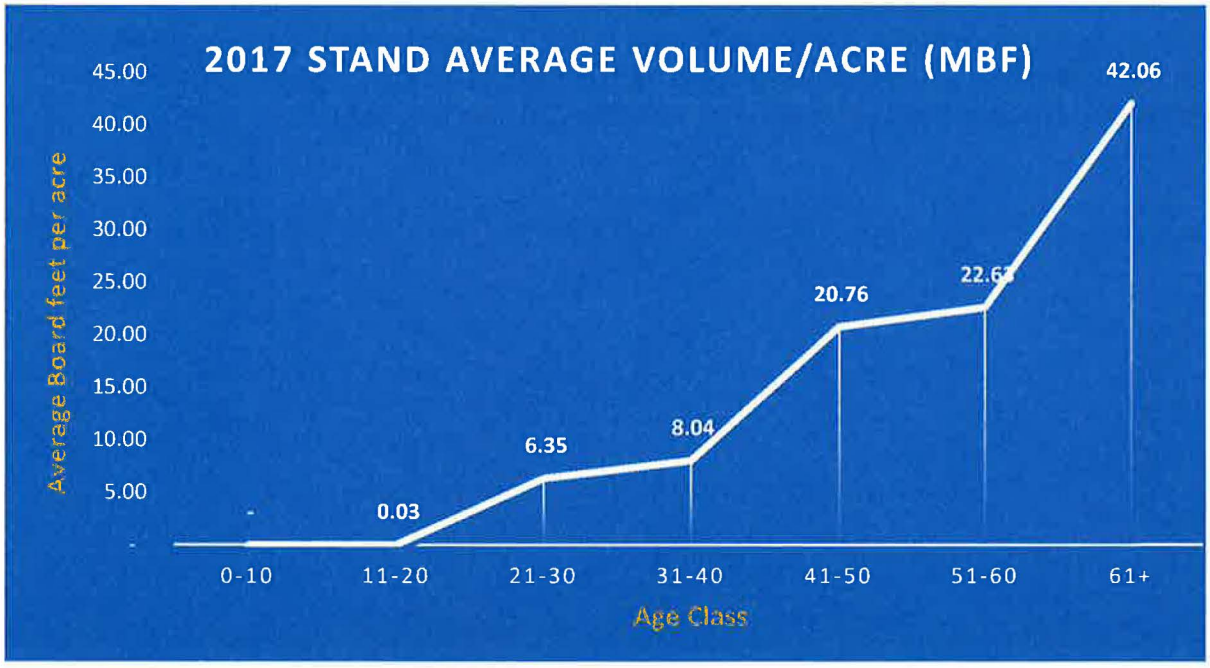
Volume by Age Class

As of 2017 there were 30.66 million board feet (mmbf) of timber growing on category 3 forest lands. Stands 61+ years old contain 21.44 mmbf of the volume which is 70% of the merchantable timber.



Average Volume per Acre by Age Class

As expected the greatest volume per acre stands are the 61+ year old stands, ranging from 26 to 58 thousand board feet per (mbf) per acre and averaging 42.06 mbf per acre. Exponential growth can be seen as the plantations increase in age with minor drops in the 31-40 and the 51-60 year age brackets. This can be attributed to smaller sample sizes and a couple of poorly stocked stands in those age classes.



Sustainable Harvest Level

The category 2 and 3 lands are managed to promote forest health and growth which in turn provides fish and wildlife habitat and for social and economic uses of the forest that are sustainable over time. The primary economic use of these forests is to harvest timber to provide raw materials and jobs to support the local forest economic sector and to generate revenue for Clackamas County Parks and Forest.

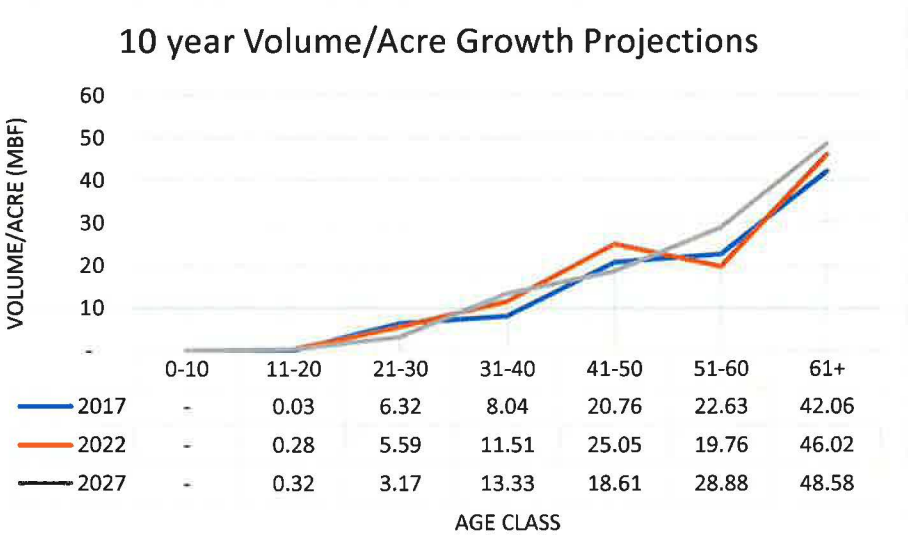
In order to help us understand what our sustained yield might be, we needed to determine what the County forest stands can produce both over the short term (yearly) and over the length of a full rotation. The 2017 inventory for managed stands (2,963 acres) was grown both 5 and 10 years out. Average annual growth over the ten year span was projected to be 1,292 mbf/year.

Projected growth in ten years

	Volume (mbf)		
Age	2017	2022	2027
0-10	-	-	-
11-20	16.97	184.27	319.14
21-30	2,178.62	1,810.81	1,327.18
31-40	2,489.96	4,987.90	5,598.62
41-50	1,804.75	2,178.13	4,360.11
51-60	2,751.41	2,059.04	4,258.50
61+	21,440.56	24,262.58	27,734.93
	30,682	35,483	43,598

Average over the ten years is 1,292 mbf/year

Volume per acre by age class shows that most of the volume is being produced in the 61+ age class. The average age of those stands is around 78 years in 2017. Growth is still increasing over these ten years and is expected to not start slowing down until at least 90 years of age. A growth to loss equilibrium not expected to be achieved until well into 250 years or more.



In order to determine what the sustained harvest level would be, the following observations can be taken into account:

- Based on the site indexes, the greatest growth per acre is in the 60+ age bracket (average age is around 78 years)
- 70% of the available merchantable volume is in the 60+ age bracket
- There are a small amount of replacement stands acres in the 41-50 and 51-60 age classes
- The projected growth of the stands is accelerating as they get into the older age classes (70-90+ years)
- There is a large percentage of younger stands that are 0-20 years of age (54%) that will eventually become a surge of volume when they reach rotational harvest age.
- There needs to be an identified minimum revenue amount/year for forest management purposes in order to ensure younger plantations are managed for optimum growth.
- Markets and management needs change over time and the annual sustained yield goal needs to take that into account

County Forester has modeled over fifty different harvest options comparing site indexes, rotation ages, species values and annual harvest volumes encompassing the entire Category 3 forestland base. The model also assumed a certain set of revenue and expenditure forecasts for delivered market prices, logging costs, etc.

The preferred sustainable harvest option was identified as being an even-age management schedule of 55 years over all site indexes and an average volume of 1.4 mmbf per year. The model forecasts an annual return of approximately $572,000 in gross revenue to the Forest program. Accounting for the average annual operating expense of the Forest program at $300,000 to $400,000 per year, County Parks would realize revenue from Forest ranging from $172,000 to $272,000 per year. Together with Stone Creek Golf Course net revenue projections between $200,000 and $400,000 annually, County Parks would realize annual revenue generation between $372,000 and $672,000. This level of sustainable revenue sufficiently meets the funding requirements to support County Park operations.

The preferred harvest option also provides the most optimal solution to an anticipated harvest gap in terms of out years to the gap (20 years) and gap period (4 years) where there will not be any trees to harvest. In order to "bridge" or "fill" this gap, the County Forester will look for opportunities to sell surplus Category 2 lands as opportunities and markets are favorable. Proceeds will be reinvested in more suitable forest lands to fill the harvest/revenue gap and ensure funds are available for County parks operations each year into the future.

The County Forester will also periodically review current timberland holdings and determine if there are opportunities to sell or trade isolated parcels or lower value sites for better growing sites and consolidation opportunitics.

Land and Timber Sale Planning Process and Public Involvement

Land Sales

On occasion, the County Forester may recommend that certain forestland property assets, identified as Category 2 or other, be sold so that the net sale proceeds can be reinvested in more productive forestlands and placed into Category 3 and managed for timber production.

Prior to a market based sale, the County Forester will:

- Propose the sale of a forestland property asset with input from the Forest Advisory Board.
- Bring forward the forestland property asset to the Board of County Commissioners with a recommendation for declaration of surplus.
- Notify in writing to adjacent property owners with an "Intent to Sell" the surplus forestland property asset at least 45 days prior to listing the property for sale.
- Contact the local CPO and newspaper at least 45 days prior to listing the surplus forestland property for sale.

Timber Sales

Each year the County Forester may select areas in which to plan harvests with input from the Forest Advisory Board. High priority areas would be those forests with significant mortality created by natural disturbances such as wind throw, insect or disease outbreak, or wildfire. If there are no areas of significant mortality, the County Forester would then consider stands older than rotation age that have the lowest annual volume growth projections. While we do not try to tie harvests to specific market prices, we do use market conditions as part of the harvest selection criteria. For example, if market conditions for timber prices are good, it is prudent to choose stands that require more expensive logging systems such as cable or helicopter harvesting. If market conditions are not as favorable, stands with less-expensive ground-based logging are chosen. Harvests of younger timber will take place when commercial thinning is desirable to improve stand health and when market conditions allow. It can take several months and sometimes up to a year to go through the planning, pre-sale field work and public involvement processes. This can make timing of sales to market conditions a bit tricky at times.

State of Oregon Forest Practices rules state that regeneration harvest units may not exceed 120 acres in size. Harvest areas may exceed 40 acres when certain situations make the most sense on a landscape scale and there are additional factors such as lowering costs of expensive logging systems.

After an area is selected for planning a harvest, the County Forester and staff walk through the stand to conduct a field survey of site conditions. This includes looking for any un-mapped streams or wet areas, identifying any special wildlife habitat like nest trees or large remnant trees, identifying any potentially unstable areas, and locating areas that could pose potential reforestation challenges such as very rocky soils. If any of these areas are identified, measures are taken to protect or exclude them from harvest. In some cases, the County Forester will consult with the Forestry Advisory Board or other appropriate agencies such as the Oregon Department of Fish and Wildlife or the Oregon Department of Forestry to seek guidance. Using the information gathered from field review and consultation, the County Forester prepares a draft timber sale plan that specifies harvest methods, environmental protection measures, and subsequent site preparation and reforestation activities. The timber sale plan is written so harvest and reforestation activities will meet or exceed the requirements of all applicable laws and regulations.

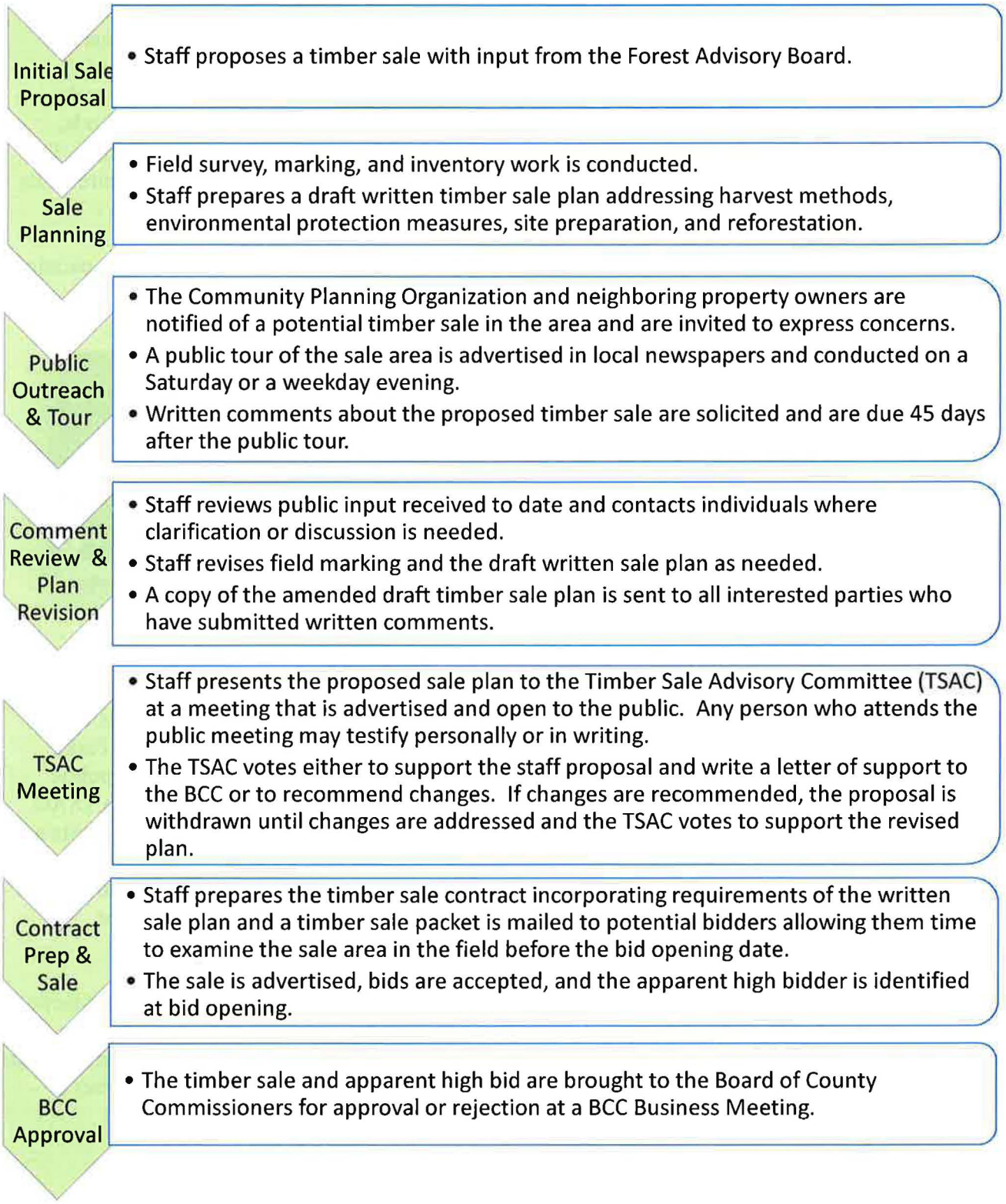
Once the draft harvest plan is prepared, Forest program staff will begin the process of sale preparation work to include marking the sale area and riparian protection boundaries, and painting trees for retention. About this same time, the County Forester notifies neighboring property owners and the local Community Planning Organization (CPO) that a timber harvest is planned. Property owners and the CPO are invited to provide input or express concerns during this phase of the process. A public tour of the proposed harvest area is advertised in a local newspaper and conducted on a Saturday morning or weekday evening for community convenience. After reviewing comments, the County Forester will contact individuals if clarification or discussion is needed. The draft timber sale plan and field marking are revised as needed based on information gained during this public process.



At this point, the Timber Sale Advisory Committee (TSAC) is brought into the process. This is a committee comprised of two members of the Forestry Advisory Board, two members of the Parks Advisory Board, and a representative from the local Community Planning Organization. A public meeting is advertised and held where the County Forester presents the timber sale plan to the TSAC. Anyone who attends this meeting may testify orally or in writing. The TSAC votes either to write a letter of support to the BCC for the sale as it is planned, or recommends changes. If changes are recommended, the proposal is withdrawn until concerns are addressed and the TSAC votes to support the revised proposed timber sale. The TSAC letter of support will be provided to the BCC for preliminary approval to proceed with the timber sale.

Forest program staff then prepares a timber sale contract which incorporates environmental protection measures and specifies harvest methods and required activities. A timber sale packet is mailed to potential bidders and time is allowed for on-site inspection of the sale area. The sale is advertised, bids are accepted, and the apparent high bidder is identified at bid opening. The timber sale contract is brought to the BCC for approval or rejection at a BCC Business Meeting.

Figure 1 – Clackamas County Timber Sale Planning Process



Cooperation with Neighboring Land Owners

The Forest program strives to be a good neighbor to all the landowners whose lands border County forests. Staff informs neighbors of any timber sale plans and seeks input from them. Staff also interacts and cooperates on various issues such as maintenance of forest roads. There are often mutual issues or concerns that provide an opportunity for cooperation. An example of this has been working with the U.S. Forest Service, the Bureau of Land Management, and private timber companies on issues surrounding damaging and dangerous activities like target shooting and off-highway vehicle use.

Legal Requirements

Federal Laws

County-owned forest lands are subject to U.S. federal environmental laws and regulations. The most pertinent of these is the Endangered Species Act, which designates critical habitat and provides a framework for recovery of a listed species. State and federally-listed threatened and endangered species that may be found within Clackamas County forest lands include the bald eagle, and northern spotted owl, although there are no known nesting sites on County-owned lands. Runs of coho salmon, chinook salmon, and steelhead are found in some fish-bearing streams. Other pertinent federal laws include the Clean Water Act and the Clear Air Act.

State Laws

Non-federal public forests and privately owned forests are subject to the Oregon Forest Practices Act (OFPA), which is administered by the Oregon Department of Forestry. In 1971 Oregon was the first state in the nation to enact a forest practices act. OFPA is a statutory framework that includes rules, technical assistance, and monitoring. The Oregon Board of Forestry has primary responsibility to adopt and revise rules and it does so as new science emerges and public values change. Some requirements of the OFPA are easily understood, and others such as the aquatic protection standards are more complicated. OFPA contains requirements that must be met for forest operations which generally fall into the categories of timber harvest, road construction, site preparation, reforestation, and the use of pesticides or herbicides. Stewardship foresters from the Oregon Department of Forestry monitor timber harvest, site preparation and reforestation activities to ensure compliance with the Oregon Forest Practices Act. Prior to these activities, a Notification of Operation is submitted to ODF so their foresters know what will be occurring on County forest land.

Standard Operating Procedures Related to Timber Harvest and Reforestation

The following list of standards includes requirements of the Oregon Forest Practices Act and additional measures that are often integrated into project design by County staff. It is the intent of Clackamas County Forest program staff to either meet or exceed all applicable state and federal laws when developing the Forest Management Plan and designing and implementing resource management projects. As discussed earlier in this document, OFPA is specifically designed to ensure the sustainability of Oregon's forest resources and is periodically updated to incorporate emerging science and changing public values.

Harvest Design/Soil Protection

- For commercial thinning or light partial cutting, leave at least 50 trees or 33 square feet of basal area of trees at least 11 inches in diameter at breast height (DBH).
- A new forest is considered established when there are at least 200 seedlings per acre that are free-to-grow (have a high probability of becoming dominant over competing vegetation) and well-distributed (at least 80 percent or more of the harvest unit has at least the minimum per-acre required seedling stocking).
- Plan harvest methods that will minimize soil disturbance and compaction. For ground-based harvest systems (generally on slopes less than 35%) work with the operator to designate landings and skid trail locations in appropriate locations. For cable or helicopter harvest systems (generally on slopes 35% or greater), work with the operator to designate skyline corridors and landings in appropriate locations.
- Exclude areas from the timber sale area boundary that present evidence of instability.

Fisheries/Water Quality/Riparian Habitat Protection

- For all fish bearing streams (Type F), maintain riparian management areas between 100 feet on each side of large streams, 80 feet on each side of medium streams, and 60 feet on each side of small fish-bearing streams. For all small non-fish bearing streams (Type N), maintain a riparian management area averaging 20 feet on either side of the stream.
  - Within riparian management areas, retain all trees and understory vegetation within 20 feet of the stream.
  - If the basal area of live conifers in the riparian management area exceeds 100 square feet per acre, the additional basal area above 100 square feet may be harvested.
  - Trees and other vegetation may be removed as needed for approved stream crossings or cable yarding corridors.
- Plan harvest operations to minimize disturbance to stream channels or wetlands and retained streamside vegetation, and to minimize the risk of sedimentation.

While future activities will meet, and in many cases exceed management standards specified in the Oregon Forest Practices Act, there is an opportunity to improve riparian habitat conditions within County-owned forests. As projects are planned, stream reaches that could benefit from the addition of large woody debris will be identified and integrated into project design. Such wood placement projects require written plans that meet ODF and ODF&W standards and require ODF notification

Wildlife Habitat Protection

- Protect sensitive wildlife sites identified by the Oregon Department of Forestry prior to harvest operations. If a new site is identified during project planning or implementation, stop the operation and consult with a Stewardship Forester. Sensitive resource sites may include habitat sites of threatened and endangered species, sensitive bird active nesting and roosting sites, or biological sites that are ecologically and scientifically significant. Protection measures would be prescribed in consultation with the Oregon Department of Fish and Wildlife.
- In regeneration harvest units, retain an average of two wildlife trees and two downed logs per acre to act as biological legacies in the new stand.
    - Green trees or snags left for wildlife must be at least 30 feet in height. 11 inches DBH, and at least 50% of them must be conifer species. When available, choose a variety of tree species and sizes of trees to retain.
    - Downed logs or trees must be at least 10 cubic feet gross volume, at least 6 feet long, and at least 50% of them must be conifer species. One downed log of at least 20 cubic feet and six feet long may count as two logs.
    - Trees and downed logs may be left in one or more clusters rather than distributed throughout the unit. Standing trees will be retained in a manner intended to minimize loss due to wind throw. Consideration will be made for benefitting other resources, such as enhancing riparian management areas.

Site Preparation, Reforestation, and Plantation Maintenance

- Within regeneration harvest units, site preparation and planting will normally occur within 12 months of the end of harvest operations.
- Plan slash treatments to minimize soil disturbance and compaction by machines. When slash piles must be burned, obtain the proper permits and burn within approved burning windows.
- Plant an average of 400 seedlings per acre of at least two tree species – usually Douglas-fir and western red cedar. Western hemlock, big leaf maple, red alder, and other species will almost always establish themselves naturally so it is not necessary to plant them.
- Monitor seedling survival to attain the goal of exceeding minimum Oregon Forest Practices Act requirement of 200 free-to-grow, well-distributed seedlings per acre within six years of harvest.
- Where necessary to meet stocking goals, employ measures to protect seedlings from mortality due to wildlife damage or vegetation competition. Measures may include use of protective tubing, bud caps, rodent trapping, and herbicide application.
- Avoid the use of herbicides by utilizing effective slash and brush treatment during harvest and prompt reforestation. In cases where competing vegetation or pests are impeding reforestation, apply herbicides or pesticides in strict accordance with standards to protect water, air, soil, and desirable vegetation.

Notification

- Complete and submit a Notification of Operation to the Oregon Department of Forestry for all forest operations for which a notification is required. Notification is required for:
    - Harvesting
    - Slash disposal and site preparation for reforestation
    - Road construction
    - Chemical application
    - Pre-commercial thinning
    - Addition of large woody debris for riparian habitat improvement

Silviculture Guidelines for Category 3 Forest Lands



Forests are dynamic ecosystems that are constantly growing and changing. Regeneration harvest is only one part of the cycle of active forest management in Category 3 forests.

Following site preparation, promptly plant regeneration harvest areas with the appropriate species at a density of 400 or more seedlings per acre; or, if natural regeneration of desirable species is likely to occur in a timely manner, plant an appropriate number of seedlings that results in a fully stocked stand. Plant at least two species of trees to improve stand diversity and ensure future stand health. Consider factors such as the presence of forest pests, competing vegetation, and site microclimate when selecting tree seedlings to plant.

Regularly evaluate plantations in the 1 to 10 year age group for conditions that threaten the establishment of a vigorous, fully stocked stand of trees. Competing vegetation, animal damage, and other threats to the plantations shall be dealt with using the common forestry tools including inter-planting, spraying brush, trapping rodents, tubing trees and other methods that the Forest program may find necessary.

