

FRST 242  
IRM Integrated Resource Management Plan  
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## **1. Description of the project**

The purpose of this project is to allow us students the chance to be given an area of forest to manage in way that coincides with forest management practices being used in the industry today. During the project we learned how to maintain forest biodiversity, wildlife habitat, Importance of various resources, and the values that make up a forest whether they be worth money or not. By the end of the project we had taken an area and figured out how to profitably remove resources while maintaining all values and resources within the management area and not negatively affecting the area. Whether this report is the best option for the management area is very debatable.

## **2. Description of the management area**

The defined management area is located at the end of Weigles road on the logging road W3000. Logging roads W3100 and W3300 are also within the management area (Figure 1). There is a gate at the entrance to the W3000 logging road to deter any illegal entries of anyone without permission. The entire area is classified under the CWHxm BEC zone, but there are different sites series though. The defined area is also owned privately (Class A land) and was procured from the E&N land use agreement, meaning it abides by the Vancouver Island Land Use Plan (2). It is not part of a community or fisheries water shed, however streams that run adjacent to the area (Quiblers to the south and Flynnfall creek to the North) and do run into a fish bearing stream (Benson creek) and eventually fish bearing lake (Brannen Lake) that is used by the city for providing water. Benson creek has documented slope stability issues on it, so special attention up stream in the management area will be given to stream sides. This will prevent any future negative impact on Benson creek from our management area. There is one wetland in the management area that is .15 hectares in size; because it is so small it does not require any management buffers.

The species composition of the area is comprised of Douglas fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), western red cedar (*Thuja plicata*), and red alder. ). The average age of the harvestable stands is 96 years with a minimum age of 63 and a maximum age of 122 years. The management area has a harvestable volume of 20,111 m<sup>3</sup>.

## **3. General Management goals**

Throughout this management area there are many goals that need to be addressed and dealt with. Some of these goals are dealing with social, recreational, cultural, economical, and ecological. To produce good economics out of the management area one must focus their attention on removing fiber from the forest whether it is timber or bio fuels. To remove these resources there must be some sort of harvesting method applied, which can cause many issues with social outlooks, cultural values and resources, recreational and ecological. From the social perspective a cut block can look very ugly and can cause concern for resources that they might use, such as water (can be a big issue). To minimize these concerns from the public, which only creates headaches there are a few things that can be done. The first is to apply sound harvesting practices that ensure there are no negative

impacts on resources used by the public. The second is let them know what is going on when possible so they do not worry. The third is if an area that is going to be harvested is in direct view of the public then either make a smaller cut block or leave some retention so the area does not look as bad.

There are a lot of recreational values within the management area so maintaining them will be one of our goals. This is not mandatory since the area is considered private land, but is good practice to keep good relations with the public. It also avoids conflict with the users of the recreation, which can lead to destruction of property and a negative outlook on the landowner.

#### **4. Summary of Inventory Report**

##### **a. Cultural**

As of now there are no documented cultural values within the management area, however if any cedar trees that resemble canoes or bark strips or even trees that might be usable for bark stripping presently they will be noted and made available to the local tribes (Snuneymuxw and the Nanoose first nations).

Ecological goals are of the utmost importance, since negatively affecting a site shows bad forest stewardship, neglect, and can result in legal action against the offenders. So to manage for this goal we will ensure good forest stewardship, good harvesting practices, and rehabilitation/reforestation. This will leave sites in as good or better condition than before they were altered.

##### **b. Timber**

To get the information of the timber in the block we conducted a cruise of the area and also used already gathered data from GIS. During the cruise we split the management area into twelve different polygons based on timber types/site series. We then did plots in each of these polygons to make sure the data that was already in GIS matched what was in the field. After analyzing the data we found that the area had a stand composition of 78% Douglas fir, 14% western red cedar, 7% western hemlock, and 2% red alder. We found that there is 20,111m<sup>3</sup> of available timber to be harvested. From that we found that the mean MAI of the area is 4.98m<sup>3</sup>/ha/yr, which is close to entire woodlots 5m<sup>3</sup>/ha/yr. (look into AAC). There are very minimal forest health issues within the management area, however there was some dwarf mistletoe and white pine blister rust found. The extent of these diseases is not enough to raise concern for action.

