DRAFT
Silvicultural Management Plan for the Outlet Bay Sewer District

I. Background

The Outlet Bay Sewer District (OBSD) is currently in the process of improving their current sewer treatment facility. As part of this improvement project, the OBSD will acquire 120 acres of land from the United States Forest Service (USFS) through a land exchange program. This acreage will allow OBSD enough room to construct new effluent storage lagoons, irrigation fields and associated facilities.

The Idaho Department of Environmental Quality (DEQ) is the regulatory agency that is responsible for permitting and monitoring community sewer systems in the state of Idaho. In order to receive the necessary approval from DEQ to operate the new sewer facility, DEQ requires that the OBSD develop a Silvicultural Management Plan for the site. One reason for developing this plan is to satisfy this DEQ requirement. However, there are other good reasons for developing this plan and some of these are presented below.

Information for the preparation of this plan was gathered from field visits to the site, discussions with the OBSD and by reviewing the Forest Service timber cruise and historical harvest history records. During the field visits to the site, the area was thoroughly walked and timber information was collected at plots in the stands.

II. Purpose, Scope and Organization of this Silvicultural Management Plan

As mentioned above, one reason for writing this plan is simply that DEQ requires that a plan be developed. However, even in the absence of this requirement, the development of this management plan is a prudent project to undertake. This plan is meant to serve as a guide as to how the land will be managed in the future. For individuals that serve on the OBSD board in the future, this document will serve as a set of "tracks" that describe why the board did or did not do certain things in the management of the parcel. Once approved, this plan should not be viewed as a static document. If conditions or circumstances change, or if new information becomes available regarding the management of sewer facility lands, this plan should be reviewed and if necessary, revised or amended.

Silviculture can be defined as the art and/or science of manipulating forest vegetation in order to meet the objectives of the landowner. A Silvicultural Management Plan is generally a long-term plan that describes what the land management objectives are for a parcel of land and outlines ways to achieve those objectives. The first step in this process is for the landowner to carefully articulate their goals and objectives. One then describes what kind of forest vegetation is necessary to meet those objectives. Lastly, by comparing

the current condition of the vegetation to the desired condition, specific management actions can be identified to more towards the desired condition.

This management plan assumes that the land exchange between the USFS and the OBSD is finalized and OBSD becomes the legal owner of the land. This plan only covers the 120 acres of land that will be acquired by OBSD. The plan does not include management recommendations for other lands where the OBSD may have additional improvements located such as sewer lines and/or lift stations. The legal description for the location of this property is: T59N, R4W; E1/2 of the NE1/4 of Sec. 6 and the SE1/4 of the SE1/4 of Sec 31, T60N, R4W.

The rest of this plan is organized into four main sections; a description of what the land management objectives are for the parcel, a discussion of what the current condition is of the vegetation and site characteristics that are applicable to the management objectives, a discussion of the desired future condition for the vegetation, and lastly, a list of management activities necessary to achieve the desired condition.

III. Management Goals and Objectives

The OBSD Board of Directors has identified the following management goals for the 120-acre site. These goals are stated in very broad terms and are followed by more specific objectives that might be used to meet the goals. Near the end of this plan there is a list of specific recommendations that should be implemented to help meet these management goals and recommendations.

Goal #1- Operate the sewer treatment facility in a way that ensures that groundwater and surface waters are not polluted and do so in a way that keeps current and future expenses to reasonable levels.

Specific Objectives to Achieve this Goal:

A) Manage the irrigation area so that the effluent sprayed onto the site does not reach the underlying groundwater and pollute drinking water sources or degrade the quality of nearby Lamb Creek or Priest Lake.

B) Manage the irrigation area in such a way to decrease the likelihood that it may need to be expanded in the future.

The irrigation site was planned and sized so that the sewer effluent could be sprayed out into the area and the vegetation would help take up the effluent from the soil and prevent it from reaching the groundwater. Through past experience and research, DEQ determined how many gallons of effluent could be sprayed onto a given area and not reach the ground water. During the planning for this project DEQ provided the OBSD Engineers with input into how big the irrigation site should be and how and when the effluent could be sprayed onto the site. DEQ assumed that the vegetation would take up

some of the effluent. In the unlikely event that future monitoring of this site shows that effluent is reaching ground water, the OBSD would likely have to increase the size of it's irrigation area to protect public health and water quality. To minimize this chance, the OBSD should try and manage the vegetation in the irrigation field area to maximize the amount of effluent that is taken up by vegetation and/or that naturally evaporates during spraying.

As more and more people develop their unoccupied lots in the District, additional effluent will need to be sprayed onto the site and it will become more important to maximize the vegetation uptake of the effluent to prevent the chance that OBSD would be required to expand the irrigation site. The District does have a few additional acres (to the south of its current planned irrigation area) to expand to in the future. However, because this potential expansion area is located fairly close to a main public road (Outlet Bay Road), DEQ would likely require that the District disinfect the effluent to a higher level before irrigating the area in order to protect the public's health. Therefore, if the District can avoid expanding its irrigation area in the future, money would be saved. Specific measures to address these objectives are presented later in this plan.

Goal #2- Manage the site to produce some revenue to the OBSD from periodic commercial forest product sales.

Specific Objectives to Achieve this Goal:

A) Maintain as much of the area as possible in a healthy, forested state and encourage the growth of commercially valuable tree species.