Evaluate plantations in the 10 to 19 year age group for pre-commercial thinning. Schedule overstocked plantations for pre-commercial thinning as needed. The Forest program shall set the goals for each pre-commercial thinning based upon the stand, the lay of the land and other relevant factors, but the typical goal is to have 200 to 250 trees per acre in these stands.

Evaluate forests in the 25 to 45 year age group for commercial thinning. Thin stands if an evaluation determines thinning an overstocked stand will improve stand conditions and is economically viable. The volume from any commercial thinning counts towards the sustainable harvest level. Commercial thinning helps to attain the goal of having healthy forests that contribute to the local economy and produce revenue to reduce taxpayer burden for supporting County Parks.

Evaluate stands 55 years old or older for regeneration harvest. Select stands for harvest based on several criteria. Prioritize stands with slower growth and consider the diameter requirements of local sawmills to support the local economy and provide a better economic return to the Parks & Forest Trust Fund. Evaluate stands with marginal stocking or poor health and propose regeneration harvest where establishing a new stand is determined to be the best option. When possible, plan timber sales in areas with more expensive logging systems for times of better log market conditions.

Forest Infrastructure Maintenance

Maintenance of the roads, culverts, bridges, gates, and other improvements on the County's forestland shall be in a manner that protects the environment and protects the asset. Examples of this include frequent checks of the forest road system to ensure culverts are not clogged, ditches are functioning properly to reduce road surface erosion and sediment delivery, and gates and locks are maintained in working order. When problems are discovered, prompt action will be taken to return the asset to proper working condition.

Forest Inventory and Management Plan Updates

At least every ten years, the Category 2 and 3 forest lands will be inventoried to determine standing timber volume in order to calculate a sustainable timber harvest level. It may be appropriate at times to also inventory the Category 1 lands, particularly if and when ecosystem service markets and/or biomass utilization become a viable source of revenue.

Every three to five years, Forest program staff will conduct an internal performance review to evaluate whether the management objectives are being met and whether new opportunities are being recognized. Forest program staff will continuously stay abreast of any changes in state and federal regulations, market conditions, and emerging economic opportunities such as ecosystem services markets.

Management direction will be reassessed and updated in the case of large-scale natural disturbance such as wildfire, wind throw, or insect or disease outbreak.

When the Category 2 and 3 land base changes by more than 40 acres, the average annual harvest level will be adjusted appropriately. This will be monitored as properties are sold or traded and replacement properties are acquired.

The Forest Management Plan will be revised and updated when there is a significant change in forest conditions, management direction, or if it is necessary in order to take advantage of economic opportunities such as ecosystem service markets.

Other Benefits of the Clackamas County Forest Program

Recreation

All forest properties are open to the public for day-use activities that are not potentially damaging to natural resources, like hiking, picnicking, and mushroom picking. Recreational access is restricted to foot, horseback, or non-motorized vehicles like bicycles. Uses that are not allowed include overnight camping, target shooting, driving motorized vehicles off-road, establishment of biking or hiking trails, littering, dumping, and removal of forest products such as firewood. Unfortunately many of these damaging and/or illegal activities occur on forest properties throughout the county, including County-owned forests. Staff monitors forest properties and discourages these activities through the use of signs and frequent patrols by staff and the Clackamas County Dump Stoppers deputy. At times it may be necessary to increase ditch sizes and/or create barriers to discourage damaging and illegal uses. During periods of high wildfire danger, public access will be restricted in order to minimize risk of fire.

Dump Stoppers Program

The Clackamas County Dump Stoppers Program has been in existence since 2003. The goals of this program are to locate and clean up illegal dump sites in forests managed by program partners, to enforce anti-dumping laws and regulations, and to educate people about the potentially adverse consequences of dumping. It has been largely funded by federal grants through the Secure Rural Schools Act and other grant programs administered by the U.S. Forest Service and the Bureau of Land Management, plus some matching funding from Clackamas County. There are in-kind contributions from program partners including Port Blakely, Weyerhaeuser, the Oregon Department of Forestry, the Oregon Department of Fish and Wildlife, and Portland General Electric. Staff consists of a program coordinator, a part-time assistant, and a County sheriff deputy who locate illegal dump sites, clean them up, and prosecute offenders when possible. Community corrections crews and volunteers do some of the dump site cleanup work. This program has been a great success. As of the end of 2016, Dump Stoppers has removed over 1,028,000 pounds of solid waste, 73,000 pounds of scrap metal, 8,900 pounds of hazardous materials, 10,200 tires, and 475 vehicles from forest lands in Clackamas County.

Environmental Education



Since the beginning of 2001, we have worked with youth groups like school classes and scouts to plant native trees and shrubs on public lands throughout Clackamas County. Our "Community Forest Partners" program has been able to partner with Metro, SOLV, schools and city parks districts to work on restoring fish and wildlife habitat while providing a service-learning environmental education opportunity for children and their parents. So far the Community Forest Partners program has worked with 7,600 children and 2,600 adults to plant 55,000 native trees and shrubs on 250 acres in natural areas throughout the county, including County Parks.

Forest program staff routinely assist local forestry education programs such as North Clackamas School District forestry classes and Timber Lake Job Corp Center students by offering service-learning volunteer project work. Students have helped with a variety of projects from covering burn piles to pre-commercial thinning.

Forest program staff often participate in the annual Clackamas County Tree School event by teaching one of the sessions about some aspect of forest management. Tree School is an all-day educational event that provides small forest owners with opportunities to take classes to learn about various aspects of managing their forest land.

Background and History

Description of Forest Ecosystems

Most of the properties managed by the Clackamas County Parks and Forest divisions are located in eastern Clackamas County in the lower foothills of the western slopes of the Cascade Mountains. A few park properties are located within the Willamette Valley along major rivers. They are almost all highly-productive lands in terms of their ability to rapidly grow and sustain healthy forests. Nearly all the County's forests are less than 80 years old and lie below 2,500 feet in elevation.

Physical Setting



The Cascade Mountains are volcanic in origin, composed mainly of basalt and andesite lava flows, pyroclastic flows, and minor sedimentary units of volcanic origin. These rock units form the bedrock of the western slopes and foothills of the Oregon Cascade Range. Topography ranges from steep-sloped ridges and valleys to gently sloping ridge tops and valley bottoms. The area has a temperate, rainy climate with a warm, dry summer. Annual precipitation on county-owned forest properties ranges between about 40 inches in the Willamette Valley to 80+ inches in localized areas in the upper elevations of County ownership. Rainfall can be locally influenced by topography and the "rainshadow effect" of north-south-oriented ridges. Snow falls in winter but only accumulates on a regular basis in the higher elevations of County ownership and prolonged periods of freezing temperatures are rare. Winter storms tend to generally move from west to east and can result in high winds, accumulation of snow and/or ice, and localized flooding. Summer temperatures rarely top 100 degrees Fahrenheit, but prolonged periods of hot days and east winds in late summer often occur, increasing wildfire danger.

On a relative scale of time, soils in the lower elevations of the Western Cascades are quite young. The volcanic origin of bedrock, topography, climate, and dominant vegetation type influence soil conditions. According to Gerig, et al. in *Soil Survey of Clackamas County Area, Oregon*, published in 1985 by the USDA Soil Conservation Service:

> "This survey area is one of the better timber growing areas in North America. Most of the best areas for timber production are in the foothills of the Cascade Range. The less productive areas generally are at the higher elevations. Favorable climate and fertile soils account for the high productive capacity of the woodland in much of Clackamas County."

Almost all soil types within County forest lands are classified as suitable for the production of timber. Most soils are moderate to well-drained loams with a healthy organic horizon and varying content of clay and rock. Susceptibility to compaction and erosion varies widely.

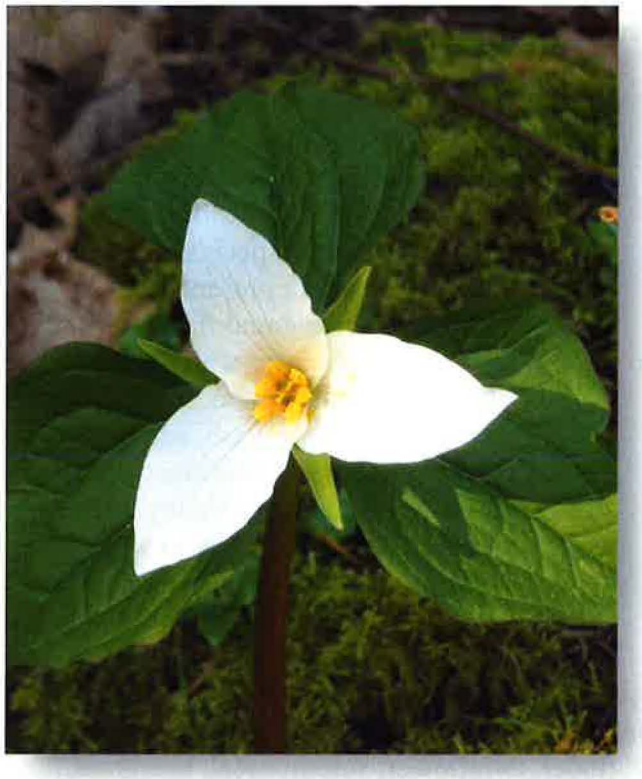
Vegetation Types and Patterns across the Landscape



Native forests in eastern Clackamas County are dominated by Douglas-fir, western hemlock, and western red cedar with inclusions of red alder and bigleaf maple. Other tree species found in County forests but present in fewer numbers include grand fir, Pacific silver fir, noble fir, western white pine, Willamette Valley ponderosa pine, black cottonwood, Oregon ash, and bitter cherry. In some of the County parks within the Willamette Valley, native tree species also include Oregon white oak, Willamette Valley ponderosa pine, and Pacific madrone. Shrubs commonly found include ocean spray, vine maple, rhododendron, tall Oregon grape, snowberry, huckleberry, salmonberry, thimbleberry, salal, devil's club, poison oak, and many others. Species commonly found in the herb layer include various ferns, vanilla leaf, Oregon oxalis, dwarf Oregon grape, pathfinder, twinflower, solomonseal, beargrass, sedges and a variety of mosses, lichens, and fungi. There are no known locations of state or federally-listed threatened or endangered plants in County-owned forest properties.

Plant communities develop over time through a process called succession. Forests are often referred to as being in an early, mid, or late seral stage of ecologic succession. Most of the forests managed by Clackamas County would be classified as early or mid-seral stage forests. Almost all County forests are younger than 80 years old and are the result of reforestation following wildfire or logging. There are some scattered older trees within some younger stands and riparian areas and several acres of forest within Eagle Fern Park that could truly be classified as "old-growth". All forests are susceptible to disturbances that can "re-set" successional processes to varying degrees. Natural disturbances include wildfires, floods, wind storms, landslides, insect and disease outbreaks, avalanches, and volcanic eruptions. Man-caused disturbances include timber harvesting, fires, and the introduction of non-native invasive plants. Disturbances can result in varying sizes of early seral stage forests, from a few trees killed by Douglas-fir bark beetle or root rot, a few acres of blowdown from a wind storm, a forty acre harvest unit, and hundreds or even thousands of acres burned by a wildfire.

Disturbance patterns and the amounts of early, mid, and late seral forests in eastern Clackamas County have been altered since settlement of the area by European-Americans, which began in the mid - 1800's. Prior to this, coniferous forests in the western Cascade foothills were less fragmented with larger contiguous areas of forests of the same seral stage and more abundant older or late seral forests. Western hemlock is the common late successional dominant in the western Cascade foothills in Clackamas County (Halvorson et al., 1986). This means that barring any disturbance, western



hemlock would eventually dominate the overstory. The dominance of Douglas-fir in these stands is due in large part to wildfire disturbance because Douglas-fir is the most fire-adapted species. Fire also opens up the canopy, allowing the shade intolerant Douglas-fir to establish itself. There are two main natural fire regimes in the western hemlock zone in the Cascades in northwestern Oregon. These are fires of mixed severity with a 50 to 100+ year return interval, and infrequent but severe stand-replacing fires which occur every 200+ years. There is evidence that fire regimes in the Willamette Valley were much more frequent, but were lower-intensity fires influenced in part by fires set by Native Americans in order to improve wildlife habitat (Clackamas County Community Wildfire Protection Plan, 2005).

Some people believe that prior to European-American settlement, all forests were older, that most of those forests are gone, and that the remaining older forests continue to decrease in size and volume because of timber harvesting. However, the first inventory of Oregon's forests, conducted by the U.S. Geological Survey (USGS) in about 1900, shows large areas of burnt and young forests. In a report titled "What do Western Oregon's Forests Look Like After a Century of Management?" published in 2009 by the Oregon Forest Resources Institute, author Gail Wells compared the USGS map of Oregon forests from 1900 to a current map and noted the following:

- There is more wood volume in Oregon's west side forests today than at the beginning of the 20th century.
- More land is covered by forests today than in 1900.
- Substantially more wood is growing than is being harvested.
- There are an estimated 2 million to 5 million acres of older forests in Oregon, most of it in federal forest reserves.
- Under current policies, the amount of older forests in Oregon will continue to increase over the next century.
- Oregon has science-based forest protection laws and practices that continue to evolve with emerging science and public values.
- Oregon's management ethic respects non-commercial values of forests, including wilderness and wildlife protection.

These observations all apply to the forests in Clackamas County. Just over half of the land base of Clackamas County is in federal forests which are being managed primarily to provide older forest habitat.

Aquatic Species and Water Quality



County-owned forest lands lie within four of the five major watersheds found in Clackamas County: Clackamas, Molalla, Sandy, and Willamette. Critical habitat for federally-listed threatened Lower Columbia River chinook, coho, and steelhead, Upper Willamette River chinook and steelhead, and Columbia River chum has been identified within portions of these watersheds. Native trout and other aquatic species such as frogs, salamanders, and sculpins may be present in streams flowing through County-owned forest land. No current federally or state listed threatened or endangered amphibians have been identified within Clackamas County forest land.

Oregon classifies streams as fish-bearing (Type F), domestic water sources with no fish (Type D), and all others (Type N). These three types are further classified as small, medium, or large. There are also different classifications for wetlands and lakes. The Oregon Department of Forestry, (in cooperation with the Oregon Department of Fish and Wildlife and the U.S. Fish and Wildlife Service), maintains a map and database showing the classification of known streams, lakes, and significant wetlands along with the size class and extent of fish or domestic water use. If unknown water features are identified during the course of forest management activities, it is the land manager's responsibility to bring it to the attention of the Oregon Department of Forestry. The Oregon Forest Practices Act requires Riparian Management Area (RMA) designation of widths between 20 and 100 feet on each side of a stream or surrounding a lake or significant wetland. Standards specified within the Oregon Forest Practices Act for forest management activities within RMAs are intended to protect riparian habitat fish and wildlife. There is a proposed rule change that would increase RMA widths by 10 feet on small and medium fish-bearing streams in northwestern Oregon which may go into effect in the summer of 2017. There are approximately 8.9 miles of streams within County-owned forests that are classified as Type F, fish-bearing. All other streams within County-owned forests are classified as Type N . There are no Type D streams. While riparian habitat conditions within County-owned forests are generally good, they have been affected by past wildfires, logging, and road



building activities. Some stream reaches are deficient in large woody debris. As projects are planned, stream reaches that could benefit from the addition of large woody debris are identified and integrated into project design. Field observations following recent high water flow events indicate that roads within County-owned forest land are draining properly and that culverts are of sufficient size, however they are continuously monitored to correct any developing problems.

Clackamas County Parks and Forest divisions further contribute to the effort to improve native fish populations by locating fish rearing tanks within two county parks. In cooperation with the Oregon Department of Fish and Wildlife, rearing tanks have recently been installed in Carver Park and Eagle Fern Park. Young fish are stocked in these tanks after hatching and reared in the waters of Eagle Creek and the Clackamas River. Their location within county parks also provides an interpretive and environmental education opportunity.

Wildlife Species



Mammals, birds, and invertebrates expected to be found within County-owned forests include species commonly expected to live within coniferous forests and some forested habitats in the Willamette Valley. Similar to stream classification information, the Oregon Department of Forestry, (in cooperation with the Oregon Department of Fish and Wildlife and the U.S. Fish and Wildlife Service), maintains a map and database with location information for threatened and endangered wildlife species. When a forest land manager files a plan to implement a forest management project, the Oregon Department of Forestry will check their information and notify the land manager if there is a concern.

Larger mammals found in County-owned forests include deer, elk, coyote, bobcat, cougar, black bears and a plethora of smaller rodents like voles, mice, rabbits, squirrels, mountain beaver (sometimes called boomers), and common beaver. They live in a variety of forest habitats and do not require specific protection measures. There are no known state or federally listed threatened or endangered mammal species living within County-owned forest properties. Two federal candidate species, the fisher and North American wolverine have had historical sightings in the vicinity of the Hoodland Corridor properties, but there currently no known locations.

Bird species found in County forest properties include raptors such as eagles, osprey, hawks, and falcons; waterfowl such as geese, herons, and ducks; and various other types of cavity nesting birds, songbirds, migratory birds, and others. The Northern spotted owl is the only federally-listed threatened bird species that might be found in County-owned forests, but there are no known spotted owl nesting sites within County-owned forest properties. With the possible exception of Eagle Fern Park, County-owned property does not have the habitat spotted owls typically like to nest in. The bald eagle has been de-listed on the federal list but is still classified as threatened on the state list. Currently, there are no known bald eagle nesting sites on County properties. Peregrine falcons were

federally de-listed in 1999 and removed from the state list of threatened and endangered species in 2007. In 2010 a nesting pair of peregrine falcons was identified at the Madrone Wall Park property. Although no longer listed as threatened or endangered, peregrine falcons are still protected by other state and federal laws. The Oregon Department of Fish and Wildlife is continuing to implement a statewide monitoring program with plans to monitor peregrine falcon nest sites.

All sorts of invertebrate species (insects) are found within County forests, but there are no listed threatened and endangered ones currently identified.

Forest Ownerships within Clackamas County



The total area of Clackamas County is 1,879 square miles or approximately 1.2 million acres. The Portland metropolitan area includes portions of three counties, one being Clackamas County. Despite the perception that Clackamas County is one of the more "urban" counties in Oregon, about 80% of the land base of Clackamas County is actually forested land.

About 51% of Clackamas County is federal forestland managed by the U.S. Forest Service and the Bureau of Land Management. These forests are located primarily in the eastern half of the County.

Harvesting of these forests increased in the 1940's during and after World War II as roads were built to access more areas. Beginning in the late 1980's, timber harvest on federal lands was greatly reduced due to controversy over how they should be managed and subsequent reductions in agency budgets.

Federal forests are now managed in large part to provide older forest habitat to benefit terrestrial and aquatic species that use or are dependent on late seral forests.

Management of federal forests currently consists of somewhere between 1,000 to 2,000 acres of thinning per year and restoration projects such as road decommissioning and in-stream fish habitat improvement. Almost no new openings are being created in federal forests within Clackamas County. This negatively impacts wildlife species that use early seral forest habitat like deer, elk, and some species of birds.

The change in management of federal forests has resulted in a significant impact on the economies of several rural Clackamas County communities, loss of timber receipt revenue to Clackamas County, and the loss of many jobs in the forest products sector. There are currently only two operating large commercial sawmills in Clackamas County.

About 11% of Clackamas County is owned by three large private industrial timber companies: Weyerhaeuser, US Forestry (formerly Port Blakely Tree Farms), and Olympic Resource Management.

These forests are managed in compliance with the Oregon Forest Practices Act on a rotation of 40 to 65 years in a manner intended to maximize economic return while protecting key resource values. Due to the reduction in timber harvest on federal lands, these lands provide important habitat for wildlife species that depend on early seral forests, such as deer and elk. These three owners contribute significantly to the forest products sector of the economy in Clackamas County.

About 16% of the County is owned and managed by small woodland owners who have widely varying management objectives and styles and who also contribute greatly to the forest products section in the county. The Clackamas County Farm Forestry Association is the largest chapter of the Oregon Small Woodlands Association and the Oregon State University Extension Forestry Program provides information and assistance to these small woodland owners.

About 1% of Clackamas County is forest land owned and managed by the Confederated Tribes of Warm Springs. Another approximately 1% are forests managed by a variety of public agencies at the state and local level, including the 4,284 acres (0.35%) managed by Clackamas County Parks and Forest. Most of the properties managed by Clackamas County Forest program staff are located in areas that lie between federal forests and privately owned industrial forest lands. County forest properties function in some ways as a transition between the younger, more intensively managed private industrial forests and the increasingly older and far less intensively managed federal forests. Other state and local agencies that manage forest lands within the county are the Oregon Department of Forestry, Oregon State Parks, and Metro Parks & Greenspaces.

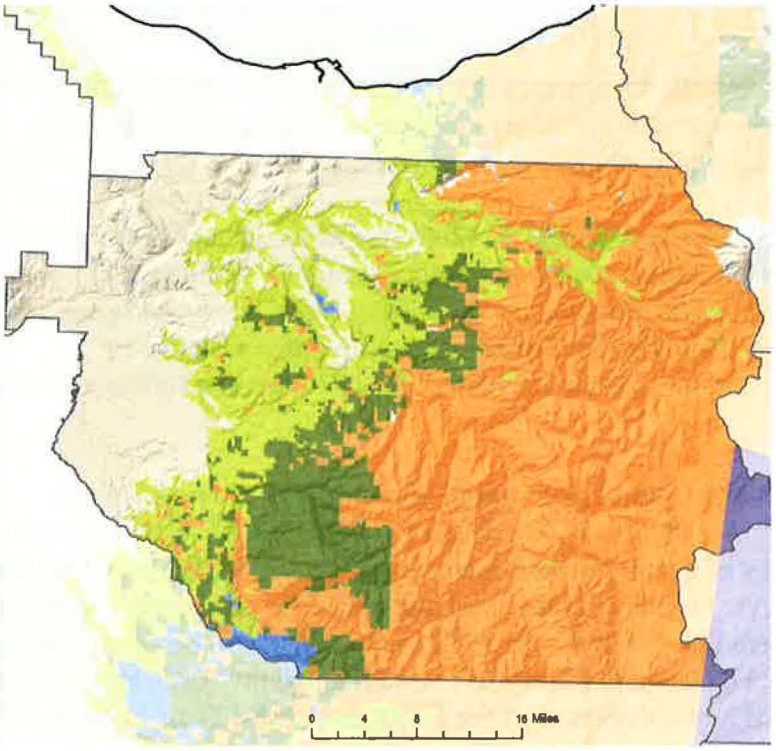
The following page displays information about forest ownership, 2015 timber harvest, and forest sector jobs in Clackamas County gathered by the Oregon Forest Resources Institute. Land ownership and timber harvest information is summarized in the table below. This shows that although the large private industrial timber companies only own 13% of the forested lands in the county, 68% of the timber harvest in 2015 came from those lands. Even though federal forests comprise almost 2/3 of the forests in the county, only 11% of timber harvested in Clackamas County in 2015 came from federal forests.