##### **c. Streams**

There are no streams that fall into the S6 classification or lower within the block of our group's management area. There are two streams that border the management area that are less than 3 meters in diameter and are non-

fish bearing. They are Flynnfall creek and Quiblers creek and are classified as S6 streams. Both creeks run into Benson creek, which is a fish bearing stream and then Brannen Lake. The minimum management area for Flynnfall and Quiblers creek is 20m, the riparian reserve zone is 0m, and the management zone is 20m. Benson creek has Cutthroat and Rainbow trout above ammonite falls so if any sediment or debris is introduced into Quiblers or Flynnfall creek they will be affected by it first. Below Ammonite falls there could potentially be Salmon, cutthroat trout, smallmouth bass, and steelhead. These species will be directly affected if sediments and debris are introduced from our management area. Since where Quiblers and Flynnfall run into a fish bearing stream we will keep a 10 meter buffer along them at all times to ensure no debris gets introduced into them. This will reduce the chance of negatively affecting fish habitat, water quality, and stream bank stability down stream. Managing our riparian's with buffers will also avoid the chance of scrutiny from the public, as Brannen lake and Benson creek are highly visible from public roads. All non-classified discharges (NCD's) will be logged up to and yarded away from. The machinery will designate one crossing if it is necessary in order to reduce disturbance of the site. The only NCD found that resides in our harvest area is trickling out of the wetland. This NCD has no connectivity to Flynnfall creek or Quiblers creek.

Benson creek also has documented sensitive slopes. Our buffers will reduce excess water from flowing into the creek and possibly causing failures of the stream banks. A failure of a stream bank would result in a rise in water turbidity and may harm resident fish. If this is caused by our forest practices we would be held accountable, this is another reason for our cautious buffer sizes.

#### **d. Wetlands**

One swamp was found in the management area and it resides within the harvest area. The wetland is 100m in length and 15m at its widest point; there are many alder and cedar trees surviving within the swamp. Western red cedar, red alder, Western hemlock, and Douglas fir surround it. Because the swamp covers less than 0.25 of a hectare it does not fit into the wetland riparian classes. This means that no reserve zone or management zone needs to be applied. Since many of the surrounding trees are of poor value, but are dominant or co-dominant trees, our prescription is to only remove high value trees from the edges of the swamp. This will ensure biological and ecologically valuable trees are left to promote natural wildlife habitat for the surrounding area.

There are no lakes within the management area, but the two S6 creeks (Flynnfall and Quiblers) adjacent to the management area do flow into Brannen Lake. Brannen Lake contains Salmon, Cutthroat trout, Smallmouth bass, and Steelhead. So it is a management goal of ours to not introduce any

sediment or debris into it that may negatively affect the species that reside in the lake.

#### **e. Forest health**

Potential forest health issues for the our management area include Root rot, browsing of the plantations, white pine blister rust, and hemlock dwarf mistletoe.

##### **i. Root Rot**

The main problem fungus is *Phellinus weirii* it causes laminated root rot on Douglas fir in our management area. Two small patches of laminated root were found. One resides in the harvest area and is 30x30 meters. Most of the Douglas fir has already fallen and is starting to decompose. The surrounding conifer trees are not showing symptoms of the disease, but when harvest happens the surrounding stumps will need to be checked for the disease and if present up rooted. A tracked machine will be used to accomplish this because the slope of the ground is less than 30 percent. This will allow for Douglas fir to be planted on the site again. The second area is above the top road and is 20x30 meters in size. It also does not show signs of being aggressive, so when this area is logged it will have the same prescription as the first site. There was no *Armillaria Ostoyae*, *Phaeolus shweinitzii*, or *Heterobasidion annosum* found within the management area and since there has been no documented large outbreaks of it in the woodlot it will be managed if found by stumping the site or planting alternate species.

