
**PEND OREILLE COUNTY PARK
FOREST STEWARDSHIP PLAN**

Prepared For:
Pend Oreille County Community Development Department



Prepared By:
Northwest Management, Inc.
15 W. Crawford
Deer Park, WA 99006
(509) 276-4699
www.consulting-foresters.com



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Landowner Information

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

Property Information

Pend Oreille County Park is located along Highway 2 approximately seven miles northwest of Elk, Washington in southern Pend Oreille County. The legal description is as follows: The E ½ of Section 23; the E ½ of the NW ¼ of Section 23; all of the W ½ of the W ½ that lies west of HWY 2 in Section 24; all within Township 30 North, Range 43 East, W.M., encompassing approximately 437 acres. The Geographic ID numbers for the parcels are 433023000000 and 433024000000

Plan Preparer

Luke Machtolf, Area Forester, ACF, CF
David Crossley, Forester
Jess Hirska, Forester

Northwest Management, Inc.
P.O. Box 1103
Deer Park, WA 99006
www.consulting-foresters.com

Additional Contributors:

WA DNR
Pend Oreille County Community Development Department
Pend Oreille County Parks Board of Directors

Landowner Objectives

The forest management goals within Pend Oreille County 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.

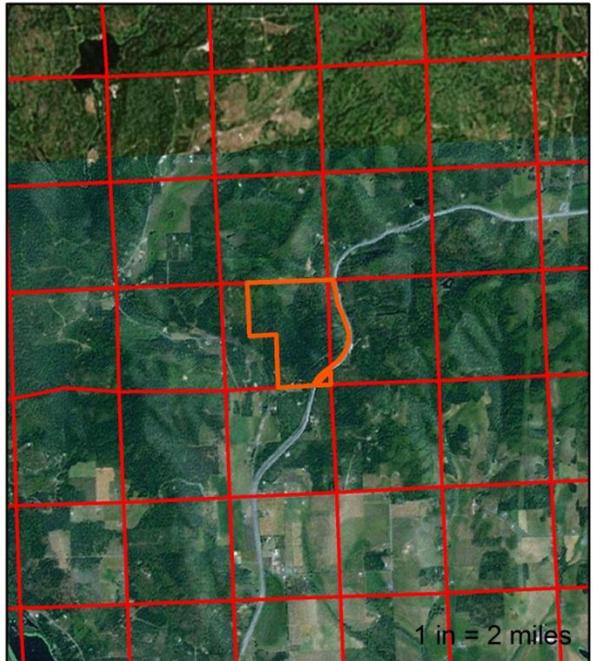
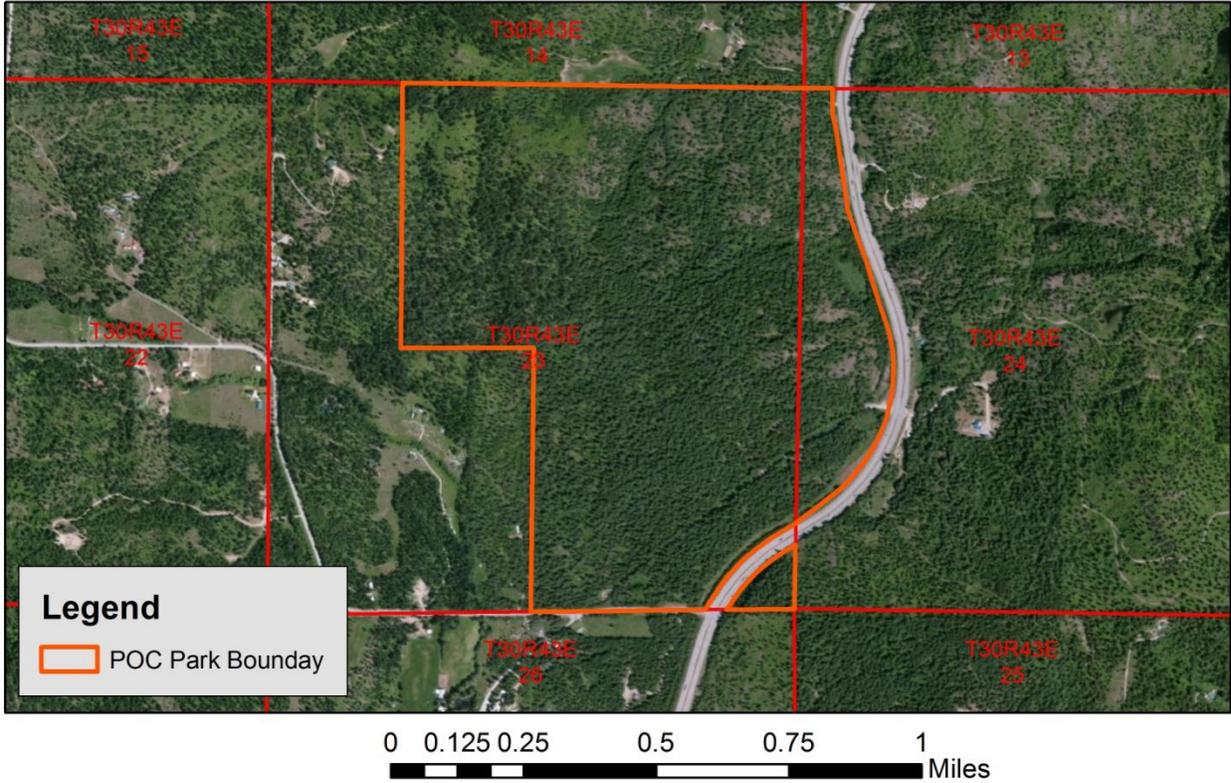
To accomplish the objectives outlined in the following pages, both passive and active forest management treatments will be utilized. These treatments are specifically identified in Resource Category IV.

Eight management units have been identified within Pend Oreille County Park based on location, access, timber density and timber type. These units are a way of organizing the ownership to make forest management treatments as efficient and effective as possible.

The itemized summary of management objectives is 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 which promote the development of old forest structure.
- Reduce trespassing and abusive road use with ATVs and off-road vehicles.
- Control noxious weed populations throughout the property.
- Provide periodic income for park maintenance and improvements.

Pend Oreille County Park - Vicinity Map
Ptns. Sections 23 & 24, T30N, R43E W.M.
Pend Oreille County, Washington



Pend Oreille County Park - Parcel Map
Ptns. Sections 23 & 24, T30N, R43E W.M.
Pend Oreille County, Washington



Introductory Overview of the Property

Introduction

The land now recognized as Pend Oreille County Park was previously known as Pend Oreille State Park, owned and managed by the Washington State Parks and Recreation Commission. Purchased from the Spokane Lumber Company by private citizens in the Newport area and donated to the State in 1927, the original park consisted of 153 acres. Over the next 46 years, surrounding land was acquired and over 450 acres was amassed in an effort to preserve the large trees found in this area. In 1981, this land was transferred from the State of Washington to Pend Oreille County under an agreement that the land continued to be used as a public park. Below are the conditions outlined as part of the land transfer agreement, taken from the "Recreational Use and Timber Management Plan for Pend Oreille State Park" that was drafted in 1982 by the Pend Oreille County Planning Department:

- A. The property shall be continuously used for public park purposes or revert to the state.
- B. Timber may be selectively harvested provided that all income from said timber harvest shall be used for park development and operation.
- C. A recreational use plan, including a timber management plan, shall be prepared by the county and approved by the Director prior to transfer of fee title. The plan shall indicate general types of recreation use and shall require the county to file an annual compliance report with the Director. The plan may be amended based on mutual agreement.

Pend Oreille County Park has developed into a popular destination for hikers, wildlife enthusiasts, equestrian riders, overnight campers and many other recreationists. The park provides a number of facilities, including a campground and day-use area, picnic tables, two picnic shelters, fresh drinking water and numerous hiking trails.

Topography

The topography within Pend Oreille County Park varies, with the southern portions being mostly flat, building into steeper ground as the property moves north. The northeastern portions of the property have prominent rock outcroppings, creating difficult, but traversable hiking opportunities. Harvest opportunities in this area are limited by the terrain. Slopes across the property range from zero to 55 percent. The highest elevations can be found in the northwestern part of the park, at 2,800 feet, and the lowest elevations are found along the old highway at 2,200 feet. The aspects within Pend Oreille County Park are generally south to east, but there are small western and northern aspects as well.

Access

Access throughout Pend Oreille County Park is variable, depending on the mode of transportation. To find the park entrance, travel along Highway 2 into southern Pend Oreille County Park. The park is located on the western side of Highway 2, just north of the Fertile Valley Road. The southern portion of the park where the campsites are located is accessible via motorized vehicle. To access the rest of the park, you must hike, bike or ride a horse on one of the many available trails. Refer to pages 60-61 for trail and road maps.

Weather

The annual average maximum temperature is 58 degrees Fahrenheit. The annual average minimum temperature is 33 degrees Fahrenheit and the annual average total precipitation is 22.8 inches. (Deer Park area - period of record: 1971-2000. Western Regional Climate Center, <http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?wa2066>)

General Vegetation

Pend Oreille County Park property is comprised of mixed conifer forestland, consisting of Douglas-fir, ponderosa pine, lodgepole pine, western larch, grand fir, western hemlock, and western red cedar. Understory vegetation includes but is not limited to snowberry, Oregon grape, mallow ninebark, ocean spray and various fescues and bunch grasses.

Pend Oreille County Park - Topographic Map
Ptns. Sections 23 & 24, T30N, R43E W.M.
Pend Oreille County, Washington



Resource Category I – Forest Health/Wildfire/Invasive Species

Forest Health - Overview

Pend Oreille County Park has been passively managed in recent years, with relatively little timber harvesting and silvicultural management taking place. This passive management, along with the exclusion of fire over the last century, has led to a number of forest health concerns for the park. The primary forest health concerns involve areas of widespread presence of root disease, excessive stocking rates, high proportions of shade-tolerant species, and susceptibility to wildfire. The treatments prescribed in this Forest Stewardship Plan will focus on increasing stand resiliency and 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 biologic 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 (light loving) species are adapted to grow on hot, sunny areas (south and west aspects) and are more resistant to drought. Shade-tolerant species grow in cool, moist forests 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 in many stands within Pend Oreille County Park, both in understory and overstory cohorts. These areas of concern will be identified in Resource Category IV. A series of commercial harvests and pre-commercial thinning treatments are prescribed to meet stocking concerns and other management objectives, where they apply.

Dwarf Mistletoe

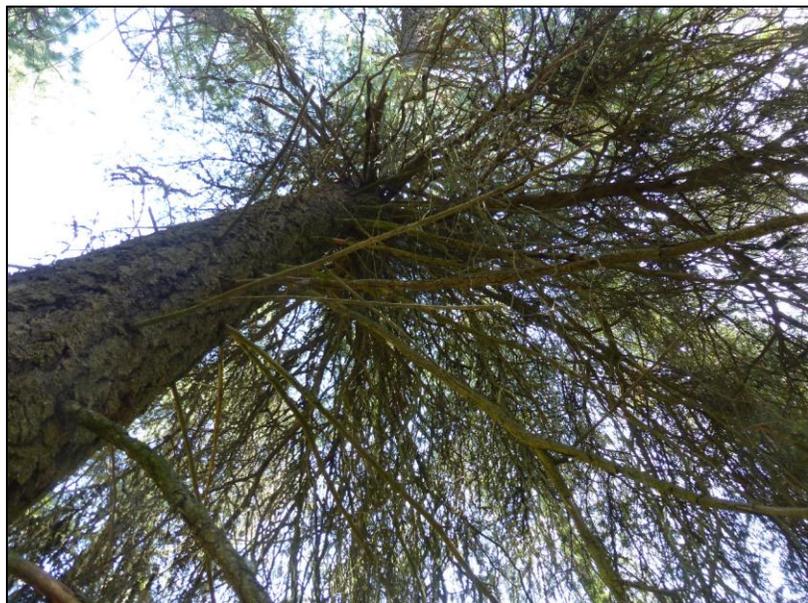
Dwarf mistletoes are small, leafless, parasitic plants that grow on branches and stems of conifers. They are usually 1 to 5 inches tall and mostly green yellow, brown or orange in color. A host tree is typically infected by only one species of mistletoe. Bunched growths of branches (witches' brooms) 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*). Indian paint fungus has been observed within some of the grand fir in Pend Oreille County Park, although this species is a minor component of the whole. Red ring rot is most commonly found in Douglas-fir, western larch, and pines. Presence of red ring rot within Pend Oreille County Park is moderate at this time, and is likely to be found in the older lodgepole pine that is scattered throughout the property. 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.

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.



Indian paint fungus conk on grand-fir, Pend Oreille Co. Park – Stand 7

Management Action

These common stem decays are frequently observed in stands of mature or overmature host species (mostly grand fir and western hemlock). The best way to minimize stem decay is to manage on shorter rotations (not longer than 120 years). 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) center in Stand 7; resilient western larch in the 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.

Increasing resilience to root disease is a substantial concern for Pend Oreille County Park. Armillaria root disease is currently widespread on the property, having been observed throughout the property in both Douglas-fir and grand fir. Most of these stands lack the species diversity which is desirable for root disease tolerance. Increasing the presence of western larch and ponderosa pine through harvest prescriptions and interplanting will be vital for increasing long-term health and diversity.

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 Pend Oreille County Park. These are the IPS pine engraver, western pine beetle, mountain pine beetle, Douglas-fir beetle, and the fir engraver. Evidence of the fir engraver has been observed throughout the park, resulting in the decline and mortality of grand fir and Douglas-fir.