The OBSD can obtain some revenue from the parcel by selling certain forest products. Commercial markets usually exist for sawtimber, pulp and chipwood. Occasionally, markets may exist for specialized products such as tree boughs for Christmas wreaths, cedar products, firewood or small trees for transplanting stock for nurseries. Of these various products, currently sawtimber is by far the most valuable. By maintaining the forested land in a productive state, the OBSD can grow valuable trees that could be periodically cut for revenue. Certain tree species are typically more valuable than others when it comes to selling them for sawlogs. If the OBSD can concentrate on encouraging the growth of these trees, future revenue can be enhanced. In addition, certain tree species are more prone to being killed or damaged from insect attacks or diseases. These species should be discouraged when possible.

As discussed in more detail later in this plan, many of the existing timber stands in the area are currently growing poorly and/or they are dominated by tree species that are not very valuable and they also contain a large amount of rot in them. Through careful management, an opportunity exists to start to convert some of these rotten, poor growing stands to a healthier condition.

B) Protect the soils on the site to maintain their high productivity.

In general, the soils that exist in this area are currently very productive. This condition allows the trees and other vegetation to rapidly grow. However, as discussed later in this plan, the inherent productivity of the soils can be easily harmed by compacting them or by removing nutrients from the site. If the soils are compacted or they are made less fertile, tree growth can be reduced dramatically. In addition, the ability of the soil and vegetation to hold and take up the irrigated effluent can be reduced significantly. Therefore, to meet all of the goals and objectives, careful attention needs to be placed on keeping as much of the soil in a healthy state.

C) Manage the forest vegetation and fuels to maintain a low risk of wildfires.

By conducting certain management practices, the probability of a wildfire burning up trees or harming structures and other improvements can be lessened. For example, trees can be spaced out and slash treated to keep the fuels to reasonable levels. Other fire hazard reduction measures are discussed later in this plan.

D) If possible, conduct forest product sales during favorable economic conditions to maximize revenue.

Timing is very important when trying to maximize revenue from harvesting trees. Under certain market conditions, sawtimber brings a high price. Under other conditions, pulpwood or chipwood markets are high and these products can be much more valuable than at other times. If possible, the OBSD should try and time the sale of its forest products to coincide with favorable market conditions.

Goal #3- Manage the site to be responsive to the desires and concerns of neighboring residents.

Specific Objectives to Achieve this Goal:

A) Protect the integrity of the scenery as seen from the Outlet Bay and Lakeshore Roads.

This area is located in the vicinity of numerous lakeside and secondary homes and cabins. The site abuts the heavily traveled Outlet Bay road as well as the Lakeshore road. Currently, the area adjacent to these travel ways is heavily treed. If the OBSD were to clearcut these areas, there would undoubtedly be some criticism from local residents. Therefore, the objective is to manage these timber stands in a fashion that keeps them visually pleasing. This would probably mean that some mature trees should always be left on the site at any given time and that the slash should be managed so that it is not unsightly.

B) Allow some use by the public of trails on the site.

Currently there are numerous trails that wind through the area. These trails are used by walkers/joggers, bikers, cross country skiers and ATV/motorcyclists. Although some of these trails will have to be closed to protect the public when the irrigation field is

constructed, there may be other trails that could be left open for public use. However, OBSD should monitor the use of these trails. By allowing the public to use some of the site for recreation, there could be liability issues that need to be considered. In addition, the OBSD may wish to consider whether or not the use of motorized vehicles on these trails should occur. Uncontrolled motorized use could potential harm soils or increase the risk of a wildfire starting.

Goal #4- Retain future options.

Currently the 120-acre site contains some small isolated areas that cannot be used for irrigation purposes and they are probably not needed for any other sewer treatment function. These areas include; 1) the "triangle piece" north of the Outlet Bay road and east of the Lakeshore road. This area is approximately 8 acres in size. In the future, the OBSD may decide to sell off this parcel and therefore this should be considered in the management of the timber in this area. 2) the narrow (50-100') strip of property east of the lakeshore road and north of where the 1048 rd intersects with the lakeshore road. This narrow strip of property is approximately ½ acre in size and is not useful for sewer treatment facilities and it would be hard to manage for timber production because of its narrow shape. Therefore, in the future, the OBSD may wish to sell off this parcel to neighboring residents. 3) The small area with the water tank and well on it. The OBSD may wish to sell or lease this area to the water association ???????. 4) the narrow (10-25') strip of property to the south of the Outlet Bay road. This area is approximately ¼ to ½ acre in size. Like the other areas discussed above, this area could not be used for any sewer treatment function and it's narrow shape makes timber management unfeasible. There are multiple private driveways that cross this property and the OBSD may wish to consider selling off this narrow parcel to the adjacent residents.

IV. Description of the Existing and Desired Condition of the Vegetation

In this section of the management plan, the existing and desired condition of the vegetation is described. The desired condition is based on the management goals and objectives listed above. In addition, because they are very applicable to this management plan, this section also presents a discussion on the soils that are present in the area as well as the past management activities that have occurred on the site.

A) Soils

The soils on this parcel are inherently very productive. The first 14-18" of the soil profile is dominated by volcanic ash with a small percentage of rock fragments. The volcanic ash that occurs in this soil is largely a result of the eruption of Mt. Mazama that occurred over ten thousand years ago. This top layer of the soil is the most productive layer in the soil profile. In addition, this ash layer largely controls how much water the soil is capable of retaining. For these reasons, this top layer of soil is extremely important for both the ability of trees and other plants to grow, as well as the ability of the soil to retain water and any sewer effluent that may be irrigated onto the soil.