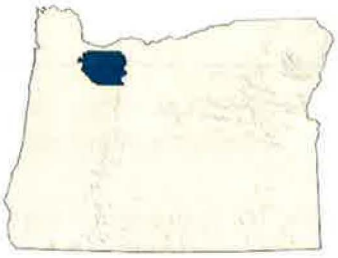
Summary of Percent of Forestland Ownership and Timber Harvest by Ownership Type in Clackamas County in 2015

Forestland Owner	Percent of the 952,000 acres of forested lands in Clackamas County	Percent of the 139,837 thousand board feet of timber harvested in Clackamas County
Federal	64 %	11 %
Large Private Industrial	13 %	68 %
Small Private Woodlands	20 %	20 %
State and Other Public	1.4 %	.1%
Tribal	1.6 %	.9%
TOTAL	100 %	100 %

CLACKAMAS COUNTY

Oregon Forest Resources Institute





LAND AREA (thousands of acres)

Total land	1,196
Total forestland (80%)	952

FORESTLAND OWNERSHIP (thousands of acres)

Federal	607
Large private	128
Small private	191
State and other public	12
Tribal	14
TOTAL	952

TIMBER HARVEST (thousands of board feet)

Federal	15,499
Large private	94,725
Small private	27,488
State and other public	816
Tribal	1,309
TOTAL	139,837

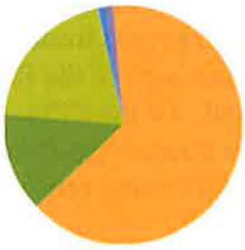
FOREST SECTOR JOBS

Forest sector jobs	3,222
% of county employment	1.8

PRIMARY WOOD PROCESSING

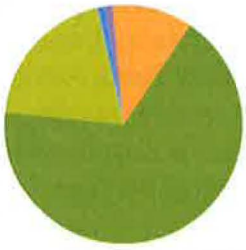
Sawmills	2
TOTAL FACILITIES	2

FORESTLAND OWNERSHIP



64%	FEDERAL	11%
13%	LARGE PRIVATE	68%
20%	SMALL PRIVATE	20%
1%	STATE AND OTHER PUBLIC	1%
1%	TRIBAL	1%

TIMBER HARVEST BY OWNER



2015

OregonForestFacts.org © 2017, Oregon Forest Resources Institute.

Timber harvest and forest sector jobs data is from 2015. Wood processing data is from 2016. Jobs data is from Oregon Employment Department. Ownership, harvest data and map provided by the Oregon Department of Forestry.

Management History of County-Owned Forest Lands

Between 1918 and 1925 over half of the County forest properties, what is now known as the Wildcat Mountain tract, were harvested by the Bear Creek Lumber Company using primarily railroad logging methods. The area subsequently caught fire and burned over, and was regenerated naturally during the next 10 years. This property was acquired through tax foreclosure, which is the case with most of the smaller tracts currently in the County forest program. Some properties were acquired through land exchange with the U.S. Forest Service.

In 1961 the Board of County Commissioners (BCC) contracted with the Oregon Department of Forestry to develop the first forest management plan for forest land owned by Clackamas County. It appears this management plan was not formally adopted nor implemented.

In 1977 the BCC appointed the first Forest Advisory Board, a committee of technical experts in the forestry field. The Forest Advisory Board recommended developing a sustained yield forest management strategy for County forest lands that would actively manage these forests and generate revenue for the County. Sustained yield is a strategy for forest management that calls for an approximate balance between net growth and the amount harvested. In 1979 the first timber sale was sold and harvested.

The Forest Advisory Board recommended the County hire a professional forester to manage the forested properties owned by the County. In 1981 the BCC created the position of County Forester and hired Troy Moore. The first inventory of County owned forest land was conducted showing there were 40.0 million board feet on 3,296 acres. In 1983 a Forest Management Plan was written with input from the Forest Advisory Board and adopted by the BCC. In 1983 the County was also going through a tremendous downturn in the economy. The General Fund was overtaxed and the Parks system was in jeopardy of closing. The BCC approved the establishment of the Parks and Forest Trust Fund to off-set the declining General Fund tax revenue to support Parks. The trust fund and user fees have been the primary funding sources for County Parks and Forest operation and maintenance since trust fund establishment in 1983. Revenue generated from timber sales provides about 40% of the funding needs for Parks operation and maintenance. It also covers the costs of the Forest program with the exception of grant-funded activities such as the Dump Stoppers program.

In 1987 a controversial harvest proposal in the Hoodland Corridor prompted the BCC to merge the Forest program with County Parks and develop a public process to review proposed timber sales. In 1988 the public input process for timber sales was adopted by the BCC and the Timber Sale Advisory Committee was formed. The Timber Sale Advisory Committee is comprised of two people from the Forestry Advisory Board, two from the County Parks Advisory Board, and one from each of the five Community Planning Organizations in the areas where the County owns forest land. Of the CPO members, only the CPO representative from the area in which the proposed sale is located has a vote, but all can participate in discussions. The chart on page 7 outlines the timber sale planning process.

In 1992 the County contracted a private environmental consulting firm to analyze the properties in the Hoodland Corridor. Fish and wildlife, vegetation, geology, water, view sheds, recreation, and cultural resources were the major focuses of the study, which was released in 1994.

In 1995 the BCC appointed an ad hoc committee to gather public input regarding the County's forest management plan. The committee conducted three public hearings around the County and received input from numerous county residents. Using the data from the 1992 environmental analysis and the public input from the hearings, the committee made a recommendation regarding which of the forested

properties should continue to be managed on a sustained yield basis for revenue generation and which should be designated for other purposes. Their recommendation to the BCC resulted in the creation of three categories of forest properties (Category 1, Category 2, and Category 3), which are described in the next section of this document.

Following an inventory of all of the Category 3 lands in 1998, a new Forest Management Plan was written in 1999. Another inventory in 2006 revealed that over 1/3 of the Category 3 acres still had forests of 60 years or older, and that some trees in these older forests were becoming too large in diameter for local sawmills. To address the diameter issues, a decision was made to change the average rotation age for the Category 3 lands from 65 years to 55 years. The Forest Management Plan was updated accordingly and approved by the BCC in February of 2008. The management of County forests has generated very little controversy, in large part due to continuous program review and public involvement.

In May of 2010, the Board of County Commissioners directed Forest program staff to make changes in the categorization of some properties; more explicitly describe how County forests are managed, and outline measures taken to ensure compliance with environmental regulations and standards.

Revenue generated from the sale of County timber covers the costs of the Forest program and supports operations and maintenance of County parks. Over the past decade the average annual revenue produced from the sale of timber has been $750,000 which has paid the management costs of the Forest program and contributed $350,000 to $450,000 of funding for operations and maintenance of parks. An inventory conducted on Category III properties in 2006 confirmed these forests have been managed in a sustainable manner, meaning the volume of timber removed has equaled or been slightly less than the volume of growth, resulting in no net loss of standing forest volume.

Accelerated Harvest

In July 2012, the Board of County Commissioners approved a recommendation by County Parks and Forest staff to accelerate timber harvest and use the revenue to pay off the $4.3 million debt still owed on the construction loan for Stone Creek Golf Course. The Forest Advisory Board and the Parks Advisory Board also supported the plan. Accelerating the rate of harvest in the older stands to pay off the golf course construction loan accomplished three things:

1) It allowed golf course revenue that was being used to make loan payments to go to County Parks instead. Revenue from the golf course is generated in a more steady and predictable fashion than revenue from timber sales, which can be volatile and unpredictable due to fluctuations in forest product markets and political climates. The end result is that County Parks has a more predictable and reliable source of revenue.
2) Early pay off of the construction loan in the fall of 2014 saved $1 million in future interest payments on the loan.
3) At the beginning of 2012 roughly 41% of Category 3 forest acres were in timber that was older than the 55 year rotation age prescribed in the 2008 forest management plan. With so much older timber, most of what was being harvested was 70-75 years old and it would take about 20 years to harvest all of the older timber. Accelerating the harvest of older stands lowered the average age of stands on the Category 3 forest properties to a range more within the prescribed rotation age.

In 2013 six timber sales (Fore, Goalie, Golf, Dhooghe, Elwood, and Fernwood Thin) harvested 9.968 million board feet from 280 acres and generated $5,113,697 of revenue. The golf course construction loan was payed off in the fall of 2014. Knowing this would reduce the inventory of standing timber on the Category 3 forest properties, former County Forester Dan Green calculated that staying with the 2008 management plan rotation age of 55 years old would mean a reduction of annual acres harvested from 55 down to about 40 acres per year, with a corresponding reduction in timber sale revenue that would be replaced by golf course revenue.

Literature and Reports Cited

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ODF&W web site. 2007. http://www.dfw.state.or.us/conservationstrategy/news/2007/April2007.asp

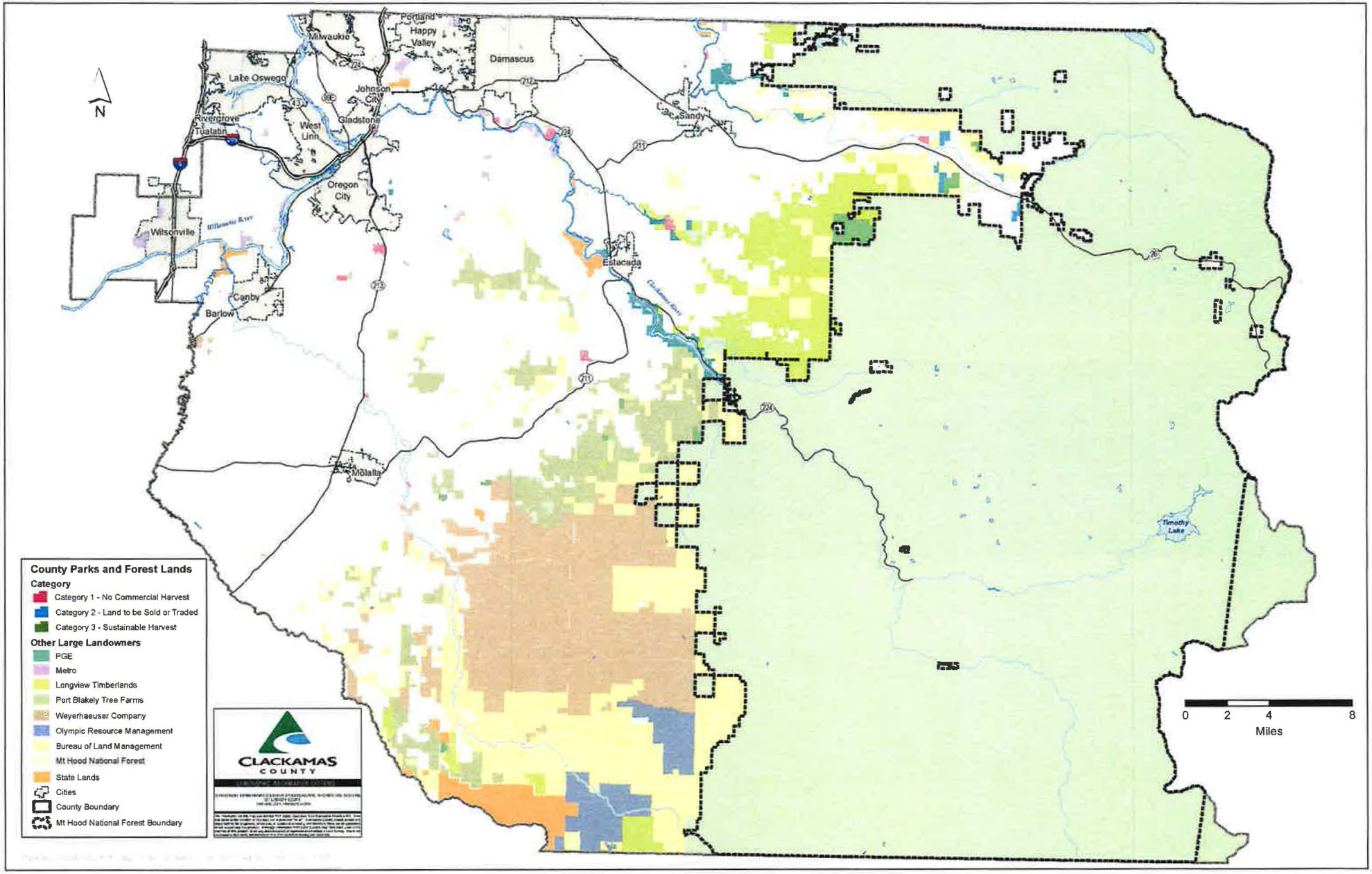
Oregon's Forest Protection Laws: An Illustrated Manual published in 2002 by the Oregon Forest Resources Institute in cooperation with the Oregon Department of Forestry

Wells, G. *What do western Oregon's forests look like after a century of management?* 2009. Oregon Forest Resources Institute.

Appendix A:

Clackamas County Forest

Property Map


Portland
Milwaukie
Happy Valley
Damascus
Lake Oswego
Johnson City
Gladstone
West Linn
Tualatin
Sherwood
Oregon City
Wilsonville
Canby
Barlow
Molalla
Estacada
Sandy
Timothy Lake
N
County Parks and Forest Lands
Category
Category 1 - No Commercial Harvest
Category 2 - Land to be Sold or Traded
Category 3 - Sustainable Harvest
Other Large Landowners
PGE
Metro
Longview Timberlands
Port Blakely Tree Farms
Weyerhaeuser Company
Olympic Resource Management
Bureau of Land Management
Mt Hood National Forest
State Lands
Cities
County Boundary
Mt Hood National Forest Boundary
CLACKAMAS COUNTY
0 2 4 8
Miles

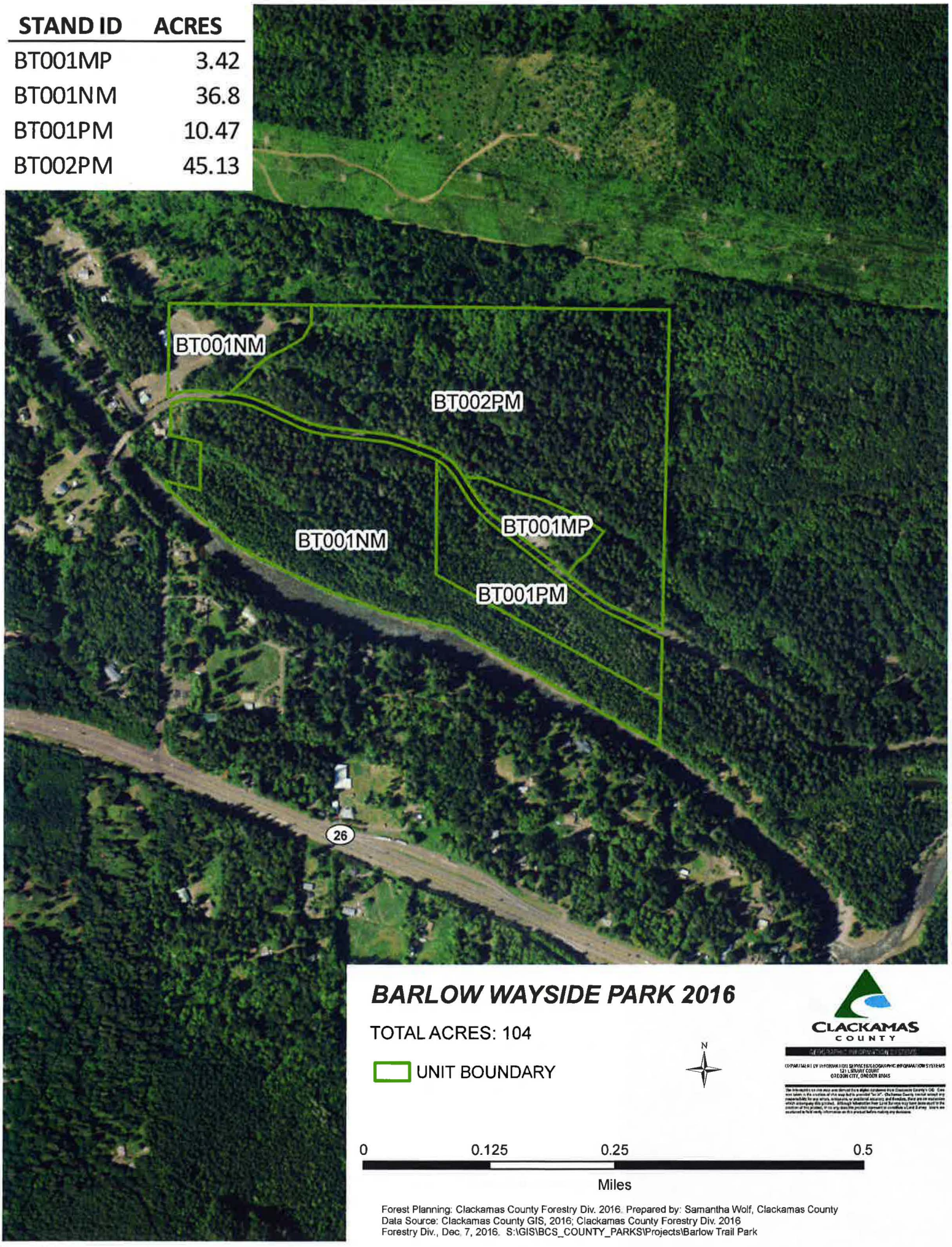
Appendix B:

Forest Property

Aerial Photos

CATEGORY I

STAND ID	ACRES
BT001MP	3.42
BT001NM	36.8
BT001PM	10.47
BT002PM	45.13



BARLOW WAYSIDE PARK 2016

TOTAL ACRES: 104

UNIT BOUNDARY

N

CLACKAMAS COUNTY

DEPARTMENT OF INFORMATION SERVICES/GEOGRAPHIC INFORMATION SYSTEMS
121 LIBRARY COURT
OREGON CITY, OREGON 97045

0 0.125 0.25 0.5

Miles

Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Div. 2016
Forestry Div., Dec. 7, 2016. S:\GIS\BCS_COUNTY_PARKS\Projects\Barlow Trail Park

STAND ID	ACRES
BP000MP	115.55
BP000NM	27.53



BARTON PARK 2016

TOTAL ACRES: 143

UNIT BOUNDARY

N

CLACKAMAS COUNTY

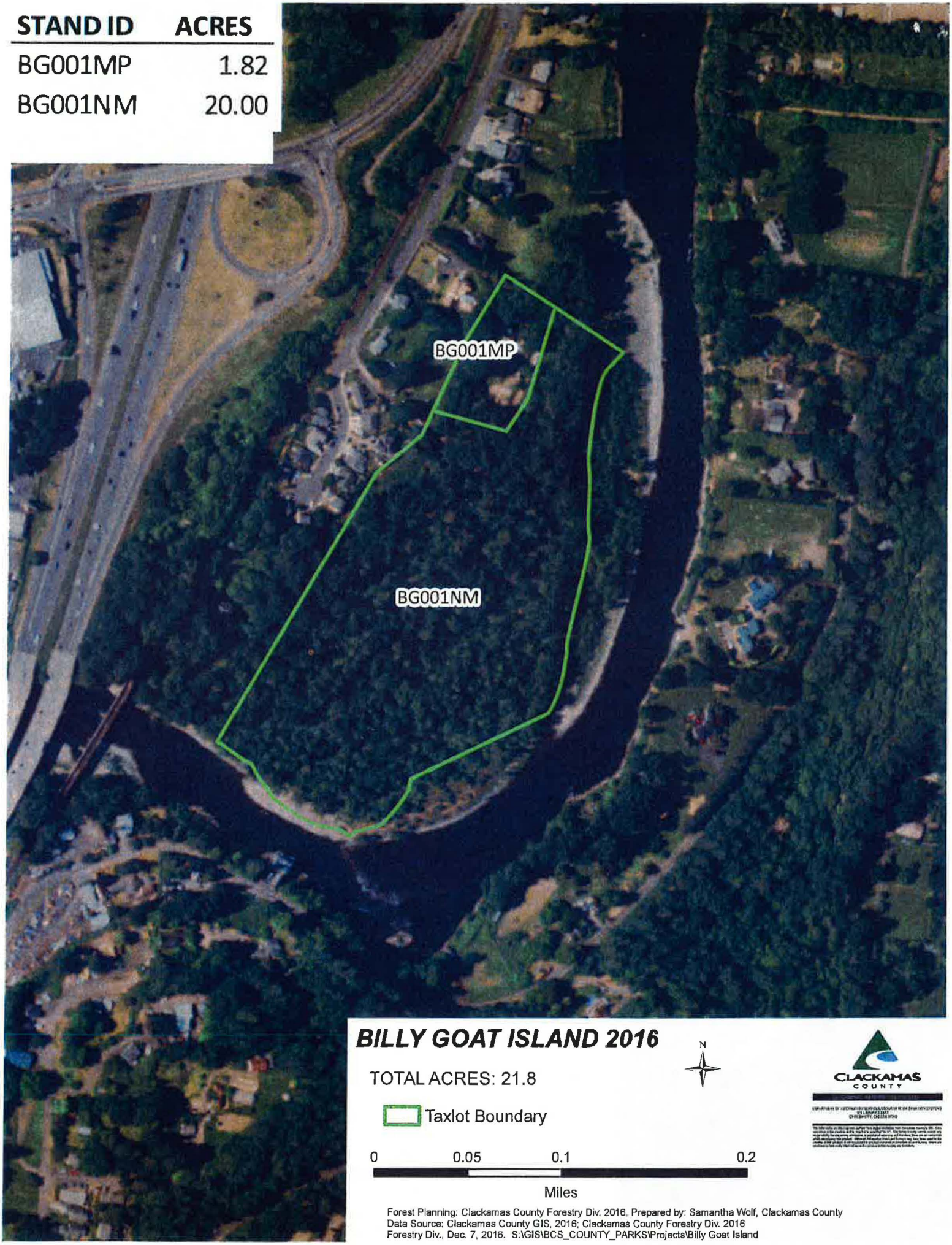
DEPARTMENT OF INFORMATION SERVICES GEOGRAPHIC INFORMATION SYSTEMS
121 LIBERTY COURT
OREGON CITY, OREGON 97045

0 0.125 0.25 0.5

Miles

Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Div. 2016
Forestry Div., Dec. 5, 2016. S:\GIS\BCS_COUNTY_PARKS\Projects\Feyrer Park

STAND ID	ACRES
BG001MP	1.82
BG001NM	20.00



BILLY GOAT ISLAND 2016

TOTAL ACRES: 21.8

Taxlot Boundary

N

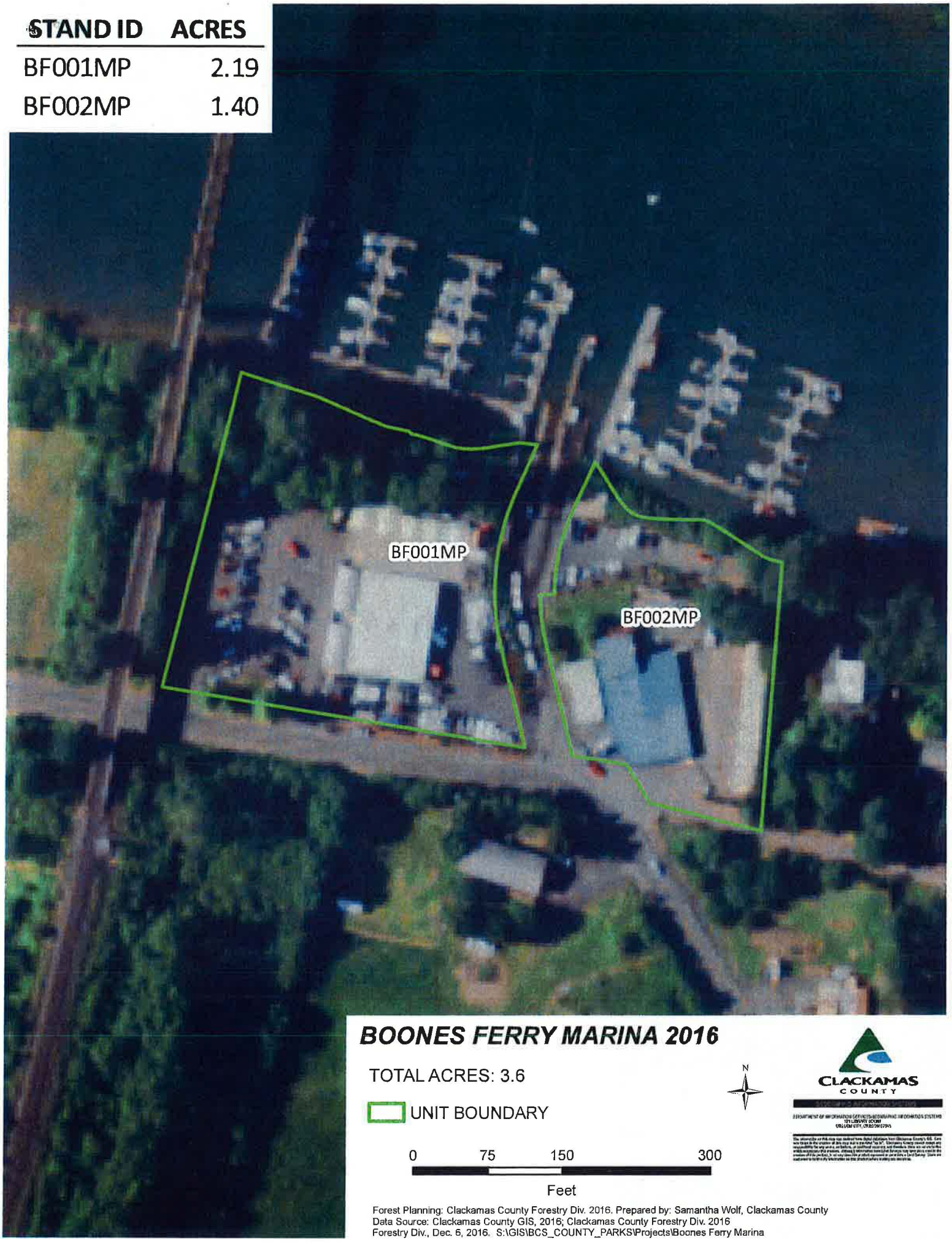
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Miles