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.

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.

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 suggestions 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.

To manage the current fir engraver population present in Pend Oreille County Park, harvesting infested trees is the most direct method. It is unlikely the fir engraver will be eradicated from the park, but controlling the population 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.

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. Western pine beetle activity is isolated, but present within Pend Oreille County Park. Host trees 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.

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). There is currently light defoliation of Douglas-fir and grand fir within portions of Pend Oreille County Park. If defoliation levels are sustained for 3 to 4 more years, top kill in mature hosts and mortality in the understory may occur. Western spruce budworm defoliation should be closely monitored over the next few years.

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, Pend Oreille County 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 Pend Oreille County Park provides very limited access for fire fighting vehicles. Where roads are present in the southern half of the property, surfaces need to be maintained to prevent erosion and maintain the current level of access. Brush and limbs growing into the right-of-way should be maintained at frequent intervals as well. Future timber harvesting and silvicultural operations will improve fire-fighting access and increase stand resiliency to wildfire through reduction of ladder fuels and stand densities.

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, St. John's Wort and Common Mullein are the most prevalent invasive species within the Pend Oreille County Park. These species occur predominantly along roads and adjacent to major skid trails and old log landings. In areas with higher soil moisture, Hounds Tongue and thistle species occur. 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 plot 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 on Pend Oreille County Park on an annual basis. This control program will be particularly important along the main road and designated trail systems, which are anticipated to be utilized by off-road vehicles, harvesting equipment, logging trucks and administrative vehicles.

Resource Category II – Soils

There are eleven soil types found within the Rustlers Gulch Recreation Area. A summary of each soil type is found below. There are some recommendations for operating on the soils within the park and a table providing expected productivity from each soil type. The following information was obtained through the USDA Natural Resource Conservation Service Web Soil Survey:

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

Map Unit 20—Bonner silt loam, 0 to 10 percent slopes (3.7%)

Map Unit Setting

- *Elevation:* 2,000 to 3,200 feet
- *Mean annual precipitation:* 25 to 35 inches
- *Mean annual air temperature:* 43 to 46 degrees F
- *Frost-free period:* 90 to 120 days
- *Farmland classification:* Prime farmland if irrigated

Map Unit Composition

Bonner and similar soils: 100 percent

Description of Bonner

- *Landform:* Terraces
- *Parent material:* Volcanic ash and loess over glacial outwash

Typical profile

- *H1 - 0 to 6 inches:* ashy silt loam
- *H2 - 6 to 12 inches:* ashy silt loam
- *H3 - 12 to 24 inches:* gravelly ashy loam
- *H4 - 24 to 60 inches:* very cobbly loamy sand

Properties and qualities

- *Slope:* 0 to 10 percent
- *Depth to restrictive feature:* 20 to 40 inches to strongly contrasting textural stratification
- *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:* Low (about 3.3 inches)

Map Unit 43—Dufort silt loam, 0 to 15 percent slopes (3.0%)

Map Unit Setting

- *Elevation:* 2,100 to 3,600 feet
- *Mean annual precipitation:* 25 to 35 inches
- *Mean annual air temperature:* 43 to 45 degrees F
- *Frost-free period:* 90 to 110 days
- *Farmland classification:* Farmland of statewide importance

Map Unit Composition

Dufort and similar soils: 100 percent

Description of Dufort

- *Landform:* Hills
- *Parent material:* Volcanic ash and loess over glacial drift

Typical profile

- *H1 - 0 to 18 inches:* ashy silt loam
- *H2 - 18 to 30 inches:* gravelly ashy loam
- *H3 - 30 to 60 inches:* very gravelly sandy loam

Properties and qualities

- *Slope:* 0 to 15 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 6.9 inches)

Map Unit 48—Hartill silt loam, 25 to 40 percent slopes (1.7%)

Map Unit Setting

- *Elevation:* 2,000 to 4,000 feet
- *Mean annual precipitation:* 20 to 27 inches
- *Mean annual air temperature:* 45 degrees F
- *Frost-free period:* 90 to 110 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

Hartill and similar soils: 100 percent

Description of Hartill

- *Landform:* Mountains
- *Landform position (three-dimensional):* Mountainbase
- *Parent material:* Volcanic ash and loess over residuum and colluvium derived from phyllite and quartzite

Typical profile

- *H1 - 0 to 8 inches:* ashy silt loam
- *H2 - 8 to 12 inches:* ashy silt loam
- *H3 - 12 to 18 inches:* channery loam
- *H4 - 18 to 36 inches:* very channery loam
- *H5 - 36 to 40 inches:* unweathered bedrock

Properties and qualities

- *Slope*: 25 to 40 percent
- *Depth to restrictive feature*: 20 to 40 inches to lithic bedrock
- *Natural drainage class*: Well drained
- *Capacity of the most limiting layer to transmit water (Ksat)*: Very low to high (0.00 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*: Low (about 5.1 inches)

Map Unit 79—Moscow silt loam, 0 to 25 percent slopes (3.5%)

Map Unit Setting

- *Elevation*: 2,200 to 5,000 feet
- *Mean annual precipitation*: 18 to 30 inches
- *Mean annual air temperature*: 43 to 45 degrees F
- *Frost-free period*: 80 to 120 days
- *Farmland classification*: Farmland of statewide importance

Map Unit Composition

Moscow and similar soils: 100 percent

Description of Moscow

- *Landform*: Mountains
- *Landform position (three-dimensional)*: Mountaintop, mountainbase
- *Parent material*: Volcanic ash and loess over residuum and colluvium derived from granite

Typical profile

- *H1 - 0 to 8 inches*: ashy silt loam
- *H2 - 8 to 12 inches*: ashy silt loam
- *H3 - 12 to 27 inches*: gravelly sandy loam
- *H4 - 27 to 31 inches*: weathered bedrock

Properties and qualities

- *Slope*: 0 to 25 percent
- *Depth to restrictive feature*: 20 to 40 inches to paralithic bedrock
- *Natural drainage class*: Well drained
- *Capacity of the most limiting layer to transmit water (Ksat)*: Very low to high (0.00 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*: Low (about 4.2 inches)

Map Unit 82—Moscow-Rock outcrop complex, 0 to 40 percent slopes (1.8%)

Map Unit Setting

- *Elevation*: 2,200 to 5,000 feet
- *Mean annual precipitation*: 18 to 30 inches
- *Mean annual air temperature*: 43 to 45 degrees F

- *Frost-free period:* 80 to 120 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

Moscow and similar soils: 65 percent

Rock outcrop: 20 percent

Description of Moscow

- *Landform:* Mountains
- *Landform position (three-dimensional):* Lower third of mountainflank, mountaintop, mountainbase
- *Parent material:* Volcanic ash and loess over residuum and colluvium derived from granite

Typical profile

- *H1 - 0 to 8 inches:* ashy silt loam
- *H2 - 8 to 12 inches:* ashy silt loam
- *H3 - 12 to 27 inches:* gravelly sandy loam
- *H4 - 27 to 31 inches:* weathered bedrock

Properties and qualities

- *Slope:* 25 to 40 percent
- *Depth to restrictive feature:* 20 to 40 inches to paralithic bedrock
- *Natural drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 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:* Low (about 4.2 inches)

Description of Rock Outcrop

Typical profile

H1 - 0 to 60 inches: unweathered bedrock

Properties and qualities

- *Slope:* 0 to 40 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)

Map Unit 86—Newbell ashy silt loam, 0 to 25 percent slopes (13.1%)

Map Unit Setting

- *Elevation:* 2,070 to 4,200 feet
- *Mean annual precipitation:* 23 to 50 inches
- *Mean annual air temperature:* 41 to 45 degrees F
- *Frost-free period:* 80 to 120 days
- *Farmland classification:* Farmland of statewide importance

Map Unit Composition

Newbell and similar soils: 80 percent

Minor components: 20 percent

Description of Newbell

Setting

- *Landform: Hills*
- *Landform position (two-dimensional): Toeslope*
- *Landform position (three-dimensional): Mountainbase*
- *Down-slope shape: Concave*
- *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: ashy silt loam*
- *Bw - 7 to 13 inches: 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: 0 to 25 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 5.5 inches)*

Minor Components

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)*

Aits

- *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: Concave, linear*

- *Other vegetative classification:* western hemlock/queen cup beadlily (CHF311)

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)

Moscow

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

Newbell, more sloping

- *Percent of map unit:* 3 percent
- *Landform:* Hills
- *Landform position (two-dimensional):* Backslope
- *Landform position (three-dimensional):* Side slope
- *Down-slope shape:* Concave
- *Across-slope shape:* Linear
- *Other vegetative classification:* grand fir/ninebark (CWS421)

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

Map Unit 89—Newbell cobbly ashy silt loam, 0 to 40 percent slopes, stony (17.3%)

Map Unit Setting

- *Elevation:* 2,260 to 4,350 feet
- *Mean annual precipitation:* 21 to 45 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: 80 percent

Minor components: 20 percent

Description of Newbell, Stony

- *Landform*: Mountains, hills
- *Landform position (two-dimensional)*: Footslope
- *Landform position (three-dimensional)*: Mountainbase, base slope
- *Down-slope shape*: Concave
- *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*: 0 to 40 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)

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)

Aits, stony

- *Percent of map unit*: 5 percent
- *Landform*: Hills, mountains

- *Landform position (two-dimensional)*: Foothlope
- *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*: 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)

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)

Kegel, poorly drained

- *Percent of map unit*: 2 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

Map Unit 109—Rathdrum very fine sandy loam (3.1%)

Map Unit Setting

- *Elevation*: 2,000 to 2,600 feet
- *Mean annual precipitation*: 25 to 35 inches
- *Mean annual air temperature*: 43 to 45 degrees F
- *Frost-free period*: 90 to 110 days
- *Farmland classification*: All areas are prime farmland

Map Unit Composition

Rathdrum and similar soils: 100 percent

Description of Rathdrum

- *Landform: Depressions*
- *Parent material: Volcanic ash and loess alluvium over glacial outwash*

Typical profile

- *H1 - 0 to 6 inches: ashy very fine sandy loam*
- *H2 - 6 to 22 inches: ashy very fine sandy loam*
- *H3 - 22 to 60 inches: ashy fine sandy loam*

Properties and qualities

- *Slope: 0 to 3 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: High (about 10.7 inches)*

Map Unit 117—Rock outcrop-Moscow complex, 30 to 65 percent slopes (30.1%)

Map Unit Setting

- *Elevation: 2,200 to 5,000 feet*
- *Mean annual precipitation: 18 to 30 inches*
- *Mean annual air temperature: 43 to 45 degrees F*
- *Frost-free period: 80 to 120 days*
- *Farmland classification: Not prime farmland*

Map Unit Composition

- *Rock outcrop: 55 percent*
- *Moscow and similar soils: 30 percent*

Description of Rock Outcrop

Typical profile

- *H1 - 0 to 60 inches: unweathered bedrock*
- *Properties and qualities*
- *Slope: 30 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)*

Description of Moscow

- *Landform: Mountains*
- *Landform position (three-dimensional): Center third of mountainflank*
- *Parent material: Volcanic ash and loess over residuum and colluvium derived from granite*

Typical profile

- *H1 - 0 to 8 inches: ashy silt loam*

- *H2 - 8 to 12 inches*: ashy silt loam
- *H3 - 12 to 27 inches*: gravelly sandy loam
- *H4 - 27 to 31 inches*: weathered bedrock

Properties and qualities

- *Slope*: 30 to 65 percent
- *Depth to restrictive feature*: 20 to 40 inches to paralithic bedrock
- *Natural drainage class*: Well drained
- *Capacity of the most limiting layer to transmit water (Ksat)*: Very low to high (0.00 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*: Low (about 4.2 inches)

Map Unit 123—Rufus channery loam, 30 to 65 percent slopes (18.8%)

- Map Unit Setting
- *Elevation*: 1,800 to 4,700 feet
- *Mean annual precipitation*: 15 to 30 inches
- *Mean annual air temperature*: 45 to 48 degrees F
- *Frost-free period*: 90 to 130 days
- *Farmland classification*: Not prime farmland

Map Unit Composition

Rufus and similar soils: 100 percent

Description of Rufus

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

Typical profile

- *H1 - 0 to 4 inches*: channery loam
- *H2 - 4 to 8 inches*: very flaggy loam
- *H3 - 8 to 14 inches*: very flaggy loam
- *H4 - 14 to 18 inches*: unweathered bedrock

Properties and qualities

- *Slope*: 30 to 65 percent
- *Depth to restrictive feature*: 10 to 20 inches to lithic bedrock
- *Natural drainage class*: Well drained
- *Capacity of the most limiting layer to transmit water (Ksat)*: Very low to high (0.00 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*: Very low (about 1.1 inches)

Map Unit 134—Skanid-Rock outcrop complex, 0 to 40 percent slopes (3.9%)

Map Unit Setting

- *Elevation:* 1,700 to 4,200 feet
- *Mean annual precipitation:* 18 to 24 inches
- *Mean annual air temperature:* 46 to 48 degrees F
- *Frost-free period:* 100 to 180 days
- *Farmland classification:* Not prime farmland

Map Unit Composition

- *Skanid and similar soils:* 65 percent
- *Rock outcrop:* 20 percent

Description of Skanid

- *Landform:* Mountains
- *Landform position (three-dimensional):* Mountainbase, mountaintop, lower third of mountainflank
- *Parent material:* Residuum and colluvium derived from granite mixed with a component of volcanic ash and loess