There has been a significant amount of research conducted on soil productivity issues on soils in the Intermountain Region. In general, research indicates that the ash component of this top soil is extremely important in determining the fertility of the soil. The main primary nutrients that control plant growth are located in this soil layer and the productivity of the soil is largely controlled by how much ash is within the soil and how the soil is treated during management activities. The following discussion summarizes some of the important management implications for these soils.

Research has shown that when heavy machinery such as logging equipment travels over these ash dominated soils, that the soils become detrimentally compacted very quickly. The ability of the soil to hold moisture and nutrients is largely controlled by the density of the soil. A denser soil will generally hold less water and nutrients than a less dense soil. Therefore, in order to preserve the productivity and water holding capacity of the soil, it is extremely important to minimize the amount of soil that is compacted by machinery traveling over the soil. Research has shown that when tractor type equipment is used to log a site and subsequently pile the slash, 45% of the soil can be detrimentally compacted. This level of soil damage would dramatically reduce future tree growth. Some management recommendations are discussed later in this plan to minimize this potential impact.

Researchers have also shown that in order to maintain the productivity of the soil, it is very important to leave some large, woody debris on the site. Large logs and tree limbs are important to the soil because as they decay, they enrich the soil. The pieces of wood help enhance the texture of the soil and thereby, the water holding capacity of the soil increases as well as the soil nutrition level going up. Therefore, researches have recommended that 15-20 tons per acre of large woody material be left on the site at any one time.

One other item regarding soil productivity is important. Researchers have shown that most of the nutrients that are within a standing tree are located in the needles and small branches of the tree. If these needles and small branches are removed from the site (eg., logger cut down the trees and remove the whole tree to the landing with tops and limbs attached), the nutrients in the soil can be depleted quickly. Some management recommendations are discussed below that can eliminate or minimize this situation when logging.

B) Past History of the Site.

On this 120-acre parcel, areas were delineated into "stands". Nine different stands were identified based on areas having similar vegetation. The attached map shows where each of these stands are located. During the rest of this management plan, specific areas will be discussed by referring to stand numbers.

Like much of the surrounding area, this 120-acre parcel burned-over in a wildfire that occurred around 1890. Because this fire was very hot, most of the trees that were present

at the time were killed. Therefore, the majority of the larger trees that now occupy the site, regenerated after that burn and are now about 110 years old. Some of the timber stands contain scattered, older trees that were not killed by the 1890 burn. A few western larch, Douglas-fir and western redcedar that are much older are scattered throughout some of these stands. In addition, portions of stands 2 and 4 contain concentrations of older western hemlock, western white pine and western redcedar. It can be assumed that in these areas, the1890 fire did not burn as intense and therefore more of the trees survived.

Based on the presence of some old stumps that were noted in the area, some light partial cutting probably took place in this area in the early part of the 1900's. The more valuable cedar and white pine that survived the 1890 burn, were probably logged from the site. In the 1950's, the USFS began keeping good records of management activities that occurred on federal lands. The following is a summary of the management history of the stands.

- Stands 1, 2 and 6- No past harvesting or other activities were recorded for this area.
- Stand 3 and most of stand 4- these areas had a commercial thinning harvest occur within them in 1976.
- Stand 5- In 1997, the larger trees that were present were removed with the intention that the existing younger trees would be managed in the future.
- Stand 7- In 1988 part of this area had the larger trees removed with the intentions that the existing younger trees would be managed for in the future. In 2001, in order to make room for the new sewer lagoons, other areas in this stand had all the merchantable trees removed.
- Stand 8-This area was clearcut in 1986. The slash was subsequently piled with bulldozers and burned. The area was planted in 1987.
- Stand 9- This area was clearcut and cleared in 1981 to make room for the existing sewer lagoons and irrigation field.

C) Existing and Desired Vegetation

The attached table contains specific information about each of the 9 stands. A management emphasis is listed for each of the stands. This was developed from the management goals and objectives that were listed above. The existing and desired condition is listed in the table for each stand. By comparing these conditions, treatment recommendations are given that are specific to each stand. For the five timber stands that contain mature or overmature timber, I have elaborated below on the information that is presented in the table.

Stands 2, 3 and 4

These stands are dominated by mature and/or overmature timber. The dominant trees in these stands are mostly 110 years old. However, some older trees are also present. Western hemlock, grand fir and western redcedar are the most common species in the stands. Smaller amounts of western larch, Douglas-fir, western white pine, lodgepole pine and Englemann spruce are also present. The larger trees have diameters that generally range from 15-24" and heights that are approximately 90-110 feet tall. Most of these trees are no longer growing very well and many of them are very rotten. A stem decay fungi called Indian Paint fungus is responsible for a lot of the rot in the stands and it has caused heavy decay to the hemlock and grand fir trees. In addition to this stem decay fungi, other insect/diseases are rotting, killing or otherwise causing damage to the trees. As a result, the small amount of growth that these trees are putting on each year is almost certainly being offset by damage or mortality. Therefore, the quantity and quality of sawtimber in these stands is currently decreasing.