##### **ii. White Pine Blister Rust**

The amount of white pine found in the management area is less the 1 percent. That being said, trees that have the disease were found growing on small rock outcrops. These trees were still alive but were showing signs of the infection. Due to the amount of the disease found and the fact that all white pine trees were already infected the prescription is to leave the trees until the surrounding timber is harvested. At that time the white pines will be cut down and disposed of to prevent further transfer of the disease.

##### **iii. Dwarf mistletoe**

The only dwarf mistletoe found was Western hemlock dwarf mistletoe and it was only present in small patches that were surrounded by Douglas fir. Since only few dispersed patches were found in the area the prescription is to leave the trees until the surrounding timber is harvested. At that time the trees will be felled, resulting in the inoculation of the disease. No other species that are capable of getting dwarf mistletoe were found to be infected by the

disease. If they are found in the future they will be felled to remove the disease from the site.

### f. Recreation

The recreational values within our management area include hiking, geocaching, and many mountain bike trails. Generally, the entrance of motorized vehicles, such as motorbikes, quads, or unauthorized cars is not wanted. One of the reasons is there is an issue with the motor bikers because they can cause vandalism and are a risk for forest fires in the summer. The motocross track is under a kilometer away and brings in lots of riders that like to sometimes leave the track and ride on the logging roads. This is why a gate was put in place at the entrance of the logging road to deter them from entering. The mountain biking trails in our area are Bad to the Bone, Yellow, E&N, Ballroom Blitz, La Grange, Hayden, Europa, and Quatchi (Figure 1). As for the hiking that goes on around and in the management area there are many attractions to bring people into the area. The main attraction is Benson creek falls, which is very close to our area. There are various geocaching locations located within the management area. These are of some importance to the public, since they are used somewhat often and contain sentimental value.