CLACKAMAS COUNTY

Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Div. 2016
Forestry Div., Dec. 7, 2016. S:\GIS\BCS_COUNTY_PARKS\Projects\Billy Goat Island

STAND ID	ACRES
BF001MP	2.19
BF002MP	1.40



BOONES FERRY MARINA 2016

TOTAL ACRES: 3.6

UNIT BOUNDARY

N

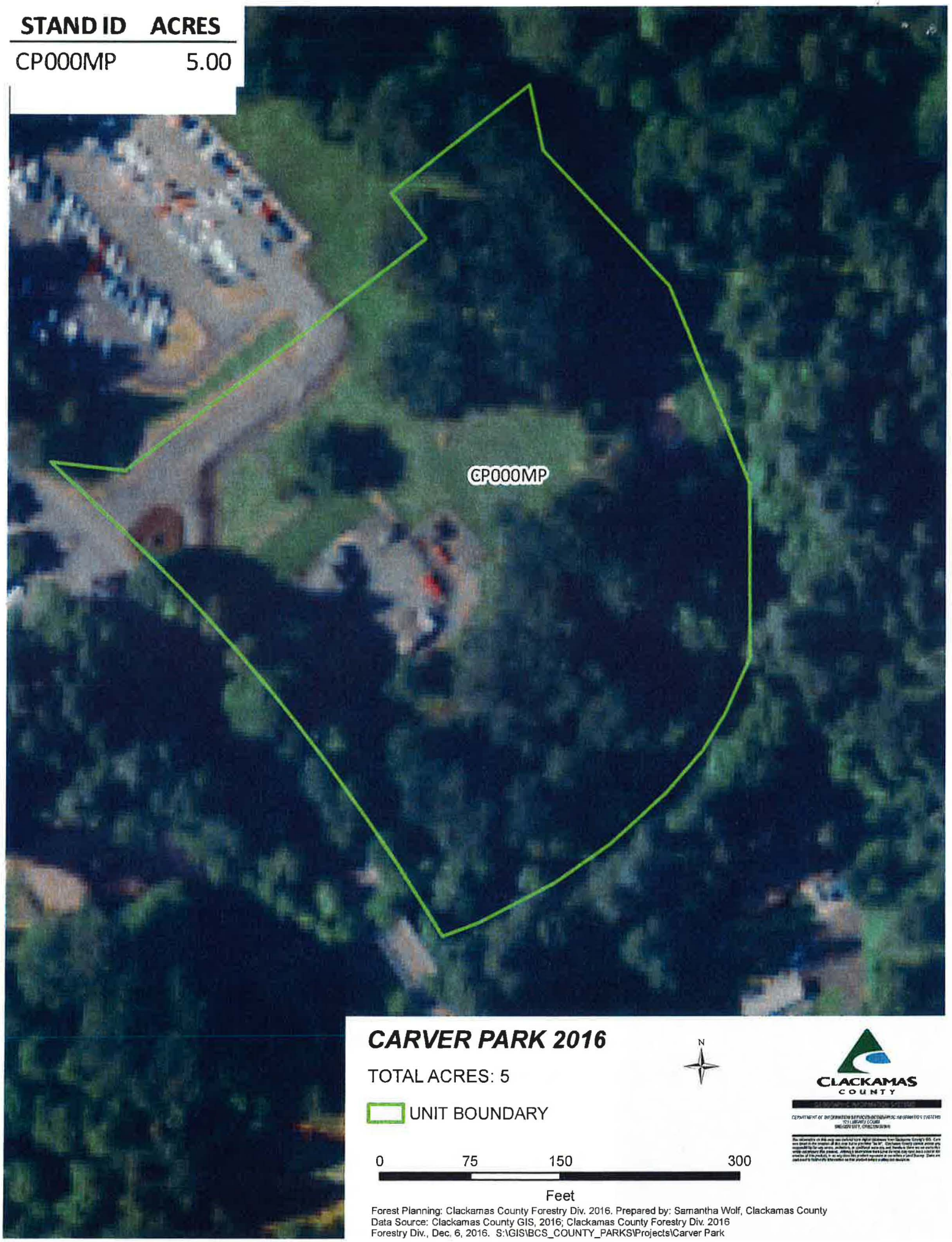
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Feet

CLACKAMAS COUNTY

Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Div. 2016
Forestry Div., Dec. 6, 2016. S:\GIS\BCS_COUNTY_PARKS\Projects\Boones Ferry Marina

STAND ID	ACRES
CP000MP	5.00



CARVER PARK 2016

TOTAL ACRES: 5

UNIT BOUNDARY

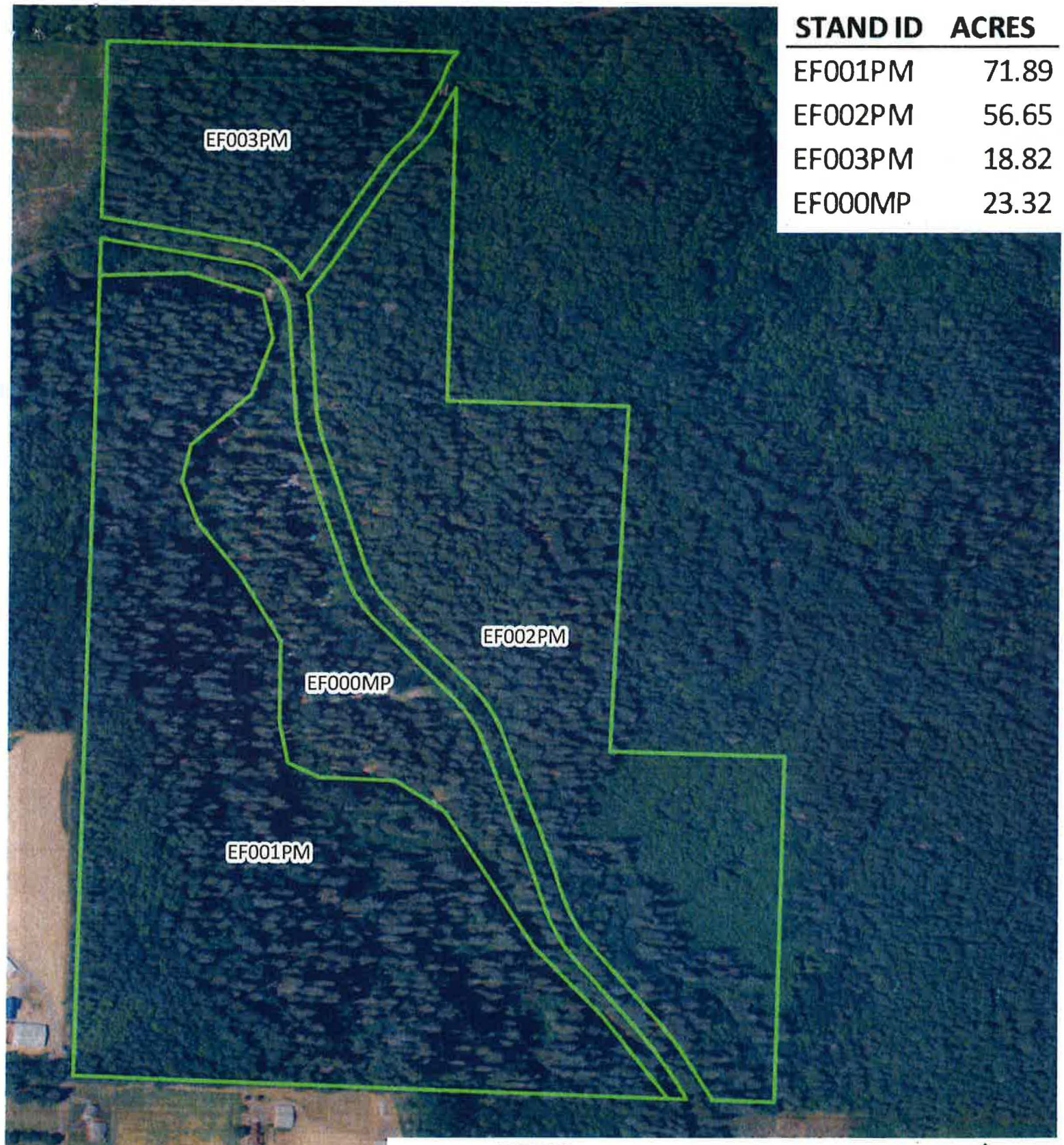
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Feet

CLACKAMAS COUNTY

Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Div. 2016
Forestry Div., Dec. 6, 2016. S:\GIS\BCS_COUNTY_PARKS\Projects\Carver Park



STAND ID	ACRES
EF001PM	71.89
EF002PM	56.65
EF003PM	18.82
EF000MP	23.32

EAGLE FERN PARK 2016

TOTAL ACRES: 171

UNIT BOUNDARY

0 500 1,000 2,000

Feet

N

Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Div. 2016
Forestry Div., Dec. 6, 2016. S:\GIS\BCS_Forestry\Projects\Unit Projects\Boulder

STAND ID	ACRES
FP00MP	0.71



FELDHEIMER PARK 2016

TOTAL ACRES: 0.71

UNIT BOUNDARY

N

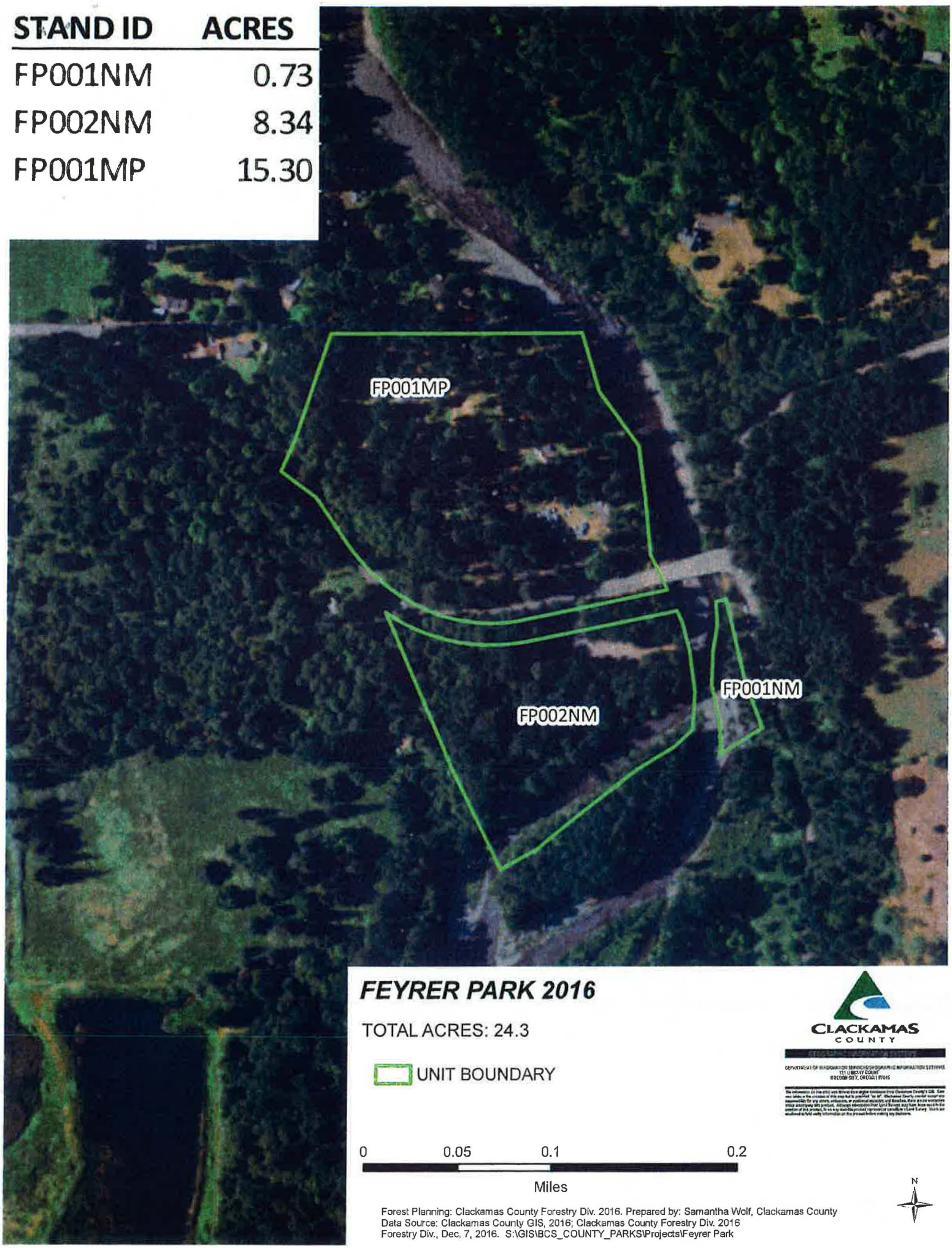
CLACKAMAS COUNTY

0 75 150 300

Feet

Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Div. 2016
Forestry Div., Dec. 6, 2016. S:\GIS\BCS_COUNTY_PARKS\Projects\Feldheimer Park

STAND ID	ACRES
FP001NM	0.73
FP002NM	8.34
FP001MP	15.30



FEYRER PARK 2016

TOTAL ACRES: 24.3

UNIT BOUNDARY

CLACKAMAS COUNTY

DEPARTMENT OF TECHNOLOGY AND GEOGRAPHIC INFORMATION SYSTEMS
121 LIBERTY COURT
OREGON CITY, OREGON 97045

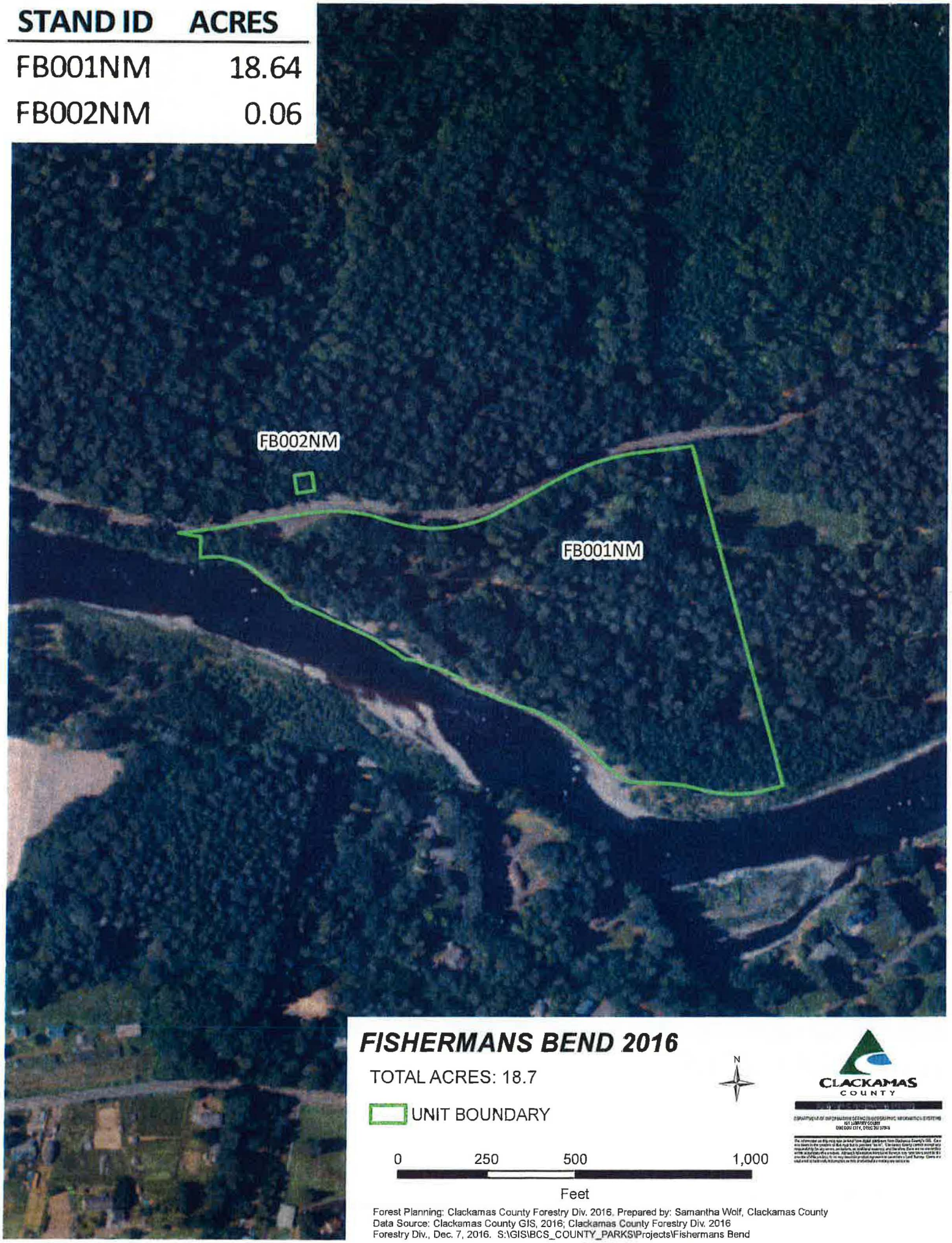
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Miles

N

Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Div. 2016
Forestry Div., Dec. 7, 2016. S:\GIS\BCS_COUNTY_PARKS\Projects\Feyrer Park

STAND ID	ACRES
FB001NM	18.64
FB002NM	0.06



FISHERMANS BEND 2016

TOTAL ACRES: 18.7

UNIT BOUNDARY

N

0 250 500 1,000

Feet

CLACKAMAS COUNTY

Forest Planning: Clackamas County Forestry Div. 2016, Prepared by: Samantha Wolf, Clackamas County
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Div. 2016
Forestry Div., Dec. 7, 2016. S:\GIS\BCS_COUNTY_PARKS\Projects\Fishermans Bend

STAND ID	ACRES
HE001NM	6.34
HE001MP	6.01



HEBB PARK 2016

TOTAL ACRES: 12.3

N

CLACKAMAS COUNTY

DEPARTMENT OF INFORMATION SERVICES/GEOGRAPHIC INFORMATION SYSTEMS
121 LIBRARY COURT
OREGON CITY, OREGON 97045

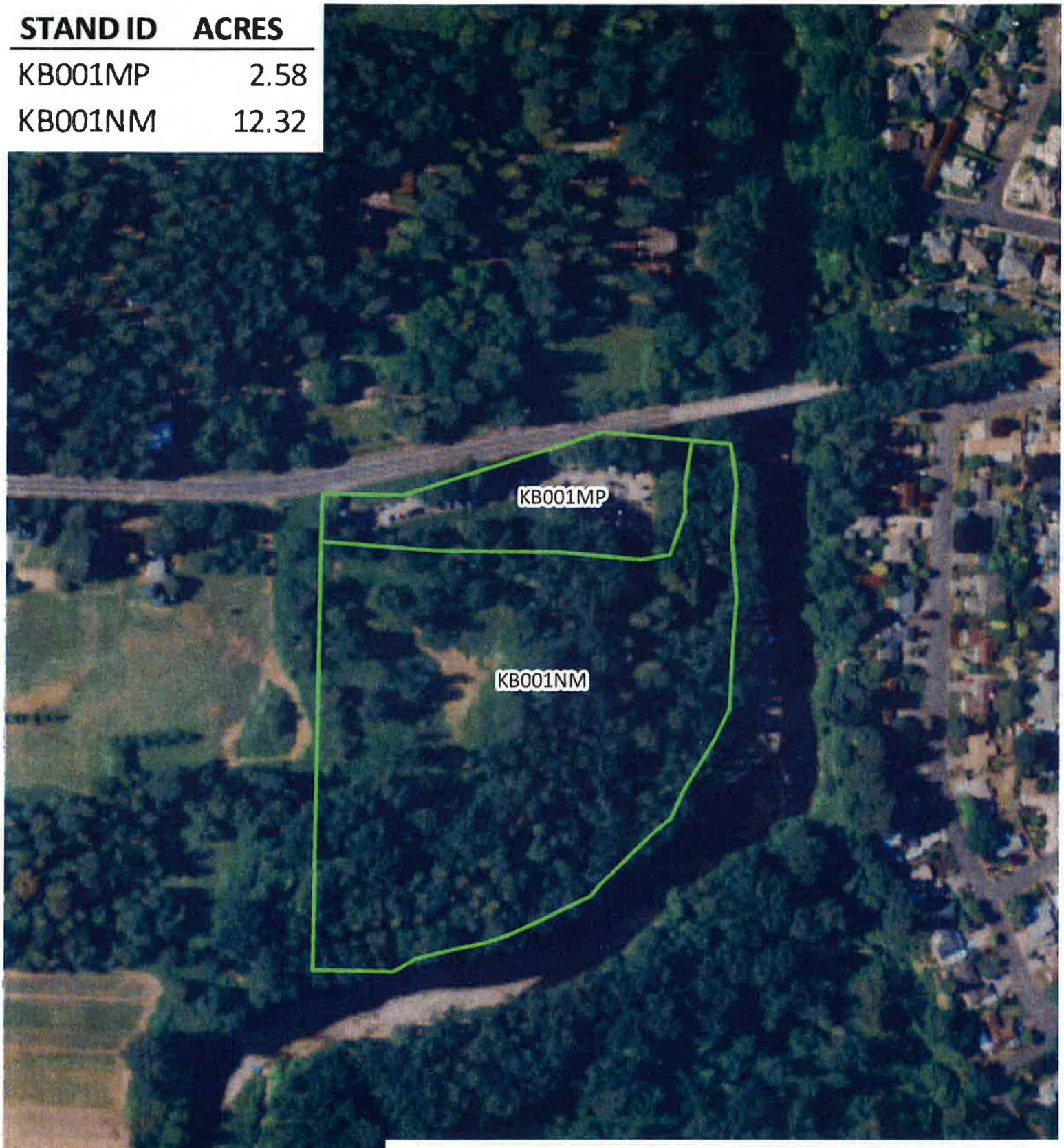
STAND BOUNDARY

0 150 300 600

Feet

Forest Planning: Clackamas County Forestry, 2016
Map prepared by: Samantha Wolf, Clackamas County Forestry, April 26, 2017
Data source: Clackamas County GIS, 2016; Clackamas County Forestry, 2016
S:\GIS\BCS_Forestry\Projects\Unit Projects\Hebb Park