In many portions of these stands, the large trees are fairly dense and they form what can be called a "single-storied" canopy layer. These areas are fairly open underneath the canopies and have very few, younger trees present. In other areas (mostly in stands 3 and 4), a commercial thinning harvest that was done in 1976 created small openings in the stand. Trees eventually seeded into these openings and now these areas have what we can call a two-storied structure. Younger, 10-30' sapling trees are now present in these small openings. Most of these smaller, younger trees are hemlock and grand fir trees that are not growing very well because the larger overstory trees are shading them too much. In addition, many of these hemlock and grand fir trees have probably already become infected with the Indian Paint fungus.

In addition to the Indian Paint fungus discussed above, other common insect and diseases that are impacting the trees are, the fir-engraver bark beetle on grand fir trees, dwarf mistletoe on the western larch, pini stem decay on the lodgepole pine and some larch, blister rust disease and mountain pine beetle on the western white pine, root rot fungi and Douglas-fir bark beetles on the Douglas-fir and pocket rot fungi in the cedar.

The desired condition for each of these timber stands is presented in the table and varies somewhat based on the assigned management emphasis for each stand. However, in order to meet the management goals and objectives listed earlier in this plan, all three of these stands need to be managed to encourage the regeneration of new trees. The stands need to be opened-up by harvesting some of the trees and conditions created so new trees will naturally regenerate and/or trees can be planted. In stand 2 some of the larger trees need to be left so that the scenery is not badly affected for folks traveling the lakeshore road. In addition, the trees that are left can serve as a seed source for restocking the site if natural regeneration is favored over planting. In stand 4 (one of the irrigation areas), some of the trees should be left to help take up the effluent that is irrigated and serve as seed sources. In stand 3, leave trees can provide a seed source for natural regeneration.

Stands 1 and 6

While these two stands share some common characteristics, there are some important differences. For this reason, some of the following discussion is separated by stand. Both of these stands are dominated by mature timber. The dominant trees in these stands are 110 years old. Douglas-fir, western larch, grand fir and lodgepole pine are the most common species in the stands. Smaller amounts of western white pine, western redcedar, western hemlock, and Englemann spruce are also present. The larger trees have diameters that generally range from 14-20" and heights that are approximately 80-100 feet tall. Both of these stands are dominated by a single-storied stand structure. Because they are densely stocked with timber, very few seedling or sapling size trees are growing in the understory of the larger trees.

Stand 1

Most of the trees are no longer growing very well in this stand. Being a short-lived tree species, the lodgepole pine has stopped growing and some trees are starting to become attacked by bark beetles. Many of the western larch in this stand have moderate to bad infections from dwarf mistletoe plants and some are starting to die from this parasitic plant. The grand fir in the stand have been heavily attacked by fir engraver beetles and while this has not killed very many of these trees, many of them now have major defects in there boles making them less valuable for sawlogs. In addition, the Indian Paint fungus is responsible for a lot of the rot in the grand fir in this stand also. As a result of the age of the timber in this stand and the presence of insect/diseases in many of the trees, the small amount of growth that these trees are putting on each year is almost certainly being offset by damage or mortality. The desired condition for this is to regenerate it with younger trees that will grow well in the future. The stand needs to be opened-up by harvesting some of the trees and conditions created so new trees will naturally regenerate and/or trees can be planted. Some of the larger trees need to be left so that the scenery is not badly affected for folks traveling the lakeshore road and Outlet Bay roads. In addition, the trees that are left can serve as a seed source for restocking the site if natural regeneration is favored over planting.

Stand 6

As compared to stand 1, this stand is in a healthier condition. Compared to all the other stands that are dominated by mature timber on the 120-acre parcel, this stand is currently the healthiest. This stand has a greater percentage of healthy western larch and Douglas-fir than does stand 1. The current density of the trees is less than that of stand 1 and this has resulted in trees with larger, healthier crowns. While their growth rates are undoubtedly declining, many of these trees are still growing. With the exception of some poor quality lodgepole pine and some miscellaneous suppressed trees, this stand is fairly healthy. Therefore, as compared to the other mature timber stands on the parcel, there are some more viable management options for this stand rather than simply regenerating it. Because the trees are fairly healthy, and because this area is visually sensitive as it is

located next to the Outlet Bay road, I would recommend a very light thinning for this stand and I would not regenerate it.

V. Management Recommendations

In the stand table that is attached to this plan, specific recommendations are made for each stand. The following recommendations are more general in nature and unless otherwise noted, they apply to the management of the whole area.

A) General Management Recommendations

1) When the land exchange becomes final, check into the possibility of placing some of the land into a state timber management program where the land is taxed at a lower rate and is managed for timber production. The whole parcel would probably not qualify to put into the program but a portion may. The Sandpoint Dept. of Lands office should be able to provide information to the OBSD regarding this possibility.

2) Monitor the site periodically to determine how well the trees are growing and to evaluate their health. Especially important is the monitoring of the trees and other vegetation in the irrigation area. There has not been much research conducted on the long-term effects of spraying sewer effluent onto areas occupied by conifer trees as to how this affects the health and growth of the trees over long periods.

3) When conducting any slash burning, make certain fire precautions are taken. Try to do any pile burning very early in the spring or late in the fall to minimize the chance that fires will get away.

4) In the specific treatment recommendations listed in the stand table, I recommend planting in some of the stands following harvest activities in order to regenerate the area with desirable tree species. However, natural regeneration will occur in these areas if the stand treatment recommendations are followed. I recommended planting western white pine because these trees are very valuable when they reach sawlog size and if blister rust resistant seedlings are planted, they have a very good chance of growing to maturity. I believe the planting costs will be captured at the harvest time. However, this economic decision will need to be made by the board. Stand 3 is an exception in that this stand will be the most open after the recommended harvest treatment and I highly recommend planting this one with white pine and western larch.