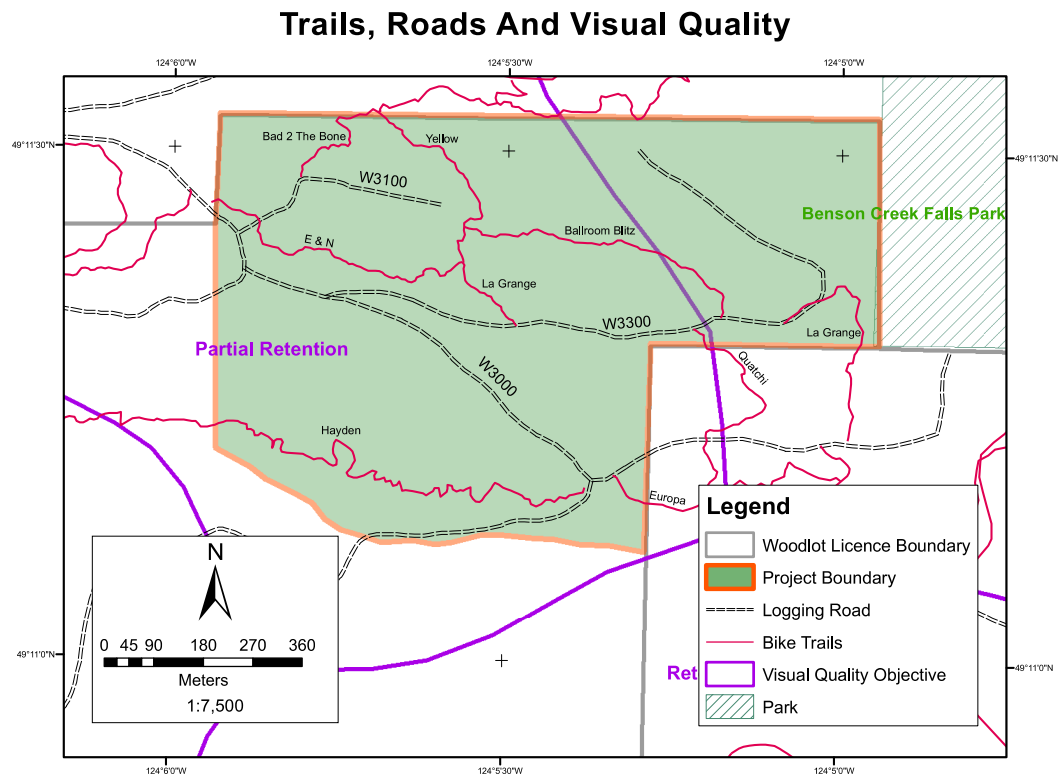


Figure 1. Trails and Roads

### **g. Wildlife**

Wildlife issues in this management area come from deer, fish, blue and red listed species. The issue with the deer is the browsing they do on seedlings and immature trees. To avoid the destruction of the trees they all get coned when planting happened so the deer cannot get to them. Fish are an issue because they can possibly be affected by harvesting from our management area. There is a possibility of blue and red listed species, but none have been found in our area.

### **h. Road Access**

The management area can be accessed by Weigles road (Paved). The logging road that leads to the management area has a gate at the entrance of it as spoken about before. The roads are in drivable shape, but to haul on them a brush cutting machine should be brought in to clean off side banks. Some of the spur roads leading out of the management area will lead further into the private lands of the woodlot and some will lead to crown land. All roads leading to the crown land will have gates at the legal lines to prevent the entry of unauthorized vehicles.

## **5) Management objectives, strategies and practices**

### **a. AAC Calculation**

Using a 100 year rotation the management areas AAC will be  $4999.7\text{m}^3$ , when compared to the entire woodlots AAC ( $4800\text{m}^3$ ) it is 4% higher. If a shorter rotation were used then the management areas AAC would increase. The management areas AAC is higher than the woodlots because of higher productivity sites within the management area. To calculate the AAC the mean annual increment (MAI) was found for the management area ( $4.98\text{m}^3/\text{year}$ ). The total harvestable volume for the area was calculated using the found polygon volumes ( $20,111\text{m}^3$ ) and then divided by 100 years (Figure2). The MAI was then added to get a value of  $220.6\text{m}^3$  per year. Out of the 44.38 harvestable hectares  $220.6\text{m}^3$  represents 1% of our volume.

To determine the calculated polygon values the known volume from 2000 was extrapolated to 2014. The  $\text{m}^3/\text{ha}$  was divided by the age then multiplied by 13 ( $2000+13=2013$ , growing season for 2014 has not occurred yet). This value was then added to the 2000 data. Each polygon's area was calculated using GIS. The new volume was multiplied by the area to get the new 2014 volume. The difference between the calculated and the found volume is  $1,439.4\text{m}^3$ . the found volumes were gathered from a measure plots that were placed arbitrarily in the center of each polygon.

### **b. Timber**



Cut block	Polygon	Calculated Polygon Volume	Harvestable Area (ha)	2014 Vol. (m3/ha)	Count plot volume (m3/ha)	Retention	Harvestable Volume (m3)
1	6	1849	3.3	555	460.9	0.005	1839.8
1	7	765	2.5	309	485.3	0.005	761.2
1	10	2845	4.4	654	628.7	0.005	2830.8
1	11	3111	7.4	422	505.7	0.005	3095.5
2	1	2333	3.9	599	426.1	0.100	2120.9
2	2	610	1.1	580	440.9	0.100	554.5
3	3	1560	4.4	359	404.6	0.100	1418.2
3	4	1541	6.4	242	402.6	0.100	1400.9
3	5	1188	2.0	600	729.5	0.100	1080.0
4	8	1060	2.3	453	333.7	0.100	963.6
4	9	994	3.0	327	351.9	0.100	903.6