STAND ID	ACRES
KB001MP	2.58
KB001NM	12.32



KNIGHTS BRIDGE 2016

TOTAL ACRES: 15

UNIT BOUNDARY

N

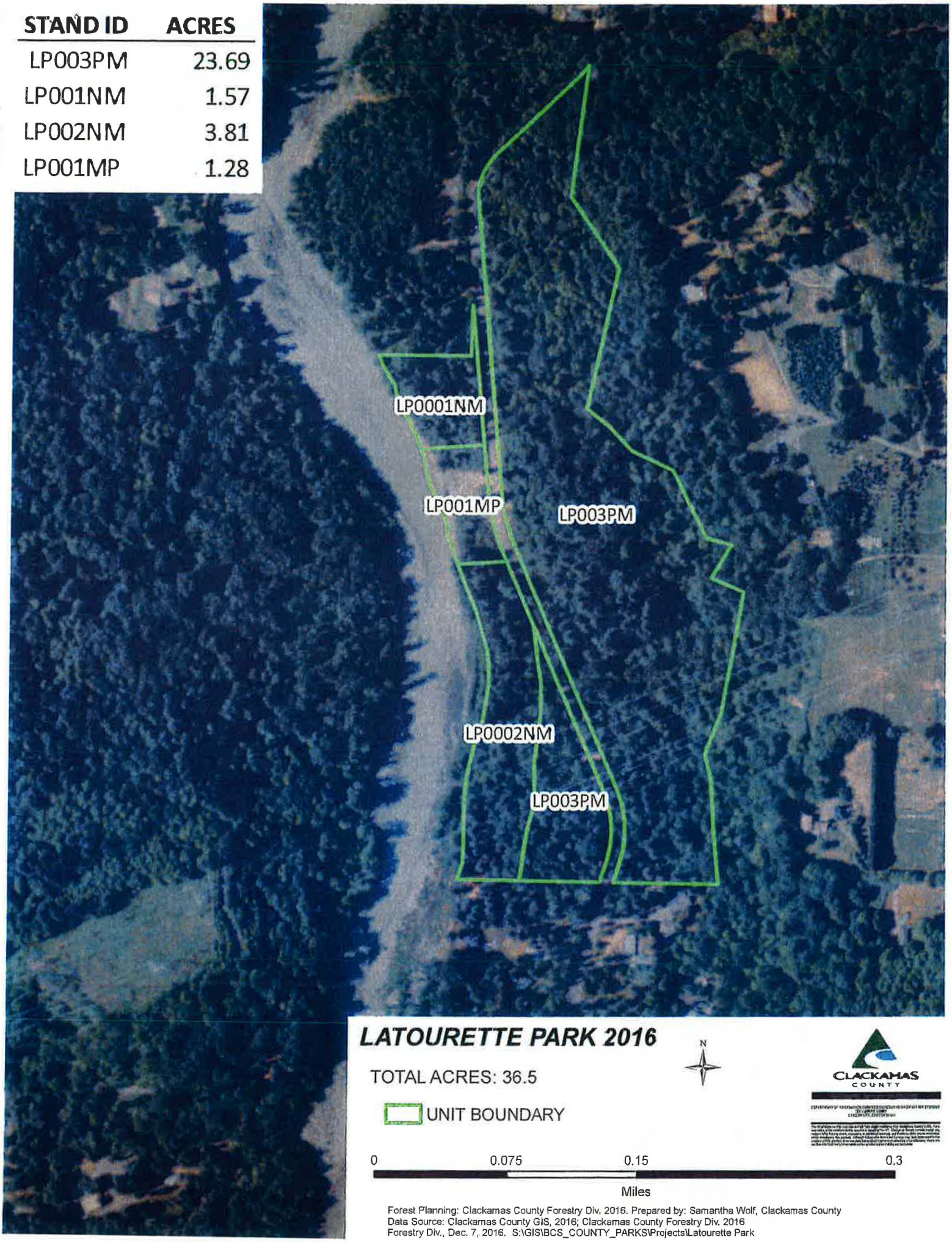
CLACKAMAS COUNTY

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Feet

Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Div. 2016
Forestry Div., Dec. 7, 2016. S:\GIS\BCS_COUNTY_PARKS\Projects\Knights Bridge

STAND ID	ACRES
LP003PM	23.69
LP001NM	1.57
LP002NM	3.81
LP001MP	1.28



LATOURETTE PARK 2016

TOTAL ACRES: 36.5

UNIT BOUNDARY

N

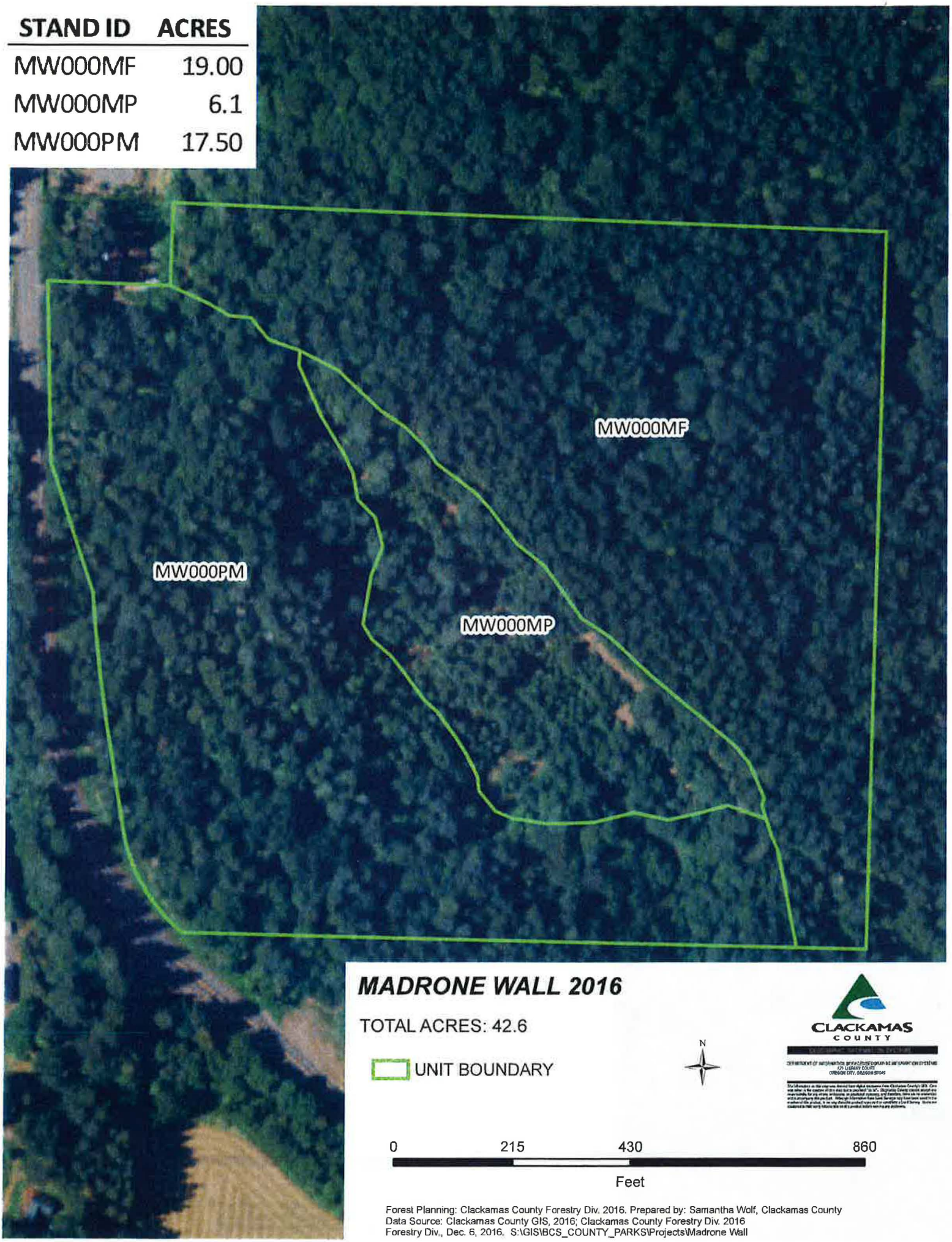
CLACKAMAS COUNTY

0 0.075 0.15 0.3

Miles

Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Div. 2016
Forestry Div., Dec. 7, 2016. S:\GIS\BCS_COUNTY_PARKS\Projects\Latourette Park

STAND ID	ACRES
MW000MF	19.00
MW000MP	6.1
MW000PM	17.50



MADRONE WALL 2016

TOTAL ACRES: 42.6

UNIT BOUNDARY

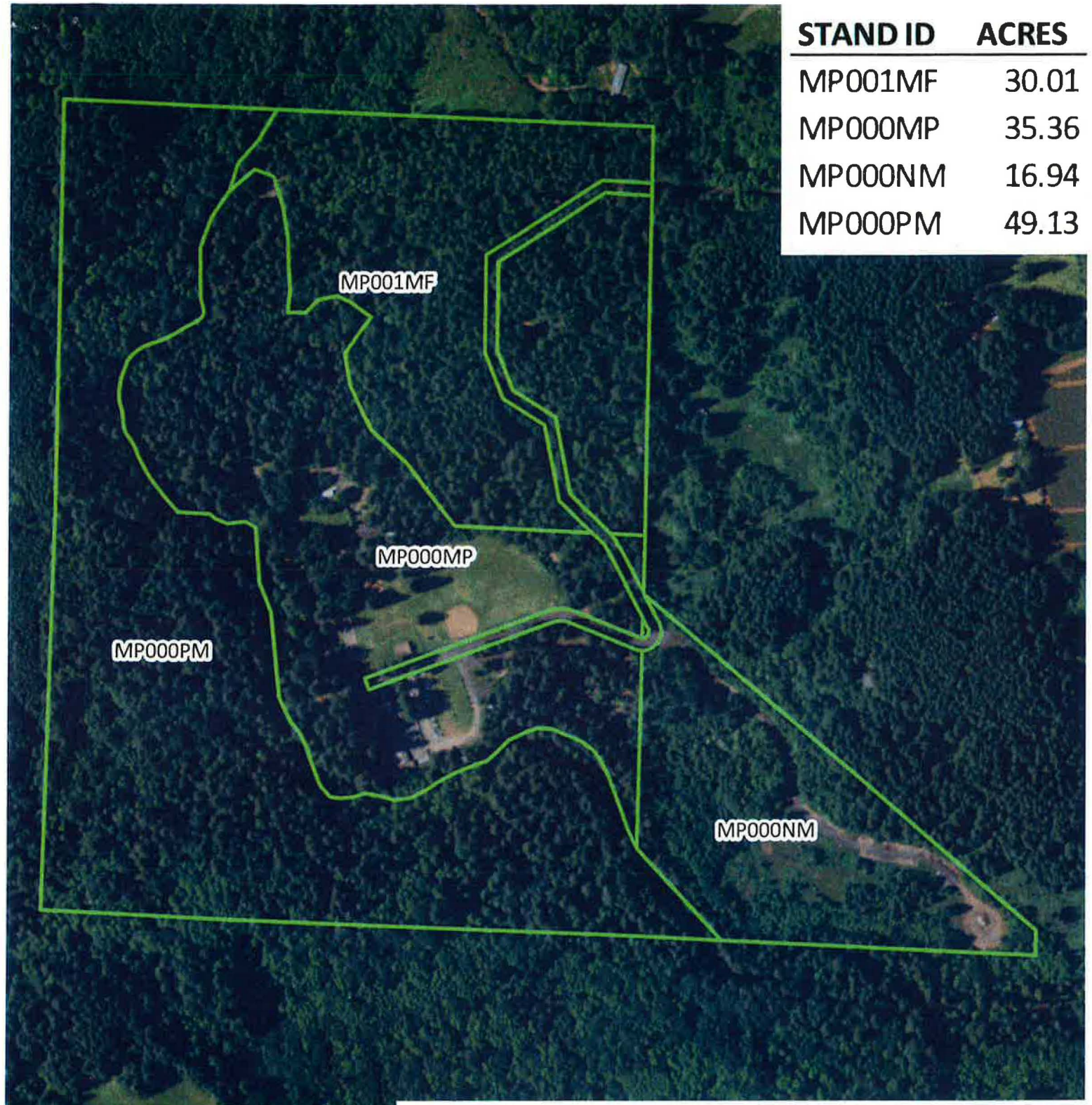
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CLACKAMAS COUNTY

0 215 430 860

Feet

Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Div. 2016
Forestry Div., Dec. 6, 2016. S:\GIS\BCS_COUNTY_PARKS\Projects\Madrone Wall



STAND ID	ACRES
MP001MF	30.01
MP000MP	35.36
MP000NM	16.94
MP000PM	49.13

METZLER PARK 2016

TOTAL ACRES: 131

UNIT BOUNDARY

CLACKAMAS COUNTY

DEPARTMENT OF INFORMATION SERVICES-GEOGRAPHIC INFORMATION SYSTEMS
121 LIBRARY COURT
OREGON CITY, OREGON 97045

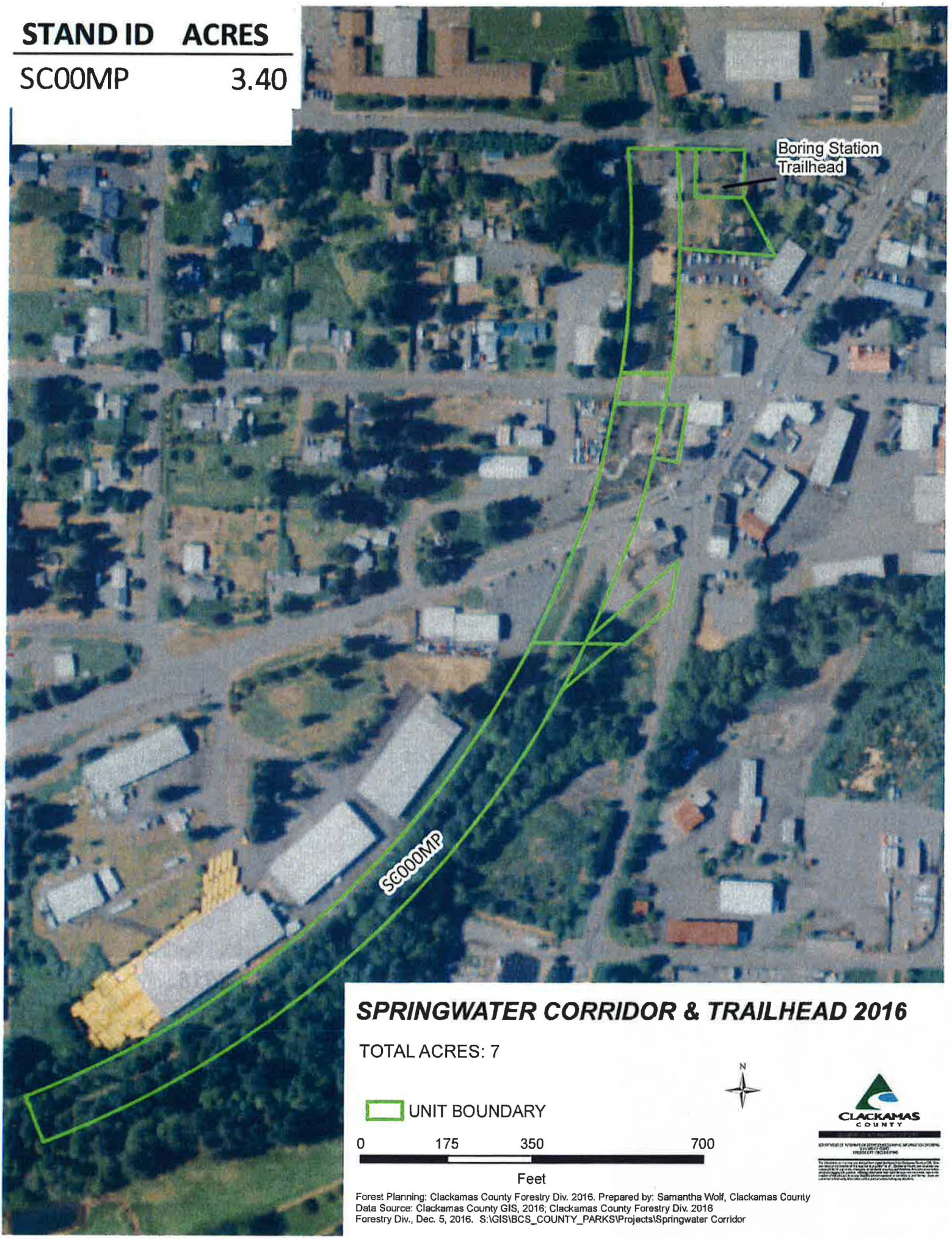
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Miles

N

Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Div. 2016
Forestry Div., Dec. 6, 2016. S:\GIS\BCS_COUNTY_PARKS\Projects\Metzler Park

STAND ID	ACRES
SC00MP	3.40



SPRINGWATER CORRIDOR & TRAILHEAD 2016

TOTAL ACRES: 7

N

UNIT BOUNDARY

0 175 350 700

Feet

CLACKAMAS COUNTY

Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Div. 2016
Forestry Div., Dec. 5, 2016. S:\GIS\BCS_COUNTY_PARKS\Projects\Springwater Corridor



STONE CREEK GOLF COURSE 2016

TOTAL ACRES: 165

Taxlot Boundary

N

CLACKAMAS COUNTY

0 0.075 0.15 0.3

Miles

Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Div. 2016
Forestry Div., Dec. 5, 2016. S:\GIS\BCS_COUNTY_PARKS\Projects\Stone Creek GC

STAND ID	ACRES
WW001MP	4.49
WW001NM	7.39
WW002NM	10.05



WAGON WHEEL PARK 2016

TOTAL ACRES: 22

UNIT BOUNDARY

N

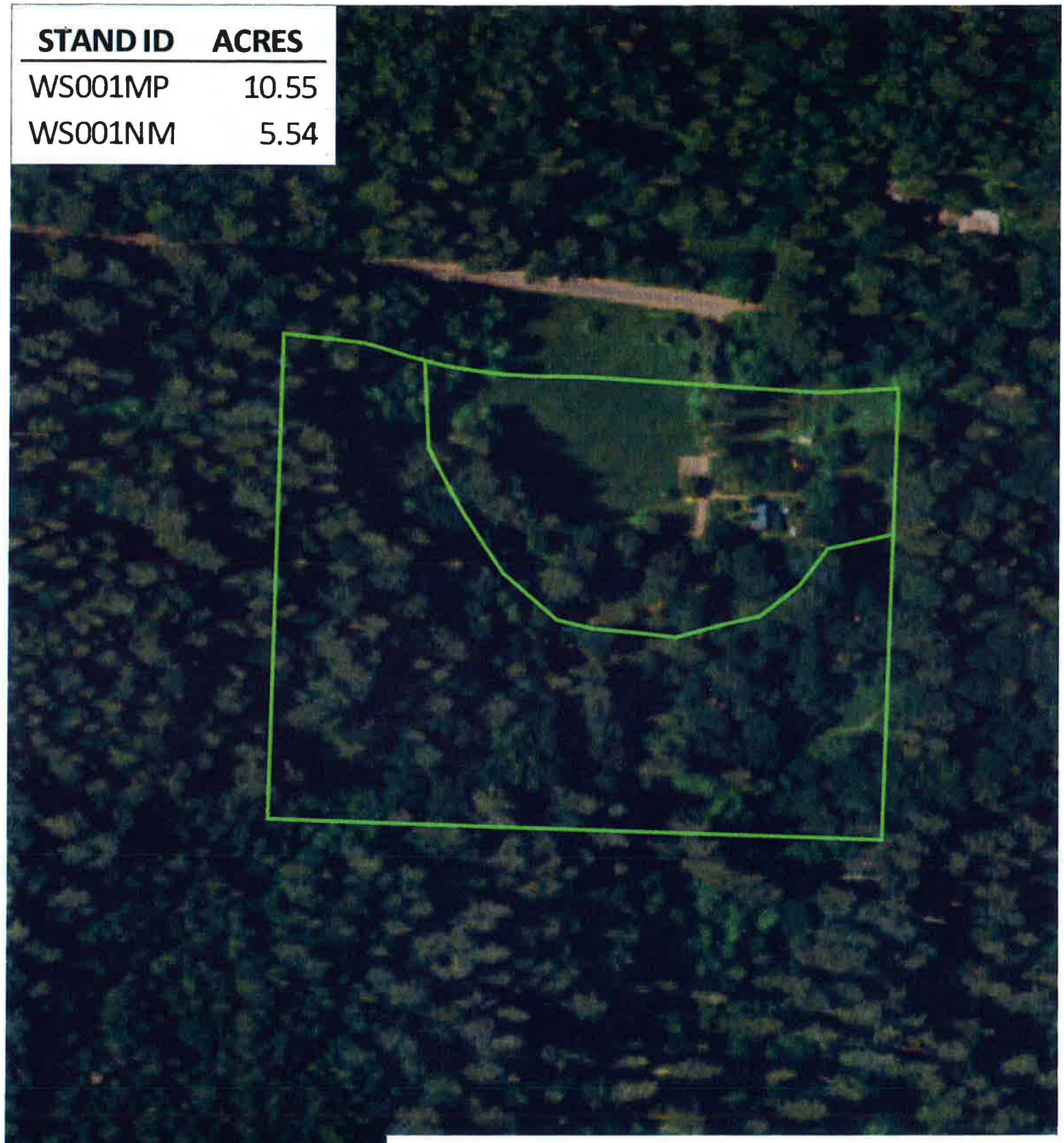
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Feet

CLACKAMAS COUNTY

Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Div. 2016
Forestry Div., Dec. 7, 2016. S:\GIS\BCS_COUNTY_PARKS\Projects\Carver Park

STAND ID	ACRES
WS001MP	10.55
WS001NM	5.54



WILHOIT SPRINGS 2016

TOTAL ACRES: 16

UNITY BOUNDARY

N

0 155 310 620

Feet

CLACKAMAS COUNTY

Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Div. 2016
Forestry Div., Dec. 5, 2016. S:\GIS\BCS_COUNTY_PARKS\Projects\Wilhoit Springs

CATEGORY

II



STAND ID	ACRES
CF00100	6.78
CF00200	3.66
CF000RD	0
CF000SB	0

CEDAR FLAT UNIT 2016

UNIT ACRES: 10.43

STAND BOUNDARY

N

0 225 450 900 Feet

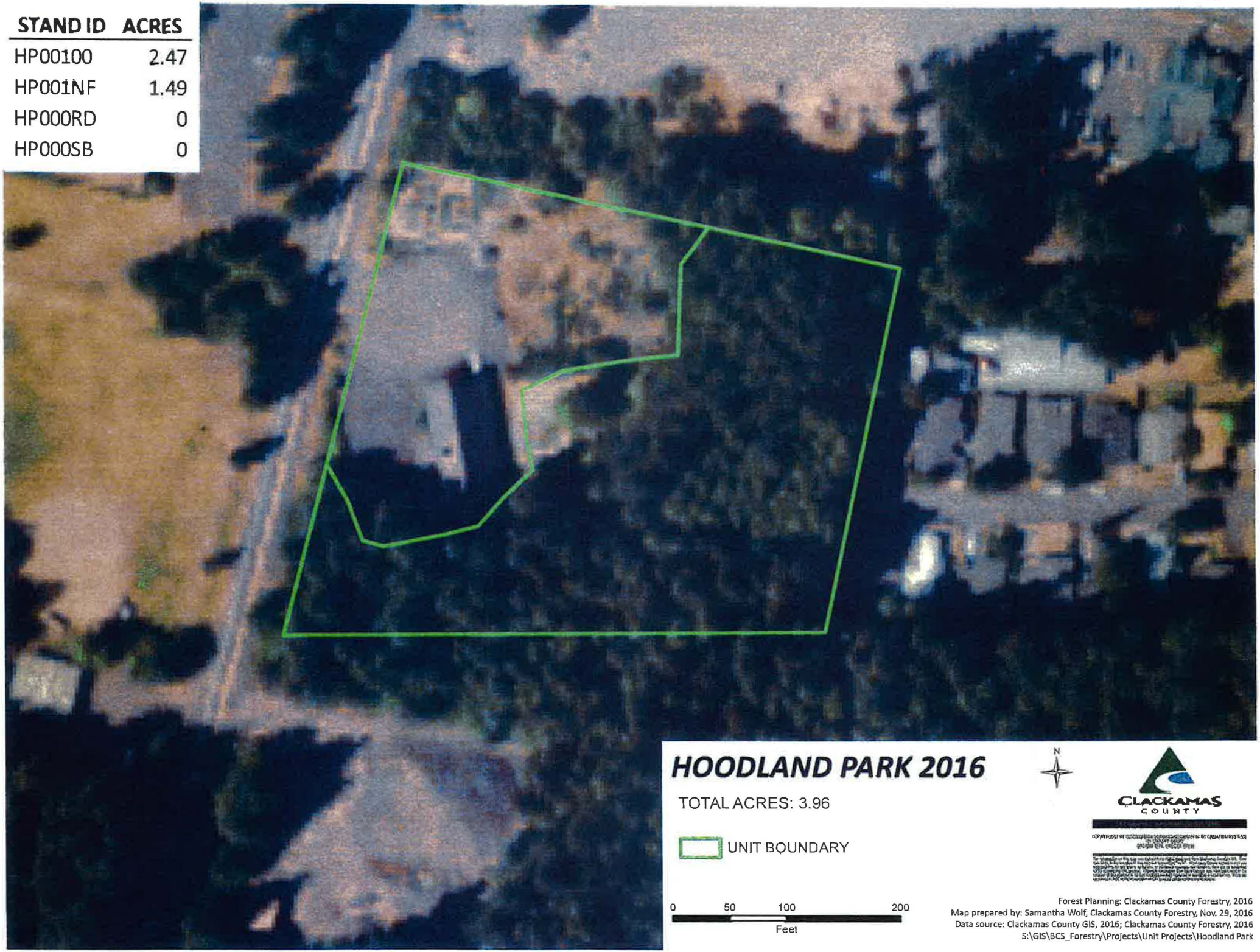
CLACKAMAS COUNTY

Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County Forestry Div., Nov. 22, 2016. S:\GIS\BCS_Forestry\Projects\Unit Projects\Cedar_flats\map images