5) Prior to each major management activity like commercial logging, pre-commercial thinning or planting, develop a site specific plan for implementing

the project. Involve a Forester in the development of the plan. This will protect the interests of the District and increase the chance for success.

B) Management Recommendations for Timber Sale Activities

1) Before selling timber or other products, develop a contract that clearly states what is being sold (and the merchantability specifications), how the work will be conducted and how the payment will be made. Unless agreements are clearly made in writing, communication problems will undoubtedly arise and expectations will not be met. The best way to avoid this is to develop a good contract and have an attorney review it before signing any agreements.

2) If the planned harvest is fairly large, hire a Forester to administer the contract in order to protect the interests of the OBSD. Even if a good contract is developed per the recommendation noted above, the logging job may not turn out very well if a knowledgeable person is not present to inspect the job to ensure that all of the conditions of the contract are met.

3) Be extremely careful with having a detrimental impact on the soil through compaction from logging equipment or construction equipment. Whenever possible, conduct timber harvest activities in the winter on 1-2' of settled snow. This snow layer will reduce soil compaction significantly. If winter logging is not feasible for whatever reason, the next best time to conduct logging is from July 1rst to October 15th. During this time, the moisture is fairly low in the soil and the soil is a little more resistant to compaction. The absolute worst time to log is from March through June. During this time, not only is the soil moisture high, the sap is starting to flow in the growing trees and this condition makes them very susceptible to scaring when machinery or other trees bump them. Scars can often later become infected with fungi that rot the trees. If the logging is not being conducted in the winter on snow, then make certain that logging equipment is kept on designated skid trails. Flag the designated skid trails in and make certain that logging equipment stays on the trails. Except where converging at a landing, space these trails out 100' apart. Do not allow equipment to travel over the soil in the timber strips between the skid trails. The worst logging equipment for harming soil are the mechanized feller/buncher machines that have to drive to each and every tree to cut the trees. In addition to harming the soils, these machines often scar more leave trees in the process of cutting down others. With some possible small exceptions, do not allow the use of this type of equipment.

4) In the planned new irrigation area, flag or stake the location for the underground irrigation pipes and only allow the logging equipment to travel in these areas.

5) Log landing locations will be necessary for harvest operations. Try and use existing areas that were previously compacted for this purpose. If a new landing has to be created, include conditions in the harvest contract that boundaries of landings would be flagged and agreed on by the OBSD.

6) Try and leave some of the logging slash on the ground for nutrient recycling- especially the needles. When possible, allow the tree tops and small branches to over-winter on the site before treating the slash. This allows many of the nutrients to "leach" out of the foliage and to be recycled into the soil.

7) If a harvest operation is planned, a permit from the USFS might be needed to haul on the Forest Service Road 1048.

8) Currently the USFS just completed a small timber sale on the parcel to harvest the trees that were in the clearing area for the new lagoons. Some rotten cedar logs were left at the landing. If the OBSD acquires the land and the logs still remain there, check into the possibility of selling those logs to someone for cedar products. There may or may not be a current market and if so, the district might be able to get some money from selling them.

9) Do not allow tractor type equipment to pile slash. In order for tractors to pile slash, it necessitates that they move back and forth across the area to gather and pile the slash. In so doing, tractors compact and harm a tremendous amount of soil. Instead of tractors, utilize machines like excavators that have a grapple thumb to pile the slash. These machines can travel down the skid trails that were used by the tractors and reach into the stand, grab the slash and pile it on the trails. Unless absolutely needed, do not allow machinery off of the previously used skid trail. Develop contract specs for what will be required to pile and what won't. Try and leave some large down logs on the site for soil productivity.

10) There are different ways to indicate to the logger which trees to cut and which ones to leave. Although the desired method depends on the situation. My recommendation is to either mark (with paint) the trees that should be cut or the trees that should be left. Most of the proposed harvest treatments (except stand #6) involve cutting more trees than would be left. Therefore, from a practical standpoint, marking the leave trees would be the easiest method. The only drawback is that marking paint is left on the tree boles and some folks might not like that from a visual standpoint. stand #6, fewer trees would be cut than would be left so the easier method would be to mark the cut trees. The tree bole should be marked near the ground and also at about 5-6' above the ground. Sometimes a landowner may not want to go to the expense of marking trees for cutting or leaving and may try and describe to the logger which trees should be cut or left. The problem with this strategy is that the logger will often have a tendency to cut the more valuable trees to increase profits. Therefore, this approach is risky and I would not recommend it.

11) Most of the stands that contain mature/overmature size trees have a lot of trees in them that are too rotten to make sawlogs out of. However, many of these large hemlock and grand fir trees would make good pulp trees. Sometimes the pulp market is such that these trees are fairly valuable and sometimes (like now) the pulp market is poor. The treatment prescriptions that are recommended in the stand table will not meet the intended objectives if sawlogs are removed but pulp trees are left standing. Therefore, any sale contracts should make the cutting of pulp trees mandatory. If the market is poor, OBSD should consider not requiring the logger to skid and remove those trees. However, the slash will still need to be treated.

