
**YOCUM LAKE PARK
FOREST STEWARDSHIP PLAN**

**Prepared For:
Pend Oreille County Community Development Department**



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Landowner Information

Pend Oreille County Community Development Department
Yocum Lake Park
P.O. Box 5066
Newport, WA 99156

Property Information

Yocum Lake Park is located in northern Pend Oreille County approximately eight air-miles southeast of Lone and one mile east of the Pend Oreille River. The legal description is as follows: the E ½ of the NE ¼ in Section 23, Township 36 North, Range 43 East, W.M., encompassing approximately 80 acres. The Geographic ID for the parcel is 433623000002.

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Pend Oreille County Community Development Department
Board of Directors - Pend Oreille County Parks

Landowner Objectives

The forest management goals within Yocum Lake Park are to enhance forest health and resiliency while maintaining wildlife habitat features and passive recreational opportunities within the park.

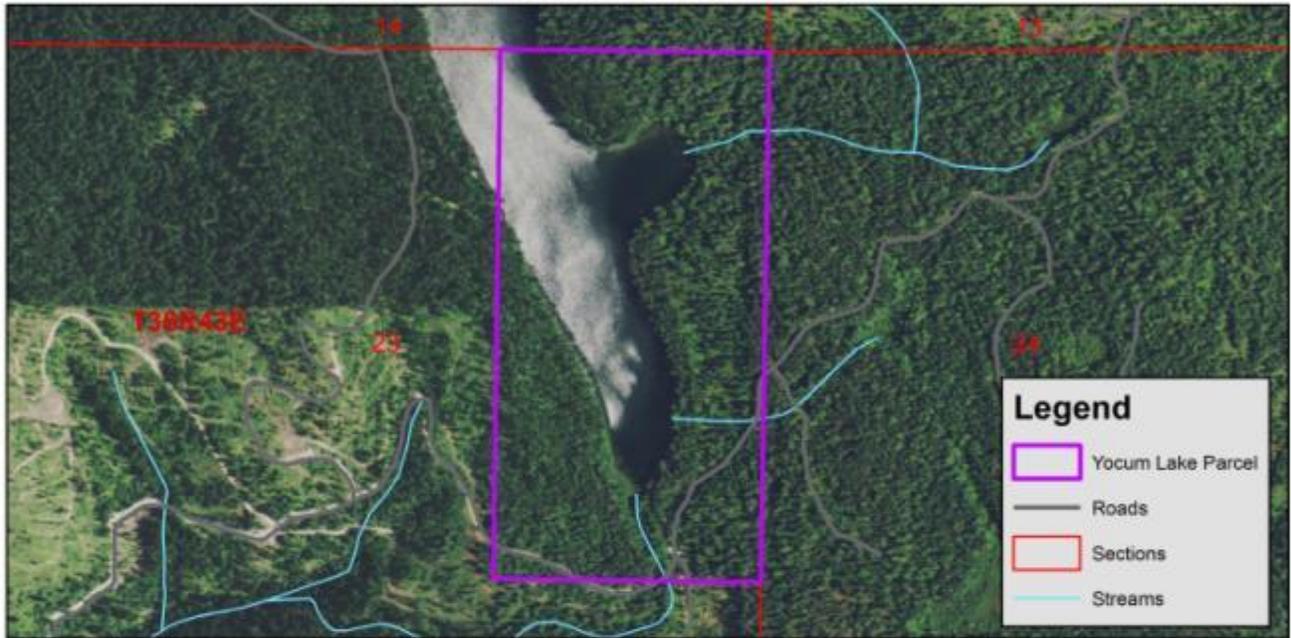
A successful forest management plan must identify a set of realistic landowner management objectives, assess the biological and ecological conditions of the forest resource, design and outline a program to achieve the management objectives and prescribe a series of silvicultural activities designed to meet specific stand treatment objectives consistent with sound forest management practices.

The forest management objectives for Yocum Lake Park are as follows:

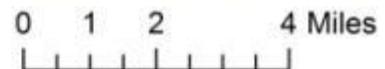
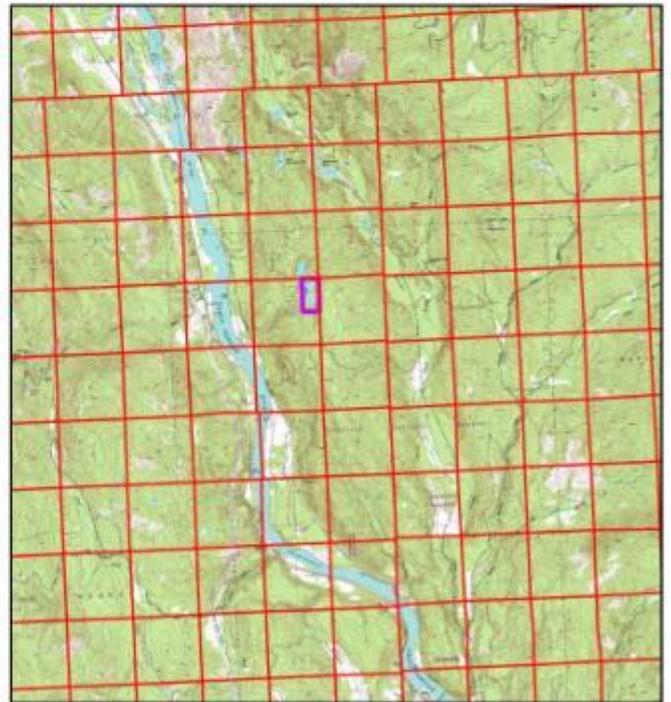
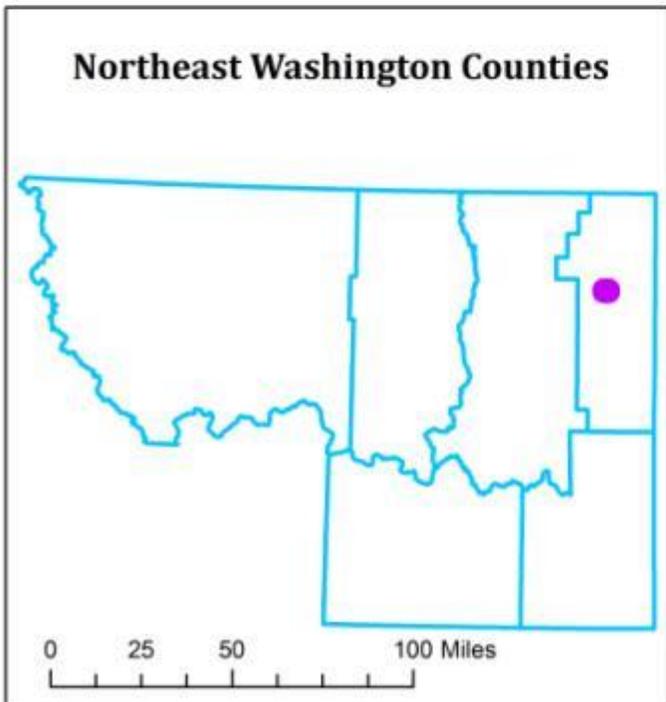
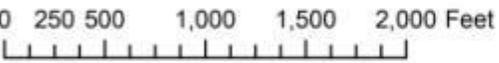
- Improve and maintain long-term forest health through active management of species composition and stocking levels.
- Implement forest management practices with consideration to important wildlife habitat components of the ownership.
- Plan forest management practices which will maintain or augment recreational opportunities within the park.
- Increase forest resiliency to wildfire, pathogens, and beetle outbreaks.
- Design forest management treatments that promote species and structural diversity.
- Control noxious weed populations throughout the property.
- Provide periodic income for park maintenance and improvements.

Yocum Lake Vicinity Map

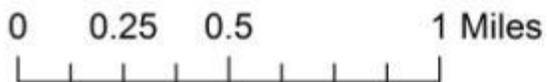
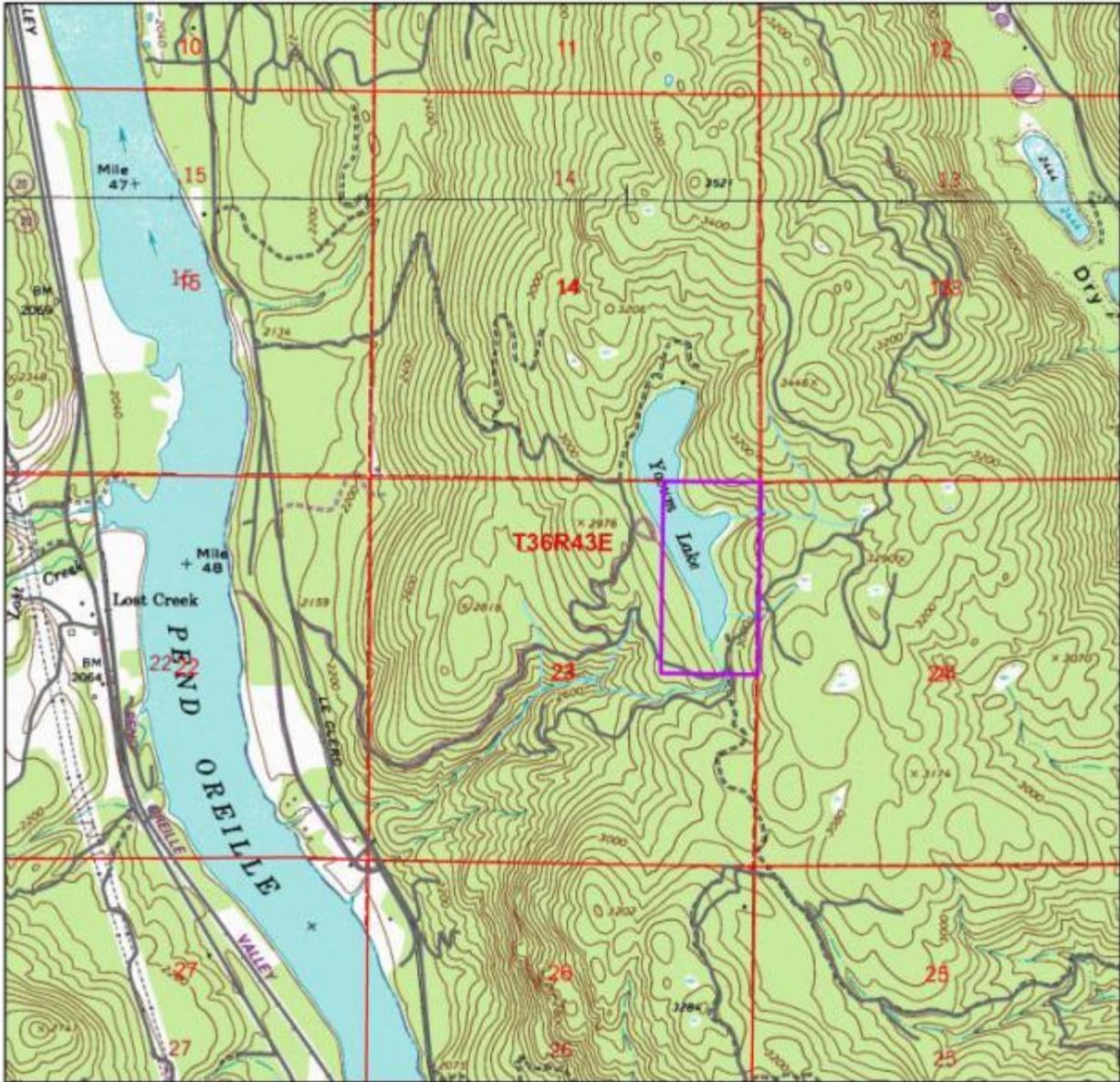
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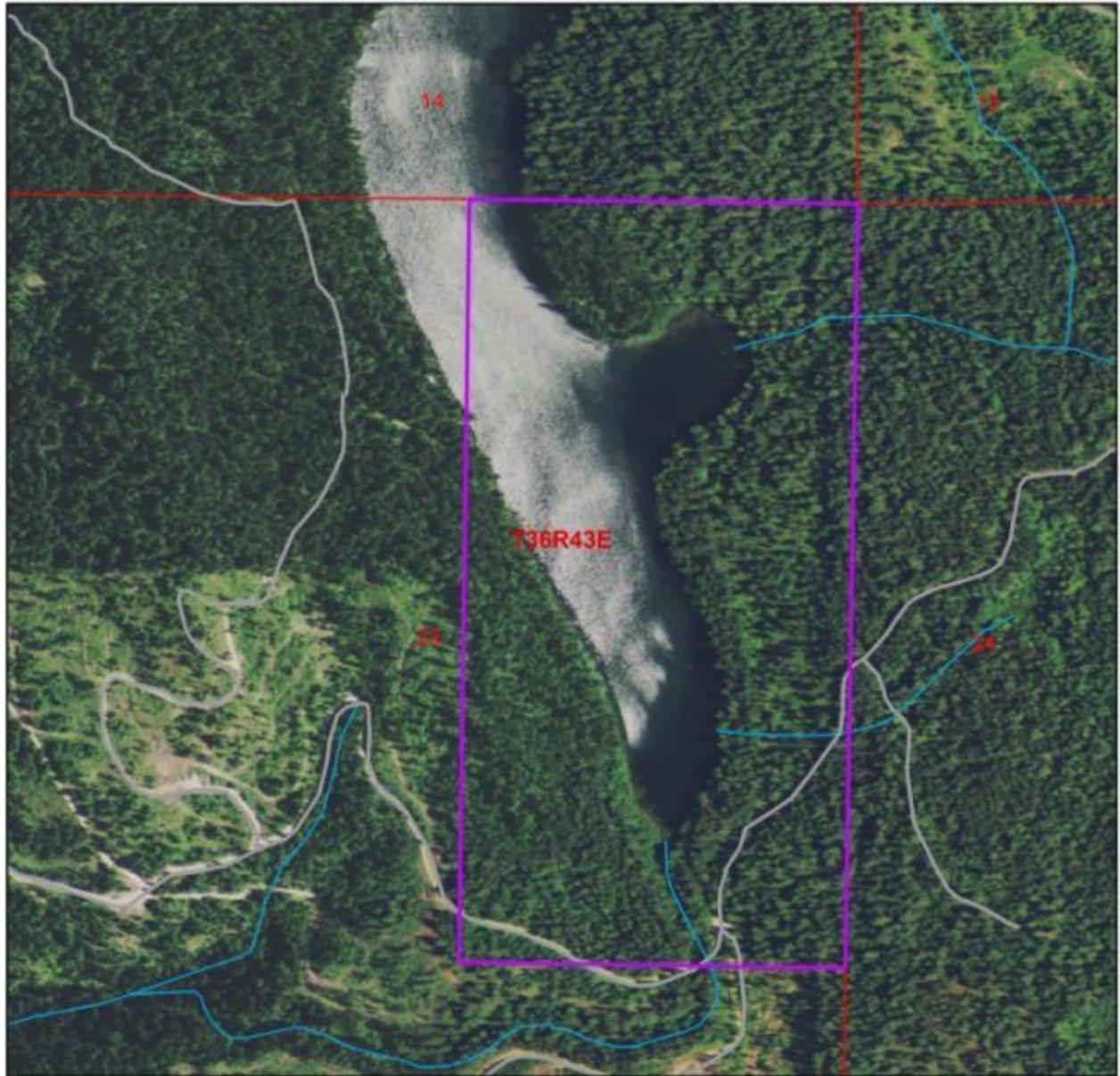
Yocum Lake
 Pend Oreille County Parks
 NE 1/4 of E 1/2 Section 23 T36N R43E W.M.
Topographic Vicinity Map



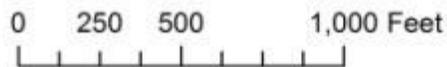
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Yocum Lake
Pend Oreille County Parks
NE 1/4 of E 1/2 Section 23 T36N R43E W.M.