Figure 2. Summary of Harvest Plan

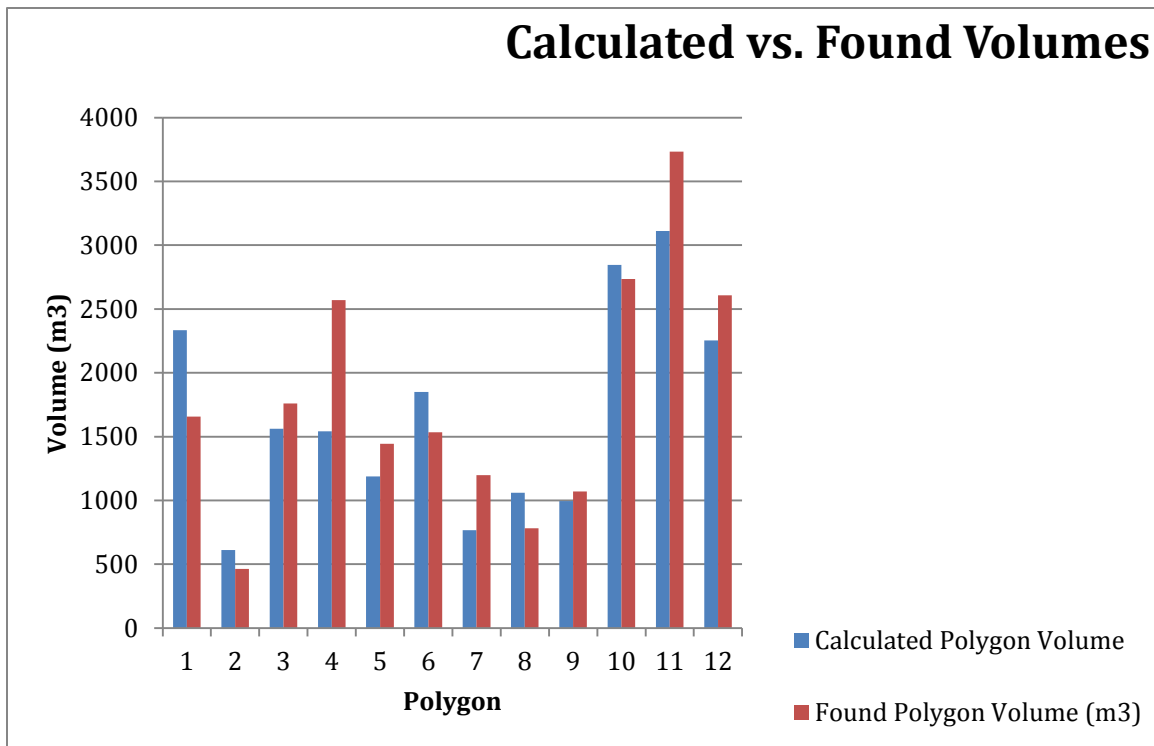
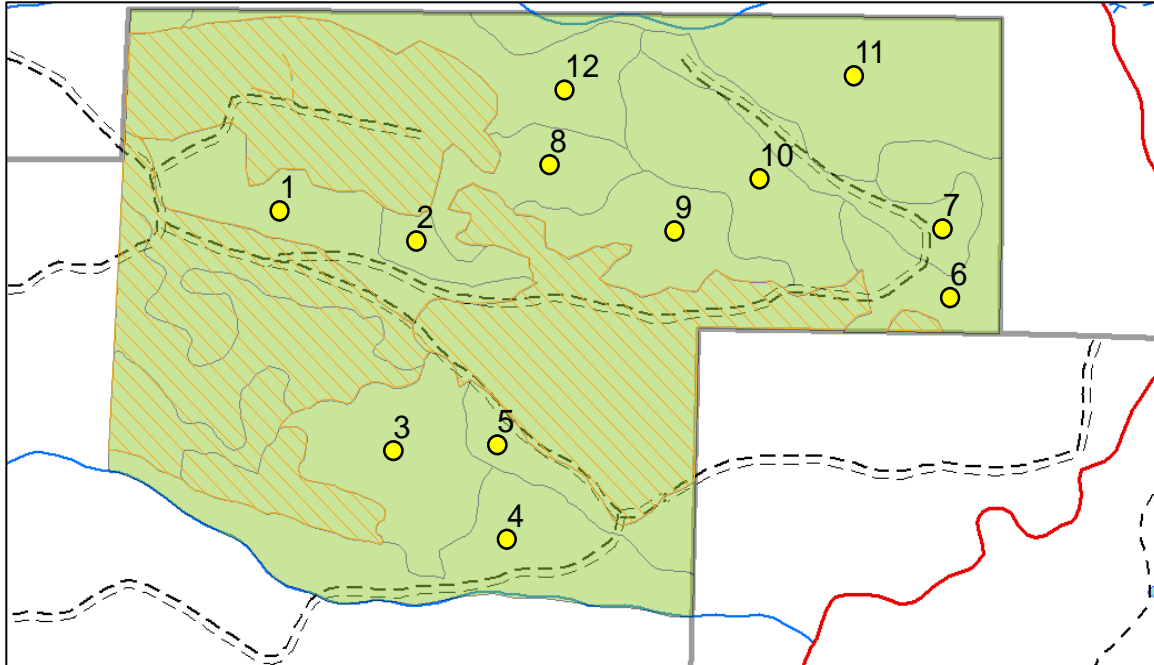