Typical profile

- *H1 - 0 to 2 inches:* ashy loam
- *H2 - 2 to 7 inches:* gravelly ashy sandy loam
- *H3 - 7 to 16 inches:* very gravelly sandy loam
- *H4 - 16 to 20 inches:* weathered bedrock

Properties and qualities

- *Slope:* 0 to 40 percent
- *Depth to restrictive feature:* 10 to 20 inches to paralithic bedrock
- *Natural drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 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:* Very low (about 1.6 inches)

Description of Rock Outcrop

Typical profile

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

Properties and qualities

- *Slope:* 0 to 40 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)

Soil Productivity

The following tables summarize the site index for each soil type within Pend Oreille County 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)
20	Bonner silt loam, 0 to 10 % slopes	72.00	112
43	Dufort silt loam, 0 to 15 % slopes	72.00	100
48	Hartill silt loam, 25 to 40 % slopes	N/A	N/A
79	Moscow silt loam, 0 to 25 % slopes	114.00	116
82	Moscow-Rock outcrop complex, 0 to 40 % slopes	114.00	116
86	Newbell ashy silt loam, 0 to 25 % slopes	72.00	103
89	Newbell cobbly ashy silt loam, 0 to 40 % slopes, stony	86.00	113
109	Rathdrum very fine sandy loam	N/A	N/A
117	Rock outcrop-Moscow complex, 30 to 65 % slopes	N/A	N/A
123	Rufus channery loam, 30 to 65 percent slopes	29.00	70
134	Skamid-Rock outcrop complex, 0 to 40 percent slopes	29.00	64

Map Unit Symbol	Map Unit Name	Tree Site Index Douglas-fir Meyer 1961 (600)	Cubic Feet/Year Douglas-fir Meyer 1961 (600)
20	Bonner silt loam, 0 to 10 % slopes	86.00	84
43	Dufort silt loam, 0 to 15 % slopes	72.00	78
48	Hartill silt loam, 25 to 40 % slopes	86.00	81
79	Moscow silt loam, 0 to 25 % slopes	57.00	75
82	Moscow-Rock outcrop complex, 0 to 40 % slopes	57.00	75
86	Newbell ashy silt loam, 0 to 25 % slopes	86.00	82
89	Newbell cobbly ashy silt loam, 0 to 40 % slopes, stony	100.00	105
109	Rathdrum very fine sandy loam	N/A	N/A
117	Rock outcrop-Moscow complex, 30 to 65 % slopes	N/A	N/A
123	Rufus channery loam, 30 to 65 % slopes	N/A	N/A
134	Skamid-Rock outcrop complex, 0 to 40 % slopes	29.00	51

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.

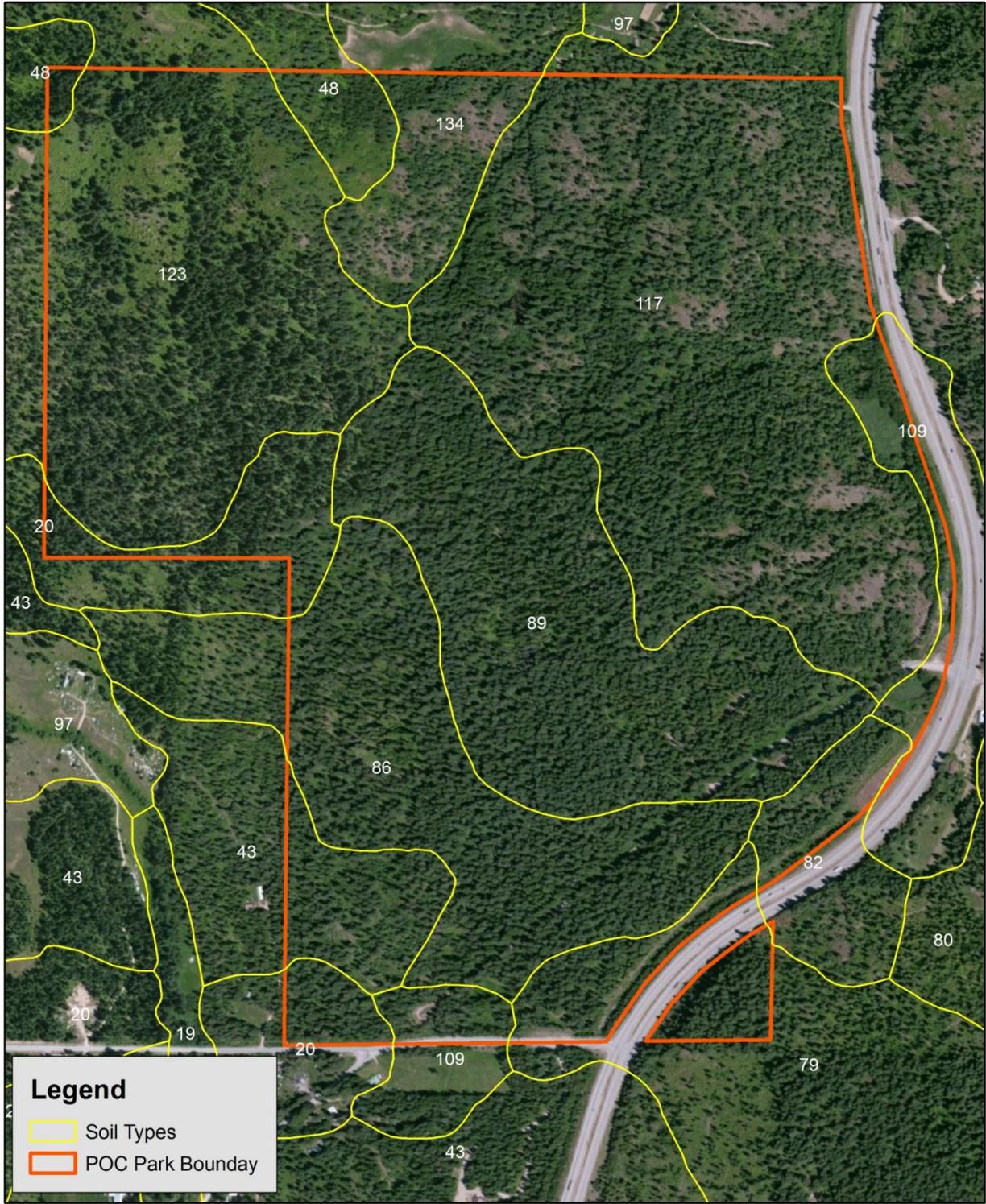
The *Site Index Curve Number* is listed in the National Register of Site Index Curves. It identifies the site index curve used to determine the site index.

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 Pend Oreille County Park are productive forestland soils. The only soil present that is not conducive to tree growth is the rock outcrop component of the Rock outcrop-Moscow complex, which comprises approximately 16.5 percent of the land area. All of the soils found within Pend Oreille County 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. These are the optimal operating periods for the remainder of the property as well, although erosion hazards are significantly lower in these areas due to the gentle terrain.

Pend Oreille County Park - Soils Map
Ptns. Sections 23 & 24, T30N, R43E W.M.
Pend Oreille County, Washington



1 inch = 700 feet



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 the streams and wetlands found within Pend Oreille County Park. Two perennial wetlands (ponds) are located in the north central portion of the property (within Stand 4). Both are considered "Type A" wetlands which require a 50-foot wetland management zone (WMZ) during harvest operations. Although partial cutting is allowed in WMZs, no harvesting will be prescribed within these areas.

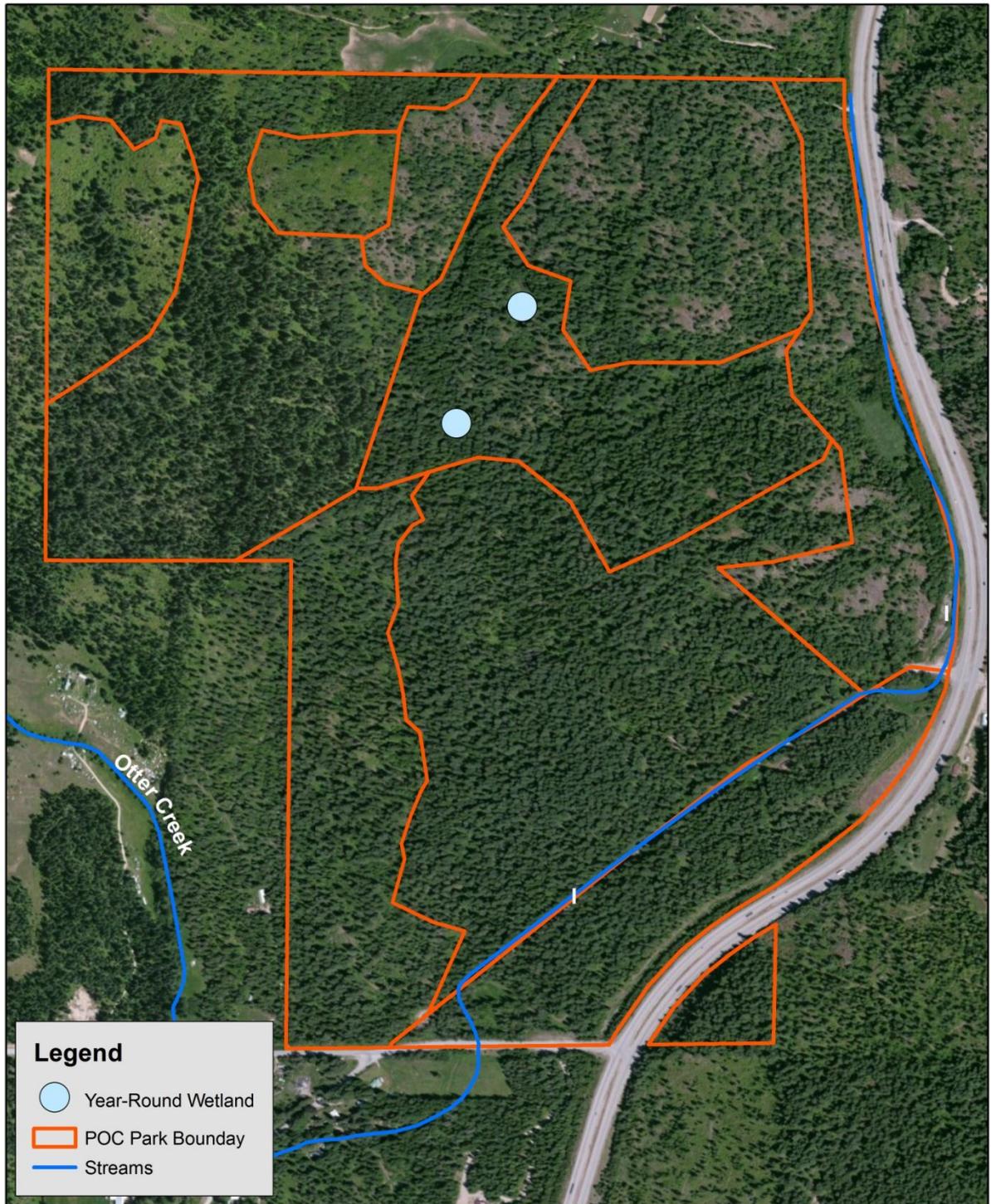
Additionally, there is a fish-bearing (Type "F") stream which flows along the west side of Highway 2 and through the southern portion of the property along the main access road (Stream "I" on the following map). This stream has unique hydrologic features, and is known to have sub-surface flow throughout much of the year. Perennial flow appears to cease less than 300 feet from the park entrance. This stream system is classified as a tributary to Otter Creek, although its connectivity by an above-ground channel is undetermined at this time. Further ground investigation of this stream network will be necessary during the Forest Practice Application review process.

Management Action

The riparian areas found within Pend Oreille County 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.

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 on the property.

Pend Oreille County Park - Water Resource Map
Ptns. Sections 23 & 24, T30N, R43E W.M.
Pend Oreille County, Washington



1 inch = 700 feet



Resource Category IV – Forest Inventory/Timber/Wood Products

Purpose and Scope

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.

Pend Oreille County Park provides a variety of wildlife habitat, recreational, and forest management opportunities. Due to the important social values of this park, timber management is not the sole priority for this property. As such, the various management units or “stands” within this ownership are classified as either “Active Management” or “Passive Management.” Active Management provides opportunities for multi-use objectives, including timber harvesting. Passive management provides the same opportunities without commercial harvesting being prescribed for the current management period.

The recommended silvicultural prescriptions for each stand are identified in the prescription table on page 62. The prescription and guidelines found therein provide a management approach for Pend Oreille County Park which is both flexible and adaptive to meet various resource concerns.

Silvicultural Treatments

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 Pend Oreille County Park is unlikely given other management concerns.

Prescribed Fire

Prescribed fire is recommended in certain stands which have a higher proportion of fire-adapted species – namely ponderosa pine and Douglas-fir. Prescribed burning would provide multiple resource benefits, including increased wildlife forage, reduction of fuel loadings, and encouragement of natural regeneration. The intent would be to “re-introduce” low-intensity ground fires into these stands which have not experienced fire within the last 80 to 100 years. Prescribed fire would aid in restoring important ecological functions that are currently being excluded. Additionally, areas which are managed with the use of prescribed fire are more easily defended in the event of a summer wildfire.

Prescribed burning operations would be performed in the spring or fall of the year. Certain pre-treatment measures may be necessary to achieve desired outcomes – i.e. pre-commercial thinning, pruning, or fuels pull-back.