2017 Clackamas County Inventory

Tract	Stand	Age	Acres	mbf/Acre	Accessible mbf Stand Volume	Douglas-fir Stand Volume	White Wood Stand Volume	Red Cedar Stand Volume	Hardwood Stand Volume	WL Area Volume	SB Area Volume
Cedar Flats	CF00010	70	6.80	9.12	58.32	26.48	31.83	-	-		
	CF00020	70	3.66	27.57	94.87	24.17	60.03	7.13	3.53		
			10.46		153.19	50.65	91.86	7.13	3.53	-	-

STAND ID	ACRES
HP00100	2.47
HP001NF	1.49
HP000RD	0
HP000SB	0



HOODLAND PARK 2016

TOTAL ACRES: 3.96

UNIT BOUNDARY

0 50 100 200

Feet

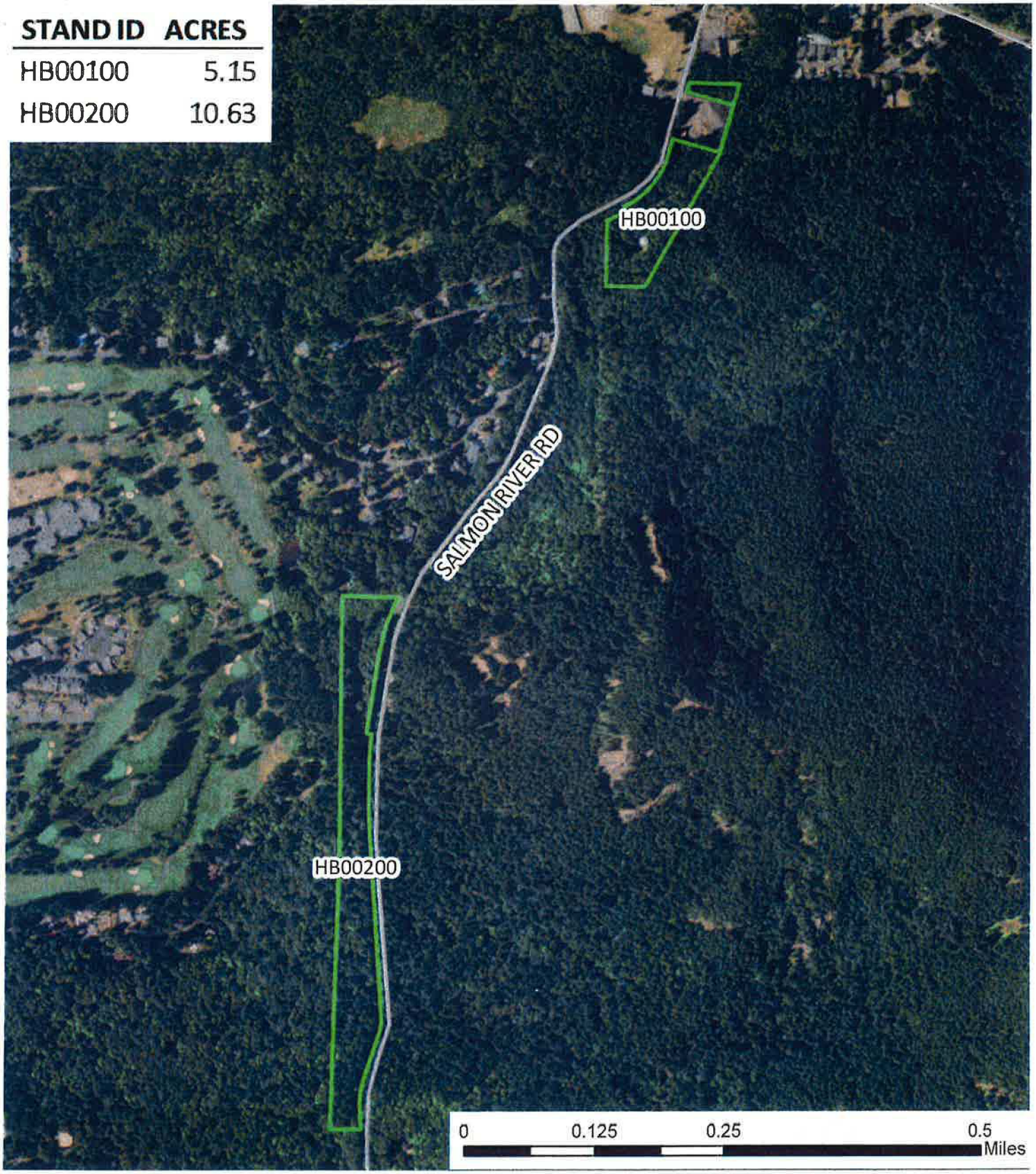
CLACKAMAS COUNTY

Forest Planning: Clackamas County Forestry, 2016
Map prepared by: Samantha Wolf, Clackamas County Forestry, Nov. 29, 2016
Data source: Clackamas County GIS, 2016; Clackamas County Forestry, 2016
S:\GIS\BCS_Forestry\Projects\Unit Projects\Hoodland Park

2017 Clackamas County Inventory

Tract	Stand	Age	Acres	mbf/Acre	Accessible mbf Stand Volume	Douglas-fir Stand Volume	White Wood Stand Volume	Red Cedar Stand Volume	Hardwood Stand Volume	WL Area Volume	SB Area Volume
Hoodland Park	HP00010	95	2.47	32.58	75.64	37.85	26.00	-	11.79		
	HP001NF		1.49								
			3.96		75.64	37.85	26.00	-	11.79	-	-

STAND ID	ACRES
HB00100	5.15
HB00200	10.63



HUNCHBACK UNIT 2016

N

TOTAL ACRES: 15.8

UNIT BOUNDARY SCENIC ROAD

CLACKAMAS COUNTY

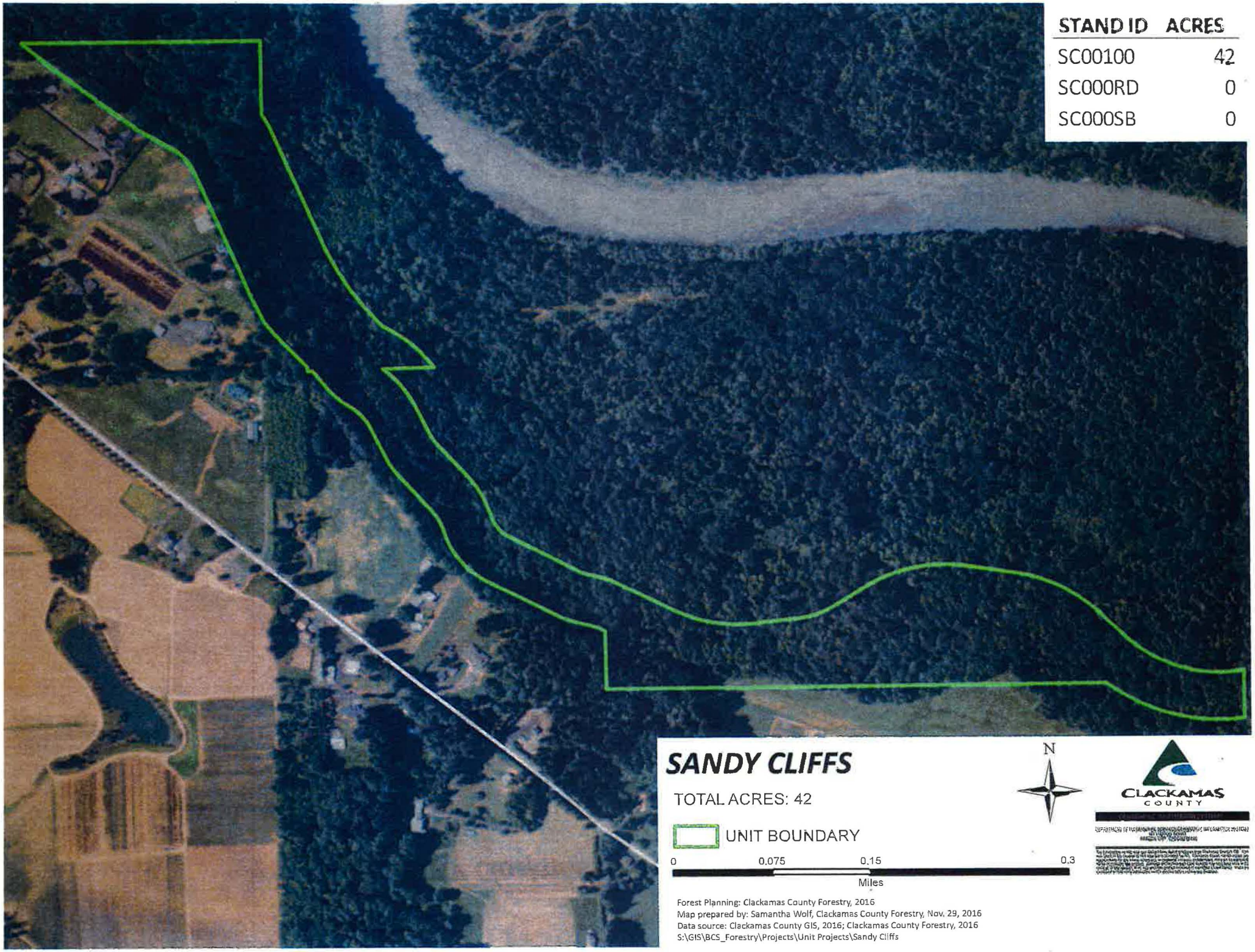
DEPARTMENT OF INFORMATION SERVICES GEOGRAPHIC INFORMATION SYSTEMS
121 LIBRARY COURT
OREGON CITY, OREGON 97045

"The information on this map was derived from digital databases from Clackamas County's GIS. Care was taken in the creation of this map but it provided "as is". Clackamas County cannot accept any responsibility for any errors, omissions, or positional accuracy in the data. There are no warranties which accompany this product. Although information from Land Surveys may have been used in the creation of this product, it is not a substitute product represented or constitute a Land Survey. Users are cautioned to field verify information on this product before making any decisions."

Forest Planning: Clackamas County Forestry Div., 2016
Prepared by Samantha Wolf, Clackamas County Forestry Div., Nov. 28th, 2016.
Data Source: Clackamas County GIS, 2016, Clackamas County Forestry Div., 2016.
S:\GIS\BCS_Forestry\Projects\Unit Projects\Hunchback

2017 Clackamas County Inventory

Tract	Stand	Age	Acres	mbf/Acre	Accessible mbf Stand Volume	Douglas-fir Stand Volume	White Wood Stand Volume	Red Cedar Stand Volume	Hardwood Stand Volume	WL Area Volume	SB Area Volume
Hunchback Leftovers	HL00010	95	5.15	33.54	162.37	94.74	23.03	29.77	14.84		
	HL00020	95	10.63	43.79	437.60	297.98	47.54	61.44	30.64		
			15.78		599.97	392.72	70.58	91.21	45.48	-	-



STAND ID	ACRES
SC00100	42
SC000RD	0
SC000SB	0

SANDY CLIFFS

TOTAL ACRES: 42

UNIT BOUNDARY

N

0 0.075 0.15 0.3

Miles

CLACKAMAS COUNTY

Forest Planning: Clackamas County Forestry, 2016
Map prepared by: Samantha Wolf, Clackamas County Forestry, Nov. 29, 2016
Data source: Clackamas County GIS, 2016; Clackamas County Forestry, 2016
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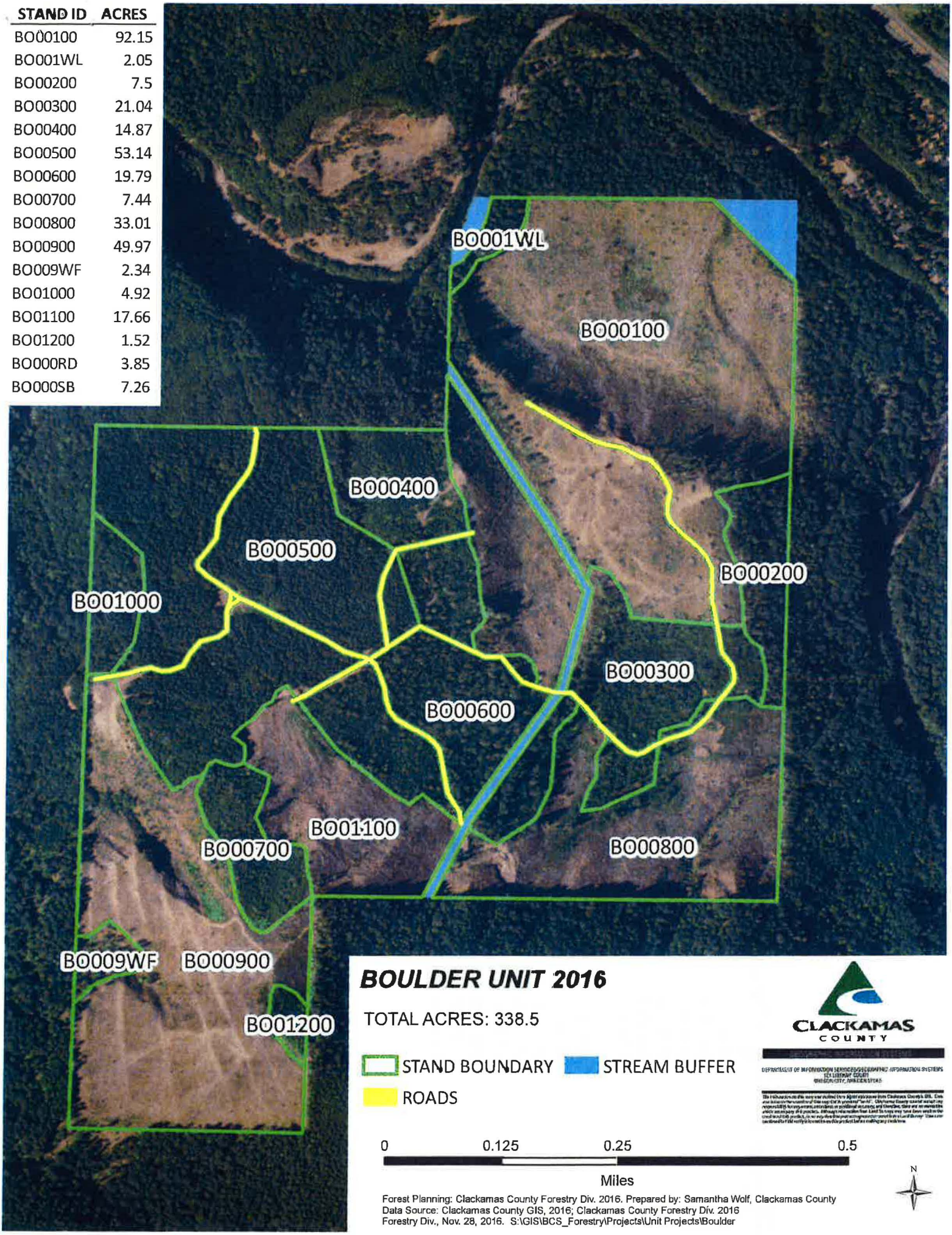
2017 Clackamas County Inventory

Tract	Stand	Age	Acres	mbf/Acre	Accessible mbf Stand Volume	Douglas-fir Stand Volume	White Wood Stand Volume	Red Cedar Stand Volume	Hardwood Stand Volume	WL Area Volume	SB Area Volume
Sandy Cliffs	SC00010	65	46.50	12.25	535.40	35.49	13.11	85.54	401.26		

CATEGORY

III

STAND ID	ACRES
BO00100	92.15
BO001WL	2.05
BO00200	7.5
BO00300	21.04
BO00400	14.87
BO00500	53.14
BO00600	19.79
BO00700	7.44
BO00800	33.01
BO00900	49.97
BO009WF	2.34
BO01000	4.92
BO01100	17.66
BO01200	1.52
BO000RD	3.85
BO000SB	7.26



BOULDER UNIT 2016

TOTAL ACRES: 338.5

STAND BOUNDARY STREAM BUFFER

ROADS

CLACKAMAS COUNTY

DEPARTMENT OF INFORMATION SERVICES/GEOGRAPHIC INFORMATION SYSTEMS
121 LIBRARY COURT
OREGON CITY, OREGON 97045

0 0.125 0.25 0.5

Miles

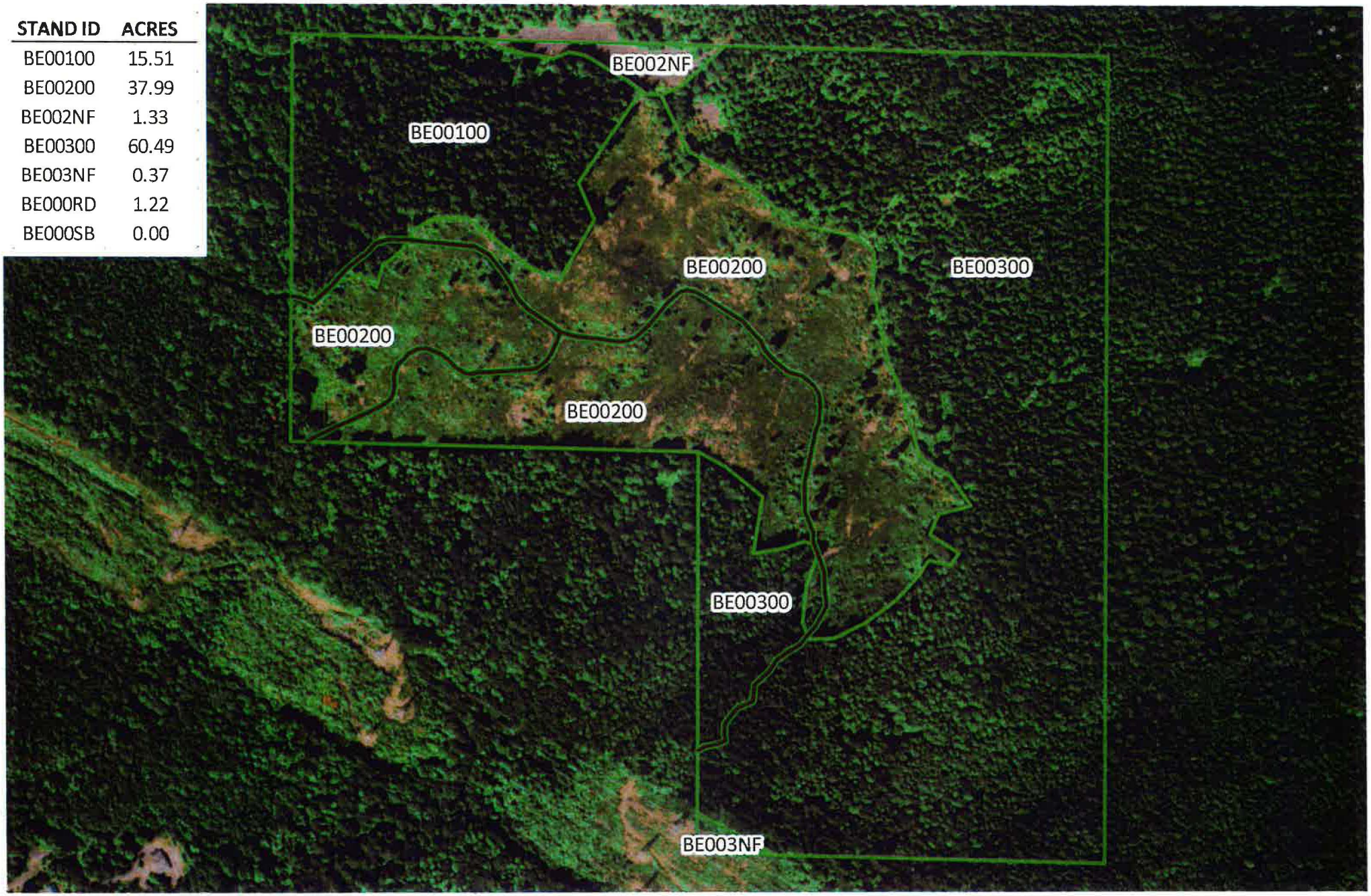
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Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Div. 2016
Forestry Div., Nov. 28, 2016. S:\GIS\BCS_Forestry\Projects\Unit Projects\Boulder

2017 Clackamas County Inventory

Tract	Stand	Age	Acres	mbf/Acre	Accessible mbf Stand Volume	Douglas-fir Stand Volume	White Wood Stand Volume	Red Cedar Stand Volume	Hardwood Stand Volume	WL Area Volume	SB Area Volume
Boulder	BO00010	0	86.14	-	-	-	-	-	-		
	BO00020	90	11.11	17.69	184.69	137.15	1.26	1.21	45.07		
	BO00030	10	20.49	-	-	-	-	-	-		
	BO00040	10	13.41	-	-	-	-	-	-		
	BO00050	31	51.32	17.73	855.26	469.43	317.18	12.49	56.10		
	BO00060	10	19.65	-	-	-	-	-	-		
	BO00070	12	10.12	-	-	-	-	-	-		
	BO00080	0	32.99	-	-	-	-	-	-		
	BO00090	1	47.52	-	-	-	-	-	-		
	BO00100	75	4.76	23.99	107.33	-	96.92	10.46	-		
	BO00110	0	18.95	-	-	-	-	-	-		
	BO00120	12	1.40	-	-	-	-	-	-		
	BO001WL	90	6.80	38.00						242.90	
	BO009WL	100	2.83	50.00						133.01	
	BO000RD		3.83								
	BO000SB	95	7.20	30.00							203.04
			338.52		1,147.28	606.58	415.36	24.17	101.18	375.91	203.04

STAND ID	ACRES
BE00100	15.51
BE00200	37.99
BE002NF	1.33
BE00300	60.49
BE003NF	0.37
BE000RD	1.22
BE000SB	0.00



BRIGHTWOOD EAST UNIT 2016

STAND BOUNDARY ROADS

N

TOTAL ACRES: 116.9

0 400 800 1,600 Feet

Forest planning: Clackamas County Forest, 2016
Prepared by: Samantha Wolf, Clackamas County Forestry, Sept. 27, 2016
Data source: Clackamas County GIS, Clackamas County.Forest 2016
S:\GIS\BCS_Forestry\Projects\Unit Projects\Brightwood East\map images