Figure 3. Calculated vs. Found volumes



**Figure 4. Management Area polygons and Harvestable Area**

### **I. Timber development Plan**

The scenario for this harvest area is to extract fiber for bioenergy. Fiber counts as logs, branches, stumps, and any small vegetation. To make harvesting for bioenergy economical one would need to harvest as much as possible. The maximum  $m^3$  that can be harvested per year in this management area is  $4800m^3$ . Since the harvestable area (44.38ha) only has around  $20,111m^3$  in it, it should only take 5 entries to harvest the area with using a clear cut method of harvest. The remaining area (32ha) of the management area is made up of plantations that are under 20 years old. This means that harvesting will not be available for at least another 15 to 20 years. The reason 30 years may be possible for harvest is because when harvesting for bioenergy you do not need the large high grade wood that takes up to 60-80 years to grow. You are only focused on what stand will give you the most volume in the least amount of time; you are looking for the end of the grand period of growth.

The best time to harvest is either late summer or winter. At this time the trees will have the least foliage and will have released their nutrients into the ground. This will result in less nitrogen being released into the air.

### **ii. Road Access**

All existing roads are drivable, but may need some brushing, culvert review, and a grader to make them suitable for hauling on. There is

one spur road that will need to be built, for this information refers to cut block 4 further in the paper.

### **iii. Harvest area overview**

There is 20,111m<sup>3</sup> in the management area. Cut blocks 2, 3, 4 (figure 4) will need to have some retention put into them because they fall within the partial retention area of the woodlot. If 7% retention is added to these cut blocks there will be 19,353m<sup>3</sup> of merchantable bioenergy being removed. If the 4800m<sup>3</sup> is harvested each sustainable harvest year then this management area will be logged within 4 entries. Each entry will occur in the winter. This will allow for an early spring plant, so the seedlings can get two growing seasons in before their first winter. It will also be when the trees have no foliage on them (allow for more nitrogen to decompose into the soils) and will be when the least amount of recreational users will be around. The volume that is removed from all cut blocks will be either sold as bioenergy or logs to go to a lumber mill. The high grade logs (I grade or better) will be sold as logs to generate a higher income in order to offset the lower economics of selling bio energy. All wood fiber that is meant to be used as bioenergy will be chipped on site and hauled away. This will save costs in hauling because a greater density of chips can fit on a truck than logs.

### **iv. Plantation management**

It should be noted that although the plantations are not included in the volume calculations they will be eligible for harvest within 20 years. They are in areas with lower a lower site series than the rest of the management area, so Instead of clear cutting them in 20 years, they will be commercially thinned in 10 years for the production of bioenergy, since the wood will be very small at this time and of no value for mills. While commercially thinning there will be corridors put into the blocks to allow for recreational trails to be put in place. These trails will replace some of the trails that will be wrecked during harvest of the other more productive blocks. Putting this added recreational value into the management area will allow for less retention to be applied in the other more valuable areas. Commercial thinning will also add value to the timber in the long run, so this area will be left until the timber is valuable enough to offset the cost of commercial thinning. This may mean that the timber will not be cut for bioenergy and will need to be left for a longer amount of time than the rest of the management area.