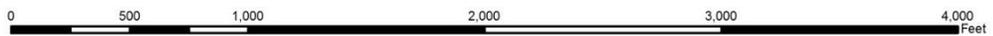
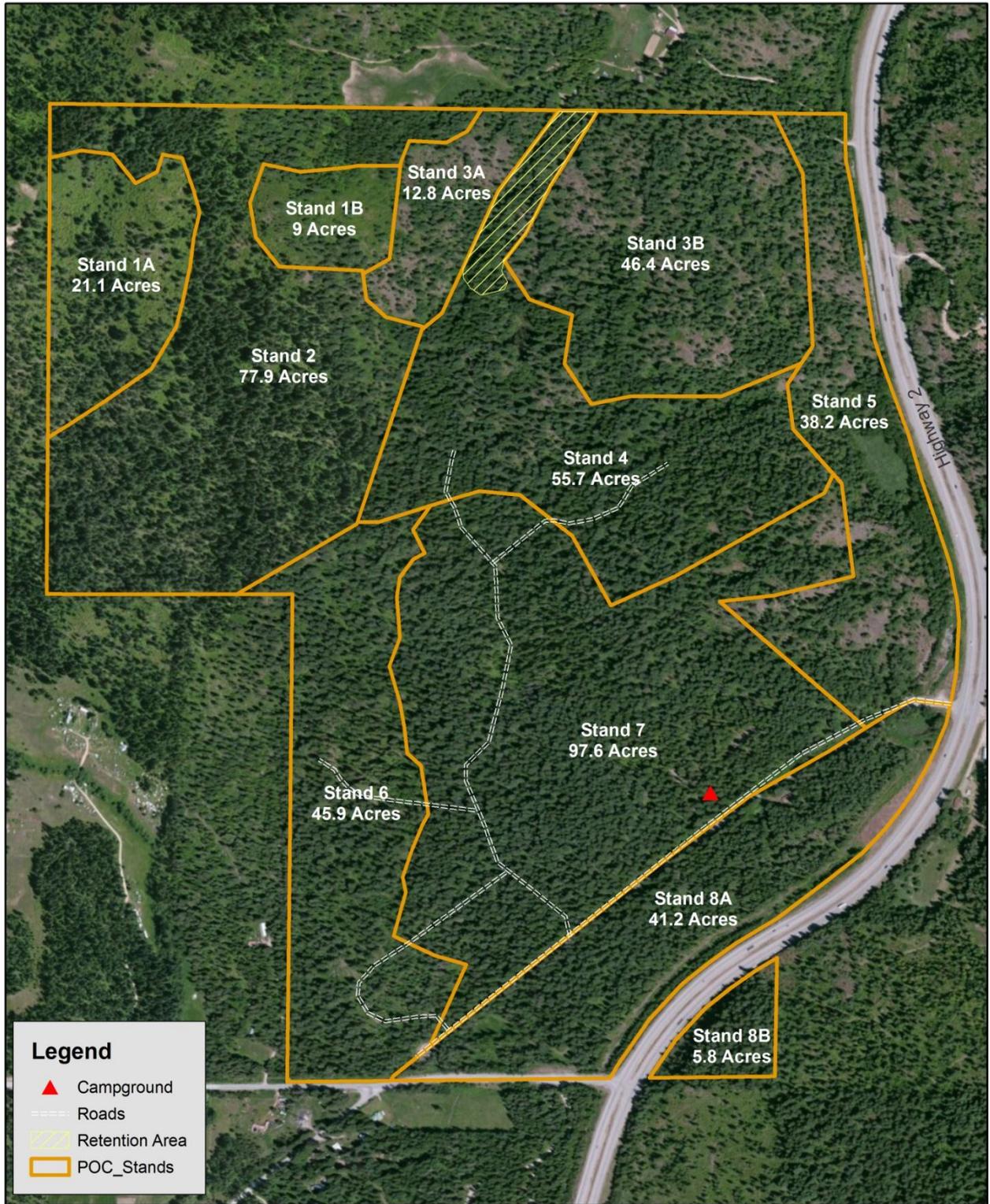


Prescribed under burn – Panhandle NF (Spring, 2014)

Stand Delineations

Pend Oreille County Park is divided into eight 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, topography, and other management factors. The management units within Pend Oreille County Park can be seen on the following page.

Pend Oreille County Park - Stand Map
Ptns. Sections 23 & 24, T30N, R43E W.M.
Pend Oreille County, Washington



1 inch = 700 feet



Stand 1

Silvicultural Objectives

- Maintain species dominance of ponderosa pine for during silvicultural treatments.
- Promote the development of a multi-canopy structure for multiple resource benefits.
- Retain snags and large woody debris for wildlife habitat.



Stand History, Structure and Condition

Stand 1 consists of 30.1 acres in the northwest corner of Pend Oreille County Park. As shown on the stand map above, Stand 1 is divided into two separate blocks. Stand 1A is 21.1 Acres and lies west of Stand 2, and Stand 1B is 9 acres and lies east of Stand 2. Similar timber type as well as proximity allows these two areas to be managed as one stand.

The overstory of Stand 1 is predominantly ponderosa pine (95%) with a minor component of Douglas-fir (5%). The average total tree height in Stand 1 is 65 feet, with a range from 35 to 105 feet. The average Diameter at Breast Height (DBH) is 12 inches, with a range from 7 to 28 inches. The crowns are an average of 65 percent live crown ratio, and indicate good vigor and health. Physical defects such as crook, sweep and multiple tops are present in amounts typical for this area. Overstory stocking rates vary from 0 to 100 Square feet per acre, with an average of 40 square feet per acre. Silvicultural treatments in the overstory are unnecessary, as this is a healthy ponderosa pine stand with minimal evidence of disease.

The understory cohort in Stand 1 consists of ponderosa pine (90%) and Douglas-fir (10%). The average stocking level in the understory is 100 trees per acre, with a range of 0 to 500 trees per acre across the stand. Much of the regeneration is small diameter (0-3 inch DBH), with a small component of advanced regeneration. Growth rates from 6 to 18 inches per year exist in the understory. Small pockets of overcrowded regeneration have led to some suppression in this cohort. Approximately 8 acres of under-stocked ground exists in this stand.

To maintain the historical structure of this stand as well as the current level of health, timber stand improvements are recommended in the understory. Over-stocked areas will be reduced to 300 trees per acre, targeting the healthiest and most dominant ponderosa pine for retention.

The desired future condition is a multi-aged stand composed primarily of ponderosa pine, with a small component of Douglas-fir. The current structure of the stand is very close to the desired condition. It is important to maintain control of the Douglas-fir population to avoid a species composition shift that often takes place in pine stands in the absence of disturbance. Particularly important to the structure of this stand is retaining all healthy large diameter trees, as they provide an old forest structure component that defines the park. 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

Vehicular access into Stand 1 is limited by the lack of roads in the northwest corner of the park. However, hiking access into this stand is good, with the Big Sky Loop trail running through much of the stand. This stand has some of the steeper pitches found on the property, with slopes up to 50 percent present. The ground is rocky in places, but not as broken as the Stand 3 to the east.

Environmental Constraints

There are no environmental constraints involved regarding any of the prescribed silvicultural treatments. Washington Forest Practice requirements and BMPs will be satisfied through the recommended silvicultural prescriptions.

Silvicultural Prescription and Schedule

Stand 1 is designated as a "Passive Management" unit. Refer to the prescription table on page 62.

Stand 2

Silvicultural Objectives

- Salvage suppressed and diseased trees in overstory.
- Promote the development of seral species through harvest treatments and timber stand improvement activities.
- Maintain integrity of old forest structures throughout the stand.
- Retain snags and large woody debris for wildlife habitat.

Stand History, Structure and Condition

Stand 2 is a 77.9 acre stand located in the northwestern portion of Pend Oreille County Park. Composed of Douglas-fir (65%), ponderosa pine (19%), grand fir (10%), western larch (2%), lodgepole pine (2%), western red cedar (1%), and western white pine (1%), this stand has a wide diversity of conifer species.

This stand has some very large diameter trees in the overstory, adding a noticeable old-growth component to the structure.

Stand 2 currently holds approximately 160 square feet of basal area per acre of merchantable timber. Total tree heights in the overstory range from 35 feet up to 140 feet, with an average of 95 feet. Diameters at breast height within Stand 2 range from 7 to 40 inches, with an average of 19 inches. Healthy trees in this stand have an average live crown ratio of 45 percent. The southern portions of this stand are facing health concerns from both the fir engraver beetle (*Scolytus ventralis*) and root disease (*Armillaria ostoyae*). The areas affected are quite apparent as there are many trees in obvious decline.



Stand 2 supports a mixed-species overstory with a prominent grand fir understory

The understory cohort in Stand 2 consists of grand fir (60%), Douglas-fir (25%), lodgepole pine (10%), ponderosa pine (2%), western larch (2%), and western white pine (1%). There is a wide distribution of size classes, ranging from small saplings to pole-sized trees 5 inches in diameter. The grand fir is generally more advanced than the other species in the understory, and stocked at rates as high as 1,500 trees per acre. Grand fir is an undesirable species within this stand, and the population should be controlled through a pre-commercial thinning, targeting seral species as the trees to be left.

To increase stand resiliency and long-term forest health, a sanitation harvest is recommended to target diseased and suppressed trees. This means the removal of trees exhibiting signs of stress from root disease and/or fir engraver beetle.

The desired future condition is a multi-aged stand composed of primarily seral species – namely western larch, ponderosa pine, and Douglas-fir. Particularly important to the structure of this stand is retaining all healthy large diameter trees, as they provide an old growth component that defines the park. 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

Stand 2 has limited vehicular access to the southeastern edge of the stand. The Big Sky Loop runs through portions of Stand 2, as shown on the Trail Map in Resource Category V. Slopes in this stand range from 10 to 40 percent, with some broken ground in the northern part of the stand. Ground based harvest operations are feasible within this stand.

Environmental Constraints

Harvesting in Stand 2 will require the use of an existing forest road that crosses Stream “1”, currently typed as a fish-bearing stream. Main skid trails and landings should be water barred as appropriate and grass-seeded following operations to help prevent erosion and reduce noxious weed establishment. Washington Forest Practice requirements and BMPs will be satisfied through the recommended silvicultural prescriptions.

Silvicultural Prescription and Schedule

Stand 2 is classified as an “Active Management” unit. Refer to the prescription guidelines on page 62 for harvesting and stand improvement treatments.

Stand 3

Silvicultural Objectives

- Improve long-term forest health by managing for root disease tolerance and appropriate stocking levels.
- Salvage low-vigor timber, especially in areas with root disease.
- Retain snags and large woody debris for wildlife habitat.



Stand 3 is a mixed PP/DF stand with sporadic stocking due to harsh growing conditions

Stand History, Structure and Condition

Stand 3 is a 59.2-acre stand located in the northeastern portion of Pend Oreille County Park. This stand consists of two parts, 3A and 3B, divided by Stand 4 as shown on the Stand Map. This is a mixed-species stand with sporadic stocking due to a high amount of granitic soils. The overstory consists of Douglas-fir (70%) and ponderosa pine (30%). Due to erratic stocking, the basal area varies significantly throughout the stand, ranging from 40 to 120 square feet per acre. The stand supports a mixture of size classes, ranging from 12 to 27 inches d.b.h. and up to 100 feet in height. Root disease (*Armillaria ostoyae*) was observed in much of the overstory Douglas-fir throughout the stand. A small amount of isolated western pine beetle (*Dendroctonus brevicomis*) activity was also observed along the eastern edge of the stand.

The understory cohort consists of clumpy Douglas-fir (70%) and ponderosa pine (30%) regeneration in the form of saplings and poles. Although overstocked in many areas, this cohort is in excellent health, although future root disease impacts are a concern which should be monitored. Light pre-commercial thinning treatments will help the future development of this cohort.

The primary objective is to increase the proportion of ponderosa pine within the stand for long-term forest health and resiliency. This will be accomplished over time by reducing the percentage of Douglas-fir and promoting the continued development of ponderosa pine through means of non-commercial thinning selection and natural regeneration.

The desired future condition is a multi-aged stand composed of approximately 60% ponderosa pine and 40% Douglas-fir. 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

The terrain in Stand 3 is gentle to moderate, with maximum slopes of 25%. Most of the stand is situated on a gentle knob composed of granite bedrock. Stand 3 is somewhat broken by rock shelves and benches. Access to Stand 3 is limited to the Big Sky Loop Trail.

Environmental Constraints

There are no riparian areas or other sensitive sites within Stand 3.

Silvicultural Prescription and Schedule

Stand 3 is designated as a "Passive Management" unit. Refer to the prescription table on page 62.

Stand 4

Silvicultural Objectives

- Increase stand resiliency to bark beetle attacks and root disease.
- Re-initiate portions of this stand through the development of a seral cohort.
- Retain snags, large woody debris and old forest structure for wildlife habitat and recreational values.



Mature grand fir within Stand 4

Stand History, Structure and Condition

Stand 4 is a 56 -acre stand located in the central portion of Pend Oreille County Park. This is a mixed-species stand with dense stocking levels due to higher soil productivity. The stand is situated within two gentle draws and the only prominent north aspect within the park. The overstory consists of grand fir (45%), western red cedar (35%), Douglas-fir (15%) and western larch (5%). The basal area within Stand 4 ranges from 200 to 350 square feet per acre, averaging approximately 250 square feet per acre. The stand supports a mixture of size classes, ranging from 10 to 30 inches d.b.h. and up to 135 feet in height. Root disease, Indian paint fungus, and fir engraver beetle were all observed in low to moderate levels throughout the stand.