Aerial Imagery and Parcel Map



1:6,000



Legend	
	Yocum Lake Parcel
	Roads
	Sections
	Streams

Introductory Overview of the Property

Introduction

Yocum Lake Park is an 80-acre park owned by Pend Oreille County and managed by the Pend Oreille County Community Development Department. The park is located in the north-central portion of Pend Oreille County, approximately eight miles southeast of Lone and one mile east of the Pend Oreille River. The parcel was acquired in 2005 by Pend Oreille County, purchased from Stimson Washington, Inc.

The park encompasses the south half of Yocum Lake. A public boat launch is located at the south end of the lake and is frequently used by fishermen and water recreationalists. Approximately 56 acres of the park is composed of mixed conifer forestland with the remaining 24 acres in the lake itself. Yocum Lake Park provides multiple recreational opportunities for the general public, including fishing, hiking, wildlife viewing, camping, and hunting.

The parcel which constitutes Yocum Lake Park (Parcel 433623000002) was purchased by the County in December of 2005 from Stimson Lumber Company. Surrounding ownerships include forest industry and US Forest Service – Arden Tree Farms, Inc. (east), Stimson Washington, Inc. (south and west), USFS (north). No recent forest management activity has occurred on the property outside of a commercial harvest performed approximately 10 to 15 years ago by the previous owner.

Topography

The topography within Yocum Lake Park varies from gentle to moderately steep. The portion of the park lying west of the lake is very gentle with slopes of 5% to 15%. The area east side of the lake consists of moderate to steep terrain, ranging from 25% to 50%.

Elevation within the park ranges from 2,900 feet to 3,120 feet. The prevalent aspects within Yocum Lake Park are found in the steeper ground east of the lake – west is the dominant aspect along with a small portion in the northeast corner having a southern aspect.

Access

Access to Yocum Lake Park is provided by Le Clerc Road North and Yocum Lake Road. To access the park from Lone, head east on the Sullivan Lake Road bridge and cross the Pend Oreille River. Turn immediately right (south) onto Le Clerc North and travel approximately 10 miles to Yocum Lake Road. Turn left (east) onto Yocum Lake Road and travel about 1.5 miles to the southwest corner of the property.

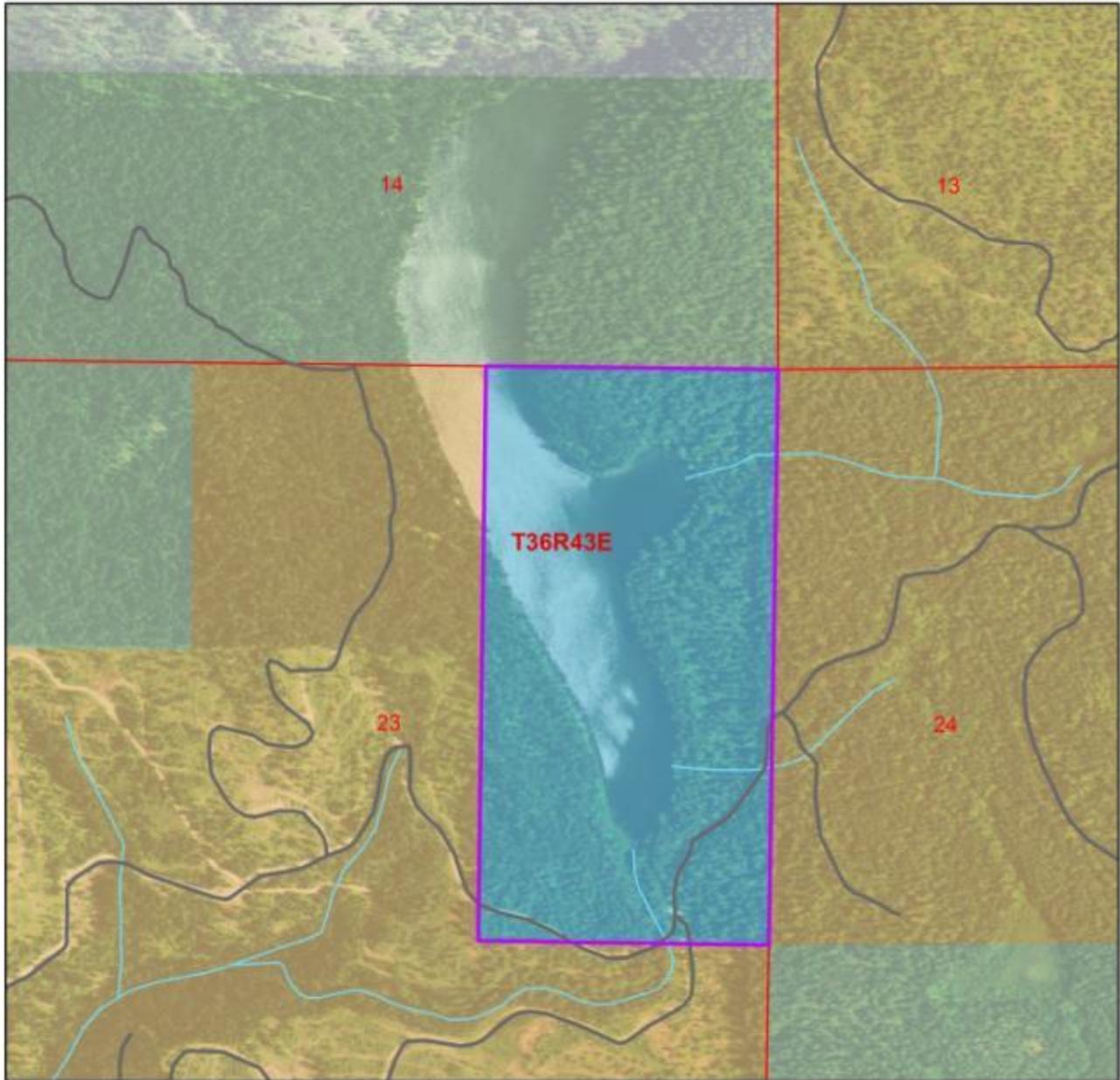
Weather

The annual average maximum temperature is approximately 54 degrees Fahrenheit. The annual average minimum temperature is approximately 31 degrees Fahrenheit and the annual average total precipitation is approximately 30 inches. Data from Prism Climate Group: <http://www.prism.oregonstate.edu/>.

General Vegetation

Yocum Lake Park is comprised of mixed conifer forestland, consisting of Douglas-fir, lodgepole pine, ponderosa pine, western larch, grand fir, western red cedar, quaking aspen, and birch. Understory vegetation includes but is not limited to ninebark, common snowberry, oregon grape, Idaho fescue, oceanspray, ceanothus, queencup bead lily, twinflower, serviceberry, huckleberry, thimbleberry, pinegrass and Rocky Mountain maple.

Yocum Lake
 Pend Oreille County Parks
 NE 1/4 of E 1/2 Section 23 T36N R43E W.M.
Surrounding Ownership



0 250 500 1,000 1,500 Feet

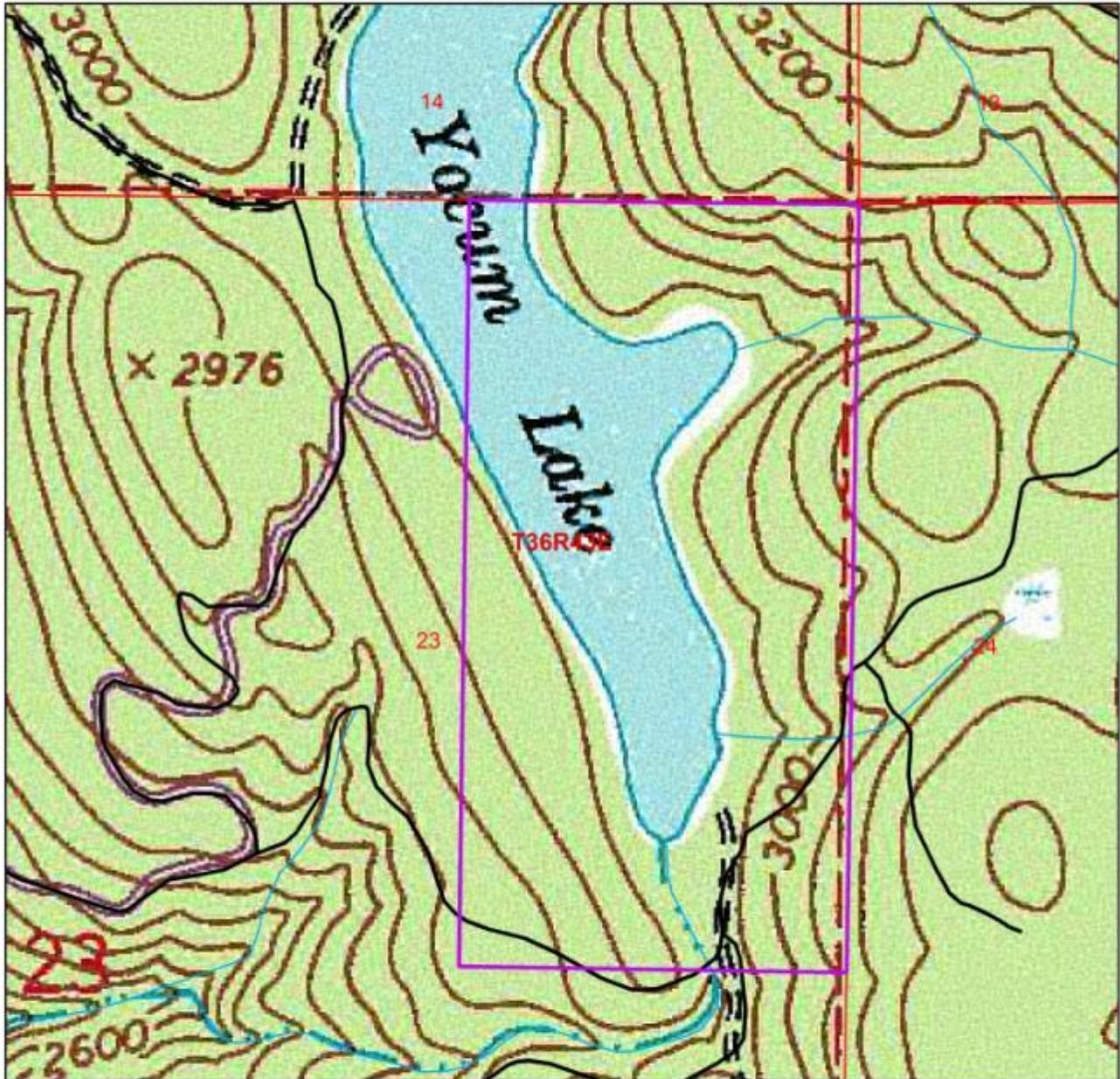


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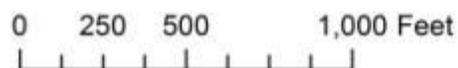
Legend

Yocum Lake Parcel	Ownership
Roads	Forest industry
Sections	Forest Service
Streams	Pend Oreille County
	Private Owner

Yocum Lake
Pend Oreille County Parks
NE 1/4 of E 1/2 Section 23 T36N R43E W.M.
Topographic Map



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Resource Category I – Forest Health/Wildfire/Invasive Species

Forest Health - Overview

The forest resource within Yocum Lake Park is in decent overall health at this time, given stand age and conditions. The primary concerns are areas of aging lodgepole pine, excessive stocking rates, and areas with a lack of desirable (seral) species in the regeneration cohort. The treatments prescribed in this Forest Stewardship Plan will focus on increasing stand resiliency through stocking rates and species composition; thereby improving long-term forest health on the property.

A healthy forest is:

- 1) Resilient to natural and human disturbance
- 2) Biologically diverse
- 3) Able to provide a sustained habitat for vegetation, wildlife and humans

Stocking Level

Trees require adequate light, water and nutrients to maintain their health and grow to their biological potential. If one or more of these elements are missing or insufficient, the tree experiences stress. Stressed trees are vulnerable to insect pests, disease problems and reduced growth rates.

The abundance of sunlight in the forest is managed by controlling the number, size and density of trees. The optimal amount of sunlight varies with individual tree species present and management goals for the property. For example, ponderosa pine requires full sunlight to reproduce successfully whereas grand fir can reproduce in heavy shade. Douglas-fir and western white pine are able to reproduce in partial shade.

Tree thinning is the primary method used to control forest density, species composition and tree growth. Non-commercial thinning is applied in young forests before trees have commercial value. The objective is to cut less desirable trees and create additional growing space for the remaining trees. Cut trees are often left in the forest to decompose. Commercial thinning is implemented when trees are larger, older and have commercial value. Cut trees are removed and sold to wood products manufacturers. Before tree thinning is implemented, a forester prepares a silvicultural prescription. The prescription details the goals of the thinning project and describes how, where, and when the work will be accomplished.

The Inland Northwest typically experiences dry summers. During this period, trees depend on moisture stored in the soil to maintain their growth. Deeper soils and cooler aspects (north and east) benefit tree growth because they store greater amounts of water that is available later into the growing season. Where soils are shallow or the aspect is hot and dry (south and west aspects), tree growth slows during drought periods due to a lack of soil moisture. Shade-intolerant species are adapted to grow on dry, sunny areas (south and west aspects) and are more resistant to drought. Shade-tolerant species grow in cool, moist conditions found on north and east aspects and adjacent to riparian areas. Shade-tolerant species are less resistant to drought. Thinning reduces the total number of trees competing for water, allowing residual trees to obtain soil moisture for a longer period during the growing season. Forest productivity is often enhanced when dense (over-stocked) forests are thinned to reduce competition for soil water.

The availability of nutrients in the soil will influence the potential for tree growth. Nutrient availability is influenced by soil type and the abundance of organic material present in the soil. Fertilizer can provide an added boost to the health and growth of a forest on some soil types. Forestry activities such as slash disposal, prescribed burning, and erosion controls are implemented to maintain or improve nutrient availability.

Management Action

One of the primary forest health problems in Inland Northwest forests is over-stocking (too many trees per acre). Over-stocking causes tree stress because neighboring trees must compete intensively for light, water, and nutrients. Overstocking is a concern within portions of Yocum Lake Park, particularly in the understory cohort east of the lake. These areas of concern will be identified in Resource Category IV. A series of stand treatments are prescribed to meet stocking concerns and other management objectives.

Dwarf Mistletoe

Dwarf mistletoes are small, leafless, parasitic plants that grow on branches and stems of conifers. They are usually 1 to 5 inches tall and mostly green yellow, brown or orange in color. A host tree is typically infected by only one species of mistletoe. Bunched growths of branches (witches' brooms) and swollen branches are frequently caused by mistletoe, so they are good places to look for mistletoe shoots to confirm infection.

Female plants produce seeds that spread the disease. Both male and female plants have a damaging effect to trees. Seeds are produced in small berries. During late summer, berries burst and seeds can travel horizontal distances of 10 to 40 feet. The sticky seeds attach to branches and infect them. Birds can distribute seeds, but most infection is from nearby infected trees. The time it takes mistletoe to kill a tree depends on several factors. Damage tends to develop slowly until the tree is heavily infected. Trees are usually killed within 10 to 15 years after they have become heavily infected throughout the crown.