12) There is an area within stand 6 (near the water storage tank) that is rather steep. If it is decided to harvest trees from around this area, extreme care must be taken during the harvesting. Tractor type skidding on steep ground can easily result in much more soil damage than on flatter ground. In addition, it is probably desirable to maintain as much shade around the tank as possible to maintain cool water temperatures and therefore, it might be appropriate not to harvest any trees from within 100-200' of the tank. Regarding stand 6, an office and parking area are planned for construction in that area. The clearing limits should be staked or otherwise indicated on the ground so that all the merchantable trees can be removed from this area with the timber sale that has been proposed. In addition, immediately surrounding this area, care needs to be taken in considering the leave trees and whether or not any of them are hazard trees that might be prone to uprooting or breaking and hitting the office or parking area.

13) Harvest area boundaries should be designated on the ground by painting trees or flagging the boundary. This measure will minimize the chances that loggers will cut trees and operate machinery in only the areas that OBSD intends to treat. In addition, care needs to be taken to avoid damaging survey markers during any harvest operations. If this were to occur, the OBSD might be liable to pay for the costs associated with resurveying areas and/or reestablishing corner monuments. This work is expensive.

14) The Board of Directors for the OBSD is considering a timber sale in the near future to implement the recommended treatments. Based on the treatments recommended in the stand table, I would estimate that approximately 700,000 board feet of sawtimber would be removed. This estimate does not include an anticipated large amount of pulp volume.