The timber quality in Stand 4 is high overall. Dominant and co-dominant trees have a high form class throughout this stand. The most common source of defect is rot associated with Indian paint fungus, crook and forked tops.

The understory component within Stand 4 is very limited, due to a mostly closed canopy. There are small patches of sapling grand fir regeneration scattered around the stand.

The primary objective is to increase stand resiliency over time by establishing long-lived seral species. Western larch and western white pine are the preferred management species for this purpose. This can

be accomplished gradually by reducing the percentage of grand fir in the overstory and promoting the development of larch and white pine in the understory through sanitation and group selection harvest regimes. Western red cedar and Douglas-fir are considered secondary management species and will be favored for retention over grand fir during thinning treatments.

The desired future condition is a multi-aged stand composed of approximately 40% larch and white pine 30% western red cedar, 20% Douglas-fir and 10% grand fir. A variety of size and age classes is desirable for wildlife and recreational values. Approximately 10 snags and five pieces of coarse woody debris per acre are desirable for wildlife habitat.

Terrain/Access

The terrain in Stand 4 is moderate, with maximum slopes of 35%. This stand is situated mostly within two draws which surround Stand 3B. This terrain is all favorable for ground-based harvesting systems.

Access into Stand 4 is adequate for future management treatments. The main-line haul road provides access to the central portion of the unit, at the base of the north-facing slope. The northern reaches of Stand 4 are more than 2,000 feet from the access road, and will require longer skidding distances.

Environmental Constraints

There are two perennial wetlands (ponds) found within Stand 4. These areas provide a perennial water source and unique habitat features within the park. Both areas require a 50-foot wetland management zone during harvest operations according to Washington Forest Practice laws. These areas will be protected with at least the minimum buffer width to preserve wetland vegetation and canopy shading.

Silvicultural Prescription and Schedule

The northern portion of Stand 4 which separates Stands 3A and 3B will not undergo harvest treatments and will be designated as a retention area. This area provides ideal wildlife thermal cover and a travel corridor between cover types, given its overstory characteristics and topographic features.

The remaining portions of Stand 4 are designated as "Active Management". Refer to the prescription guidelines on page 62 for harvesting and stand improvement treatments.

Stand 5

Silvicultural Objectives

- Manage passively for scenic and recreational values.
- Maintain integrity of old growth component.
- Retain snags and large woody debris for wildlife habitat.

Stand History, Structure and Condition

Stand 5 consists of 38.2 acres on the eastern boundary of Pend Oreille County Park, bordering Highway 2. This stand is primarily composed of Douglas-fir (70%) and ponderosa pine (25%) with a minor component of grand fir, western larch and western red cedar (5%). This mature stand has gone largely unmanaged due to the broken and steep terrain. This stand currently holds approximately 100 square feet of basal area per acre of merchantable timber. Total tree heights in the overstory range from 40 feet up to 130 feet, with an average of 80 feet. Diameters at breast height within Stand 5 range from 10 to 30 inches, with an average of 17 inches. Healthy trees in this stand have an average live crown ratio of 45 percent. Health concerns in this stand include pockets of root disease (*Armillaria ostoyae*), physical defects such as broken tops, and suppression.

The conifer understory in Stand 5 consists of Douglas-fir (60%), grand fir (25%) and ponderosa pine (15%). Stocking levels in the understory are patchy and consist primarily of saplings and poles in and along canopy openings. Other components of the understory include ocean spray, ninebark, Oregon grape, snowberry, and a variety of grasses.

Stand 5 adds great aesthetic and wildlife values to the park as a whole. Though the steep and broken ground is not conducive to active management, it does provide character to the park with its scenic rock outcroppings. Moreover, while root disease and broken top trees are not ideal characteristics of a healthy timber stand, they do add wildlife habitat through increased nesting opportunities and coarse woody debris.



Stand 5 provides an excellent view shed from the Highway 2 corridor

Terrain/Access

As mentioned above, the terrain in Stand 5 is rough, and access is limited. It is primarily an eastern aspect and slopes range from 25 to 70 percent, with vertical drops up to twenty feet in height. As shown on the Trail Map, the Ginger's End and Veronica's Prom trails both lead to the edge of Stand 5, providing viewpoints for recreationist. Emergency fire access is poor for fire engines, and would require firefighters to hike in on an initial attack.

Silvicultural Prescription and Schedule

Stand 5 is a "Passive Management" unit with no forest management treatments scheduled to take place. Refer to the prescription table on page 62.

Stand 6

Silvicultural Objectives

- Salvage low-vigor timber, especially in areas with root disease.
- Promote the growth of ponderosa pine, western larch and white pine through harvest prescription and timber stand improvement activities.
- Retain snags and large woody debris for wildlife habitat.



Stand 6 – Mixed species stand which has undergone partial cutting in the previous 15 years.

Stand History, Structure and Condition

Stand 6 is a 45.9 acre stand located in the southwestern portion of Pend Oreille County Park. Composed of Douglas-fir (70%), grand fir (10%), western larch (10%), ponderosa pine (5%), lodgepole pine (2%), western red cedar (2%), and western white pine (1%), this stand has a wide diversity of conifer species. Previous harvest activities reduced the standing volume in this stand by roughly half, with the primary species harvested being grand fir and Douglas-fir. This stand currently holds approximately 90 square feet of basal area per acre of merchantable timber. The overstory is very stratified, with heights ranging from 35 to 125 feet in total tree height. There are varying diameter classes in the overstory as well, with diameters from 7 inches to 38 inches present. With these varying size classes in mind, the average total tree height is approximately 90 feet, and the average DBH at 18 inches. The overstory of this stand is facing a serious health concern with root disease (*Armillaria ostoyae*) impacting the Douglas-fir and grand fir.

The understory cohort in stand 6 consists of grand fir (70%), Douglas-fir (15%), lodgepole pine (10%), ponderosa pine (2%), western larch (2%), and western white pine (1%). There is a wide distribution of

size classes, ranging from small saplings to pole-sized trees 5 inches in diameter. The grand fir is generally more advanced than the other species in the understory, and stocked at rates as high as 2,000 trees per acre. This grand fir population is an undesirable characteristic of this stand, and should be mitigated through a pre-commercial thinning, targeting seral species for retention.

To increase stand resiliency and long-term forest health, the stand composition will be shifted towards species more resistant to root disease. This means focusing a sanitation harvest on the removal of diseased Douglas-and grand fir, and retaining all healthy conifers within the stand. Following the sanitation harvest, pre-commercial thinning activities will be employed to maintain healthy stocking levels as well as keep the grand fir cohort in check.

The desired future condition is a multi-aged stand composed of a diverse range of healthy conifer species, at least 50% of which being ponderosa pine and western larch. Particularly important to the structure of this stand is retaining all healthy large diameter trees, as they provide late-successional structure for aesthetic and habitat values. 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.



The understory cohort in Stand 6 is overstocked throughout much of the stand

Terrain/Access

Stand 6 has generally good access for both harvest and recreational activities. The previous harvest activities involved the construction of several spur roads off the Parks mainline road (Ginger's End), and the Big Sky Loop runs north to south through the stand. The slopes in this stand are very gentle, ranging from flat up to 25 percent. With relatively short yarding distances (less than 600 feet) and gentle ground, harvest operations are very favorable within this stand.

Environmental Constraints

Stream "I" (a Type "F" stream) is located at the south end of Stand 6 and will require a 75-foot riparian management zone during future harvest operations. Main skid trails and landings should be water barred as appropriate and grass-seeded following operations to help prevent erosion and reduce noxious weed establishment. Washington Forest Practice requirements and BMPs will be satisfied through the recommended silvicultural prescriptions.

Silvicultural Prescription and Schedule

Stand 6 is classified as an "Active Management" unit. Refer to the prescription guidelines on page 62 for harvesting and stand improvement treatments.

Stand 7

Silvicultural Objectives

- Improve stand health by managing for the long term growth of root rot resistant species.
- Salvage low-vigor trees.
- Retain snags and large woody debris for wildlife habitat enhancement.

Stand History, Structure and Condition

Stand 7 is 97.6 acres and is located in the south central area of the park with the southern boundary being the paved access road. The day use and campground are located in this stand. Douglas-fir (78%), grand fir (12%), western larch (5%), ponderosa pine (4%), lodgepole pine (<1%), western white pine (<1%) and western red cedar (<1%) are the conifer species found in this stand. Past management actions and natural events have created a two-aged forest structure throughout much of this stand. The dominant overstory averages 18 inches d.b.h with heights of approximately 110 feet. Some areas and individual trees are showing a decline in health and vigor due to the advanced age of the overstory. The second age class consists of seedling to pole-sized trees that have become established as canopy openings have developed - either by harvest or natural death (primarily root disease). This understory cohort is predominantly composed of shade tolerant species, namely grand fir.

Forest health is very poor in the western portion of Stand 7, where grand fir is prevalent in the overstory. Armillaria root disease centers can be observed throughout this portion of the stand. In addition, there has been a considerable amount of fir engraver beetle activity over the previous 10 years, along with advancing decay from Indian paint fungus. These agents will continue to deteriorate forest health over time, as the stand progresses towards a climax phase and supports mostly shade-tolerant species. Canopy openings must be created in root disease centers to provide opportunities to establish seral species, namely western larch and ponderosa pine.



Areas dominated by grand fir in Stand 7 have declining health

The eastern portion of Stand 7 is in better health, overall and is stocked primarily with Douglas-fir. There is a very prominent amount of large overstory timber, much of which is “oversized,” being too large for the primary sawmills to manufacture. This portion of the stand should be managed to maintain the current structure, while applying sanitation harvesting and interplanting as necessary to combat root disease and promote greater species diversity.



Eastern portion of Stand 7 supports a mature stand of Douglas-fir

The desired future structure of this stand is similar to what is now – a prominent large-diameter overstory with a developing understory. However; the challenge will be to modify species composition in the understory to allow for long term growth of vigorous root disease resistant trees. A harvest entry in the near term should focus on salvaging trees that are in decline due to root disease, retention of western larch, ponderosa pine and lodgepole pine and creating sufficient canopy openings to create favorable conditions for seral species establishment through interplanting. Following the harvest entry a non-commercial thinning should be performed in pockets of dense regeneration to control both species composition and stocking levels. Seral species should be favored for retention over shade tolerant species during thinning treatments.

Terrain/Access

Stand 7 has a gently sloping southern aspect with short pitches or broken terrain (5% of area) with slopes up to 35%. All of Stand 7 is operable with ground-based harvesting equipment. Access is excellent, as the forest mainline runs directly through the stand.

Environmental Constraints

Stream “I” flows along the main (paved) access road along the south boundary of Stand 7. A 75-foot riparian management zone is required during harvest operations. All skid trails and landings should be grass-seeded and water barred as necessary following harvest operations.

Management Prescription

Stand 7 is classified as an “Active Management” unit. Refer to the prescription guidelines on page 62 for harvesting and stand improvement treatments.

Stand 8

Silvicultural Objectives

- Improve stand health and resiliency by controlling stocking levels and species composition.
- Reduce ladder and ground fuels throughout the unit.
- Maintain and improve wildlife habitat.

Stand History, Structure and Condition

Stand 8 is 47 acres and is located in the southeast corner of the property. State Highway 2 passes across the southeast corner and divides Stand 8 into two units, 8A 41.2 acres and 8B 5.8 acres. Some of these acres are not expected to be managed for forest use as there is a caretaker's residence along the north boundary, a power line right of way paralleling Highway 2 and a steep cut slope above Highway 2 in the northeast corner. Conifer species and their percent composition are: Douglas-fir (85%), grand fir (10%), western larch (1%), ponderosa pine (1%), western red cedar (1%), western hemlock (1%), western white pine (<1%) and lodgepole pine (<1%). There have been trees harvested from this stand in the past but the treatment was not widespread or intensive. There is presently an estimated basal area of 190 square feet per acre. The stand classification varies somewhat across the stand between single and multi-aged, but generally the stand is single-aged. Stand 8 supports a mature overstory with smaller co-dominants and suppressed trees present in the mid-canopy.

A closed canopy has kept the regeneration and shrub component to a minimum. Average DBH is 15 inches for the stand and average tree height is 84 feet. Root disease was observed in the stand as well as other pests and pathogens but this stand does not have a widespread forest health concern at this time other than over stocking.

The desired future condition of this stand is at least 50% of the overstory being a root disease resistant species, namely western larch, western white pine or ponderosa pine. This can be achieved through sanitation and group selection harvesting, reducing the basal area to approximately 100 square feet per acre. The largest and healthiest trees of the desirable species should be retained to create an un-even age stand structure.

Fuels reduction treatments also should be applied following commercial harvesting, as Stand 8 is the most likely ignition source being adjacent to Highway 2. This stand provides an opportunity to create defensible space for the park, especially with the excellent access provided by the paved access road (old highway) along the northern stand boundary. Reduction of ladder fuels and fine ground fuels (10 and 100-hour fuels) within a minimum distance of 100 feet along the paved access road would be beneficial for this purpose.

Terrain/Access

Stand 8 is defined by two terrain types. In the northeast corner a ridge runs from the northeast to the southwest. In the southwest corner the terrain is generally flat to rolling. Slopes range from 0 to 30% with the entire area workable with conventional harvesting equipment. Access is good along the north boundary. There is a road/trail that accesses the northeast corner and a road that accesses the southern area. There are also trails and access points near the caretaker's residence. Stand 8B does not have an established access despite bordering Highway 2.