Management Action

Control of dwarf mistletoe involves reducing the amount of mistletoe to a low level. Heavily infected trees are cut or girdled to kill the tree and the parasitic plant. Lightly infected trees can have branches pruned. All live branches up to the highest infected branch should be cut off. Infected trees can be retained if they are isolated from healthy trees or surrounded by resistant tree species within 40 feet. If the disease is so advanced that most trees need to be cut, planting mistletoe resistant trees is a good alternative. Douglas-fir for example can be replaced with ponderosa pine.

Mistletoe control is generally a long-term process with activities usually focused around harvest or thinning operations to reduce cost. The first step is to select heavily infected trees for removal during current or future harvests. Second, remove infected young trees during pre-commercial thinning operations. Third, prune infected branches off of trees which are left behind but have light infections. Lastly, monitor for mistletoe outbreaks every three to five years.

Stem Decay

Two very common stem decays in the region are Indian paint fungus (*Echinodontium tinctorium*) and red ring rot (*Phellinus pini*). Red ring rot is most commonly found in Douglas-fir, western larch, and pines. Presence of red ring rot within Yocum Lake Park is found primarily within the 70 year-old lodgepole pine growing west of the lake. Both rots can be very harmful, affecting the usable volume in infected trees and increasing the likelihood of wind throw.

The diseases are spread through wind born spores. The spores attach to branches and rot trees later in the tree's life. Indian paint fungus is tan and water soaked at first, becoming yellow to orange and stringy. Stems are often almost completely hollowed by this decay. Conks, which can reach sizes of a foot in diameter, develop under branches or branch stubs. They are woody, hoof-shaped and toothed on the underside. The upper surface is dark brown or black, lower surface is gray, and the interior is brick red. Punk knots also have brick red tissue within.



Phellinus pini conk – USDA Forest Service

Red ring rot conks are woody with a dark, ridged upper surface with a tan or cinnamon pore layer on the underside. They vary from hoof-shaped to oppress on the bark with little or no upper surface. They are usually about 2 inches in diameter and the inside is tan or brown. The rot first appears as a red or brown stain in the heartwood.

The stain often forms concentric rings or crescents in the cross section. In later stages, white pockets are distinct from the surrounding dark red or brown wood. In late stages the decay is stringy and mostly white. Swollen knots may be the only outward sign of infection. These knots have a spongy texture and are filled with brown mycelium.

Management Action

These common stem decays are frequently observed in stands of mature or overmature host species. The best way to minimize stem decay is to manage on shorter rotations (70 years maximum for lodgepole and less than 110 years for other species). To further minimize heart rots, it is extremely important to minimize wound damage when entering a stand to implement silvicultural treatments. As

no chemical or biological method will protect a tree, wound prevention is the only effective way to keep from reactivating dormant infections. The following actions should minimize heart-rot:

1. Thin trees early to increase growth and maintain stand vigor, but use care to minimize trunk wounds.
2. When partial cutting, select crop ("leave") trees with at least 50% live crown ratio, at least 8 inches of current leader growth, and the best form and height.
3. Minimize wounding in thinning operations, prescribed burns, slash disposal, or overstory removal.

Wounds may be prevented by:

1. Not logging in the spring and early summer, when trees are more susceptible to injury than later in the year.
2. Using the proper equipment for the site.
3. Marking "leave" trees rather than "cut" trees.
4. Planning straight-line skid trails before logging, and avoid sharp turns. Leave designated "bump" trees or cull logs along the edge of skid trails.
5. Matching log length with final spacing. A close final spacing means skidding short logs, while longer logs are suitable for wide spacing.
6. Logging skid trails first, before the rest of the stand, so that the skid trail is clear.
7. Cutting low stumps (less than 3-4") in skid trails, to keep the skidder or logs from being shunted into crop trees.
8. Falling trees so they are at a 45 degree angle directly towards or directly away from skid trails, to prevent too much maneuvering by the machinery or sharp turns by the log.
9. Cutting limbs flush to the bole before skidding to prevent branch stubs from shunting logs into crop trees.
10. Removing slash and other fuels from around the base of crop trees before under-burning the stand.
11. Talking to anyone operating in your stand about minimizing damage to crop trees, and if necessary make contract specifications regarding penalties for damages.

Root Disease

Root diseases are the most damaging group of tree diseases. Diagnosis and identification is based on:

1. Circular groups of dead and dying trees. Root diseases tend to kill a few trees each year. Look for dying trees at the edge of a group with dead trees towards the center.
2. Thinning tree crowns. Crowns of root diseased trees fade in color, thin from the inside of the tree crown towards the edge. Diseased trees may produce a cone crop, though much of the seed is not viable.
3. Young trees are killed more quickly than older ones.
4. Symptoms and signs in roots and root crowns. Trees with advanced root disease may have basal resin flow, wood discoloration and decay, and presence of fungal tissue.



Root disease (Armillaria) mortality center

Three of the most common root diseases found in the Inland Northwest include laminated root rot (*Phellinus weirii*), Armillaria root rot (*Armillaria ostoyae*), and annosum root and butt rot (*Heterobasidion annosum*). The following table displays the primary, intermediate, and seldom hosts for each species of root disease.

Root Disease	Primary Hosts	Intermediate Hosts	Seldom Hosts
Laminated	DF, GF, MH	SA, WH, ES	PP, LP, WP, WL
Armillaria	DF, GF	PP, LP, WP, SA, WH, ES, WRC	WL
Annosum	GF, SA	ES, DF, LP, PP, WRC	WL

Species key: DF=Douglas-fir, GF=grand fir, MH=mountain hemlock, SA=subalpine fir, WH=western hemlock, ES=Engelmann spruce, PP=ponderosa pine, LP=lodgepole pine, WP=white pine, WRC=western red cedar, WL=western larch

Management Action

Root disease is managed by promoting the establishment and growth of resistant species. Not all conifer species are equally susceptible to root disease. Many young stands can be grown to merchantability if disease tolerant species are favored. Dead and dying trees can be salvaged; however, rates of disease spread and tree mortality may not be reduced. There is some evidence that partial cutting increases the rate of mortality in root-diseased stands.

When combined with other forest pathogens or insect outbreaks, root disease can have a significant impact on a stand over a 15-year period. Root disease is often the initial weakening agent of forest

stands prior to large-scale insect outbreaks. The only effective and practical way to manage for root disease in this scenario is to establish species with a higher tolerance, such as western larch and ponderosa pine.

Armillaria root disease is found in low levels within Yocum Lake Park. Most of the susceptible species (namely Douglas-fir and grand fir) are found east of the lake; however, root disease is not a significant concern at this time. Nevertheless, species which are more tolerant to root disease will generally be favored in stand treatment prescriptions (namely western larch and western white pine).

Bark Beetles

Across the forests of the Pacific Northwest there are a number of bark beetles that pose a threat to forest health. There are five species in particular that pose the most likely threat to Yocum Lake Park. These are the IPS pine engraver, western pine beetle, mountain pine beetle, Douglas-fir beetle, and the fir engraver. Bark beetle activity is found only in minor levels within Yocum Lake Park at this time. Warmer conditions and less available ground water, associated with climate change, have played a large role in the increased beetle mortality that has occurred in coniferous forests throughout North America in recent years. Bark beetles that attack live trees generally target trees that are water stressed. Once a tree has become stressed, it loses its ability to block the beetles from boring through the bark and into its cambium. When a beetle attacks a tree, it releases a pheromone to attract other beetles, and then heads to the nutrient-rich cambium where it will lay eggs.

Trees killed by bark beetles can often times be recognized as red trees in the stand that appear suddenly. A tree can turn from green to red within weeks. However, other indicators would have been present for months. These indicators are things such as pitch tubes, boring dust, or frass on the bark. Red trees themselves are usually not a forest health risk. They are an indicator of what has happened in the stand and what may happen in the future. The western and mountain pine beetles are considered major tree killers in eastern Washington. Both prefer trees greater than 8 inches in diameter. Trees that they attack often die due to a girdled phloem.

Pine Engraver Beetle (Ips Pini)

Pine engraver beetles are slash-breeding insects. The beetles primarily attack fresh, green material on the ground greater than 2 inches in diameter. Examples would be logging slash, tops of trees broken during wind or ice storms, and non-commercial thinning debris (trees cleared around new homes or developments is a prime example). Once green material hits the ground, it is a food source for 3-6 months. After the 3-6 months, the sugary layer under the bark turns sour. The pine engraver beetle generally attacks slash in April or May during its first flight. Another flight will occur 8 weeks later. This second flight will look for green slash; if it is not available they will look for stressed trees and attack the top of the tree. If the tree is less than 20 feet tall it will likely die; however, larger trees will most likely survive although their tops may be attacked. Usually another beetle species will come in and kill these weakened trees.

To minimize pine engraver attacks, do not create logging or thinning slash greater than 2 inches in diameter between January and June. If logging is conducted during these times, the following measures should minimize a pine engraver problem.

1. Proper utilization of all material down to two inches in diameter.
2. Pile and burn material greater than two inches within 6 weeks if possible.
3. Chip or remove material greater than two inches in diameter within 6 weeks.
4. Form a green chain of fresh slash; this option provides a continuous supply of food for the beetle through their entire breeding season, keeping them out of standing trees.

Fir Engraver Beetle (Scolytus ventralis)

The fir engraver is a bark beetle found in grand fir, Douglas-fir, western larch, and Engelmann spruce. It is approximately 4 mm long and the posterior of the abdomen is concave. Reddish-brown or white boring dust can be found in bark crevices of host trees. Unlike other bark beetles, the fir engraver makes horizontal egg galleries. Infected grand fir trees have thinning crowns, and needles become red. Fir engravers fly during the summer months looking for new host trees. The peak of this activity is in mid-July. Attacks are made upon weakened, recently dead, or dying fir trees. Root rot, overstocking, and drought often trigger attacks. Females attack the trees first, boring into the inner bark and await the males in the nuptial chamber. After mating, the female will bore away from the nuptial chamber, depositing her eggs along the way. Trees will often increase resin production in order to poison the larvae and ward off the female's attack. However, grand fir does not produce nearly as much resin as Douglas-fir, and is therefore more susceptible to such an attack. Larvae will over-winter in their host, and eventually pupate and become adults the following spring.

Harvesting infested trees is the most direct method in controlling fir engraver beetle populations. Eradication is not possible, but control measures through active management will keep populations in check. Augmenting grand fir stands with species diversity through interplanting and promoting multiple age classes will help to reduce favorable fir engraver beetle conditions.

Isolated levels of fir engraver activity can be found within Yocum Lake; however, there is only a small amount of grand fir found within the park. The overall stand structure is not conducive to large-scale attacks, given the variety of species and age classes. Future management practices will continue to limit the risk of fir engraver mortality within the park.

Mountain Pine Beetle (Dendroctonus ponderosae) & Western Pine Beetle (Dendroctonus brevicomis)

Mountain pine beetles and western pine beetles are found inhabiting pine stands throughout the Inland Northwest. Mountain pine beetle activity is isolated, but present within Yocum Lake Park. Mountain pine beetle activity is of most concern in the lodgepole pine found west of the lake, especially given its age. Lodgepole pine becomes increasingly susceptible to beetle attack at 70 to 80 years, as it nears its typical age threshold.

Host trees of mountain pine beetle can be identified by brown or reddish foliage, pitch tubes on the trunk, boring dust at the base, and flaking bark due to woodpecker predation. Pitch tubes of mountain pine beetles are approximately 1 inch in diameter. A creamy to pink color indicates a successful attack, while clear to white pitch tubes often indicate an unsuccessful attack.

Western pine beetle pitch tubes are smaller than those of the mountain pine beetle. They are typically reddish in color and only ½ inch wide. Pitch tubes may or may not be present on host trees.

Woodpecker activity is strongly associated with western pine beetles. Pine beetle activity can also be identified by the shape and pattern of egg galleries seen on the inner bark. Mountain pine beetles produce a long and strait gallery with a slight crook at the basal end. Western pine beetles form long galleries which wind laterally and longitudinally in a spaghetti-like pattern (also known as “serpentine”). Females fly in August looking for host trees. Susceptible species include ponderosa pine, lodgepole pine, and western white pine. Pine beetle activity is most often found in areas where tree vigor has been reduced due to maturity, disease, mechanical damage, overstocking, and drought. When a suitable host is found, the female sends out a pheromone to attract males. The tree is then swarmed by many pine beetles, which bore into the tree. Once mating has taken place, the female will bore a vertical egg gallery and lay her eggs. Larvae will develop into pupae, and emerge as adults in the spring. The life cycle is then repeated.

The best methodology for preventing attacks is maintaining proper stand densities throughout the development of a forest – an indirect control method. The “Best Management Practice” for bark beetles is to reduce stand density. For a pine stand this would mean thinning to levels between 40 and 70 square feet of basal area per acre. Creating small “patch” or clear cuts (5 to 10 acres in size) across a landscape or a large timber ownership will mimic natural disturbance events, creating a forest of multiple age classes. This stratification is very effective in creating non-suitable bark beetle habitat.

Douglas-fir Beetle (*Dendroctonus pseudotsugae*)

Douglas-fir beetle outbreaks are usually initiated by disturbance events such as windthrow, winter breakage, fire scorching, or defoliation. Downed or weakened trees are attacked and beetles build up large populations. The next year, new generations emerge and attack susceptible trees in surrounding stands. Damage in standing trees is greatest in dense stands containing a high percentage of large, mature Douglas-fir. Outbreaks typically last 2 to 4 years. Stands with the highest risk of outbreak include the following characteristics:

- Basal area exceeding 250 square feet per acre
- Douglas-fir stand composition is greater than 50 percent
- Average stand age is greater than 120 years
- Average diameter at breast height is greater than 14 inches.

Salvage of down or weakened Douglas-fir is a primary tool in preventing Douglas-fir outbreaks. When attacks have already occurred, removing standing green or faded infested trees will help reduce or

prevent further damage in the area. The risk of Douglas-fir beetle damage is reduced when dense mature stands are commercially thinned or regeneration harvesting occurs. The presence of root disease should also be evaluated, as low-level beetle populations are often supported by root disease areas or other weakened trees.

Douglas-fir beetle activity has not been observed within Yocum Lake Park. Current stand conditions are not conducive to significant outbreaks. On-going management activities will continue to limit the likelihood of significant Douglas-fir beetle attacks.

Western Spruce Budworm

Western spruce budworm is an insect pest which defoliates Douglas-fir, Engelmann spruce, subalpine fir, and western larch and is known to be one of the most significant defoliators in North America (Agee, Edmonds, & Gara, 2000). If defoliation levels are sustained for 3 to 4 more years, top kill in mature hosts and mortality in the understory may occur. No defoliation of Douglas-fir and grand fir within recent years appears to have occurred within Yocum Lake Park. Defoliation by this pest should be monitored as a two-storied stand conditions develops over the next management period.

Tree damage associated with budworm defoliation includes growth loss, top-kill, deformity, reduced seed production and tree mortality. Larger diameter trees that survive major budworm outbreaks in a weakened condition may later be killed by bark beetles. It usually takes three-five years of moderate to severe tree defoliation to cause tree mortality.