CLACKAMAS COUNTY

2017 Clackamas County Inventory

Tract	Stand	Age	Acres	mbf/Acre	Accessible mbf Stand Volume	Douglas-fir Stand Volume	White Wood Stand Volume	Red Cedar Stand Volume	Hardwood Stand Volume	WL Area Volume	SB Area Volume
Brightwood East	BE00010	58	15.51	47.41	691.22	652.34	8.89	27.26	29.99		
	BE00020	6	37.99	-	-	-	-	-	-		
	BE00030	50	60.49	23.93	1,360.62	883.22	200.77	7.45	269.18		
	BE002NF		1.33	-							
	BE003NF		0.37	-							
	BE000RD		1.22	-							
			116.91		2,051.84	1,535.56	209.67	34.71	299.17	-	-

STAND ID	ACRES
BP00100	5.18
BP001NF	7.76
BP000SB	1.15



BRIGHTWOOD PIT UNIT 2016

TOTAL ACRES: 14.08

STAND BOUNDARY

STREAM BUFFER

N

CLACKAMAS COUNTY

DEPARTMENT OF INFORMATION SERVICES/GEOSPATIAL INFORMATION SYSTEMS
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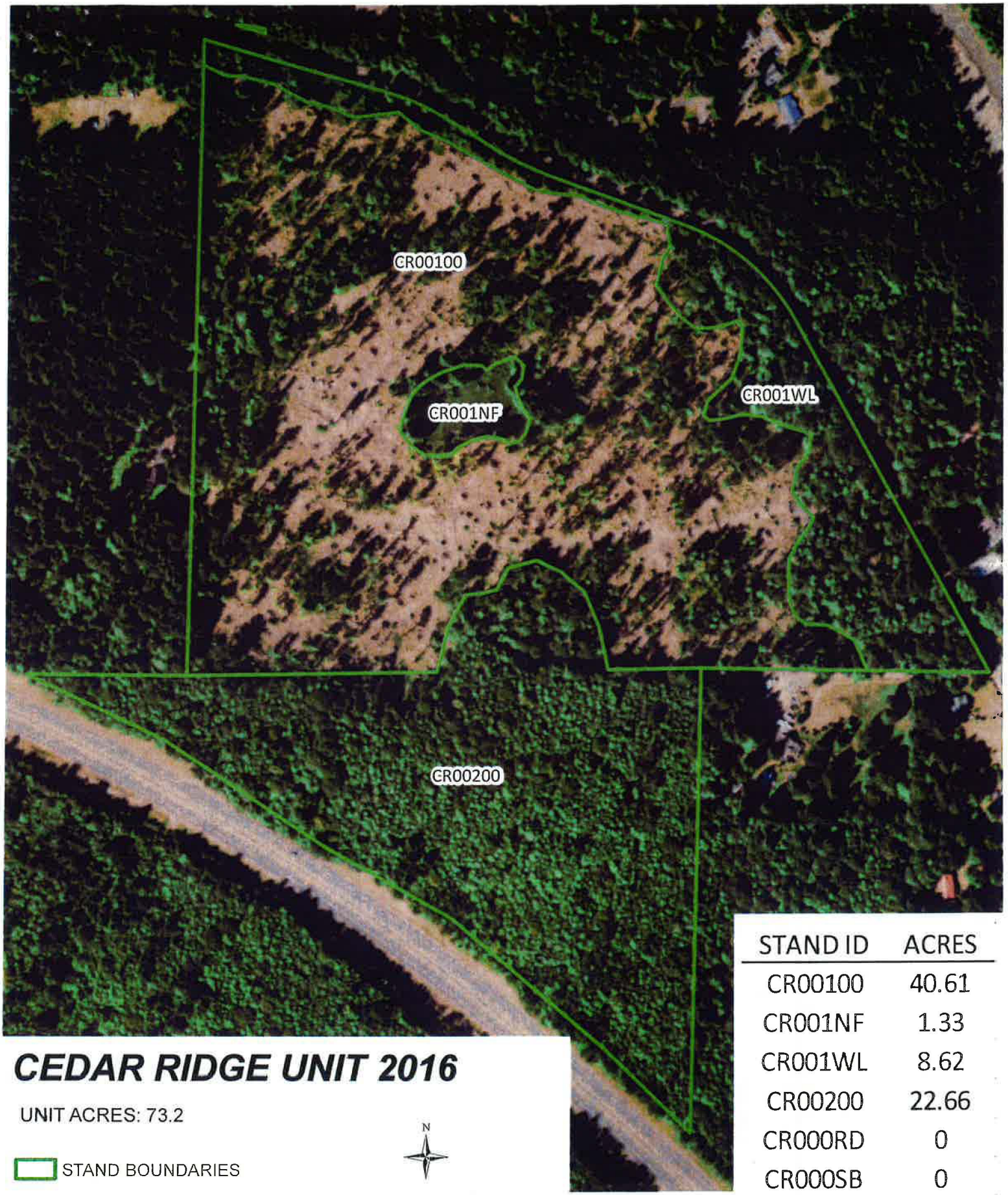
Forest Planning: Clackamas County Forestry Divison, 2016
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry Divison, 2016.
Map prepared by: Samantha Wolf, Clackamas County Forestry, Nov. 30, 2016.
S:\GIS\BCS_Forestry\Projects\Unit Projects\Brightwood Pit

0 250 500

Feet

2017 Clackamas County Inventory

Tract	Stand	Age	Acres	mbf/Acre	Accessible mbf Stand Volume	Douglas-fir Stand Volume	White Wood Stand Volume	Red Cedar Stand Volume	Hardwood Stand Volume	WL Area Volume	SB Area Volume
Brightwood Pit	BP00010	27	5.18	3.96	19.27	-	-	-	-		
	BP000NF		7.76	-							
	BP000RD		-	-							
	BP000SB	57	1.15	27.51							29.74
			14.09		19.27	-	-	-	-	-	29.74



CEDAR RIDGE UNIT 2016

UNIT ACRES: 73.2

STAND BOUNDARIES

N

0 250 500 1,000 Feet

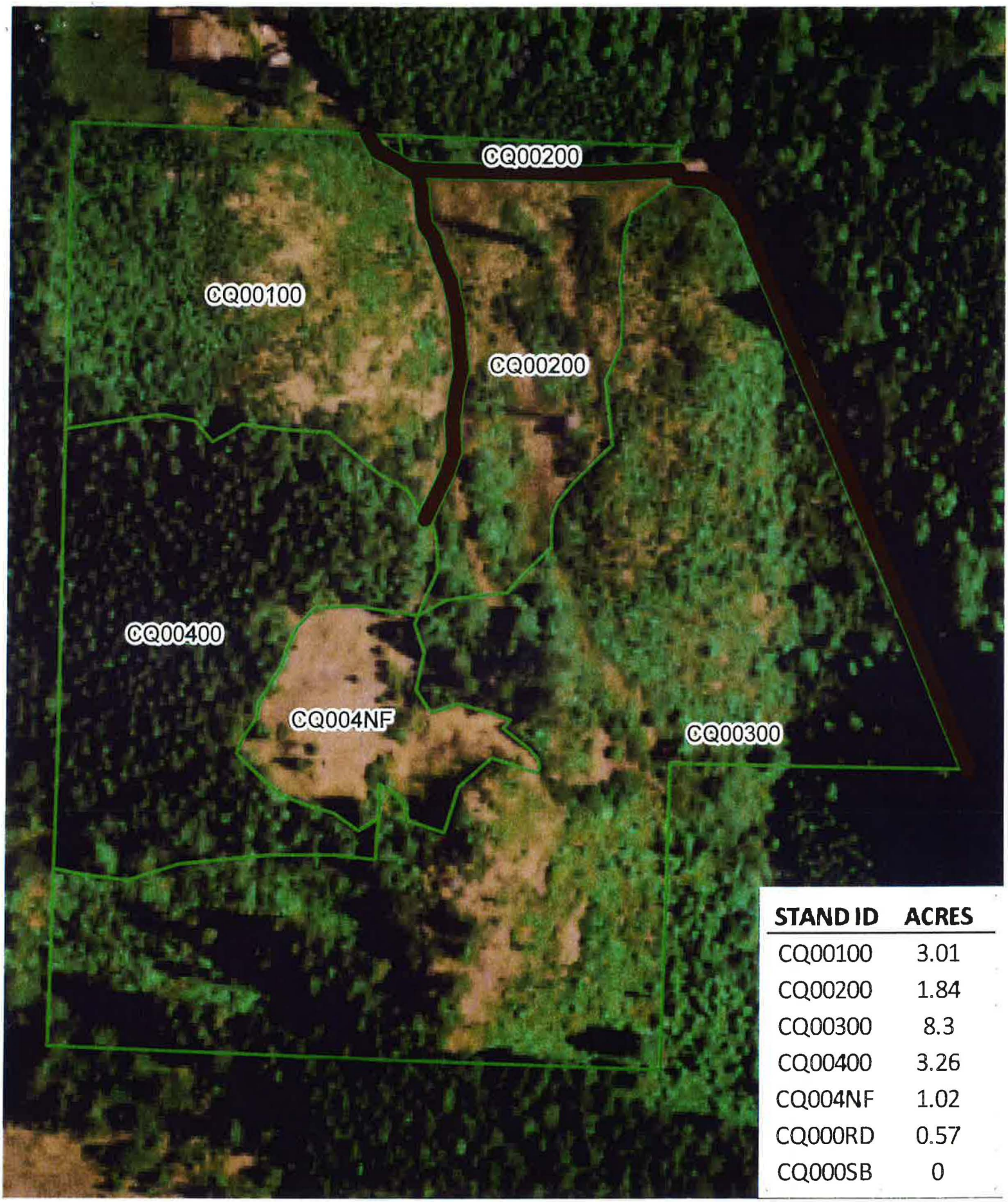
STAND ID	ACRES
CR00100	40.61
CR001NF	1.33
CR001WL	8.62
CR00200	22.66
CR000RD	0
CR000SB	0

CLACKAMAS COUNTY

Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County Forestry Div., Sept. 12, 2016. S:\GIS\BCS_Forestry\Projects\Unit Projects\Cedar Ridge\Map images

2017 Clackamas County Inventory

Tract	Stand	Age	Acres	mbf/Acre	Accessible mbf Stand Volume	Douglas-fir Stand Volume	White Wood Stand Volume	Red Cedar Stand Volume	Hardwood Stand Volume	WL Area Volume	SB Area Volume
Cedar Ridge	CR00010	2	40.61		-	-	-	-	-		
	CR00020	25	22.66	7.57	161.24	-	-	-	-		
	CR001NF		1.33		-						
	CR001WL	83	8.62	39.50						320.06	
	CR000RD		-								
			73.22		161.24	-	-	-	-	320.06	-



STAND ID	ACRES
CQ00100	3.01
CQ00200	1.84
CQ00300	8.3
CQ00400	3.26
CQ004NF	1.02
CQ000RD	0.57
CQ000SB	0

CLACKAMAS QUARRY UNIT 2016

ROADS STAND BOUNDARY

N

TOTAL ACRES: 18

0 100 200 400 Feet

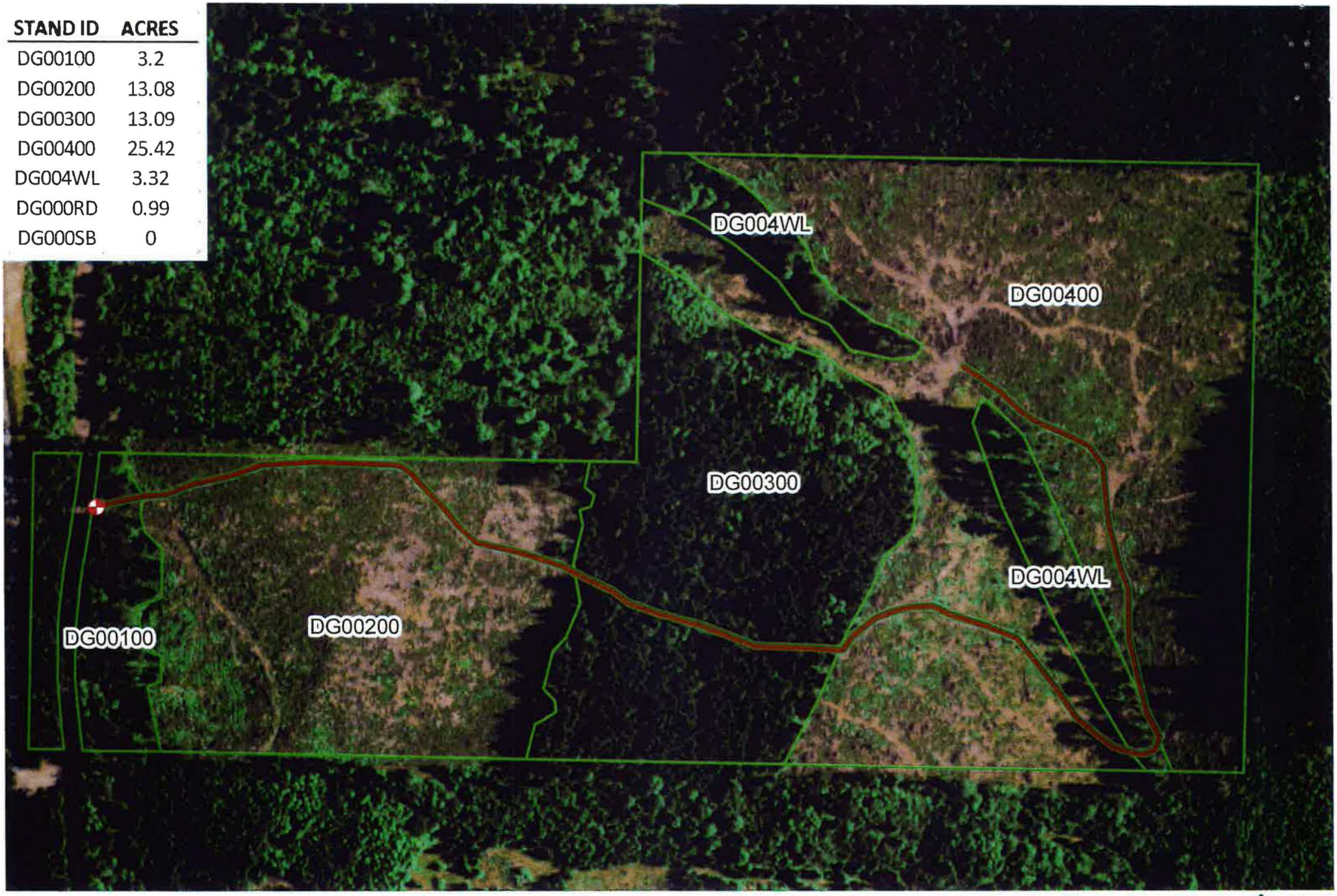
Forest Planning: Clackamas County Forestry, 2016 Prepared by Samantha Wolf, Sep. 12, 2016
Data Source: Clackamas County GIS (2014), Clackamas County Forestry (2016)
S:\GIS\BCS_Forestry\Projects\Unit Projects\Clackamas_quarry\map images

CLACKAMAS COUNTY

2017 Clackamas County Inventory

Tract	Stand	Age	Acres	mbf/Acre	Accessible mbf Stand Volume	Douglas-fir Stand Volume	White Wood Stand Volume	Red Cedar Stand Volume	Hardwood Stand Volume	WL Area Volume	SB Area Volume
Clackamas Quarry	CQ00010	9	3.01	-	-	-	-	-	-		
	CQ00020	9	1.84	-	-	-	-	-	-		
	CQ00030	9	8.30	-	-	-	-	-	-		
	CQ00040	25	3.26	8.72	26.72	26.72	-	-	-		
	CQ002NF		1.02								
	CQ000RD		0.57								
			18.00		26.72	26.72	-	-	-	-	-

STAND ID	ACRES
DG00100	3.2
DG00200	13.08
DG00300	13.09
DG00400	25.42
DG004WL	3.32
DG000RD	0.99
DG000SB	0



DHOOGHE STAND MAP 2016

GATES
ROADS
STAND BOUNDARY

N

TOTAL ACRES: 59.09

0 500 1,000 Feet

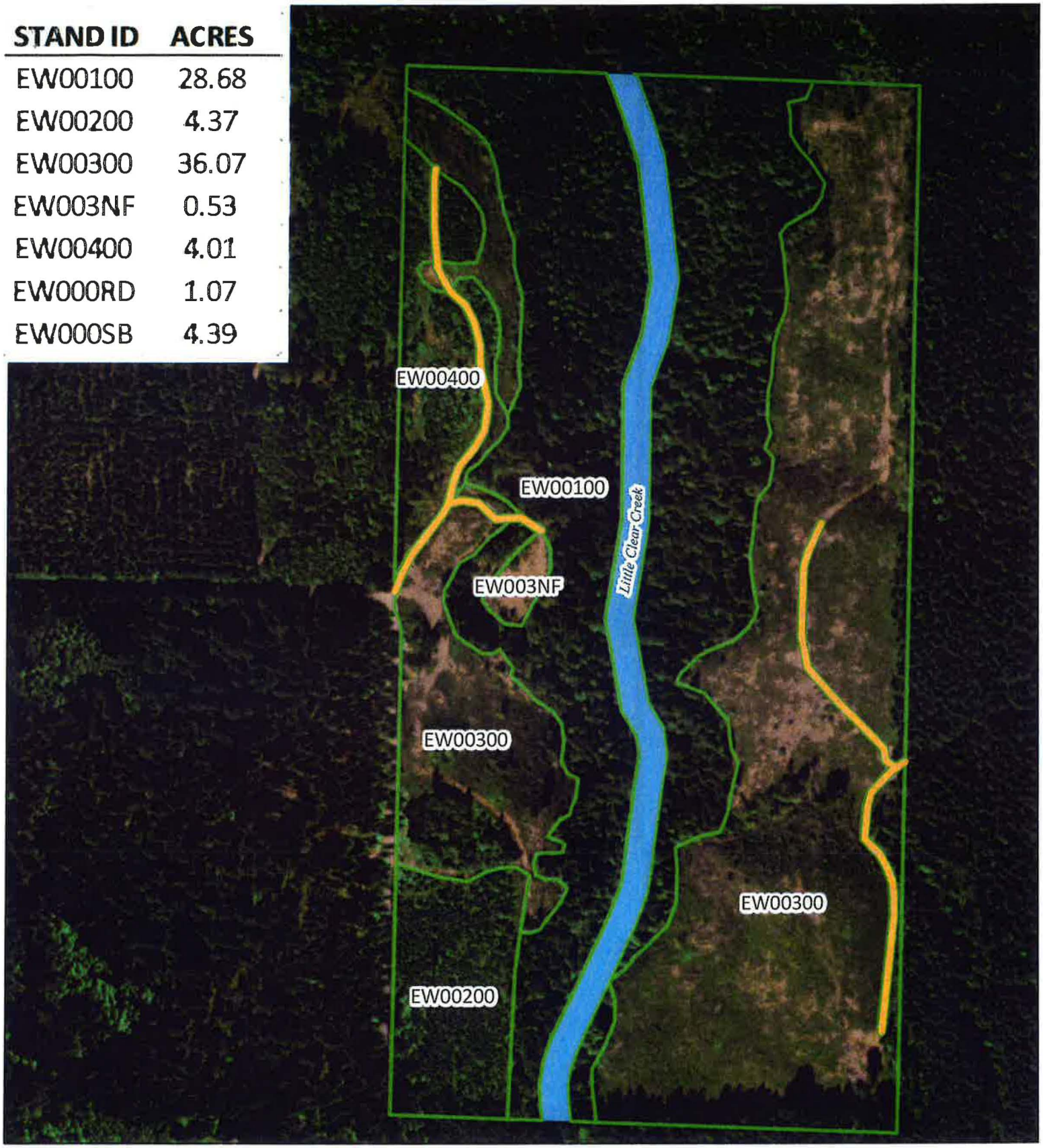
Forest planning: Clackamas County Foresry, 2016
Map prepared by: Samantha Wolf, Clackamas County Forestry, Sept. 26, 2016
S:\GIS\BCS_Forestry\Projects\Unit Projects\Dooghie

CLACKAMAS COUNTY

2017 Clackamas County Inventory

Tract	Stand	Age	Acres	mbf/Acre	Accessible mbf Stand Volume	Douglas-fir Stand Volume	White Wood Stand Volume	Red Cedar Stand Volume	Hardwood Stand Volume	WL Area Volume	SB Area Volume
Dooghie	DG00010	65	3.20	18.99	57.12	53.76	-	-	3.36		
	DG00020	1	13.08	-	-	-	-	-	-		
	DG00030	35	13.09	5.43	66.83	49.40	5.18	3.05	9.19		
	DG00040	1	25.42	-	-	-	-	-	-		
	DG004WL	65	3.32	18.99						59.26	
	DG000RD		0.99	-							
			59.10		123.95	103.16	5.18	3.05	12.55	59.26	-

STAND ID	ACRES
EW00100	28.68
EW00200	4.37
EW00300	36.07
EW003NF	0.53
EW00400	4.01
EW000RD	1.07
EW000SB	4.39



ELWOOD UNIT 2016

TOTAL ACRES: 79.1

STAND BOUNDARY
STREAM BUFFER
ROADS

0 250 500 1,000 Feet

N

CLACKAMAS COUNTY

GEOGRAPHIC INFORMATION SYSTEMS

DEPARTMENT OF INFORMATION SERVICES/GEOGRAPHIC INFORMATION SYSTEMS
121 LIBRARY COURT
OREGON CITY, OREGON 97045

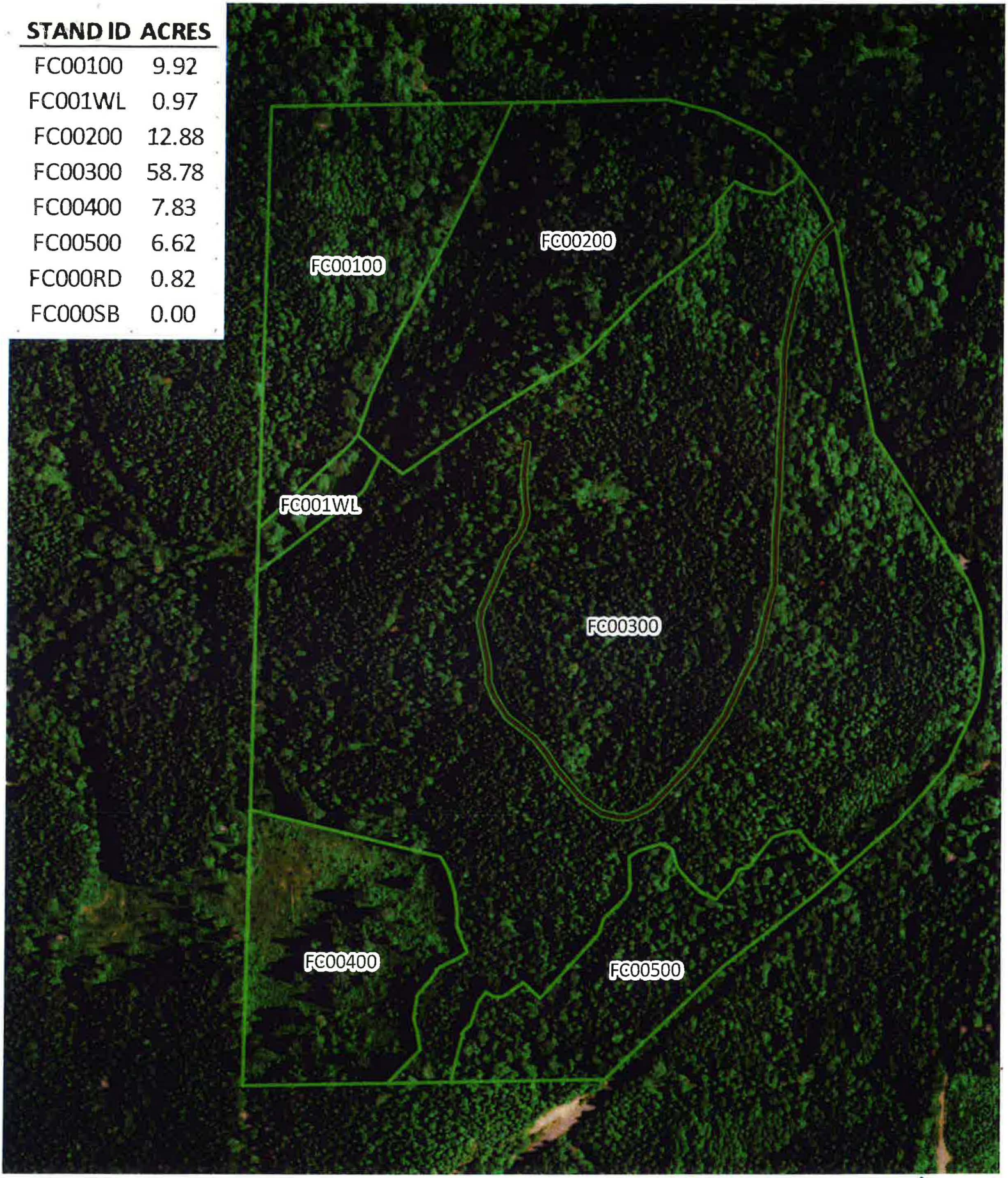
The information on this map was derived from digital databases from Clackamas County's GIS. Care was taken in the creation of this map but is provided "as is". Clackamas County cannot accept any responsibility for any errors, omissions, or positional accuracy, and therefore, there are no warranties which accompany this product. Although information from Land Surveys may have been used in the creation of this product, in no way does this product represent or constitute a Land Survey. Users are cautioned to field verify information on this product before making any decisions.