Environmental Constraints

In the northeast corner there is a stream (Stream "I") and wetland area that during wet seasons has a substantial amount of flow. Road construction has channeled the stream to flow on the north side of the old highway. Stream I has a 75-foot riparian management zone, which will reach into the northern boundary of Stand 8.

Management Prescription

Stand 8 is designated as an "Active Management" unit. Refer to the prescription guidelines on page 62 for harvesting and stand improvement treatments.

Management Prescriptions

The table on page 62 summarizes the management prescriptions for each stand within Pend Oreille County Park. A set of guidelines has been established to aid in the planning of forest treatments and is meant to be used in conjunction with the prescription table. This approach provides flexibility to implement treatments based on a variety of concerns, including forest health condition, timber market strength, recreational values/use, and budget constraints.

Prescription Guidelines

The following guidelines augment the prescription table and will aid in the planning of forest health treatments during this management period (20 years). An itemized list by management factor follows:

1. Access: All commercial harvesting operations must utilize the existing road system. No new road construction is planned for the park, as this will degrade the recreational value of the property.
2. Treatment Size: The size of commercial treatment units will not exceed 40 acres. This is also the maximum amount of acres which can be treated in a single fiscal year. This stipulation will reduce conflicts with public use and prevent rapid, large-scale changes to the forest environment.
3. Wildlife Habitat Management: A minimum of 10% of the gross treatment acres for commercial units will include designated retention areas of varying size and shape where no timber harvest will occur. The location of these retention areas will be determined during the unit layout process. This will also apply to pre-commercial thinning treatments to provide areas for nesting and thermal cover habitat.
4. Canopy Openings: Natural canopy openings exist throughout the park as a result of forest insects and pathogens. Canopy openings provide areas for introducing new species which can combat current forest health issues. Canopy openings up to 2 acres in size may be created to address specific forest health concerns, i.e. root disease and insect outbreaks.
5. Harvesting Systems: All prescribed harvest operations will be performed with ground-based equipment. Harvest methods must employ some form of complete slash disposal, in order to conform to the 1982 Recreational Use and Timber Management Plan. This may include whole-tree yarding or unit-level treatments (piling/mastication).
6. Treatment Timing: Forest health treatments have been given a timing priority which is based on current forest health conditions. The timing is somewhat flexible and should be based on the needs of Pend Oreille County, public recreation, market conditions, etc.
7. Timber Volumes: Not more than 80 MBF (thousand board feet) will be harvested annually, or on a 5-year cutting cycle not to exceed 400 MBF (1982 Recreational Use and Timber Management Plan).

Management Prescription Table

Stand No.	Management Emphasis	Harvest Regime			Timing	Species Management			Stand Improvement				Timing	Wildlife Management		
	Active/Passive	GS	S	CT	Yrs.	Management Spp.	Interplant	Site Prep	PCT	Fuels Red.	Slash Treatment	RX Burn	Yrs.	Snag Creation	CWD Recruit.	Habitat Piles
1	Passive					PP		No	x	x	Lop	x	4	x	x	x
2	Active		x	x	10	WP, PP, WL	x	Mech.	x	x	Lop/Pile	x	12	x		x
3	Passive					PP		No	x	x	Lop/Pile	x	5	x	x	x
4	Active	x	x		12	WL	x	Spot			None			x		x
5	Passive										None				None	
6	Active	x	x		7	WL, PP	x	Spot	x		Pile		9	x	x	x
7	Active	x	x	x	3	WL, PP	x	Mech.			None				x	x
8	Active	x	x		5	WP, PP, WL	x	Mech.		x	Grind/pile		6		x	x

Table Definitions

- Harvest Regimes: (see pages 39-40 for definitions)
 - GS = Group Selection Harvesting
 - S = Sanitation Harvesting
 - CT = Commercial Thinning
- Treatment Timing: The preferred maximum number of years prior to the treatment.
- Management Spp. (Species): the preferred seral species for long-term management.
- Interplant: Introducing containerized nursery stock through manual planting (see pg. 41).
- Site Prep: Method of site preparation utilized to prepare the site prior to planting, if necessary (see pg. 42).
- PCT: Pre-commercial thinning
- Fuels Red.: Fuels Reduction prescribed due to fuel loading concerns which impact stand health and/or public safety.
- Slash Treatment: The method of disposing activity slash – lop and scatter, pile, grind/masticate.
- RX Burn: Prescribed under-burn to achieve multiple resource benefits – stand health, ecological function, and wildlife habitat enhancement. RX burns should be completed in the spring or fall following fuels reduction and slash treatments.
- Snag Creation: Girdling of overstory trees to create a snag or mechanical “high stumping” during harvest operations.
- CWD Recruitment: Retention of currently dead snags and down logs throughout the harvest unit. May also involve yarding out of large-diameter cull material during harvest operations.
- Habitat Pile: Construction of wildlife habitat piles, which can often be incorporated with stand improvement or harvest treatments

Natural Disturbance Events

In the event of natural disturbances, such as wildfires, significant wind storms, insect outbreaks, etc., the management prescription table and guidelines should be utilized as much as possible for the purpose of salvage harvesting and other mitigation work. Passive management units will not undergo commercial salvage operations, but may be treated by other means, if necessary.

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

A large part of the attraction of Pend Oreille County Park is the extensive trail system that provides hiking, horseback riding, and mountain bike riding opportunities in the spring, summer, and fall months and snowshoeing and cross country skiing opportunities in the winter. The Backcountry Horsemen's Association volunteers their time and labor to maintain the trail system each spring. The trail system is comprised of just over 7 miles of trails, and covers the vast majority of the park, shown on the County's trail map on the following page.

Pend Oreille County surveyed users of the Park in 2013, and found that many people would like to see more trails added. Along with the addition of new trails, increased maintenance to the current trails would be well received. This could include location signs posted along the trail, as well as trail improvements. These improvements can be implemented through a variety of local volunteer groups, including the Backcountry Horsemen, POC Parks and Recreation Foundation, and local Boy Scout Troops. Another potential addition to the park's trail system is a 2.5 mile non-motorized trail that would connect Pend Oreille County Park and Rustler's Gulch Recreation Area, which is also owned by the county. The county is currently seeking grant money to complete this proposed project, named the Rustler's Gulch Equestrian Trail.

Part of the trail system is comprised of old road beds, primarily in the lower, flatter reaches of the park. These road beds will be utilized during the proposed harvest activities, eliminating the need for new road construction. This is beneficial in a number of ways, including reduced logging costs, minimizing the amount of soil compaction across the property and removing additional acres out of forest production.

While the trails provide good access to the northern portions of the property for foot access, vehicular access is limited, meaning initial attack response time on a wildfire will be increased. This is important to consider, as wildfires are much easier to contain and less destructive in the early stages. A road map is found on page 66. The roads on this map are currently used as trails, although they are existing roads from previous forest management. This road system will need to be utilized for future management.

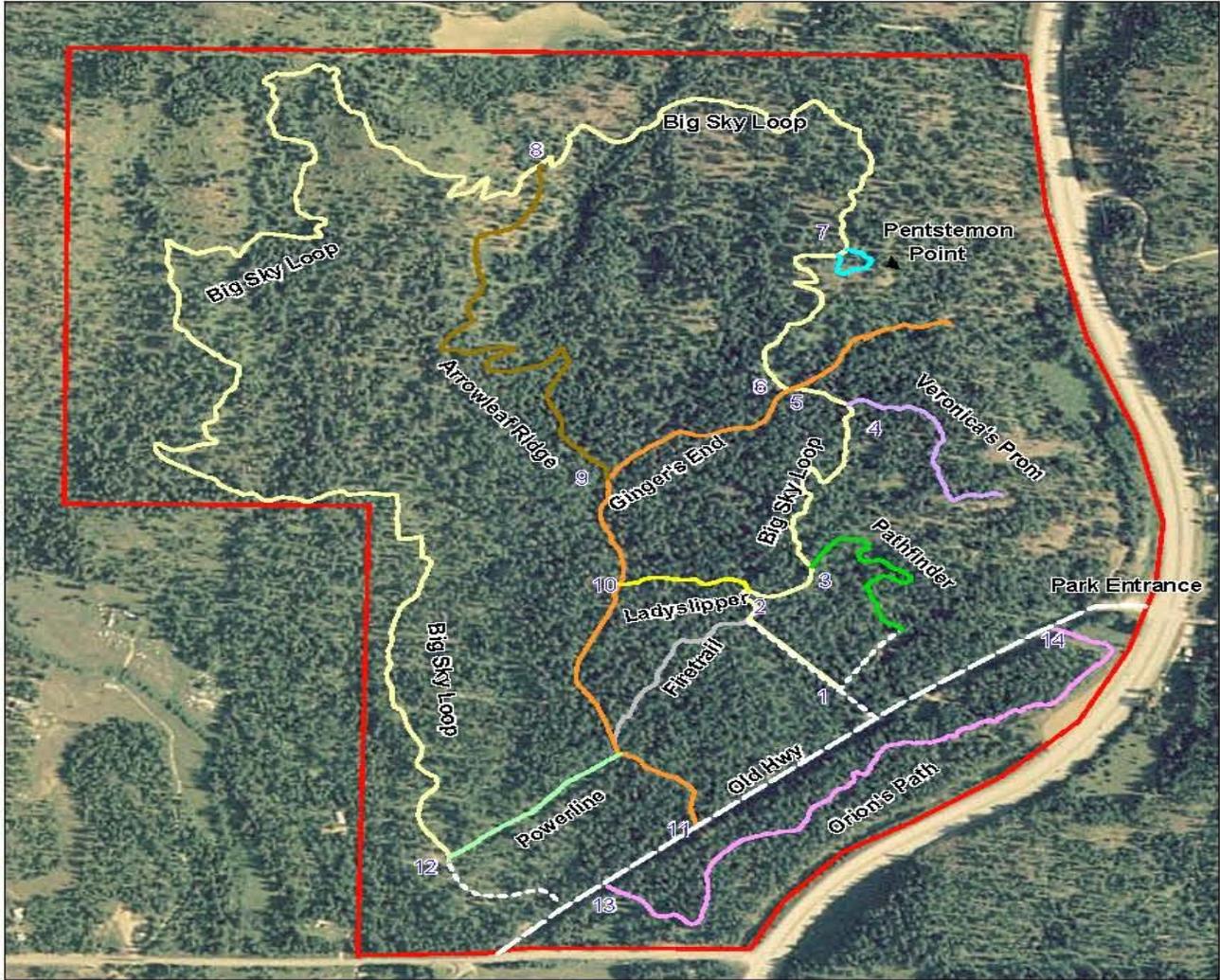
Management Action

Maintaining the current level of access is the base level for road/trail management within Pend Oreille County Park, occurring annually in the spring. In addition to this maintenance, improvements can be made in several ways, with volunteer groups spearheading efforts to increase trail maintenance, and Pend Oreille County continuing the effort to acquire grant money to fund the Rustler's Gulch Equestrian Trail project. These improvements will be dependent on the availability of funds, as well as volunteers' time.

With harvest activities, the old roads on the property will be utilized. This use of the roads will follow forest practice laws, and may require the replacement or construction of stream crossings. The most likely crossing will be on Stream "1" shown on the water resource map. This stream is currently labeled as "Fish-Bearing", and will be visited by an ID Team to verify its classification before a forest practice application is approved. When constructing any crossing, Best Management Practices will be used to prevent any sediment delivery to the watershed. Following the use of these roads, all bare ground will be grass-seeded, to prevent erosion as well as reduce the spread of invasive species.

Additionally, while Pend Oreille County Park is a non-motorized park, there is evidence of off-road vehicles using the trails. This can be both damaging to the trails and dangerous to the hikers/horses using the trails. Posting signs and monitoring the trails to reduce the use of ORVs in the park would help reduce these risks.