When tree shoot growth begins in early summer budworm larvae (small caterpillar) will web together adjacent shoots. During July, reddish brown branch tips will give trees a scorched appearance. The upper portion of the tree crown may appear bare or thin. Budworm larvae feed in buds and foliage from May-July. Older larvae have dark heads and an olive-brown body with whitish spots. Pupal cases are attached to damaged shoots. Orange to gray-brown moths less than one inch across are abundant in late July and August during an outbreak.

Control:

Natural controls include ants and birds which eat budworm larvae. Leaving woody debris on the ground for ants and snags as nesting sites for birds can help sustain populations of these predators. Other natural controls are believed to include cold, wet spring weather; viral pathogens, and lack of food following subsequent years of infestation.

Silvicultural practices include maintaining or increasing tree diversity in vulnerable stands (increase the relative abundance of non-host tree species), thinning from below to create single story forest stand structures, and thinning to reduce inter-competition between trees and to increase the vigor of retention trees.

Insecticides are most effective when applied as larvae are actively feeding on new foliage in June. For large outbreaks, aerial applications of *Bacillus thuringiensis* a bacterium and the chemical insecticide carbaryl (Trade name –Sevin) are generally recommended. Ground based applications of carbaryl and *Bacillus thuringiensis* (BT) can be effective on smaller trees. BT must be eaten by the larvae to cause mortality. A protein crystal formed by the bacterium carries a toxin which is released in the gut of the larvae. When BT is ingested the toxin is released and the mid-gut wall is destroyed and the larvae stops feeding. The bacteria enter the blood of the insect causing full scale infection and death of the insect within 3-5 days.



Western Spruce Budworm Caterpillar (Photo Credit: Natural Resource Canada)

Wildfire – Overview

Wildfire in the Inland Northwest can be a natural and ecologically-enhancing process or a destructive threat to property and life. Naturally occurring forest fires have shaped and managed the landscape since before mankind. Early human observers of fire and the ecological effects of forest fires learned to use fire to influence flora and fauna according to their design. When European settlers started making improvements to the land that included buildings and perishable crops, forest fires became viewed as destructive and harmful. Prescribed fire can be a useful tool in reducing natural and human-created fuel loadings while also serving as an effective means of site preparation for tree planting.

Available fuel and its properties help in predicting probability of ignition, rate of spread and fire intensity. All vegetation will become available fuel under different conditions. Grass can dry out early in the year and burn readily; however it will not hold a fire for an extended period of time. Large dead logs will dry slowly during the year, but if they ignite the fire will burn for an extended period of time. The arrangement and quantity of available fuel is very important in predicting forest fires.

Weather affects how fires burn as well. Extended droughts can dry vegetation that would not burn during wet seasons. Wind will increase the rate of spread and intensity once ignition has occurred. Humidity affects how quickly dead vegetation becomes available fuel. Topography affects fire behavior. Hill slopes burn faster when compared to flat terrain because on a hill slope as heat rises from a fire it prepares fuel above it for ignition. How terrain is aligned to the sun influences the type of vegetation that will grow, as well as the stocking density of this vegetation. Alignment with the sun will also affect fuel moisture and temperature.

Management Action

Weather can be predicted but not controlled. Topography is very difficult to change on a large scale. Available fuel and its properties can be managed with relative ease. The risk of a stand replacing

wildfire can be reduced by controlling stocking levels and receptacle ground fuels. Proper stocking levels ensure that each tree has adequate resources to grow. This spacing keeps the horizontal and vertical arrangement of available fuels spaced away from each other so that excessive amounts of heat are not built up. Wildfire will likely threaten, at some point, Yocum Lake Park property. If proper silvicultural actions are taken before a wildfire event, it will be easier to suppress and the forest will be more resilient to its effects.

The amount of time between fire ignition and the arrival of fire suppression equipment and personnel has an effect on the success level of suppression activities. The existing road infrastructure within Yocum Lake Park provides adequate access for fire fighting vehicles. The main access road traverses the southwest corner of the property and provides access to the bench on the western portion of the lake. Given the gentle terrain and relatively small area west of the lake (15 acres), no further vehicle access is necessary. Access in the eastern portion of the property is most limited at this time. A grown-in skid trail exists approximately 250 feet from the lakeshore, which was utilized during the most recent harvest. This trail could provide greater access to this area if the vegetation was cleared; however, motorized public use of this trail would greatly increase as a result, which is not desirable. The eastern portion of the park is relatively small and narrow and an ignition would likely be contained from the adjoining ownerships to the east, thus, increased access for fire vehicles in this area is not a high priority.

Invasive Species

Invasive grasses and forbs can have a detrimental effect on wildlife. Wildlife have adapted to the use certain plants for food and shelter. Non-native plants can out-compete native plants, reducing their populations and disrupting the ecological balance that has developed over time.

Management Action

Dalmation Toadflax and St. John's Wort are the most prevalent invasive species within the Yocum Lake Park. These species occur predominantly along roads and adjacent to major skid trails. The use of weed-consuming beetles can be an effective option for reducing large populations of noxious weeds. These biological controls are used independently for other methods and can be an excellent initial treatment. Isolated plant invasions can be effectively eliminated using herbicide applications. Properly selected and applied, herbicides do not harm grass populations and the resulting reduction of invasive species will allow native or beneficial grasses and forbs to re-establish in the area. Herbicide treatments may follow an initial biological control method (if available) once the weed population has been reduced. Substantial weed infestations may require several years of repeated treatments. A noxious weed control program should be employed in Yocum Lake Park on an annual basis. This control program will be particularly important along the main road to the park (Yocum Lake Road).

Resource Category II – Soils

There are four soil types found within Yocum Lake Park. A summary of each soil type is found below. Recommendations for operating on the soils within the park and a table providing expected productivity from each soil type are included. The following information was obtained through the USDA Natural Resource Conservation Service Web Soil Survey:

<http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm>

56—Inkler gravelly silt loam, 20 to 40 percent slopes

Map Unit Setting

- *National map unit symbol:* 59v9
- *Elevation:* 2,200 to 4,500 feet
- *Mean annual precipitation:* 20 to 35 inches
- *Mean annual air temperature:* 41 to 45 degrees F
- *Frost-free period:* 90 to 120 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Inkler and similar soils:* 100 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Inkler

Setting

- *Landform:* Mountains
- *Landform position (three-dimensional):* Lower third of mountainflank
- *Parent material:* Glacial till, colluvium and residuum derived from igneous rock mixed with a component of volcanic ash and loess

Typical profile

- *H1 - 0 to 5 inches:* gravelly ashy silt loam
- *H2 - 5 to 27 inches:* very gravelly loam
- *H3 - 27 to 42 inches:* very gravelly loam
- *H4 - 42 to 60 inches:* very gravelly loam

Properties and qualities

- *Slope:* 20 to 40 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water storage in profile:* Moderate (about 6.6 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified

- *Land capability classification (nonirrigated):* 6e
- *Hydrologic Soil Group:* B
- *Other vegetative classification:* Douglas-fir/ninebark (CDS715)

59—Inkler-Rock outcrop complex, 40 to 65 percent slopes

Map Unit Setting

- *National map unit symbol:* 59vd
- *Elevation:* 2,200 to 4,500 feet
- *Mean annual precipitation:* 20 to 35 inches
- *Mean annual air temperature:* 41 to 45 degrees F
- *Frost-free period:* 90 to 120 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Inkler and similar soils:* 65 percent
- *Rock outcrop:* 20 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Inkler

Setting

- *Landform:* Mountains
- *Landform position (three-dimensional):* Center third of mountainflank
- *Parent material:* Glacial till, colluvium and residuum derived from igneous rock mixed with a component of volcanic ash and loess

Typical profile

- *H1 - 0 to 5 inches:* gravelly ashy silt loam
- *H2 - 5 to 27 inches:* very gravelly loam
- *H3 - 27 to 42 inches:* very gravelly loam
- *H4 - 42 to 60 inches:* very gravelly loam

Properties and qualities

- *Slope:* 40 to 65 percent
- *Depth to restrictive feature:* More than 80 inches
- *Natural drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.57 to 1.98 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water storage in profile:* Moderate (about 6.6 inches)

Interpretive groups

- *Land capability classification (irrigated):* None specified
- *Land capability classification (nonirrigated):* 7e
- *Hydrologic Soil Group:* B

- *Other vegetative classification: Douglas-fir/ninebark (CDS715)*

Description of Rock Outcrop

Typical profile

- *H1 - 0 to 60 inches: unweathered bedrock*

Properties and qualities

- *Slope: 40 to 65 percent*
- *Depth to restrictive feature: 0 inches to lithic bedrock*
- *Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 5.95 in/hr)*
- *Available water storage in profile: Very low (about 0.0 inches)*

Interpretive groups

- *Land capability classification (irrigated): None specified*
- *Land capability classification (nonirrigated): 8s*

90—Newbell cobbly ashy silt loam, 40 to 65 percent slopes, stony

Map Unit Setting

- *National map unit symbol: 2tcs3*
- *Elevation: 2,380 to 4,870 feet*
- *Mean annual precipitation: 21 to 49 inches*
- *Mean annual air temperature: 41 to 45 degrees F*
- *Frost-free period: 80 to 120 days*
- *Farmland classification: Not prime farmland*

Map Unit Composition

- *Newbell, stony, and similar soils: 75 percent*
- *Minor components: 25 percent*
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Newbell, Stony

Setting

- *Landform: Mountains, hills*
- *Landform position (two-dimensional): Footslope*
- *Landform position (three-dimensional): Mountainbase, base slope*
- *Down-slope shape: Concave, convex*
- *Across-slope shape: Linear*
- *Parent material: Volcanic ash and loess over glacial till derived from granite*

Typical profile

- *Oe - 0 to 1 inches: moderately decomposed plant material*
- *A - 1 to 7 inches: cobbly ashy silt loam*
- *Bw - 7 to 13 inches: cobbly ashy silt loam*
- *2BC - 13 to 27 inches: very gravelly sandy loam*
- *2Cd - 27 to 61 inches: very gravelly sandy loam*

Properties and qualities

- *Slope*: 40 to 65 percent
- *Percent of area covered with surface fragments*: 0.1 percent
- *Depth to restrictive feature*: 20 to 40 inches to densic material
- *Natural drainage class*: Well drained
- *Capacity of the most limiting layer to transmit water (Ksat)*: Moderately low (0.01 to 0.14 in/hr)
- *Depth to water table*: More than 80 inches
- *Frequency of flooding*: None
- *Frequency of ponding*: None
- *Available water storage in profile*: Low (about 4.5 inches)

Interpretive groups

- *Land capability classification (irrigated)*: None specified
- *Land capability classification (nonirrigated)*: 7e
- *Hydrologic Soil Group*: C
- *Other vegetative classification*: grand fir/ninebark (CWS421)

Minor Components

Moscow

- *Percent of map unit*: 5 percent
- *Landform*: Mountains, hills
- *Landform position (two-dimensional)*: Backslope
- *Landform position (three-dimensional)*: Mountainbase, side slope, base slope
- *Down-slope shape*: Concave, convex
- *Across-slope shape*: Linear, convex
- *Other vegetative classification*: western hemlock/queen cup beadlily (CHF311)

Scrabblers

- *Percent of map unit*: 5 percent
- *Landform*: Terraces
- *Landform position (two-dimensional)*: Toeslope
- *Landform position (three-dimensional)*: Tread
- *Down-slope shape*: Linear
- *Across-slope shape*: Linear
- *Other vegetative classification*: Douglas-fir/pinegrass (CDG131)

Aits, stony

- *Percent of map unit*: 5 percent
- *Landform*: Mountains, hills
- *Landform position (two-dimensional)*: Footslope
- *Landform position (three-dimensional)*: Mountainbase, base slope
- *Down-slope shape*: Concave
- *Across-slope shape*: Linear
- *Other vegetative classification*: western hemlock/queen cup beadlily (CHF311)

Inkler

- *Percent of map unit*: 5 percent

- *Landform*: Hills
- *Landform position (two-dimensional)*: Toeslope
- *Landform position (three-dimensional)*: Base slope
- *Down-slope shape*: Concave
- *Across-slope shape*: Linear
- *Other vegetative classification*: Douglas-fir/ninebark (CDS715)

Kegel, poorly drained

- *Percent of map unit*: 3 percent
- *Landform*: Draws, seeps
- *Landform position (two-dimensional)*: Toeslope
- *Down-slope shape*: Concave
- *Across-slope shape*: Concave

Rock outcrop

- *Percent of map unit*: 2 percent

94—Newbell-Rock outcrop complex, 40 to 65 percent slopes

Map Unit Setting

- *National map unit symbol*: 2tcs4
- *Elevation*: 2,230 to 4,720 feet
- *Mean annual precipitation*: 21 to 47 inches
- *Mean annual air temperature*: 41 to 45 degrees F
- *Frost-free period*: 80 to 120 days
- *Farmland classification*: Not prime farmland

Map Unit Composition

- *Newbell, stony, and similar soils*: 65 percent
- *Rock outcrop*: 20 percent
- *Minor components*: 15 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Newbell, Stony

Setting

- *Landform*: Mountains, hills
- *Landform position (two-dimensional)*: Footslope
- *Landform position (three-dimensional)*: Mountainbase, base slope
- *Down-slope shape*: Concave, convex
- *Across-slope shape*: Linear
- *Parent material*: Volcanic ash and loess over glacial till from mixed minerology

Typical profile

- *Oe - 0 to 1 inches*: moderately decomposed plant material
- *A - 1 to 7 inches*: cobbly ashy silt loam
- *Bw - 7 to 13 inches*: cobbly ashy silt loam

- *2BC - 13 to 27 inches*: very gravelly sandy loam
- *2Cd - 27 to 61 inches*: very gravelly sandy loam

Properties and qualities

- *Slope*: 40 to 65 percent
- *Percent of area covered with surface fragments*: 0.1 percent
- *Depth to restrictive feature*: 20 to 40 inches to densic material
- *Natural drainage class*: Well drained
- *Capacity of the most limiting layer to transmit water (Ksat)*: Moderately low (0.01 to 0.14 in/hr)
- *Depth to water table*: More than 80 inches
- *Frequency of flooding*: None
- *Frequency of ponding*: None
- *Available water storage in profile*: Low (about 4.5 inches)

Interpretive groups

- *Land capability classification (irrigated)*: None specified
- *Land capability classification (nonirrigated)*: 7e
- *Hydrologic Soil Group*: C
- *Other vegetative classification*: grand fir/ninebark (CWS421)

Description of Rock Outcrop

Typical profile

- *R - 0 to 59 inches*: bedrock

Properties and qualities

- *Slope*: 40 to 65 percent
- *Depth to restrictive feature*: 0 inches to lithic bedrock

Interpretive groups

- *Land capability classification (irrigated)*: None specified
- *Land capability classification (nonirrigated)*: 8

Minor Components

Scrabblers

- *Percent of map unit*: 3 percent
- *Landform*: Terraces
- *Landform position (two-dimensional)*: Toeslope
- *Landform position (three-dimensional)*: Tread
- *Down-slope shape*: Linear
- *Across-slope shape*: Linear
- *Other vegetative classification*: Douglas-fir/pinegrass (CDG131)

Aits, stony

- *Percent of map unit*: 3 percent
- *Landform*: Hills, mountain slopes
- *Landform position (two-dimensional)*: Toeslope, footslope
- *Landform position (three-dimensional)*: Base slope

- *Down-slope shape:* Concave
- *Across-slope shape:* Convex, linear
- *Other vegetative classification:* western hemlock/queen cup beadlily (CHF311)

Inkler

- *Percent of map unit:* 3 percent
- *Landform:* Hills
- *Landform position (two-dimensional):* Toeslope
- *Landform position (three-dimensional):* Base slope
- *Down-slope shape:* Concave
- *Across-slope shape:* Linear
- *Other vegetative classification:* Douglas-fir/ninebark (CDS715)

Moscow

- *Percent of map unit:* 3 percent
- *Landform:* Hills
- *Landform position (two-dimensional):* Backslope
- *Landform position (three-dimensional):* Mountainflank, side slope, base slope
- *Down-slope shape:* Convex, concave
- *Across-slope shape:* Convex, linear
- *Other vegetative classification:* western hemlock/queen cup beadlily (CHF311)

Kegel, poorly drained

- *Percent of map unit:* 3 percent
- *Landform:* Seeps, draws
- *Landform position (two-dimensional):* Toeslope
- *Down-slope shape:* Concave
- *Across-slope shape:* Concave

163—Water

Map Unit Composition

- *Water:* 100 percent
- *Estimates are based on observations, descriptions, and transects of the mapunit.*

Soil Productivity

The following tables summarize the site index for each soil type within Yocum Lake Park for ponderosa pine and Douglas-fir:

Map Unit Symbol	Map Unit Name	Tree Site Index Ponderosa Pine Meyer 1961 (600)	Cubic Feet/Year Ponderosa Pine Meyer 1961 (600)
56	Inkler	106	NA
59	Inkler	106	100
90	Newbell, Stony	113	86

94	Newbell, Stony	103	72
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Map Unit Symbol	Map Unit Name	Tree Site Index Douglas-fir Meyer 1961 (600)	Cubic Feet/Year Douglas-fir Meyer 1961 (600)
56	Inkler	84	NA
59	Inkler	84	72
90	Newbell, Stony	105	100
94	Newbell, Stony	82	86

Description — Forest Productivity (Tree Site Index)

The "site index" is the average height, in feet, that dominant and co-dominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands.