Forest Planning: Clackamas County Forestry Div., 2016 Prepared by: Samantha Wolf, Clackamas County Forestry Div., Sept. 21, 2016
Data Source: Clackamas County GIS Dept., 2014 S:\GIS\BCS_Forestry\Projects\Unit Projects\Elwood

2017 Clackamas County Inventory

Tract	Stand	Age	Acres	mbf/Acre	Accessible mbf Stand Volume	Douglas-fir Stand Volume	White Wood Stand Volume	Red Cedar Stand Volume	Hardwood Stand Volume	WL Area Volume	SB Area Volume
Elwood Quarry	EQ00010	54	28.68	11.23	302.86	166.31	-	44.91	91.63		
	EQ00020	14	4.37	-	-	-	-	-	-		
	EQ00030	2	36.07		-	-	-	-	-		
	EQ00040	14	4.01		-	-	-	-	-		
	EQ003WL									-	
	EQ003NF	0	0.53								
	EQ000RD	0	1.07								
	EQ000SB	55	4.39	24.30							100.28
			79.12		302.86	166.31	-	44.91	91.63	-	100.28

STAND ID	ACRES
FC00100	9.92
FC001WL	0.97
FC00200	12.88
FC00300	58.78
FC00400	7.83
FC00500	6.62
FC000RD	0.82
FC000SB	0.00



FAMILY CAMP UNIT 2016

ROADS STAND BOUNDARY

0 250 500 1,000 Feet

N

TOTAL ACRES: 97.8

CLACKAMAS COUNTY

DEPARTMENT OF INFORMATION SERVICES/GEOGRAPHIC INFORMATION SYSTEM
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OREGON CITY, OREGON 97045

Forest Planning: Clackamas County Forestry, 2016
Map prepared by: Samantha Wolf, Clackamas County Forestry, Sept. 27, 2016
Data Sources: Clackamas County GIS (2014); Clackamas County Forestry (2016)
S:\GIS\BCS_Forestry\Projects\Unit Projects\Family Camp\map images

2017 Clackamas County Inventory

Tract	Stand	Age	Acres	mbf/Acre	Accessible mbf Stand Volume	Douglas-fir Stand Volume	White Wood Stand Volume	Red Cedar Stand Volume	Hardwood Stand Volume	WL Area Volume	SB Area Volume
Family Camp	FC00010	33	9.92	17.17	160.11	75.06	3.79	-	81.27		
	FC00020	41	12.88	30.77	372.50	300.60	30.24	-	41.67		
	FC00030	33	58.78	5.10	281.85	263.89	-	-	17.96		
	FC00040	5	7.83	-	-	-	-	-	-		
	FC00050	41	6.62	19.84	123.44	123.44	-	-	-		
	FC001WL	33	0.97	9.54						8.70	
	FC000RD		0.82	-							
			97.82		937.89	762.98	34.03	-	140.90	8.70	-

STAND ID	ACRES
FQ00100	16.59
FQ001NF	3.19
FQ00200	15.18
FQ002NF	2.25
FQ00300	8.04
FQ003NF	12.18
FQ00400	6.68
FQ00500	4.05
FQ000RD	0.76
FQ000SB	0



FERNWOOD QUARRY STAND MAP

TOTAL ACRES: 68.9

STAND BOUNDARY
ROADS

0 250 500 1,000
Feet

N
W E
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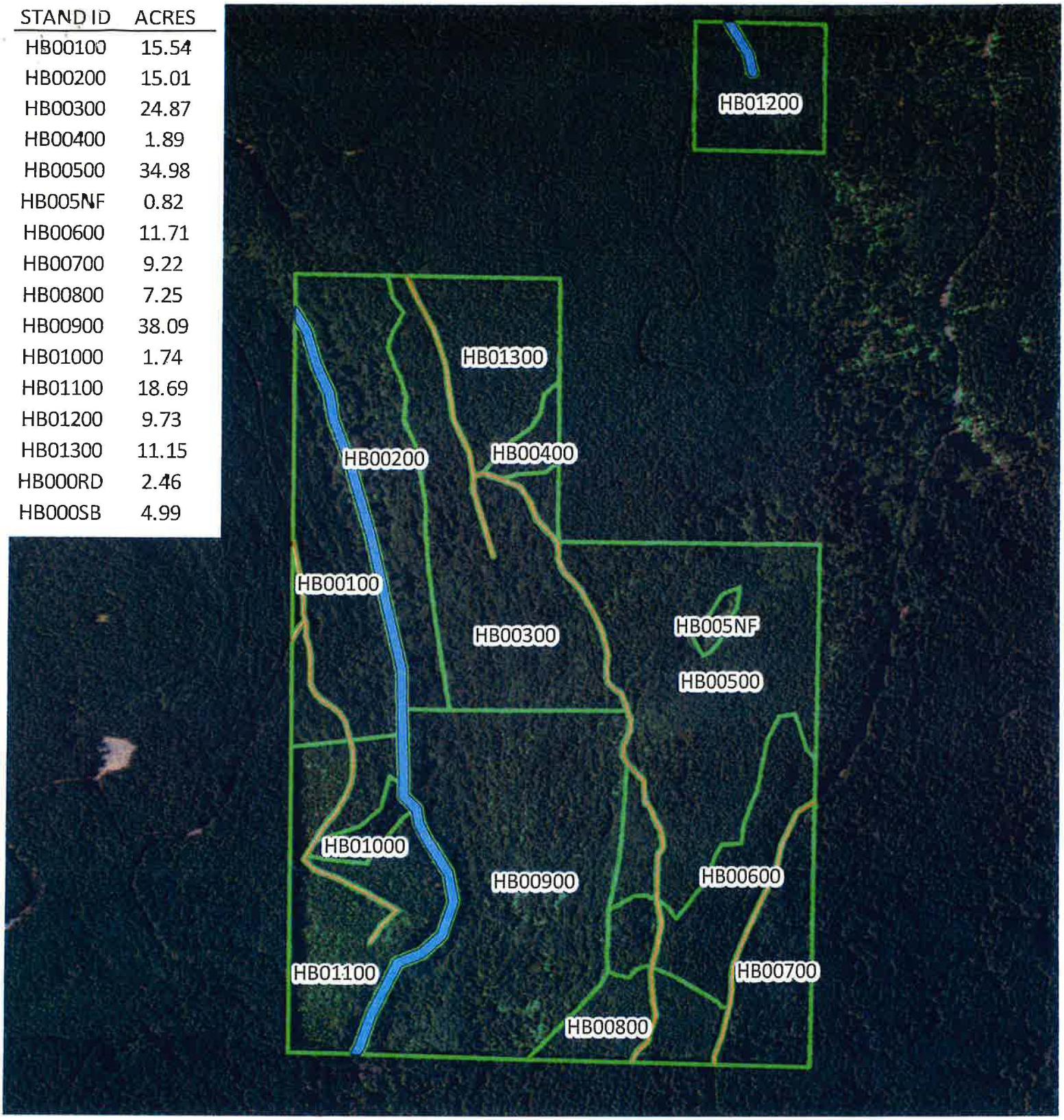
CLACKAMAS COUNTY

Forest Planning: Clackamas County Forestry, 2016 Prepared by Samantha Wolf, Nov. 17, 2016
Data Source: Clackamas County GIS, 2016. S:\GIS\BCS_Forestry\Projects\Unit Projects\Fernwood Quarry

2017 Clackamas County Inventory

Tract	Stand	Age	Acres	mbf/Acre	Accessible mbf Stand Volume	Douglas-fir Stand Volume	White Wood Stand Volume	Red Cedar Stand Volume	Hardwood Stand Volume	WL Area Volume	SB Area Volume
Fernwood Quarry	FQ00010	14	16.72	-	-	-	-	-	-		
	FQ00020	42	15.33	12.27	176.74	176.74	-	-	-		
	FQ00030	42	8.04	18.33	138.49	133.71	-	2.35	2.43		
	FQ00040	0	6.68	-	-	-	-	-	-		
	FQ00050	42	4.28	8.50	34.20	25.15	-	-	9.05		
	FQ001NF	0	3.19	-							
	FQ002NF		2.29	-							
	FQ003NF		12.38	-							
	FQ000RD		0.76	-							
			69.67		349.43	335.60	-	2.35	11.49	-	-

STAND ID	ACRES
HB00100	15.54
HB00200	15.01
HB00300	24.87
HB00400	1.89
HB00500	34.98
HB005NF	0.82
HB00600	11.71
HB00700	9.22
HB00800	7.25
HB00900	38.09
HB01000	1.74
HB01100	18.69
HB01200	9.73
HB01300	11.15
HB000RD	2.46
HB000SB	4.99



HILLOCK BURN UNIT 2016

TOTAL ACRES: 208.1

0 0.125 0.25 0.5
Miles

N

UNIT BOUNDARY STREAM BUFFER ROADS

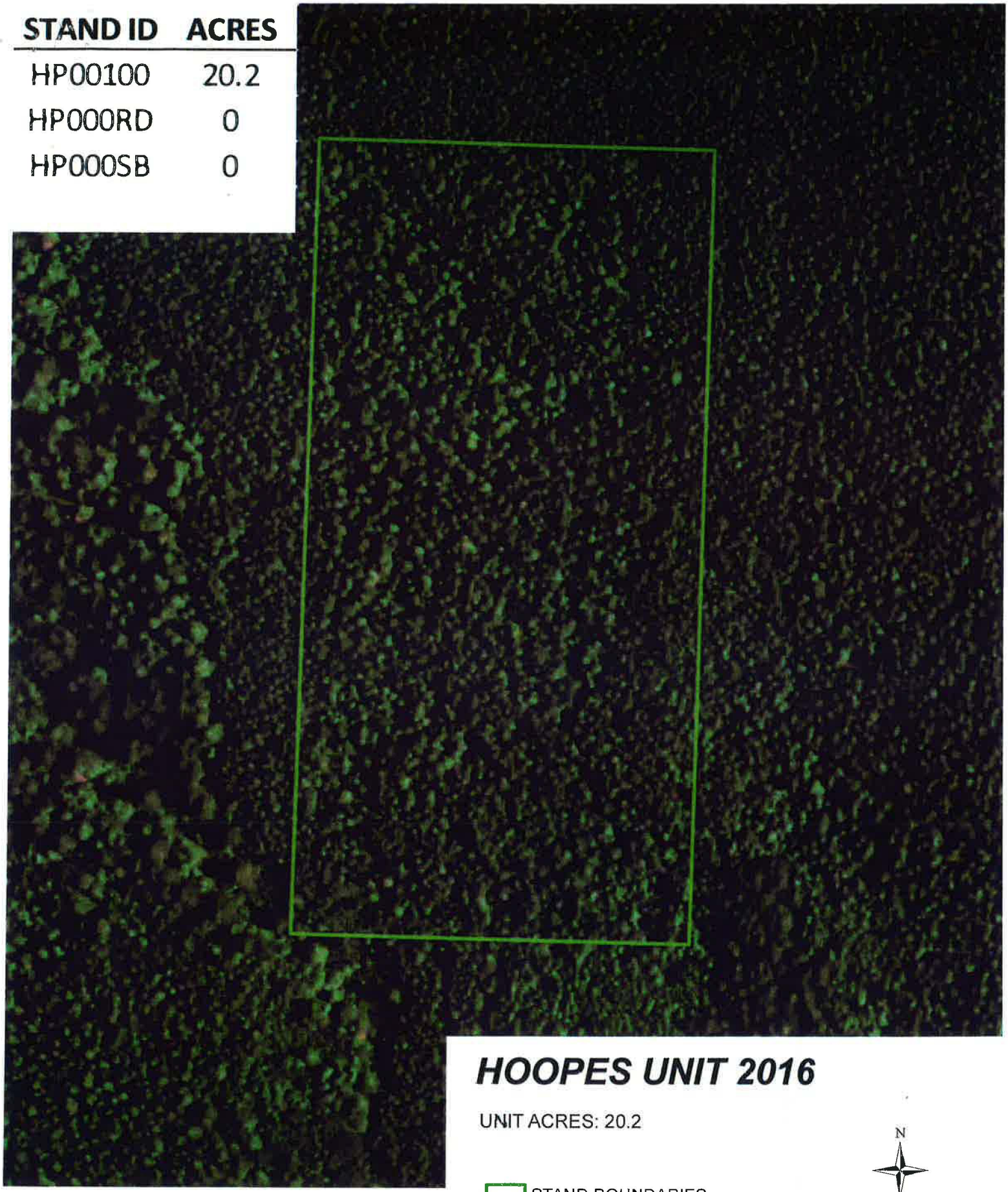
CLACKAMAS COUNTY

Forest Planning: Clackamas County Forestry, 2016
Map prepared by: Samantha Wolf, Clackamas Forestry Dept. Nov. 29, 2016.
Data Source: Clackamas County GIS, 2016; Clackamas County Forestry, 2016.
S:\GIS\BCS_Forestry\Projects\Unit Projects\Hillock Burn

2017 Clackamas County Inventory

Tract	Stand	Age	Acres	mbf/Acre	Accessible mbf Stand Volume	Douglas-fir Stand Volume	White Wood Stand Volume	Red Cedar Stand Volume	Hardwood Stand Volume	WL Area Volume	SB Area Volume
Hillock Burn	HB00010	22	15.54	2.97	43.40	28.69	11.22	-	3.49		
	HB00020	54	15.01	8.44	119.04	36.06	54.63	21.90	6.45		
	HB00030	29	24.87	8.19	191.37	108.92	71.93	9.26	1.26		
	HB00040	59	1.89	54.98	97.68	21.05	64.43	12.19	-		
	HB00050	25	34.99	6.56	215.76	163.93	44.90	-	6.94		
	HB00060	27	11.71	24.09	265.20	115.35	143.00	-	6.86		
	HB00070	27	9.22	19.95	172.86	118.76	42.81	-	11.28		
	HB00080	25	7.25	7.66	52.22	41.74	9.86	-	0.62		
	HB00090	25	38.09	4.27	152.78	67.74	78.66	2.33	4.08		
	HB00100	79	1.74	58.95	96.41	66.55	29.86	-	-		
	HB00110	13	18.69	-	-	-	-	-	-		
	HB00120	81	9.73	24.07	220.18	42.25	119.50	-	58.43		
	HB00130	27	11.15	8.18	85.75	77.53	3.26	-	4.96		
	HB005NF		0.82	-							
	HB000RD		2.46	-							
	HB000SB	81	4.99	34.52							161.92
			208.15		1,712.64	888.56	674.06	45.68	104.37	-	161.92

STAND ID	ACRES
HP00100	20.2
HP000RD	0
HP000SB	0



HOOPES UNIT 2016

UNIT ACRES: 20.2

N

STAND BOUNDARIES

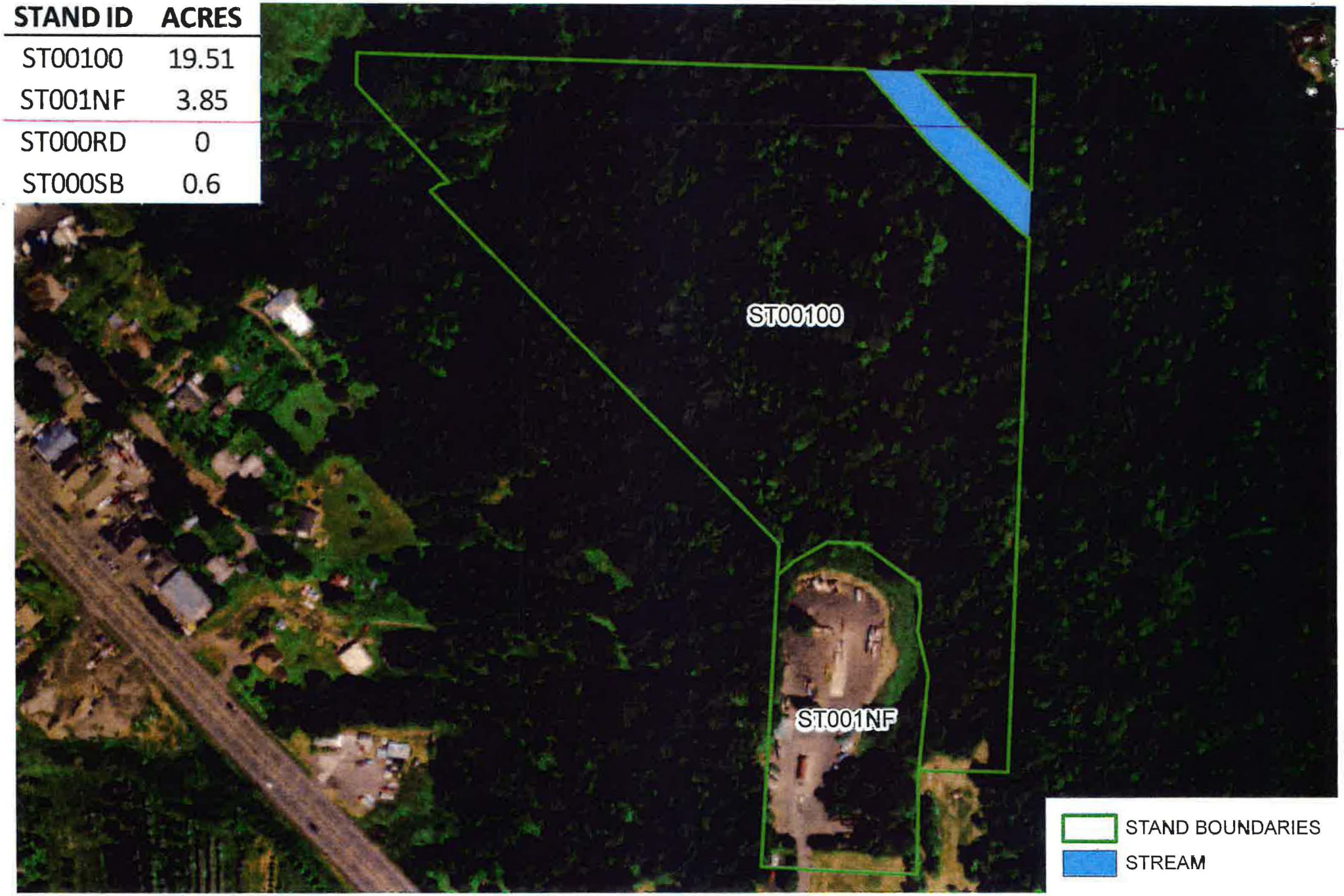
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Forest Planning: Clackamas County Forestry Div. 2016. Prepared by: Samantha Wolf, Clackamas County Forestry Div., Sept. 12, 2016. S:\GIS\BCS_Forestry\Projects\Unit Projects\Hoops\Map images

2017 Clackamas County Inventory

Tract	Stand	Age	Acres	mbf/Acre	Accessible mbf Stand Volume	Douglas-fir Stand Volume	White Wood Stand Volume	Red Cedar Stand Volume	Hardwood Stand Volume	WL Area Volume	SB Area Volume
Hoopes	HO00010	31	20.20	11.50	218.29	200.49	17.79	-	-		

STAND ID	ACRES
ST00100	19.51
ST001NF	3.85
ST000RD	0
ST000SB	0.6



SANDY TRANSFER

TOTAL ACRES: 23.96

0 200 400 800 Feet

N
W E
S

CLACKAMAS COUNTY

Forest Planning: Clackamas County Forestry, 2016 Prepared by Samantha Wolf, Oct. 11, 2016
Data Source: Clackamas County GIS, 2016
S:\GIS\BCS_Forestry\Projects\Unit Projects\Sandy Transfer

2017 Clackamas County Inventory

Tract	Stand	Age	Acres	mbf/Acre	Accessible mbf Stand Volume	Douglas-fir Stand Volume	White Wood Stand Volume	Red Cedar Stand Volume	Hardwood Stand Volume	WL Area Volume	SB Area Volume
Sandy Transfer	ST00010	65	19.51	34.42	631.17	233.53	69.76	105.95	221.94		
	ST001NF		3.85	-							
	ST000SB	65	0.64	15.00							9.02
			24.00		631.17	233.53	69.76	105.95	221.94	-	9.02


WC00200
WC002WL
WC00100
WC003WL
WC00400
WC00500
WC00300
WC05500
WC00600
WC01600
WC03400
WC00700
WC00800
WC00900
WC01000
WC01500
WC03500
WC01400
WC03300
WC01300
WC02000
WC03200
WC020WL
WC03600
WC03800
WC03000
WC03700
WC03100
WC05000
WC03900
WC04900
WC04800
WC046WL
WC040WL
WC04000
WC04100
WC04700
WC04600
WC045WL
WC04500
WC05100
WC05200

WC00420	68	34.59	45.14	1,467.81	859.95	369.07	327.29	26.21		
WC00430	12	21.09	-	-	-	-	-	-		
WC00440	30	32.05	5.91	177.99	157.05	20.94	-	-		
WC00450	12	10.59	-	-	-	-	-	-		
WC00460	12	43.50	-	-	-	-	-	-		
WC00470	8	49.53	-	-	-	-	-	-		
WC00480	66	9.64	27.48	249.03	24.58	197.86	10.24	17.26		
WC00490	12	4.81	-	-	-	-	-	-		
WC00500	13	35.89	-	-	-	-	-	-		
WC00510	12	16.93	-	-	-	-	-	-		
WC00520	34	42.16	15.52	615.22	157.53	448.58	3.29	5.83		
WC00530	2	26.36	-	-	-	-	-	-		
WC00540	78	3.14	41.92	123.72	28.43	91.17	4.11	-		
WCO0550	14	7.53		-	-	-	-	-		
WCO0560	23	97.96	3.08	283.71	178.64	101.20	26.70	1.38		
WCO0570	14	41.55		-	-	-	-	-		
WCO0580	7	45.89	-	-	-	-	-	-		
WCO0590	22	23.93	2.77	62.38	51.47	7.11	3.80	-		
WCO0600	1	47.21		-	-	-	-	-		
WCO0610	3	22.96		-	-	-	-	-		
WCO0620	12	102.75		-	-	-	-	-		
WC002WL	65	2.51	38.50						90.84	
WC003WL	65	1.42	29.90						39.91	
WC020WL	74	1.94	42.92						78.27	
WC026WL	74	0.51	25.30						12.13	
WC027WL	67	0.80	31.45						23.65	
WC040WL	72	3.54	36.80						122.46	
WC045WL	68	1.49	35.14						49.22	
WC046WL	68	5.85	31.23						171.73	
WC000RD		25.54	-							
WC000SB	75	98.00	29.20							2,689.90
		4,294.73		37,031.15	24,083.74	9,340.17	1,488.83	2,161.17	2,116.06	3,697.90