Pend Oreille County Park Trail System

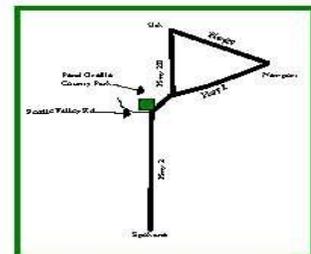


Big Sky Loop	Ginger's End
Arrowleaf Ridge	Veronica's Prom
Pathfinder	Ladyslipper
Orion's Path	Pentstemon Point
Powerline	Firetrail
Old Hwy White	Park Boundary

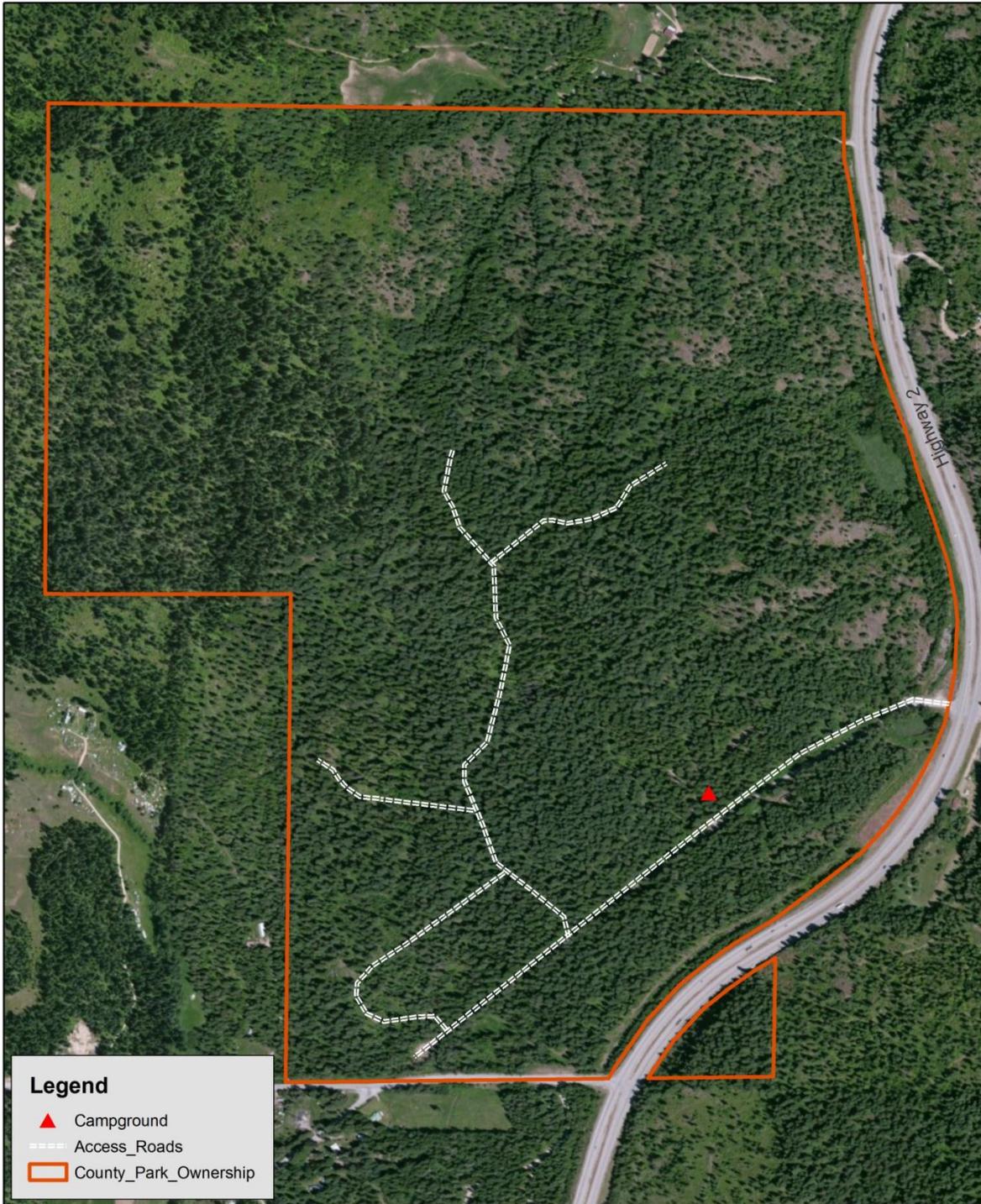
Trail Distances

Big Sky Loop = 3.2 mi.
 Ginger's End = .83 mi.
 Arrowleaf Ridge = .61 mi.
 Pentstemon Point = 440 ft.
 Veronica's Prom = .23 mi.
 Pathfinder = .25 mi.
 Ladyslipper = 655 ft.
 Orion's Path = .68 mi.
 Powerline = .19 mi.
 Firetrail = .20 mi.
 Road = .70 mi

TOTAL = 7.1 miles (approx)

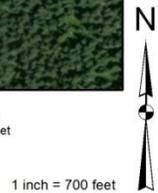


Pend Oreille County Park - Road Map
Ptns. Sections 23 & 24, T30N, R43E W.M.
Pend Oreille County, Washington



Legend

- ▲ Campground
- ==== Access_Roads
- ▭ County_Park_Ownership



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.

Pend Oreille County Park provides wildlife habitat for several species of birds, small mammals, and ungulates. In addition, the property provides areas of thermal and security cover, especially for big game animals such as deer. 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

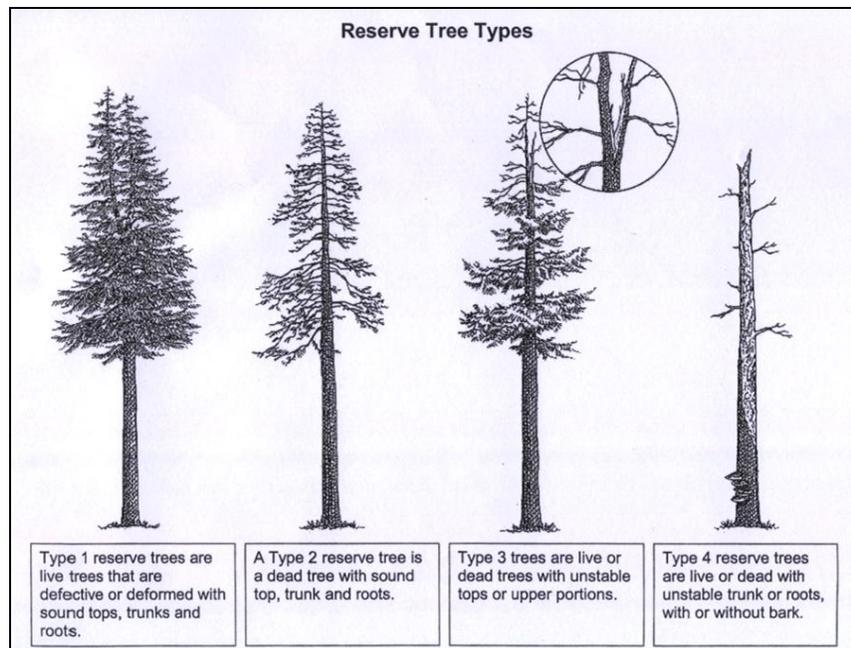
Snags and Coarse Woody Debris

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 the management units on Pend Oreille County 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 10 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 where they will not impact surrounding regeneration. This is advisable for ground squirrels and nesting owls.

Understory

- ⇒ Retain understory vegetation wherever possible, especially preferred species which are currently present on the site, which include serviceberry, elderberry, 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 food plots or wildlife shrub plantings in areas with available sunlight would intersperse food with cover and increase habitat effectiveness.
- ⇒ 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” will be incorporated into future harvest prescription during the sale layout process. These areas would be flagged out for no harvest activity and should vary in size and shape depending on the harvest unit size. These areas would ideally consist of dense understory vegetation that provides thermal and security cover or areas of complex vertical structure with higher snag frequency, etc. This approach, coupled with dispersed retention of snags, will provide valuable habitat elements throughout the ownership and break site distance. Retention guidelines also apply to pre-commercial thinning and fuels reduction treatment units. Approximately 10% of the gross acres for all treatment units will consist of retention areas of varying sizes and shapes.
- ⇒ 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. Approximately 2 piles per acres is prescribed for all treatment units.

Species Present/Observed

Pend Oreille County 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 likely 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.

The Washington State Department of Fish and Wildlife Priority Habitats and Species List (PHS) identify habitats and species which are “considered to be priorities for conservation and management.” The

PHS database identifies “palustrine” (wetland, aquatic habitat) and northwest white-tailed deer as being present within Pend Oreille County Park.

Resource Category VII - Protection of Special Resources

There are no known threatened or endangered species, cultural, or historical resource protection issues on Pend Oreille County Park. The U.S. Fish and Wildlife Critical Habitat Portal shows this park has no critical habitat for endangered species and it lies outside of the bull trout overlay.

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 Pend Oreille County Park in both the short and long term.

For the reasons mentioned above, the aesthetic resource values of Pend Oreille County 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. Stand 7, which has a large presence of root disease mortality among the Douglas-fir and grand fir, presents the largest challenge. The removal of dead and dying trees from the overstory will noticeably change the look of the overstory. 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 the aesthetics of the park.

Pend Oreille County Park provides multiple recreational and educational opportunities to citizens in Pend Oreille County and the surrounding area. The campground and day-use located within the park is a popular destination for the local public. People often travel from Spokane to camp in the park because of its close proximity.

Educational opportunities are significant and may include field trips for local schools, colleges, universities, 4-H, scout troops, etc. This is an excellent resource for forest stewardship classes administrated through WSU Extension (see Resource Category IX for further examples). The most common forms of recreational use include camping, hiking, equestrian riding, and wildlife viewing/photography. Restricting motorized vehicle access increases the quality of other forms of recreation on the property. As the management and infrastructure within Pend Oreille County Park develops, recreational and educational opportunities on the property will expand.



Pend Oreille County Park Campground

Resource Category IX - Specialized Forest Products

The non-timber forest products available in Pend Oreille County Park offer a unique opportunity for local residents to experience many different aspects of a forest. These opportunities range from hiking trails that wind through different forest management practices, edible plant and mushroom identification seminars, craft and hobby classes using specialized forest products and native plants.

Other educational classes can be conducted for a fee at Pend Oreille County Park. A class focusing specifically on edible wild plants such as nuts, fruits, and vegetables can help provide attendees with healthy, natural diet choices. These classes could be facilitated through a partnership with Washington State University Extension. In addition to nuts, fruits, and vegetables, mushrooms are another bountiful specialized forest product available in the park. The best way to educate the public on mushroom identification would be to invite a local mushroom club to develop natural as well as cultured harvest sites. Mushroom identification can extend beyond the edible species to include those that have medicinal uses as well as the roles these fungi play in the forest ecosystem.

Removal of Christmas trees from the understory can provide local families with the satisfaction of cutting their own Christmas tree, while generating revenue and managing stocking densities at the same time. Areas of fir and pine that need management can be identified prior to the holidays and made publicly open to Christmas tree harvest with the purchase of a tag. Other special forest products geared towards the Holidays are available as well. Cedar boughs, along with fir and pine boughs, are great for making Christmas wreaths and other ornamental decorations, and seed cones can be used to further

decorate. Joining efforts with a local youth organization such as FFA, 4-H, or Boy Scouts would keep program costs low and offer great experience to the volunteers at the same time.

The Pend Oreille County Park provides an excellent venue for public education and outreach. 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. Education loops can provide a first-hand look into how a forest can be managed for multiple benefits. Establishing interpretative signs along the extensive trail system as it traverses through areas of forest management would offer a first-hand educational opportunity to public users.

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 Pend Oreille County Park.

Management Timetable (2015-2034)

Year	Management Practice	Stand	Extent (#, acres)	Comments
2015	Prepare FSP Harvest	7	30	Sanitation/GS
2016	Site Prep Grass Seed Burn Landing Piles	7 7 7	15	Mechanized
2017	Interplant Habitat Rxs	7 7	15 30	WL/PP Piles
2018	Harvest PCT/Fuels Red. Habitat RXs	8 1 8	35 10 35	Sanitation/GS Lop/Scatter Slash Piles
2019	Site Prep Grass Seed Burn Landing Piles Fuels Reduction RX Burn Habitat RXs	8 8 8 8 1A 1	15 35 21 10	Mechanized Pile or Mulch Slash Under-burn spring/fall Piles/Snags
2020	Interplant PCT/Fuels Red. Habitat RXs	8 3 3	15 30 30	WP/PP/WL Lop/Scatter Slash Piles/Snags
2021	Harvest RX Burn	6 3	20 46	Sanitation/GS Under-burn spring/fall
2022	Interplant Grass Seed Burn Landing Piles	6 6 6	10	Spot Disturbance
2023	PCT Habitat RXs	6 6	20 20	Lop/Scatter Slash Piles/Snags
2024	Harvest Habitat RXs	2 2	35 35	Sanitation/CT Piles/Snags
2025	Site Prep Grass Seed Burn Landing Piles PCT/Fuels Red.	2 2 2 2	10 10	Mechanized Lop/Scatter Slash
2026	RX Burn Habitat RX	2 & 1B 2	80 50	Under-burn in spring Piles/Snags
2027	Harvest	4	20	Sanitation/GS

2027 (cont)	Interplant Habitat RXs	2 4	10 20	WP/PP/WL Piles/Snags
2028	Interplant Grass Seed Burn Landing Piles	4 4 4	10	Spot Disturbance
2029	Monitor Forest Health	All Stands		
2030	Harvest Evaluation	7		Analyze Markets/Stand Health
2031	Harvest	7	30	Sanitation
2032	Grass Seed Burn Landing Piles	7 7		
2033	Harvest Evaluation	6	20	Analyze Markets/Stand Health
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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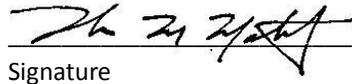
APPENDIX A

Forest Stewardship Plan Signature Page

Governor's Deed/1982 Timber Management Plan for Pend Oreille State Park

FOREST STEWARDSHIP PLAN SIGNATURE PAGE

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



6-16-2015

Plan Preparer Is:

Signature

Date

Luke M. Machtolf, ACF, CF[®]

Print Name

Area Manager

Title

Northwest Management, Inc.

Agency/Company

15 W. Crawford

Address

Deer Park, WA 99006-1103

machtolf@nmi2.com

Phone: (509) 276-4699

- 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

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County

[Handwritten marks]

RECEIVED
V. 47 P. 237-245

02 APR 19 P 4: 18

Bookie Walter

GOVERNOR'S DEED

WHEREAS the State of Washington, acting by and through the Washington State Parks and Recreation Commission, at the Commission's September 17, 1981 regular meeting in Spokane, Washington, under the provisions of Chapter 96, Laws of 1981 (RCW 39.33.010) authorized the transfer to Pend Oreille County of Pend Oreille State Park, located in Pend Oreille County, on lands more particularly described below; and

WHEREAS Pend Oreille County, acting by and through the Board of County Commissioners, by resolution dated March 2, 1981, authorized the County's acceptance of the transfer of Pend Oreille State Park from the Commission;

NOW THEREFORE, the STATE OF WASHINGTON, as Grantor, for and in consideration of the mutual benefits to be derived, pursuant to the provisions of Chapter 96, Laws of 1981 (RCW 39.33.010), on such terms and conditions as are hereinafter stated, hereby transfers, conveys and quit claims unto PEND OREILLE COUNTY, Washington, as Grantee, all of its right, title and interest in and to Pend Oreille State Park, more particularly described as follows:

In Section 23
The NE 1/4;
The E 1/2 NW 1/4;
That part of the SE 1/4 lying westerly of the westerly line of the existing state highway right of way; EXCEPT the south 100 feet thereof lying east of former State Highway #2.