The *Base Age* is the age of trees in years on which the site index is based. "TA" indicates total age. "BH" indicates breast height age. "N/A" indicates that base age is not applicable.

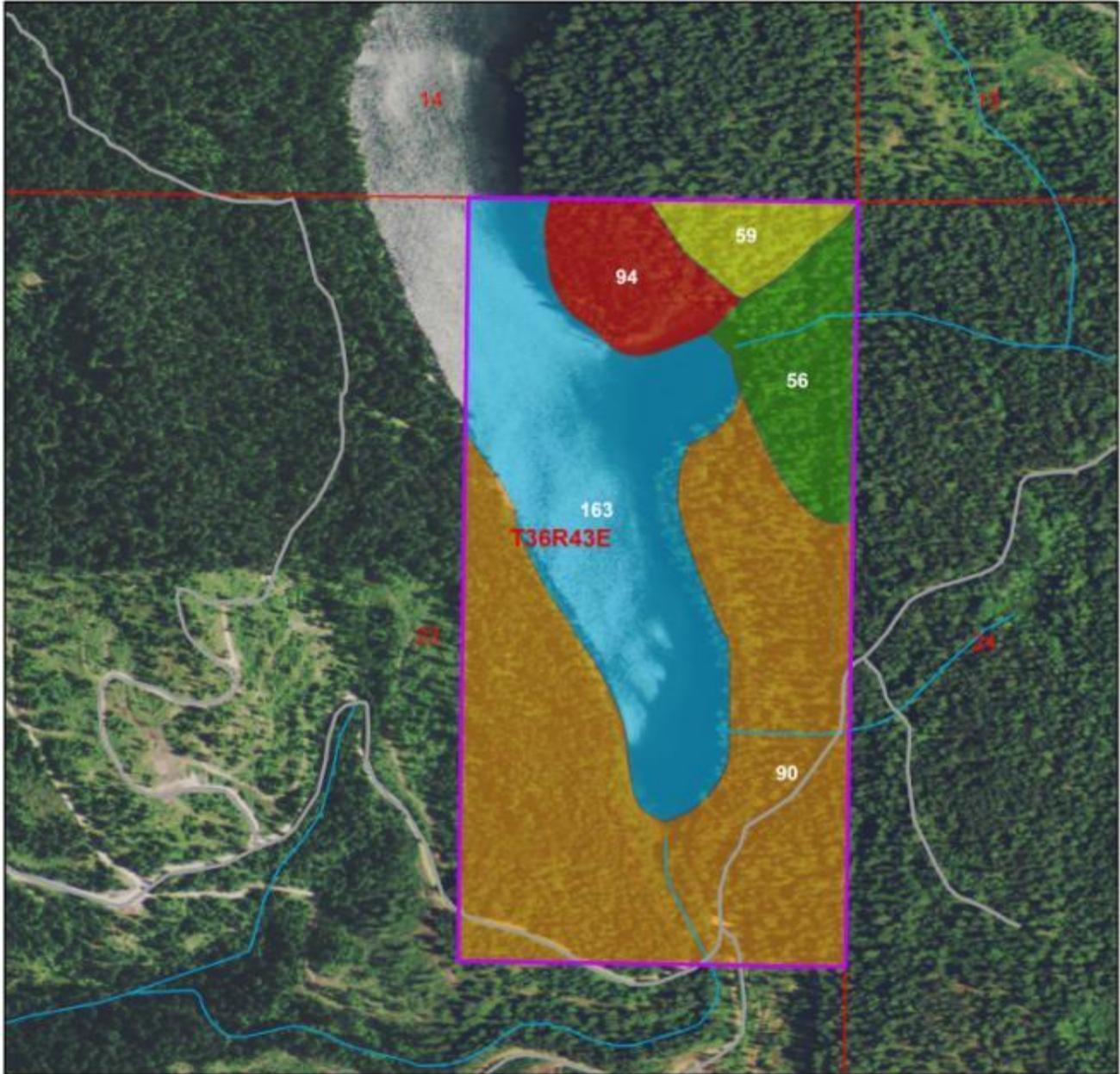
The *Site Index Curve Number* is listed in the National Register of Site Index Curves. It identifies the site index curve used to determine the site index.

The *Volume Growth Rate* is the maximum wood volume growth rate likely to be produced by the most important tree species. This number, expressed as cubic feet per acre per year and calculated at the age of culmination of the mean annual increment (CMAI), indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand. (Reference: United States Department of Agriculture, Natural Resources Conservation Service).

Soil Summary

The soils found within Yocum Lake Park are productive forestland soils. The only soil present that is not conducive to tree growth is the rock outcrop components in Map Units 59 and 94. All of the soils found within Yocum Lake Park have a low resistance to soil compaction. Selection of appropriate harvesting systems and proper road maintenance within these areas is particularly important. Additionally, proper seasonal timing of harvesting activities is important to protect soils structure and productivity in these areas. Operating during periods when the soil is frozen or dry will help to prevent compacting and reduce detrimental disturbance. More than 85% of the forested portion of the parcel has a severe or very severe erosion hazard, primarily due to steep slopes in these areas. Caution should be taken to avoid exposed soil. The soils support a variety of tree species including Douglas-Fir, ponderosa pine, lodgepole pine, western larch, western hemlock, western red cedar and western white pine.

Yocum Lake
 Pend Oreille County Parks
 NE 1/4 of E 1/2 Section 23 T36N R43E W.M.
Soils Map



0 250 500 1,000 Feet



1:6,000

Legend			
	Yocum Lake Parcel		163: Water
	Roads		56: Inkler gravelly silt loam
	Sections		59: Inkler-rock outcrop complex
	Streams		90: Newbell cobbly ashy silt loam
Yocum Soils			94: Newbell-rock outcrop complex

Resource Category III – Water Quality/Riparian and Fish Habitat/Wetlands

Riparian areas are defined as areas adjacent to free water where the vegetation of that area, the vegetative community, is directly affected by the free water. These areas include streams, rivers, ponds, seeps, springs, and wetlands; water is the main factor of a riparian system that distinguishes it from the surrounding uplands. The additional water available in a riparian system supports lush vegetation, which helps to retain water in the system. During periods of high runoff, such as snowmelt in the spring, intermittent streams will carry water and sediment into the receiving perennial streams.

Riparian areas are beneficial to the ecosystem and the landowners in many ways. With proper management, vegetative cover filters sediment from streams. Large organic debris in streams filter sediment and slows the water's velocity, thus reducing its ability to carry sediment. Trapping these sediments contributes to the rich soil found in riparian areas, further supporting the vegetative community. Grasses, shrubs, and trees in the riparian area catch and hold sediments and pollutants that come from adjacent fields and forests. Sediments are then removed from the water, improving the quality and clarity. Healthy riparian areas slow water flow, reduce the likelihood of downstream flooding, filter and spread the water, and stabilize stream banks during high water events.

Riparian areas are home to a variety of wildlife and bird species that find food, shelter, and relief from temperature extremes. Loss of vegetation is one of the most serious changes affecting the riparian area. The impact can be great, because until re-growth occurs, the land is subject to increased erosion, decreased water quality, and wildlife use will be altered. Some of the plant and tree species that contain high forage value for wildlife include aspen, serviceberry, and cottonwood.

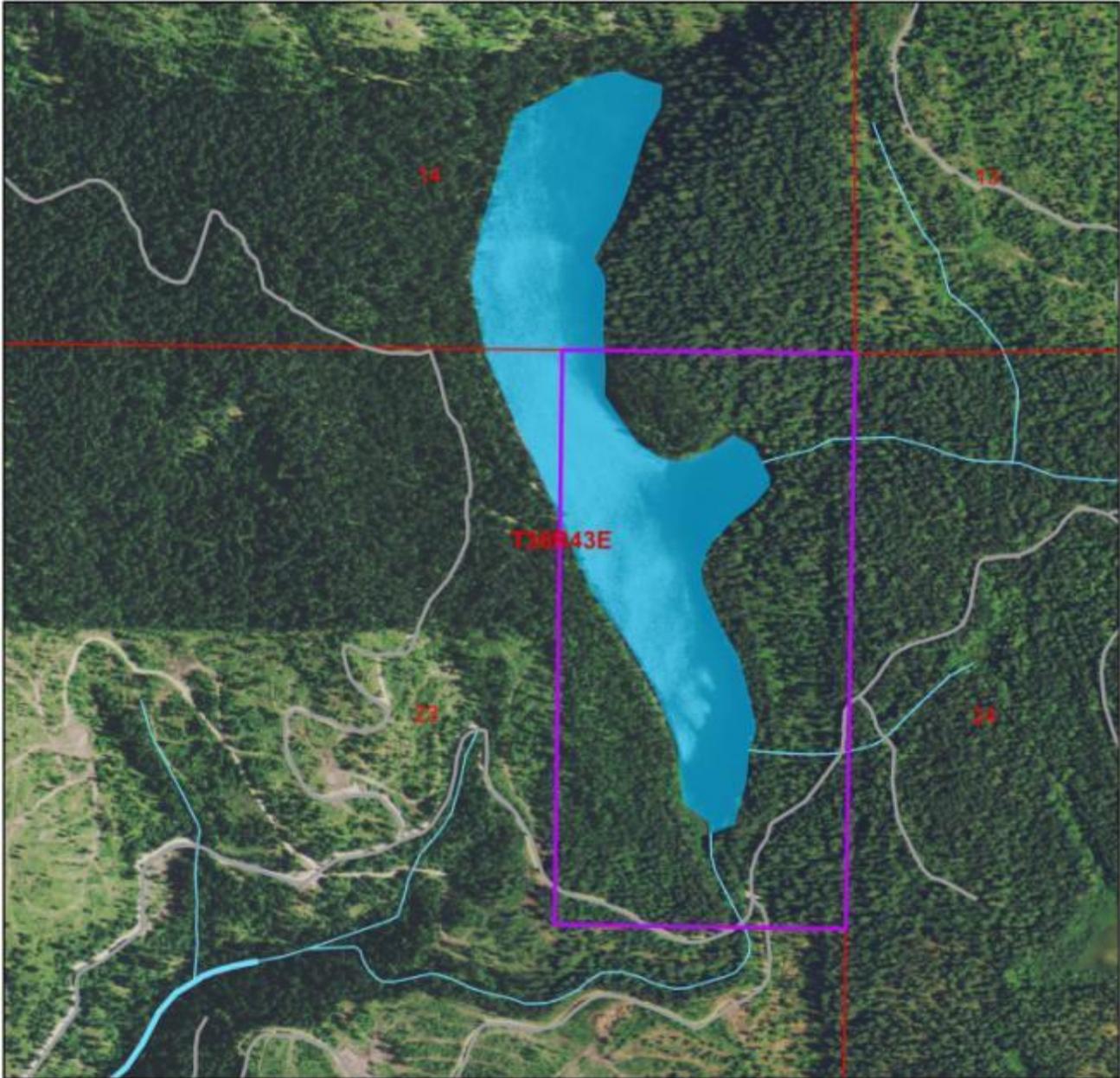
The water resource map on the following page depicts the locations of streams and water bodies found within Yocum Lake Park. The two streams found along the eastern side of the lake were not supporting surface flow during field visits in the month of September; however, both drainages may be below perennial water sources (springs or wetlands) found on the adjoining parcel to the east. Further review of these drainages would be required prior to final classification. Yocum Lake and its tributary stream to the south are both fish-bearing waters. Yocum Lake is classified as a type "S" water, or, shoreline of the state (navigable water).

Management Action

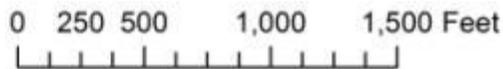
The riparian areas found within Yocum Lake Park provide unique wildlife habitat elements and should be passively managed for this purpose. The denser canopy cover found in such areas provides hiding and thermal cover for big game along with a likely travel corridor between differing cover types. Additionally, the lack of management in these areas will foster snag and large woody debris recruitment. Maximum riparian management zone (RMZ) widths should be adhered to during future harvesting operations occurring adjacent to these areas. Yocum Lake and its tributary stream require a 110-foot riparian management zone buffer during commercial harvest operations. The two streams along the east side of the lake will require a 50-foot RMZ if determined to be classified as perennial streams.

Establishing additional shrub species such as red-osier dogwood, elderberry, chokecherry and others will help increase plant diversity and improve habitat values. These types of improvements can be scheduled with other conifer reforestation activities which may occur within the park following future harvests.

Yocum Lake
 Pend Oreille County Parks
 NE 1/4 of E 1/2 Section 23 T36N R43E W.M.
Water Type



1:8,000



Legend	
	Yocum Lake Parcel
	Roads
	Sections
Streams	
	Fish
	Non-Fish
	Perennial Lake

Resource Category IV – Forest Inventory/Timber/Wood Products

Table 1, below, summarizes the 2012 Yocum Lake timber cruise (performed by the former Pend Oreille County forestry consultant). This was a low-intensity cruise, consisting of 10 variable radius plots installed across the parcel. These volumes include all material that meets minimum saw log specifications (a 16' log with a 5.5" top diameter inside bark). Gross Scribner volume is classed by species. This information is provided for reference purposes only.