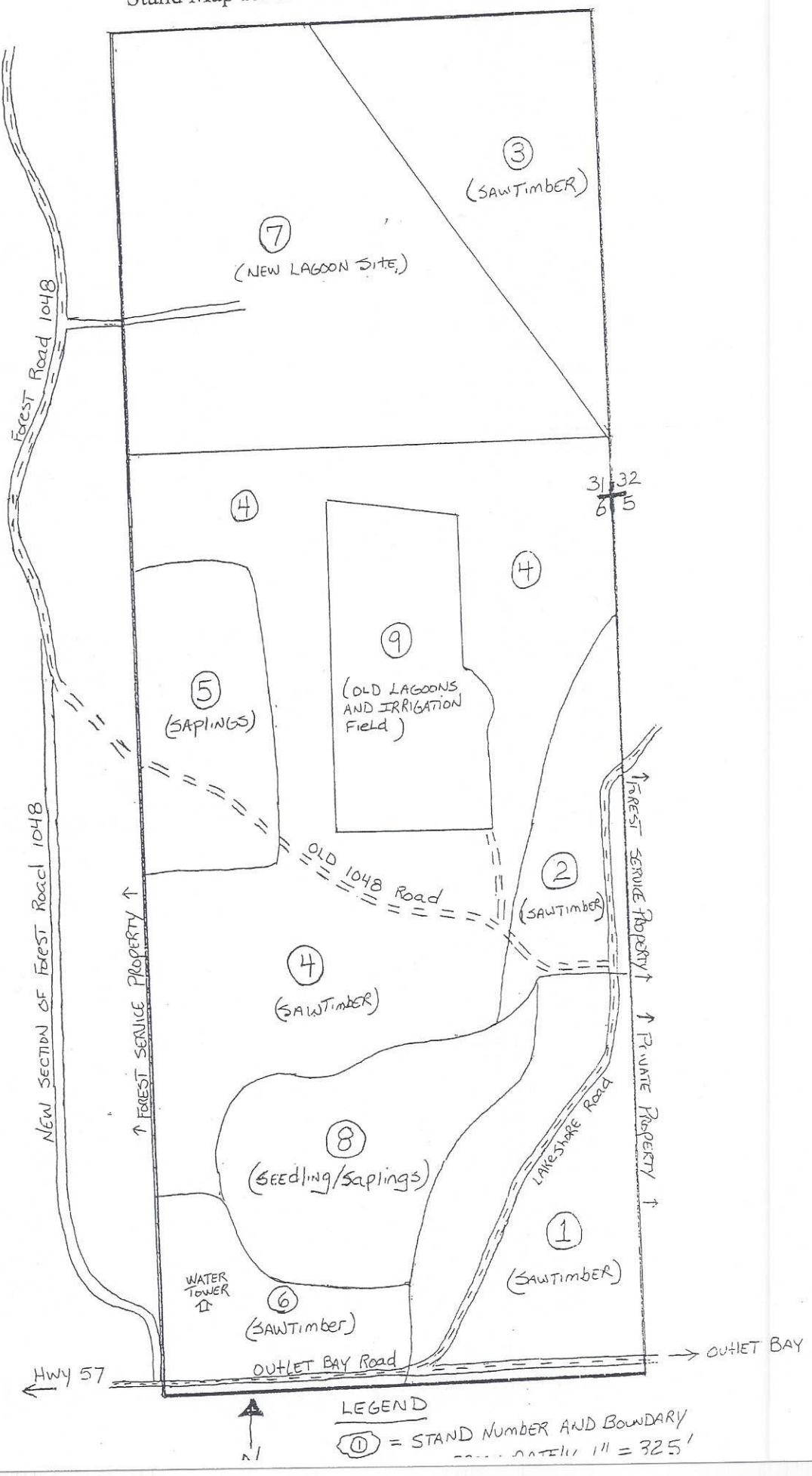
VI. Qualifications of Preparer

I have worked as a Forester for the USFS on the Priest Lake Ranger District of the Idaho Panhandle National Forests for approximately 10 years. While working for the USFS, my major responsibilities include writing Environmental Impact Statements and Environmental Assessments for timber sale projects on the District. I identify timber sale opportunities, write Silvicultural prescriptions for individual timber stands and incorporate this information into environmental documents. Since being employed by the USFS, I have written dozens of Silvicultural prescriptions for timber stands. In addition, I supervise Forestry Technicians in conducting the marking of trees and other chores for the preparation of the timber sale contracts. I am currently serving on the Board of Directors for the Kalispell Bay Sewer District (KBSD). About a year ago, I wrote a management plan for the KBSD that was similar to this plan. Regarding my formal education, in 1986 I received a Bachelor of Science degree in the field of Forest Management from Humboldt State University in northern California. In 1988, I received a Master's Degree in Science from the University of Washington in Forest Management. While studying at the University of Washington, I specialized in Silviculture and conducted a thesis on the topic. I have published articles in professional journals on forestry topics related to Silviculture and forest ecology.

Prepared By: _____ Date:_____
David F. Cobb, Forester

Approved By: _____ Date:_____
Eric Anderson, Chairman OBSD

Stand Map for the Outlet Bay Sewer District



Summary of Outlet Timber Stands

Stand #	Acres	Mgmt Emphasis	Present Condition	Desired Condition	Recommended Treatment	Notes
1	12	Timber Income while maintaining visual integrity	Dense mature timber. Some healthy trees but most are unhealthy and/or not growing well. Single storied stand. Lots of existing down slash on ground.	Healthy trees growing well and visually appealing stand. To achieve this, should manage for a two-storied stand structure w/large trees left while growing smaller trees underneath them.	Reduce current tree stocking by 65%. Leave approx. 60 of the current 190 sqft/ac of BA. Leave the healthiest trees of the desired species. These would generally be the larger sawlog size WL, PP, WP, C, DF and if needed, WH and GF. These are the dominant trees in the stand. If few good leave trees are present in an area (e.g., on west side of lakeshore rd), consider leaving a few smaller trees (GF/WH/C sapling/pole size trees) just to maintain visually appealing stand. Could use CTL logging equipment or tractor. Logger slash submerch trees, grapple pile from trails and burn piles. Leave limbs/tops in woods. Could rely on natural regen but recommend planting WP.	A portion of this area (east side of the lakeshore road) might be considered for sale in the future by the OBSD. Several ATV trails in area. Even if the property is sold, by leaving good trees the value of the property would be higher than if all the good trees were removed. Extreme northeast portion of this stand has a "sliver" of timber between the eastern property boundary and the lakeshore road. This sliver might be difficult to log.
2	7	Timber Income while maintaining visual integrity	Dense overmature timber. Most of the trees are unhealthy and many are very rotten. Mostly a single-storied stand.	Healthy trees growing well and visually appealing stand. To achieve this, should manage for a two-storied stand structure w/large trees left while growing smaller trees underneath them.	Reduce current tree stocking by 65%. Leave approx. 60-65 of the current 210 sqft/ac of BA. Leave the healthiest trees of the desired species. These would generally be the larger sawlog size C and WP. In a few small places, will have to leave the better quality WH and/or GF because no good leave trees are present. Tractor log, logger slash submerch, grapple pile from trails and burn piles. Leave limbs/tops in woods. Could rely on natural regen but recommend planting WP.	Some cable (satellite?) was strung along ground through this area. Need to determine if important. Northern-most 1 acre in stand is not visible from lakeshore road so would not have to leave as many trees as rest of the area. This area has quite a few large WP. Need to discuss leaving or not. Along the SE side of this stand, the area forms a narrow "sliver" of timber between the eastern property boundary and the lakeshore road. This sliver might be difficult to log.

Stand #	Acres	Mgmt Emphasis	Present Condition	Desired Condition	Recommended Treatment	Notes
3	11	Timber Income	Dense mature timber. Most of the trees are unhealthy and many are very rotten. Due to past harvest of valuable trees, some areas are two-storied now. However, seedling/sapling size trees are mostly suppressed trees of undesirable species.	Healthy trees growing well. Should manage for single-storied stand structure dominated by WP and WL.	Reduce current tree stocking by 85%. Leave approx. 20-25 of the current 135 sqft/ac of BA. Leave the healthiest trees of the desired species. These would generally be the larger sawlog size WL, C and DF. Leave the rotten C for wildlife, as they are not valuable. Tractor log, logger slash submerch, grapple pile from trails and burn piles. Leave limbs/tops in woods. Could rely on natural regen but strongly recommend planting WP and WL.	ATV trails through area. One small intermittent seep/spring located and care needs to be taken to avoid during logging. ATV trails through area.
4	34	Effluent Uptake while providing some timber income	Dense mature and overmature timber. Most of the trees are unhealthy and many are very rotten. Due to past harvest of valuable trees, some areas are now two- storied. Some areas with a seed/sapling understory have good young trees and these can be managed while other areas have poor quality understory trees.	Healthy trees, shrubs and grass cover that can take up a lot of effluent. To achieve this, should manage for a two-storied stand structure w/large trees left while growing smaller trees and shrubs underneath them.	Reduce current tree stocking by 65%. Leave approx. 40-45 of the current 145 sqft/ac of BA. Leave the healthiest trees of the desired species. These would generally be the larger sawlog size WL, C, WP and DF. In a few small places, will have to leave the better quality WH because no good leave trees are present. Tractor log but be certain to keep log equipment on future sprinkler clearing areas. Do not have logger slash submerch. Instead selectively slash/thin submerch trees after logging by OBSD. Have logger grapple pile from trails but place piles out of sprinkler line clearing area. Burn piles. Could rely on natural regen to stock openings but recommend spot planting WP.	Numerous ATV trails through area.