In Section 24
All that part of the W 1/2 W 1/2 lying westerly of the westerly line of the existing state highway right of way.

All in Township 30 North, Range 43 East, W.M., in Pend Oreille County, Washington.

This conveyance is expressly made subject to the following terms and conditions:

I

The above described property shall be continuously used for public park purposes.

II

III

The above described lands shall be managed, developed and operated as a public park, and the timber thereon managed, in accordance with the Recreational Use and Timber Management Plan for Pend Oreille State Park, as amended in February 1982, a copy of which is attached hereto as Exhibit "A", and by this reference incorporated as if set forth fully herein. This plan may be amended at any time with the mutual written consent of the parties hereto, in which event, the use plan, as amended, will form the basis of this condition.

IV

Pend Oreille County will, on or before the first day of each calendar year, file a report with the Washington State Parks and Recreation Commission, Site Planning and Acquisition Section, 7150 Cleanwater Lane (KY-11), Olympia, Washington 98504, to verify compliance with the Use and Management Plan described above. The report will include, at a minimum, an account of all income, expenses, volume of timber removed, development accomplished, park operation schedules and third party leases or agreements during the preceding year.

In the event Condition I, above, shall fail, all right, title and interest conveyed herein shall automatically revert to the Grantor, without the need of notice or entry. In the event of non-compliance with the terms of Conditions II, III or IV, above, by the Grantee, its successors or assigns, then the Grantor may reenter and retake its former estate.

GIVEN under my hand and the official seal of the STATE OF WASHINGTON this 6th day of April, 1982.

APPROVED AS TO FORM:
KEN O. EIKENBERRY
Attorney General

JOHN SPELLMAN, Governor
State of Washington
ATTEST:

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RECREATIONAL USE AND
TIMBER MANAGEMENT PLAN
FOR
PEND OREILLE STATE PARK

Board of County Commissioners

E. C. Armstrong, Chairman
H. M. Yako, Member
Robert L. King, Member

Prepared by:

PEND OREILLE COUNTY PLANNING DEPARTMENT
February 1982

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Exhibit "A" 47-239

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INTRODUCTION

This basic plan is being completed for submission to the Washington State Parks and Recreation Commission. The Commission has required such a plan before transferring the Pend Oreille State Park facility to Pend Oreille County.

Late in 1980, the State Parks and Recreation Commission met with the Board of Pend Oreille County Commissioners to ascertain if the Board of County Commissioners had any interest in acquiring Pend Oreille State Park. At that time the Board of County Commissioners took the matter under advisement until receiving the conditions of the state relative to the county's acquisition.

Early in 1981 the county received the conditions of transfer. The conditions were found acceptable to the county. Therefore, on February 23, 1981, the County Commissioners held a public hearing in order to receive public input on the county's proposed acquisition of the park. On March 2, 1981, the Board of County Commissioners signed a resolution accepting the conditions of the state and authorizing the Planning Department to draft a basic use plan for the county's use of the park. On August 31, 1981 State Parks staff held another public hearing in compliance with RCW 39.33.010. On September 17, 1981 the State Parks and Recreation Commission approved the transfer of the park to Pend Oreille County with the following conditions:

- a. The property shall be continuously used for public park purposed or revert to the state.
- b. Timber may be selectively harvested provided that all income from said timber harvest shall be used for park development and operation.
- c. A recreational use plan, including a timber management plan, shall be prepared by the county and approved by the Director prior to transfer of fee title. The plan shall indicate general types of recreation use and shall require the county to file an annual compliance report with the Director. The plan may be amended based on mutual agreement.

PARK HISTORY

In the early 1920's, the people of Newport heard that this area of old growth timber was going to be logged off. They took up donations to purchase 153 acres of this land for a park. The land was later donated to Washington State Parks. The state park lands were acquired from the following:

- | | |
|--|--------------------|
| 1. Spokane Lumber Company | 153 acres - 1927 |
| 2. H. G. Klopp | 240 acres - 1938 |
| 3. George Elmer Brown | 13.74 acres - 1969 |
| 4. Washington State Highway Commission | 14.66 acres - 1969 |
| 5. Washington State Highway Commission | 17.10 acres - 1970 |

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6. Robert H. Neumiller	8.86 acres - 1969
7. Washington State Highway Commission	6.75 acres - 1973
TOTAL	454.12

Two (2) parcels have been separated from the park for road purposes; leaving a total park acreage of approximately 437 acres.

DESCRIPTION OF THE FACILITIES

The Pend Oreille State Park facility consists of approximately 437 acres lying in the south central portion of Pend Oreille County adjacent to State Route 2. Approximately two-thirds of the southern portion of the park is in old growth fir, larch, and pine. Upper portions of the area are less densely covered with second growth timber.

There are 14 various structural facilities which the state has constructed during their years of operation. The major facility being the public rest-rooms and showers. The other facilities consist of various buildings such as storage buildings, well house and water reservoir.

Thirty-six campsites and a large day use area have also been developed.

RECREATION

The Board of County Commissioners were primarily interested in two aspects of the park. First was the desire by the Commissioners to keep the park open to the public. Secondly, the in place facilities that are presently existing drew the interest of the Commissioners. With such facilities, it would be possible for Pend Oreille County to begin a county park operation without the large capital expense of building park facilities.

While the park lacks a major attraction, such as a lake or significant stream, it does provide a quiet recreational setting in the forest for the users of the facility. Use of the park appears to be primarily over-nighters off of State Route 200, and local residents who frequently use the park for picnics and family reunions.

Therefore, it is the county's plan to develop and build on the facilities already in place and functional at the park and to add new facilities only as park use and the availability of capital funds warrant the necessary improvements. It is the county's position that park use fees, in conjunction with revenue obtained from management of park resources, should pay for park operations.

CAMPSITES

The presently existing 36 campsites are suitable for campers, trailers less than 20 feet in length and tenting.

When demand increases, it is the county's plan to develop additional sites to the west of the present camping sites. This would be done by developing a new loop road with camping sites lending off it much the same way the existing camping area is developed, and in accordance with a plan developed in the past by State Parks.

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Such a development would require that a new restroom facility be constructed in a central area. In conjunction with the restroom facility or at another site, the county would propose to develop a holding tank dump station to accommodate park users.

TRAILS

There are several trails that are now existing in the park which are presently used for hiking in the summer. The county, in their trail development program, would expand on these trails to include use of the trails for cross-country skiing and possibly snowmobiling in the winter. Separation of snowmobiles and cross-country skiing trails would be provided to the greatest extent possible.

Several warming areas would be constructed to accommodate cross-country skiers and snowmobilers if the need arises.

The county is investigating the possibility of establishing horseback riding trails in the park. Local horse clubs have expressed interest in helping to establish and maintain such trails.

SPECIAL INTEREST AREAS

Pend Oreille County has been contacted by Spokane Community College, Department of Natural Resources, in regard to establishing an instruction and demonstration forest area within the park area.

It is the position of Pend Oreille County that adequate room exists within the park to accommodate such area. It would be developed in cooperation with Spokane Falls Community College and possibly other area colleges.

Such an area would provide for an instruction and demonstration forest which would also have appeal as a public interest point for park visitors.

OPERATION AND MANAGEMENT

The operator will be responsible for park maintenance and control; as specified by the county.

The Pend Oreille County Planning Department, which is responsible to the Board of County Commissioners, is the county department directly responsible for park operations.

Pend Oreille County intends to operate the park with a good neighbor policy toward adjacent landowners.

There are at least 13 property owners adjoining the park and at least three residences within 500 feet of the park boundary. All operations and facilities of the park will be designed and constructed in such a manner as to be as compatible with the neighboring property and residences.

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TIMBER MANAGEMENT PLAN

In addition to convenient camping facilities, two natural attractions are important features at Pend Oreille Park - large old growth trees and wildlife. Maintaining and enhancing recreational use in the proposed Pend Oreille County Park will require protecting and perpetuating these features. The objective of this integrated recreational and timber management plan is to provide basic guidelines for implementing a modified selective timber harvest program, that will imitate nature by allowing the forest to develop into a stand of trees as large, mature and majestically scenic as possible, without losing most of them to natural harvesting agents. Periodic timber sales will generate income for the maintenance of facilities and for the development of trails and other improvements.

Of the 437 acres comprising the park, 250 acres is undeveloped merchantable forest capable of providing commercial forest products (mainly sawlogs). Another 100 acres is insufficiently stocked and is not used in allowable sustained yield calculations. Fifty (50) acres is presently considered uneconomical for intensive forest practices. A summary of approximate acres by timber and land use is as follows:

Commercial forest (stocked)	250
Commercial forest (non-stocked)	100
Non-Commercial forest	50
Developed Area and right-of-way	37
Total Area	437 acres

The approximate net annual growth per acre for the stocked commercial forest is 80 cubic feet (400 board feet). Potential production under intense management is 500 board feet per acre. To allow for the development of an inventory of large old trees and for cull and dead trees for wildlife use, a reduced sustained harvest based on approximately 320 board feet per acre net annual growth (64% of potential) is proposed. As the nonstocked area becomes satisfactorily forested, its potential growth can be added to the program. Likewise, if timber markets improve, the non-commercial forest can be included.

A 320 board foot growth rate per acre will support an annual harvest of 80 M board feet of sawtimber. If harvested in the proposed manner, this timber has an approximate net stumpage value of \$4,000 on the current depressed market.

Trees will be individually marked for removal by a professional forester according to individual tree and stand conditions. Harvested trees will include excess trees from younger overstocked stands as well as salvage of some mature and overmature old growth. Harvest schedules will be coordinated with both recreational uses and local markets preventing danger and inconvenience to park users and to maximize returns.

The following modifications of the county's normal selective timber management program will insure that large old trees and wildlife are perpetuated and that recreational use is benefited by logging.

400 mbf

CWD + wildlife
piles

- 1) Small volumes of timber (a maximum of 80 M board feet per year) will be salvaged annually or on a five year cutting cycle. Short cutting cycles will allow the county to keep trees until physiologically mature without excessive risk of losing them to insects, disease or other natural forces.
- 2) There will be complete slash disposal in all areas of heavy use and throughout most of the ownership. Exceptions might occur where soil and wildlife would be better served by leaving some residue on the site. Examples of places and times which might require less than complete and prompt disposal would include scattering and mulching small tree limbs on thin soil areas and winter logging which can provide foliage and lichens from tree tops as food for deer.
- 3) A sufficient number of large cull and dead standing trees (10 - 20 per acre) will be allowed to accumulate, where appropriate, to satisfy the needs of cavity nesting birds and other wildlife. Unmerchantable trees are attractive to many people and are useful for forestry educational purposes.

Setting aside some or all of the undeveloped property as a totally natural area is inadvisable. Wildfire and insect outbreaks on such a small tract and in such a domestic area are unacceptable. Eliminating these dynamic natural forces will alter the fulfillment of natural succession and prevent the reestablishment of many species of plants and animals which occurs in the local natural habitats. This would eventually result in the formation of a jungle of deformed shade tolerant trees and litter. The most logical alternative is to approximate the natural scheme by substituting mortality and surface fire with logging and wood gathering.

- 4) Logging spurs and skid trails will be built on locations that provide trails for hiking, cross-country skiing, horse back riding and other appropriate recreational and forest educational activities.

Pend Oreille County is heavily dependent upon the production of forest products. Pend Oreille Park can be used as a show place demonstrating natural forest development and intensive forest practices while providing a place to camp, picnic and recreate.

COMPLIANCE AND AMENDMENTS

For the purpose of complying with the conditions of the Commission as cited in the introduction, Pend Oreille County will, on or before the first day of each calendar year, file a report with the Washington State Parks and Recreation Commission, Site Planning and Acquisition Section, 7150 Cleanwater Lane (KY-11), Olympia, Washington 98504, to verify compliance with this Recreational Use and Timber Management Plan. The report will include, at a minimum, an account of all income, expenses, volume of timber removed, development accomplished, park operation schedules and third party leases or agreements during the preceeding year.

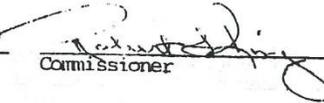
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Any amendments to this Plan must be based on mutual agreement between the County and the Commission through its Director or designee.

COUNTY APPROVAL

This plan was prepared by the Pend Oreille County Director of Planning and Community Development and has been reviewed and approved by the Pend Oreille County Commission at their regularly scheduled meeting of February 08th, 1982.


Commissioner


Commissioner

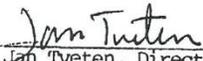

Commissioner

STATE PARKS PLAN APPROVAL

Per September 17, 1981 Commission action, the transfer of Pend Oreille State Park to the county requires that "A recreation use plan, including a timber management plan, shall be prepared by the county and approved by the Director prior to transfer of fee title".

This "Recreational Use and Timber Management Plan for Pend Oreille State Park" submitted by the Board of County Commissioners meets Washington State Parks and Recreation Commission's requirements and is hereby approved.

Dated this _____ day of _____, 198 .


Jan Tveten, Director

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