Yocum Lake Park 2012 Timber Cruise	
Species	Gross Volume (MBF)
RC	10.0
DF/WL	183.0
LP	22.0
PP	24.0
Total	239.0

Table 1

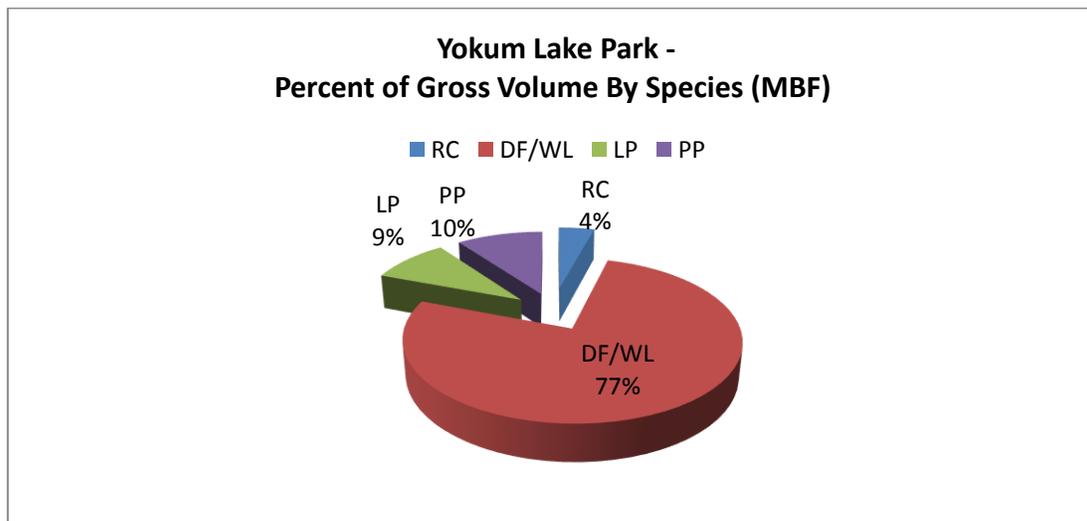


Figure 1

Silvicultural Treatments

Through the implementation of the recommended silvicultural treatments, the management objectives for this property can be achieved. This section of the plan will describe past management activities that occurred, the stand structure and condition, preferred management regime, and future management activities.

Yocum Lake Park provides a variety of wildlife habitat, recreational, and forest management opportunities that will benefit the local public. Forest management actions are designed to meet the multiple use objectives of this valuable county park.

The following is a brief description of the silvicultural treatments that are suggested to occur on the property. These definitions are meant to familiarize the reader with management options identified in this section.

Uneven aged/Sanitation

Generally, a sanitation harvest would only take damaged or diseased trees. An uneven aged stand is perpetuated by conducting an uneven aged harvest, also known as single tree selection. For this particular property, the sanitation harvest will be paired with single tree selection in order to maintain and perpetuate an uneven aged stand.

Stocking levels of at least three age or size classes must be maintained in order to have an uneven aged stand that can be harvested at regular intervals. More age classes require a shorter harvest cycle with less volume harvested per entry. Comparing age classes to each other in trees per acre should show most of the trees in the regeneration cohort, with progressively fewer trees in each age class above. Each harvest needs to harvest enough trees to open the forest canopy so the next cohort of regeneration can become established. This is especially important when shade intolerant tree species are desired. With each harvest entry, all of the overstory is removed and each class following has more trees retained than the class above it. With this silvicultural system, sanitation, species selection and stocking control are essential. The best trees should be retained from each cohort, as some of those trees will eventually become the overstory that casts seed for yet another cohort.

Commercial Thinning

The ideal number of crop trees to grow through to the end of a stand's rotation age is approximately 150-180 trees per acre depending on site conditions. This average range applies to more mesic conditions. When an even-aged stand of younger merchantable-sized timber has a significantly greater number of trees per acre, a commercial thinning should occur to lessen the inter-tree competition and to concentrate the growth on the potential crop trees. In a commercial thinning harvest, defective, poorly formed, poor vigor, and suppressed trees should be targeted for removal as well as any additional trees necessary to reach the desired stocking level and species composition.

Group Selection

Individual tree and group selection harvests usually occur in stands that have an uneven-aged, multi-storied structure and a diverse mix of species. Mature and over mature trees are harvested as well as some smaller, younger trees to control the stocking in the stand. Groups of trees are removed in a small patch to clear an area for regeneration either through natural means or by planting. The target stand is a multi-storied, multi-aged stand with many species present.

Pre-commercial Thinning

Pre-commercial thinning occurs in young stands that are growing with very high stocking levels. An ideal stand to thin would be one where the trees are less than 15 feet tall and in excess of 400 trees per acre. The ideal target stocking level for trees of this size is around 250 trees per acre. Species selection is generally the same as for a commercial thin with an average spacing between trees of approximately 12-15 feet.

Reforestation

Natural reforestation occurs when viable seed germinates and becomes an established seedling that can grow to maturity. Silvicultural treatments to control sunlight, space and nutrients favor different species' reforestation abilities. Tree planting, with stock from a nursery, is done early in the spring and later in the fall when conditions favorable to the seedlings are found. The art and science of tree planting has progressed to improve seedling survival, genetics and cost effectiveness. Currently, containerized seedlings are preferred by many. Each seedling is germinated and grown for at least one year in growing medium that stays with the tree, as it is out-planted. This "plug" of growing medium helps the seedling to survive the stress and strain of transplanting and also makes the planting process less prone to error. Advantages of successful natural regeneration are low cost and proven tree genetics. Advantages of tree planting are control of species composition, possible improvement of genetics and stocking level control.

Site Preparation

One of the major obstacles to seedling survival, both natural and planted, is shrub and grass competition. In most stands, a major component of the understory is shrub and grass species rather than the desired tree seedlings. This becomes a management challenge when stands are opened up and shrubs quickly occupy the open space. Proper site preparation is crucial for planting success. Numerous site preparation methods are available to treat competing shrubs and grasses.

- Mechanical site preparation: Ripping the brush out with an excavator or dozers equipped with a brush blade can be feasible and a low cost method in areas with low to moderate slopes (0-35%). The method may also include use of forestry mowers (masticators) that eliminate woody brush which can be worked into the duff layer. These machines typically cause less soil displacement than dozers and excavators.
- Spot disturbance: During the planting process, depending on site conditions, scalps can be made. A scalp peels back heavy sod or grass, shrubs and heavy duff to reveal mineral soil where the seedling is then planted. Scalps vary in size from 1 to 9 square feet.
- Chemical site preparation: Herbicide spraying kills the competing vegetation (brush and grass) and allows the seedlings optimal growing conditions for the critical time period following planting. Chemical site preparation is frequently used in forest management; however, its application for site preparation in Yocum Lake Park is unlikely given other management concerns.

Prescribed Fire

Prescribed fire use within Yocum Lake Park will be limited to pile burning of logging and non-commercial thinning slash. Prescribed under-burning, although a valuable management tool, is not practical within Yocum Lake Park given the size of the parcel, topography, road access, and topographical features. Pile burning is an effective tool in mitigating fuel hazards and can also serve as a means to partial site preparation in some cases. Prescribed pile burning activity would be performed in the fall and early winter months following stand treatments.



Fall Unit Pile Burning for Fuels Reduction and Site Preparation

Stand Delineations

Yocum Lake Park is divided into three separate management “units” or “stands” for the purpose of evaluating the property and developing a course of forest management actions into the future. Stand delineations were developed based on species composition, age class, access, topography, and other management factors. The management units within Yocum Lake Park can be seen on the stand map on the following page.

Yocum Lake
Pend Oreille County Parks
Stand Map



1:4,000

Stand 1

Silvicultural Objectives

- Establish and promote the development of a new seral species cohort.
- Promote the development of a multi-canopy structure for multiple resource benefits.
- Retain and recruit snags and large woody debris for wildlife habitat.



Lodgepole pine dominant overstory with a significant amount of paper birch

Stand History, Structure and Condition

Stand 1 consists of 15 acres in the southwest portion of Yocum Lake Park. The overstory of Stand 1 is predominantly lodgepole pine (50%) and western larch (30%) with a minor component of Douglas-fir (15%) and very small amount of grand fir and ponderosa pine (5%). In addition to the conifer overstory, there is a significant amount of birch present in the mid-canopy layer. The presence of this deciduous species is competing with the understory conifer development. Much of the birch has died out, although its presence in the canopy remains significant. No management activity has occurred within this stand for at least 30 years.

The timber in Stand 1 would be considered small to medium-sized sawtimber. Tree heights of the dominant overstory range from 65 to 95 feet – the lodgepole pine ranges from 65 to 80 feet, while the dominant western larch and Douglas-fir range from 75 to 95 feet. The average Diameter at Breast Height (DBH) is 13 inches, with a range from 10 to 18 inches. Crown conditions are good throughout most of the dominant overstory, with an average live crown ratio of approximately 40%. Some physical defects are present (mostly in the lodgepole pine) – mostly crook, sweep and catfaces (old wounds in the cambium). Overstory basal area ranges from 30 to 140 square feet per acre, with an average of 65 square feet per acre.

The understory cohort in Stand 1 consists mainly of scattered grand fir (65%) and Douglas-fir (25%) seedlings and saplings along with a small amount of ponderosa pine, lodgepole pine, and white pine

(10%). Most of the visible regeneration is seedlings and saplings ranging from 1 to 6 feet in height and stocked at an approximate rate of 200 trees per acre (although it's distribution is patchy). Upon closer view of the forest floor, there is a significant amount of small seedlings present which are less than six inches in height, most of which are grand fir and Douglas-fir. Stand 1 will eventually shift to conifer dominance in the mid and understory layers over the next 20 years without any active management.

Forest health within Stand 1 is good overall at this time. The only concern in this regard is the age of the lodgepole pine component, which is approximately 70 years. Lodgepole pine is typically managed on rotations less than 80 years to prevent age-related mortality, as this is generally a short-lived species. Small amounts of red ring rot were observed in the lodgepole pine as well. The western larch and Douglas-fir within the stand are in excellent condition and of good quality.

The desired future condition is a two-aged stand composed primarily of western larch, Douglas-fir, ponderosa pine and western white pine. The current structure of the stand is mostly a single-aged stand with a significant hardwood component. In the absence of proper forest management treatments, this stand would develop into a two-aged stand with a shade-tolerant understory consisting mostly of grand fir, which is not desirable. A variety of size and age classes is desirable for wildlife and recreational values. Approximately ten snags and five pieces of coarse woody debris per acre are desirable for wildlife habitat.

Terrain/Access

Access to Stand 1 is provided by Yocum Lake Road, which transects the southwest portion of the unit. Stand 1 has very gentle terrain, with slopes average approximately 10%. There are no access or terrain concerns for harvesting equipment or future management actions.

Environmental Constraints

A riparian management zone (RMZ) will be required along the west shoreline of Yocum Lake and its associated stream on the south end. The RMZ width is 110 horizontal feet from the shoreline/stream bank.

Silvicultural Prescription and Schedule

Timber Harvest: A group selection harvest is recommended within the next 5 years to remove at least 90% of the lodgepole pine within the stand. The objective of this harvest is to prevent excessive loss of timber value in the aging lodgepole pine while opening canopy conditions for further establishment of seral species. At least 50% of the paper birch should also be harvested to create favorable growing conditions for these shade-intolerant species. This material may be marketable as a firewood sort, since there is no market for them as sawlogs.

This harvest can be performed with mechanized or conventional harvesting equipment. Processing (limb and top) would ideally occur within the unit to prevent large landing areas along Yocum Lake Road. Logging slash should then be piled and burned to reduce fuel hazards and aid with site preparation.

Reforestation: In the spring following the recommended harvest, interplant western larch, white pine, and ponderosa pine at a rate of 200 trees per acre. Some natural regeneration will occur, but planting

will ensure the desired species composition. Additional site preparation should not be necessary, following the logging and piling/burning. Monitor planted seedlings for 5 years until establishment can be confirmed.

Stand 2

Silvicultural Objectives

- Maintain integrity of old forest structures throughout the stand.
- Retain snags and large woody debris for wildlife habitat.
- Manage passively for recreational and scenic values.



Mature ponderosa pine and Douglas-fir on a dry south slope

Stand History, Structure and Condition

Stand 2 consists of 8 acres in the northeastern portion of Yocum Lake Park. Most of the stand is located on a moderately steep, south-facing slope. The overstory of Stand 2 is primarily ponderosa pine (50%) and Douglas-fir (40%) with a minor component of lodgepole pine (10%). Stand 2 is isolated from Stand 3 (to the south) by a steep draw on its southeast corner. The majority of this stand is steep and rocky, especially ascending from the draw. There is no evidence of logging or forest management activity occurring within the last 50 years.

The timber in Stand 2 is mostly large sawtimber. Tree heights of the dominant overstory range from 75 to 100 feet. The average Diameter at Breast Height (DBH) is 16 inches, with a range from 10 to 24 inches. Crown conditions are fair throughout most of the dominant overstory, with an average live crown ratio of approximately 35%. Some physical defects are present given the age and structure of the stand. Crook, sweep and double tops are found in the stand. Overstory basal area ranges from 60 to 160 square feet per acre, with an average of 100 square feet per acre.

The understory cohort in Stand 2 consists mainly of scattered Douglas-fir and ponderosa pine, found mostly in small clumps within canopy openings. A moderate amount of brush is present in Stand 2, mostly consisting of oceanspray and ninebark.

Forest health within Stand 2 is moderate at this time. Several areas within the stand are overstocked for the harsh site conditions and relatively low site class found in this area. In addition, there is a fair amount of suppressed and defective timber due to a lack of management and site conditions. Some visual evidence of root disease was observed within some of the Douglas-fir.

Terrain/Access

There is no road access to Stand 2. A hiking trail does exist along the lakeshore near the southern boundary of the stand. Road access is not practical in this area due to a high amount of rock and steep side slopes. Slopes range from 20% to 55%.

Environmental Constraints

Yocum Lake requires an RMZ width of 110 horizontal feet from the shoreline during any commercial harvest activity.

Silvicultural Prescription and Schedule

Given the operational constraints and visual qualities of Stand 2, there are no recommended management actions at this time. Cable yarding is the most appropriate logging system for this stand; however, there is no road access to accommodate this type of system. Nor is there a sufficient road system on any of the neighboring parcels.

Because this slope faces much of Yocum Lake, it is most valuable for the scenic quality that it provides to the park. Harvesting options would be very expensive and likely not economical or practical given all of the constraints.

Stand 3

Silvicultural Objectives

- Improve long-term forest health by managing stocking levels and species composition.
- Retain snags and large woody debris for wildlife habitat.
- Promote a multi-aged stand for multiple resource benefits.



Open overstory of PP, DF, WL harvested about 12 years ago

Stand History, Structure and Condition

Stand 3 is a 20-acre stand located on along the east side of Yocum Lake. The stand is located on a western aspect with moderate slopes. Most of Stand 3 was harvested about 12 years ago, shortly before the property was acquired by Pend Oreille County. The current stand consists of a relatively open overstory with a significant amount of sapling-sized regeneration. The overstory is comprised of medium-sized sawtimber consisting of western larch (65%), ponderosa pine (25%), and Douglas-fir (10%). Tree diameters range from 12 to 16 inches DBH, with heights of 80 to 95 feet. The average basal area is approximately 40 square feet. Due to being recently harvested, the residual overstory is in mostly good health and condition. Dominant and co-dominant seed trees were selected for retention during this harvest.

The understory cohort consists of well-stocked lodgepole pine, grand fir, ponderosa pine, Douglas-fir and western larch. Most of the regeneration cohort is in the form of saplings ranging from 5 to 8 feet tall. The stocking rates average approximately 600 trees per acre. Most of the trees within this cohort displayed good crown condition and vigorous leader growth.