Stand #	Acres	Mgmt Emphasis	Present Condition	Desired Condition	Recommended Treatment	Notes
5	7	Effluent Uptake while providing some timber income	Dense young trees. Presently growing well but will need thinning soon to maintain health and growth. In addition, some areas are so dense that there will be a "wall" next to the sprinkler lines that will reduce the effective spread of effluent.	Healthy trees, shrubs and grass cover that can take up a lot of effluent. To achieve this, should manage for a two-storied stand structure w/large trees left while growing smaller trees and shrubs underneath them. Because of young age of the current trees, will not reach this desired structure for 50+ yrs.	Reduce the density of these trees to achieve an average spacing of 12' between the leave trees. Choose leave trees based on the following species preference (from highest preference to lowest): WP, WL, PP, ES, C, GF, DF, and WH. In addition to using the species as a selection factor, use tree quality and size. Select leave trees that have good form, terminal leader growth, and do not have any signs of insect/disease problems or scars.	
6	7	Administrative function while maintaining visual integrity and some timber income. (the office/shop and associated parking area will be constructed in this area).	Mature timber stand but not as dense as the other stands and much more healthy. Many trees are healthy and growing well.	Healthy trees growing well and visually appealing stand. Because this stand is currently fairly healthy, it can be managed as a single-storied stand for another 30+ yrs before considering how to replace aging trees with younger ones. At that time, a two-storied structure might be applicable.	Conduct a "light" thinning and sanitation prescription by removing approximately 1/3 of the trees. Remove the smaller trees that are in the suppressed and intermediate crown classes. Remove the few DF with root rot, WL infected with mistletoe and LPP with poor live crown rations. In addition, remove any WP that have signs of blister rust cankers. Remove any trees that pose a hazard to the shop/office that will be constructed in this area.	In addition to the water tank located in this stand, there are other improvements like an overhead electrical line, a well and associated pipes. The less obvious improvements need to be carefully marked so loggers do not damage them (especially during winter logging operations where snow could obscure them)

Stand #	Acres	Mgmt Emphasis	Present Condition	Desired Condition	Recommended Treatment	Notes
7	23	Effluent Storage and miscellaneous timber income. (Most of this area will be used for the construction of the lagoons. However, the areas that are not used for this purpose could be managed for timber income)	Young trees. Some growing well and others were poor quality trees that were suppressed by the larger trees that were growing overtop of them that were recently logged to clear the area for the lagoons.	In the areas that are not used for the lagoons and associated improvements, the desired condition is to grow healthy trees for future timber income.	Once the lagoons and other improvements are in place, evaluate the area to determine if enough area remains to manage for timber production. If so, consider the quality of seedling/sapling size trees that are present and decide if areas should be thinned or if the quality is so poor that they should be slashed and new trees planted. If areas are to be thinned, space the trees out and select leave trees like discussed above for stand #5. If some areas need to be slashed and replanted with better trees, plant WP and WL.	Because a third lagoon cell may be added in the future sometime, do not invest in any timber management in the probably location for the additional lagoon.
8	10	Effluent Uptake and timber income (Part of this stand is within the area that will be developed for the irrigation area. If the need arises, the irrigation area might be expanded in the future to occupy the remaining portion of this area)	Dense young trees. Presently growing well but will need thinning in approx. 5 yrs to maintain health and growth. In addition, the trees will need thinning to avoid a "wall" from forming next to the sprinkler lines and reducing the effective spread of effluent.	Healthy trees, shrubs and grass cover that can take up a lot of effluent. To achieve this, should manage for a two-storied stand structure w/large trees left while growing smaller trees and shrubs underneath them. Because of young age of the current trees, will not reach this desired structure for 50+ yrs.	In approx. 5 years, reduce the density of these trees to achieve an average spacing of 12' between the leave trees. Choose leave trees based on the following species preference (from highest preference to lowest): WP, WL, and LPP. The area was planted by the USFS with blister rust resistant WP so when present, heavily favor these WP trees. The numerous LPP trees in this stand seeded in naturally. In addition to using the species as a selection factor, use tree quality and size. Select leave trees that have good form, terminal leader growth, and do not have any signs of insect/disease problems or scars.	

Stand #	Acres	Mgmt Emphasis	Present Condition	Desired Condition	Recommended Treatment	Notes
9	9	Effluent Uptake and timber income. (This area is the old sewer lagoon and irrigation area)	About 1/3 of this area is currently occupied by the old lagoons and 2/3 is occupied by the irrigation site. The irrigation site is occupied by dense grass and weeds. No trees are present.	Healthy trees, shrubs and ground cover that can take up a lot of effluent. To achieve this, should manage for a two-storied stand structure w/large trees left while growing smaller trees, shrubs and grass underneath them.	Plant the old irrigation site with WP and WL trees on a 12' spacing. To insure seedling survival, it will probably require fairly large "scalps" to reduce the grass competition. Prior to planting the seedling, remove the grass for a distance of approx. 18" from around the planting area. In the old lagoon area, try and place a layer of topsoil on the site to rehabilitate the soil and then plant with WP and WL.	On the road into the old sewer lagoons and on the portion of the 1048 road that will be abandoned, try and place some topsoil on the old road prism and plant with WP.