Forest health in Stand 3 is good overall. The only concern with the overstory component is a minor amount of dwarf mistletoe observed in the western larch. Mistletoe levels should be monitored as the understory develops. If a significant amount of western larch regeneration is adjacent (within 60 feet) to infected overstory trees, they can be girdled to prevent further mistletoe infection. The primary concern is maintaining optimal stocking levels and species composition in the emerging regeneration cohort. Pre-commercial thinning (PCT) treatments will be helpful in the near future to address these concerns.

The desired future condition is a multi-aged stand composed of mostly western larch and ponderosa pine, along with a lesser component of Douglas-fir and lodgepole pine. A variety of size and age classes is desirable for wildlife and recreational values. Approximately ten snags and five pieces of coarse woody debris per acre are desirable for wildlife habitat.

Terrain/Access

Access to Stand 3 is adequate for future management purposes. Yocum Lake Road accesses the southern half of the stand and then turns into a brushed-in logging spur/skid trail. This old logging spur appears to be located a sufficient distance out of the RMZ to accommodate landing areas and may be reused in future commercial entries.

The terrain in Stand 3 is gentle to moderate, with maximum slopes of 50% at the far north end. Most of this stand is 35% slope or less. This stand is operable with ground-based harvesting equipment.

Environmental Constraints

Yocum Lake requires an RMZ width of 110 horizontal feet from the shoreline during any commercial harvest activity.

Silvicultural Prescription and Schedule

A commercial harvest is not recommended within this management period (20 years). Stand conditions, if managed, may be nearing commercial treatments in 20 to 25 years. Much of the existing overstory is recommended for long-term retention to satisfy habitat and visual benefits consistent with the desired future condition. As mentioned, overstory western larch infected with mistletoe may be girdled (killed in place) to reduce the spread of the parasite to receptive saplings.

Pre-commercial thinning is recommended to take place within the next 5 to 8 years to reduce stand densities and manage species compositions within the regeneration cohort. The preferred species for retention (in descending order) are: western larch, white pine, ponderosa pine, Douglas-fir, and lodgepole pine. All grand fir should be removed during PCT treatments. The target stocking level of this treatment is 200-250 trees per acre (13 to 15-foot spacing). Slash treatment may involve lop and scatter or hand-piling and burning. The later is recommended for fuels reduction concerns associated with high public use and adjacency to other ownerships, aesthetics value, and recreational access within the treatment area. Piled areas should be seeded with a wildlife forage mix following burning.

This treatment is recommended in the next 5 to 8 years to allow the regeneration to develop more prior to selecting the best crop trees. Crowns should be slightly overlapping and trees should ideally be 12 to 15 years of age prior to PCT treatments.

Natural Disturbance Events

In the event of natural disturbances, such as wildfires, significant wind storms, insect outbreaks, etc., the silvicultural objectives found within Resource Category IV should be utilized as much as possible for the purpose of salvage harvesting and other mitigation work.

Timely salvage operations are critical to prevent loss of value. This management approach allows for a timely execution of salvage efforts which are consistent with the objectives of the Forest Stewardship Plan.

Resource Category V – Property Access/Roads and Trails

Yocum Lake Road provides access to and within the park. This is a native-surface road which experiences light to heavy travel with pickups and passenger vehicles. Road use is at peak levels during hunting season and the late spring months when fishing season is most popular. The current road bed is in serviceable condition and is not in any need or reconstruction. Routine road maintenance (grading, ditch clearing, cross drain maintenance) should be evaluated and performed as necessary.

Access to and within Yocum Lake Park is adequate for all planned forest management activities. There is about 1,800 feet of existing traversable road within the park. This does not include the grown-in logging spur along the east side of the lake. If this road is re-opened for management uses in the future, it should be decommissioned to limit vehicle traffic once operations are completed. This will reduce unwanted dumping, shooting, etc. which may occur very near the lake shore.

There is no need or desire to construct new roads within the park. The existing road system will be maintained and open to public use for the foreseeable future. This road also provides access to the adjoining parcel to the east, owned by Arden Tree Farms.

A hiking trail originates from the north end of the grown-in logging spur along the east side of the lake. The trail traverses the northeastern shoreline and appears to receive semi-frequent use. Some minor clearing and limbing along the trail would be beneficial for users; however, there are no significant improvement needs at this time.

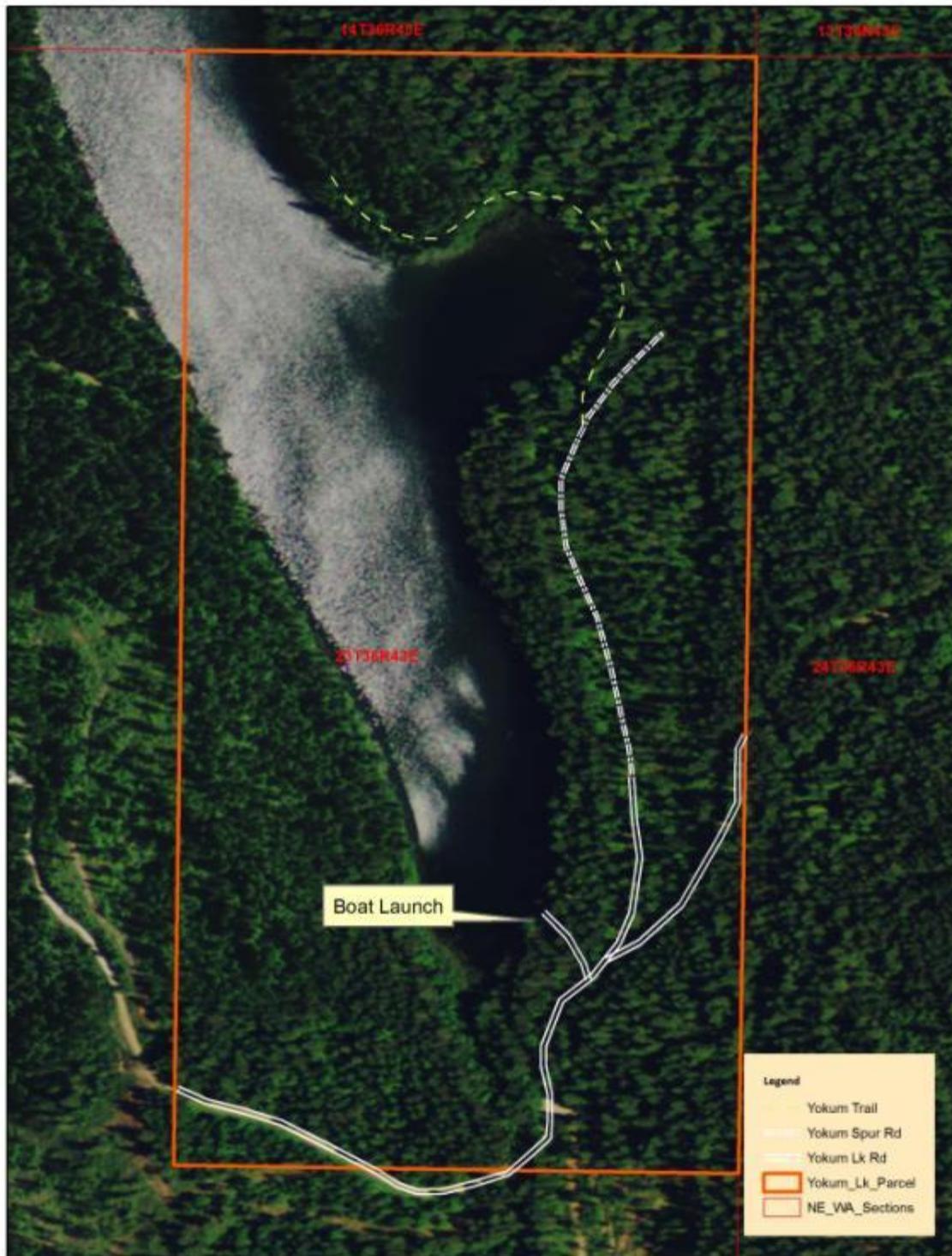
The gentle topography on the west side of Yocum Lake provides easy hiking access to this entire portion of the park. No trail construction is necessary in this area.

The road and trail system within Yocum Lake Park is in good, serviceable condition. Routine road maintenance and semi-frequent trail clearing should meet the needs of the current infrastructure. There is no apparent necessity for increasing the amount of roads or trails within Yocum Lake Park.



Yocum Lake Road near the western boundary of the park

**Yocum Lake
Pend Oreille County Parks
Road & Trail Map**



1:4,000


**NORTHWEST
MANAGEMENT, INC.**
 Map Created By:
 Northwest Management, Inc.
 P.O. Box 1103
 Deer Park, WA 99006
 509-276-4699
 www.consulting-foresters.com



Resource Category VI – Wildlife

All forest-dependent wildlife species require food, water and shelter from inclement weather (both summer and winter), and cover from predators for breeding, rearing of young, and feeding. The mixture of forest vegetation types and landforms determines suitability of habitat for each particular wildlife species. A diverse mixture of tree and shrub species, sizes, and age classes, as well as dead and dying trees in the form of snags and coarse woody debris (fallen trees and large logging debris) will increase wildlife species diversity and abundance. The presence of water and associated vegetation (riparian zones) in proximity to diverse forest habitats enhances biological diversity.

Diverse and persistent forest, shrub, and herbaceous plant stands arranged with consideration to special habitat features such as water, edge, snags, openings, and other features will increase year-round wildlife use of the property.

It is important to consider habitats (or lack thereof) located around the subject property, this is often called the landscape matrix. This offers an overall picture of how a particular parcel could be managed in comparison to adjacent habitats. The matrix can impact how animals use patches of habitat. Land uses within a matrix can differ in their impact on related wildlife. Conversion of forests to residential development or agriculture is often regarded as permanent habitat loss, while silvicultural disturbances tend to provide a more heterogeneous structure and often provide quality habitat for wildlife. The landscape matrix may provide clues to a land manager of the potential wildlife uses of a particular property and thus, how to manage it.

As previously mentioned, wildlife species have a set of specialized requirements, including food, water, and cover. If one of these requirements is in short supply, overall effectiveness of the habitat is reduced. A requirement in short supply is referred to as a limiting factor. Limiting factors are comparable to the staves in a barrel - if one of the barrel staves reaches only part-way to the top, then the barrel will only hold water up to that level. The barrel staves represent different habitat aspects of food, water, and cover. A habitat's effectiveness or ability to support wildlife is based on its most limiting factor. These three factors - cover, food, and water - can be further broken down into sub-factors.

Cover

High plant diversity across a landscape provides cover requirements for many species. Cover requirements also differ within a species depending on time of year and the activity of the animal. Cover can be broken down into sub-components of thermal and security cover; these differ in their functions, but may occupy the same site.

The vegetation that provides thermal cover is generally denser than security cover. Thermal cover provides animals protection from the elements by providing them with warmer conditions in winter and cooler conditions in summer. Thermal cover requirements vary with species, ranging from conifer thickets for deer and elk, to the grass cover used by smaller mammals such as mice and voles.

Security cover provides animals protection from predators. Uses include resting, loafing, and bedding areas, feeding areas, travel corridors, and areas for rearing young.

The most effective habitat includes components of thermal and security cover in proximity to the other main habitat components of food and water. Interspersion of the important components increases an animal's ability to travel between and use the various areas for feeding, security, and reproduction. A local area may be improved for wildlife without increasing the amount of any food or cover resource, if the interspersion of the needed resources is increased. In addition, the interspersion of the various habitat components can produce "edge habitat."

Food

High plant diversity also offers a broad variety of foods needed by different species. Deer, moose, and elk vary in their food choices. White-tailed deer commonly browse the tips of woody trees and shrubs, and forage on broad-leaved forbs when they are available. Elk graze herbaceous plants such as grasses, clover, and alfalfa, feeding on browse when it is readily available. Moose are primarily browsers, preferring the tips of woody trees and shrubs, especially willows and red-osier dogwood. They will also consume a variety of broad-leaved forbs and aquatic plants, depending on availability.

Water

The need for water varies between species, ranging from the strong association and absolute water requirement of amphibians and aquatic mammals, to species that require only minimal amounts for drinking water. Waterfowl, including migratory ducks and geese, use open water for escape areas from predators, and also feed on aquatic insects, crustaceans, and plants. Shorebirds, such as snipe and herons, use shallow water areas for feeding and will nest along the shorelines.

Yocum Lake Park provides valuable wildlife habitat for several species of birds, small mammals, fish, amphibians, and ungulates. Yocum Lake itself is a highly valuable water source for various species, while providing habitat for fish, amphibians, waterfowl, etc. In addition, the property provides areas of thermal and security cover, especially for big game animals such as deer and elk. The riparian management zones, in particular, provide each of the identified habitat features that are essential for wildlife. The riparian zones offer safe travel corridors, bedding areas, and security/thermal cover. Forage is found in the form of native grasses and forbs.

Wildlife habitat can be protected, enhanced, and even created with appropriate management done in conjunction with other forest management activities. A brief explanation of some of the important habitat components follows along with management recommendations.

Habitat Component Descriptions

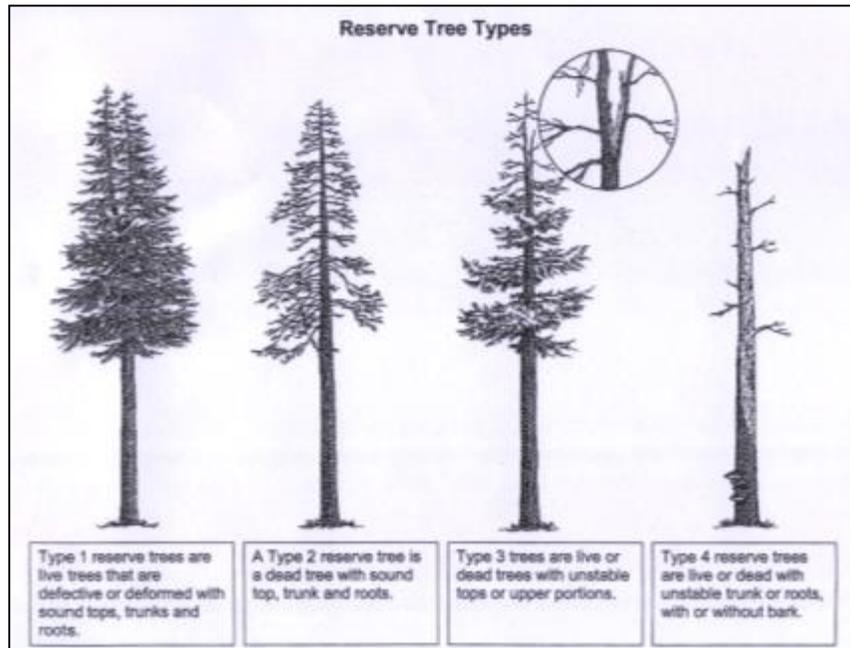
Snags and Coarse Woody Debris

About one-third of forest wildlife species are dependent on snags (standing dead trees) and coarse woody debris (down logs and trees). More than 60 of these species use cavities (holes excavated in trees) created primarily by woodpeckers for nesting and shelter. Most cavity nesters prefer the harder and larger diameter snags; those that are in the earlier stages of decay. The taller and larger diameter snags benefit more species, for a longer period of time, than the smaller snags. However, small diameter and shorter snags (including stumps at least 3 feet in height) are also utilized for feeding and

cover. Snag dependent wildlife also use live trees with substantial amounts of decay. This includes broken tops, large dead and/or broken branches, cracked or damaged boles, heart rot, and mistletoe and rust brooms. Brooms (clumps of deformed branches) caused by these pathogens and parasites are readily used by platform nesters such as hawks, owls, eagles, and ospreys and as shelter for mammals such as squirrels and pine martens. Most wildlife species that use snags will use trees with substantial decay. Many of these defective trees will last for long periods of time and although they have little economic value, they have excellent value to snag-dependent wildlife.

Coarse woody debris goes through a similar decay cycle and usage pattern as snags. The larger diameter and longer length hard logs last longer and are used by more wildlife species than the smaller and softer pieces of coarse woody debris.

It has been determined that wildlife is so dependent upon snags and coarse woody debris that these have become regulated resources in the state of Washington. Minimum retention of these critical components is mandatory by law when timber harvest occurs. Ideally, these two components should be scattered throughout forested stands. If there is a lack of either resource, steps can be taken to increase their occurrence, some of them being very easy, such as mechanical “high-stumping”. Eastern Washington FPA regulations require the following retention during logging: 2 wildlife recruitment trees/acre (“wrts”), 2 green recruitment trees/acre (“grts”), and 2 segments of coarse woody debris/acre (CWD) – also known as the law of “2-2-2.” The picture below summarizes the four types of wildlife recruitment trees defined in the Washington FPA.



To meet wildlife habitat objectives, snags and coarse woody debris should be well distributed throughout each stand in Yocum Lake Park. Harvesting prescriptions and snag creation measures should be initiated where deficiencies in either component are identified.

Understory Vegetation

This consists primarily of grasses and forbs in sunnier locations and berry producing shrubs where sufficient sunlight and moisture are present. Some shade tolerant understory conifers also comprise this habitat category. Ground nesting and foraging birds and the majority of mammals use this habitat feature for food, shelter, and cover. Understory vegetation is scattered throughout the property except where the forest canopy has closed and eliminated sunlight to the forest floor. Many of the woody understory species provide a great food source to ungulates such as white-tailed deer.

Management Recommendations

The following management recommendations are consistent with the overall management goals for the property and are guidelines designed to protect and enhance wildlife habitat while accomplishing forest management objectives concurrently.

Overstory and Coarse Woody Debris

⇒ Snag retention and recruitment should be incorporated into all timber harvest operations. Trees with low economic value that contain obvious defects useful to wildlife should be retained wherever possible. If snags are in a shortage, creating them can be a viable alternative. Created snags can include size ranges from high stumps (at least 3 feet in height and at least 10 inches in diameter) to those that are at least 12 inches in diameter and at least 30 feet tall. Snags can be created from conifers by girdling it to kill the whole tree or hiring professional arborists to limb and top trees. Broken top or dead top trees can be created by girdling at the point of desired breakage with a chainsaw. A mechanical harvester during a harvest operation can also create snags through “high stumping” (see photo below). The minimum snag frequency for all stands is 5 snags per acre. This target may be reached through high stumping, retention of overmature timber (snag recruitment), and snag creation (girdling).

⇒ Retain existing large pieces of coarse woody debris during harvest operations, especially pieces which are at 18 inches in diameter and larger. Large treetops and butt ends that are bucked during harvest operations can be retained for coarse woody debris and yarded back out into the treatment unit. This component can also be created from poor quality trees that are at least 20 feet long and at least 10 inches in diameter at the small end. The target coarse woody debris level for all treatment units is 5 pieces per acre.



Mechanical “high-stump” created by feller-buncher in previous harvest entry

⇒ Retain selected Douglas-fir with mistletoe brooms (if available) where they will not impact surrounding regeneration. This is advisable for ground squirrels and nesting owls.

Understory

- ⇒ Retain understory vegetation, especially preferred species which are currently present on the site, which include serviceberry, and chokecherry. Sites that may be disturbed during management activities and exposed to increased sunlight may be seeded to a wildlife forage seed mix. The creation of small foraging areas or wildlife shrub plantings in areas with available sunlight would intersperse food with cover and increase habitat effectiveness. Seeding previously burned areas (piled areas) is a good example of this improving understory habitat.
- ⇒ Planting shrub species such as blue elderberry, red osier dogwood, serviceberry, chokecherry, and mock orange can be undertaken to enhance species diversity and berry production in the understory of the property. This would help all wildlife species, particularly birds.
- ⇒ “Retention areas” may be incorporated into future treatment prescriptions during the project layout phase. Given the small size of the harvest area in Stand 1, the adjacent RMZ will serve well as a designated retention area. Retention areas can also be incorporated into pre-commercial thinning treatments. These areas would ideally consist of dense understory vegetation that provides thermal and security cover. This approach, coupled with dispersed retention of snags, will provide valuable habitat elements throughout the ownership and break site distance.
- ⇒ Construct small habitat piles which become excellent nesting cover for birds and small mammals. Piles should be at least 4 feet tall and compacted enough to sufficiently shed rainfall. Obvious overhangs and/or entrance points are favorable as well. Habitat piles can be constructed during commercial and non-commercial treatments. One to two piles per acre is the favorable amount of piles, depending on location.

Species Present/Observed

Yocum Lake Park property supports a wide assortment of wildlife. White-tailed deer, moose, elk, mountain lion, black bear, and coyotes are some of the mammals that utilize the property. Other mammals that use the property include bobcat, cougar, deer mouse, little brown myotis (bat), porcupines, raccoons, red squirrels, snowshoe hares, shrews, martens, weasels, badgers, and voles.

Some of the common birds that utilize the property include wild turkey, ruffed grouse, pileated woodpecker, owls, raptors, crows, various species of songbirds, and migratory birds. Amphibians, fish, and other aquatic wildlife are present in and around Yocum Lake.

Resource Category VII - Protection of Special Resources

The Washington State Department of Fish and Wildlife's (WDFW) Priority Habitats and Species List (PHS) identify habitats and species which are "considered to be priorities for conservation and management." The PHS database recognizes Yocum Lake as a Common loon (*Gavia immer*) breeding area. The Common loon is a state sensitive species, thus WDFW has adopted management recommendations for this bird. The Washington State Department of Fish and Wildlife recommends that between April 15th and July 15th, a 490' buffer around nest sites should be observed for all human activities. Between July 15th and September 1st, a 490' buffer around nursery location should be observed. Other recommendations include protecting loons and their habitat during courting, laying eggs and rearing chicks, avoiding activities that elevate mercury levels and developing artificial nesting islands (e.g. sedge mat and cedar log rafts). More information is available through the WDFW at: http://wdfw.wa.gov/publications/00026/Abbreviated_Common_Loon.pdf.

The outlet of Yocum Lake, which is a tributary to the Pend Oreille River, has listed occurrences of westslope cutthroat trout (*Oncorhynchus clarki lewisi*). The westslope cutthroat trout is a Washington state Species of Concern. More information about this land use planning for salmonids is available at: <http://wdfw.wa.gov/publications/pub.php?id=00033>.

In addition to westslope cutthroat, Yocum Lake Park is within the WA DNR bull trout overlay. The Pend Oreille River and its tributaries are all included within the overlay. Bull trout (*Salvelinus confluentus*) are listed as "threatened" under the federal Endangered Species Act. Bull trout are a native char found in many river systems throughout Washington State and are reliant upon clean, cold water to survive. For more information on bull trout, visit: <http://wdfw.wa.gov/fishing/washington/Species/1259/>. Adherence to the WA Forest Practices Act and wildlife habitat components of this plan will address management concerns affecting westslope cutthroat trout and bull trout.

The PHS Database also shows Yocum Lake Park and its surrounding area as having regular concentrations of Rocky Mountain Elk (*Cervus elaphus nelson*) and nearby occurrences of Gray wolf (*Canis lupus*).

Resource Category VIII - Aesthetics and Recreation

The aesthetic qualities of a property inherently improve the recreational enjoyment of outdoor activities such as hiking, camping, and wildlife viewing. Conversely, forest management activities such as timber harvesting are often times viewed by the public as unappealing with a negative impact on the surrounding flora and fauna. This poses a particular challenge when the property in question is a public park where recreation holds great value. The purpose of this plan is to outline a series of silvicultural treatments that will maintain the aesthetic and recreational qualities valued by the users of Yocum Lake Park in both the short and long term.

For the reasons mentioned above, the aesthetic resource values of Yocum Lake Park must be considered during all phases of forest management. The harvest prescriptions identified within this plan have been designed with consideration to the aesthetic impacts of management. With proper implementation of timber stand improvements such as PCT and planting, stand health and species composition will quickly outweigh any short-term impacts a harvest may have on aesthetics within the park.

Yocum Lake Park provides multiple recreational and educational opportunities to citizens in Pend Oreille County and the surrounding area. The public boat launch provides excellent lake access for small fishing boats, canoes, and kayaks (internal combustion motors are prohibited).

The old logging spur and lakeshore trail provide opportunities for low-intensity hikes around the lake. Wildlife viewing, photography, hunting, and equestrian riding are other opportunities available in the park.

Educational opportunities are also possible for local groups. Field trips following recent or active forest management practices would be beneficial to local elementary and high schools, colleges, universities, 4-H, scout troops, etc.

Resource Category IX - Specialized Forest Products

The opportunities for harvesting of specialized forest products are limited at Yocum Lake Park due to the size of its forested acreage and its location. However, Yocum Lake Park does provide an excellent venue for public education and outreach regarding specialized forest products. Partnering with WSU extension, there are multiple opportunities to conduct forest stewardship classes for various groups of citizens and forest landowners while promoting sound forest management practices that meet multi-use objectives. Additionally, there are opportunities to establish “for fee” classes with instruction on harvesting of floral crafts (shrubs, cones, bark), mushroom culturing and harvesting, wild fruit and vegetable harvesting and processing, wildland survival, etc.

Scout troops also have a unique opportunity in this park to integrate educational field trips hosted by resource professionals in conjunction with a fishing/camping trip.

On-going forest management practices should evaluate opportunities to incorporate these specialized forest products and services when possible. These often over-looked resources may provide sources of income, educational outreach, and recreation to the local citizens along with more widespread support of active forest management within Yocum Lake Park.

Management Timetable (2015-2034)

Year	Management Practice	Stand	Extent (#, acres)	Comments
2015	Prepare FSP			
2016	Harvest Evaluation	1	15	Evaluate market/stand needs
2017	Timber Harvest	1	15	Group selection
	Slash Disposal	1	15	Burn unit piles
	Habitat Piles	1	15	retain piles for habitat
	Special Forest Product	1	--	Firewood sale of birch
2018	Tree Planting	1	15	WL, WP, PP
	Seeding	1	--	seed piles/trails
2019	Monitor Forest Health Planting Evaluation	All Stands 1		Monitor seedling survival
2020	PCT Evaluation	3	20	Apply for DNR cost-share
2021	PCT Treatment	3	20	Create suitable habitat
	Habitat Piles	3	20	piles
	Planting Evaluation	1	--	Monitor seedling survival
2022	Slash Disposal	3	20	Burn PCT piles (retain habitat piles)
	Snag Recruitment	3	--	Girdle WL w/ mistletoe
2023	Seeding	3	--	Seed pile burn areas
	Planting Evaluation	1	15	Confirm establishment
2024	Snag Recruitment	RMZ		Evaluate snag distribution in RMZ
	PCT Evaluation	3	--	Evaluate PCT results
2025	Install bird boxes and goose platforms	RMZ	--	Install wood duck boxes and platforms
2026	Habitat Planting	RMZ	--	Evaluate habitat shrub planting along RMZ
2027	Monitor Forest Health	All Stands	--	
2028	PCT Evaluation	3	--	Evaluate PCT results & check stocking levels

2029	Trail Maintenance	2, 3	--	Clear vegetation along trail
2030	Monitor Forest Health	All Stands	--	
2031	Maintain Bird Boxes & Platforms	RMZ	--	Replace as needed
2032	Harvest Evaluation PCT Evaluation	3 1	20	Evaluate market/stand needs Check stocking levels
2033	Update Forest Inventory PCT	All Stands 1	-- 15	Integrate into FSP Apply for cost-share, PCT as needed
2034	Update FSP			

Glossary of Terms

1-hr fuels - Forest fuels which have a diameter up to ¼ inch.

10-hour fuels - Forest fuels which have a diameter ranging from 0.25 to 1 inch.

100-hour fuels – Forest fuels which have a diameter ranging from 1 to 3 inches.

1,000-hour fuels - Forest fuels which have a diameter ranging from 3 to 8 inches.

Basal Area - The area of the circle formed by the cross-section of a tree taken 4.5 feet above the ground.

Best Management Practices (BMP) - A practice or combination of practices that are determined to be the most technologically or economically feasible means of preventing or managing potential impacts.

Co-Dominant - A tree whose crown helps to form the general level of the main canopy in even-aged stands, or in uneven-aged stands, the main canopy of the tree's immediate neighbors, receiving full light from above and comparatively little from the sides.

Crop Tree - A healthy tree of a species that is ecologically suitable for the site, and commercially valuable.

Culmination of Mean Annual Increment (CMAI) - The age at which a timber stand reaches its highest average growth rate, or mean annual increment (MAI). MAI is calculated as stand volume divided by stand age. Culmination age is the optimal biological rotation age to maximize long-term volume production from a growing site.

Dominant - A tree whose crown extends above the general level of the main canopy of even-aged stands, or in uneven-aged stands, above the crowns of the tree's immediate neighbors and receiving full light from above and partial light from the sides.

Live Crown Ratio – The ratio of the length of the crown compared to the length of the whole tree.

Organic Material – Decomposed plants, animals and other organisms.

Pre-Commercial Thinning - A silvicultural treatment to reduce the number of trees in young stands, often carried out before the stems removed are large enough to be used or sold as a forest product. Prevents stagnation and improves growing conditions for the remaining crop trees so that at final harvest the end-product quality and value is increased.

Thermal Island – A thermal covering such as a patch of timber left from logging that provides thermal cover for wildlife.

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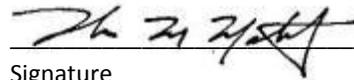
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APPENDIX A

Forest Stewardship Plan Signature Page

FOREST STEWARDSHIP PLAN SIGNATURE PAGE

PLAN PREPARED BY (Primary author, if more than one):



10-28-2015

Plan Preparer Is:

Signature

Date

Luke M. Machtolf, ACF, CF®

Print Name

Area Manager

Title

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- Private Natural Resource Professional
- Agency Representative
- Landowner Who Completed Coached Stewardship Planning Course
- Landowner Who Is a Natural Resource Professional

List other professionals, and their affiliations, who contributed to this plan. If this was a "Coached Plan", list natural resource professionals who serve as "coaches".

NMI; Jess Hirska – Forester, NMI; David Crossley – Forester, NMI; Glen Kohler – WA DNR Forest Entomologist

James R. Freed – WSU Extension Forestry Professor; Ken Bevis – WA DNR Stewardship Biologist

LANDOWNER SIGNATURE: The contents of this plan are acceptable to me/us. I/we intend to manage this property in a manner consistent with the objectives of the Forest Stewardship Program and to implement this plan to the best of my/our ability.

Landowner signature(s) Date

Print Landowner name(s) Date

APPROVAL SIGNATURE:

I have reviewed this plan and approve it as meeting the standards for a Forest Stewardship Plan.

Signature of Designated Service Representative Date

Print Name of Designated Service Representative

Title Agency

Address Phone