### **v. Initial harvest unit**

Cut block one (First year) will be comprised of polygons 6,7,10, (figure 4) and 11. They are located at the northeast side of the management area. These four polygons cover an area of 17.53

hectares and have 8570.81m<sup>3</sup> of potential bioenergy and sellable logs. The species make up is mostly Douglas fir, some western hemlock, and a little bit of western red cedar. Since 0.05% of the block is going to be dedicated to a 10m stream buffer the volume being removed is only going to be 8528m<sup>3</sup>. This stream buffer is being put in place for the purpose of reducing erosion and sedimentation in the stream; wind throw is not an issue in this area. This cut block does exceed the annual allowable cut, but makes the most economical sense as it is also located in an area that is the farthest away from public view and from intruding on any recreational values. It makes more economical sense to harvest these four polygons as a unit because they are at the end of the spur road. Meaning that there will be no other harvesting beyond these blocks in the future so if they were not taken in one cut block then machinery would have to be hauled in twice, roads would have to be brushed twice or even upgraded, and more disturbance would occur. The only downside to harvesting this block is that only 1030m<sup>3</sup> will be harvestable the next year.

This cut block will be harvested with a clear cut method and hoe chucked to road side. 50% of the stumps will be uprooted and all the branches will be gathered and hauled away for excess m<sup>3</sup>. The area of the cut block that borders Benson Creek Falls Park will be logged up to, as blow down is not an issue within this area. As much as possible the foliage will be left to promote some biodiversity within the stand. Since the foliage holds most of the nitrogen of the tree it is best to leave it in the forest to decompose and add nutrients to the soil. If the nitrogen rich foliage is hauled away and burnt as a biofuel it can add nitrogen to the air, thus vectoring climate change further. As talked about earlier in the reforestation section the block will then be planted with 80% hardwoods and 20% softwoods to promote maximum potential for producing biofuels in the stand. These are also the polygons that require no retention in them.

The green up period for each cut block in the management area will not be set at a certain age, but will be considered greened up enough to harvest again once the plantation has reached free growing plus an additional 2 two years to ensure there is no issues with adjacency.

As talked about earlier, this is the least harmful to recreational values, but when harvesting there is always going to be someone that is affected. There are two mountain biking trails that run for a short time through the cut block (Ballroom Blitz and la Grange). To manage for these the machine operators will be instructed to cause as little damage to the trails as possible. When harvesting is over and site clean up is happening the trails will try to be restored as much as possible.

## **vi. Harvest units 2,3,4**

### **Cut block 2**

The second harvest will consist of polygons 1 and 2. These polygons make up an area of 4.95 hectares and will produce 2943.66m<sup>3</sup>. These polygons fall within the retention area of the woodlot plan; to deal with this they are going to have a 7% reduction in m<sup>3</sup> harvested, so the actual harvestable volume is 2,750m<sup>3</sup>. This is the smallest of the cut blocks and will be cut on the second entry because of its geographic relationship to the first cut block. Even when the first cut block is greened up and this one is cut there will still be a buffer of standing timber between the two. This will enhance visual effects of the management area. This block will have the same harvesting method as the first since it is already roaded and all volume can be hoe chucked to road side.

### **Cut block 3**

The third harvest block will be comprised of polygons 3,4, and 5. These polygons make up an area of 12.7 hectares and have 4290m<sup>3</sup> in them. A 7% reduction in harvesting will need to be applied for retention within the stand. This includes a 10m buffer on the stream to the south of the cut block to prevent sedimentation and bank failure (Wind throw in not an issue in this area), so the actual harvestable volume is 4,009m<sup>3</sup>. This block will be harvested just as block 1 and 2 since it is already roaded. This area was chosen third because it will not connect the first two cut blocks like the fourth cut block will. I wanted to leave the fourth cut block until last because of that reason.

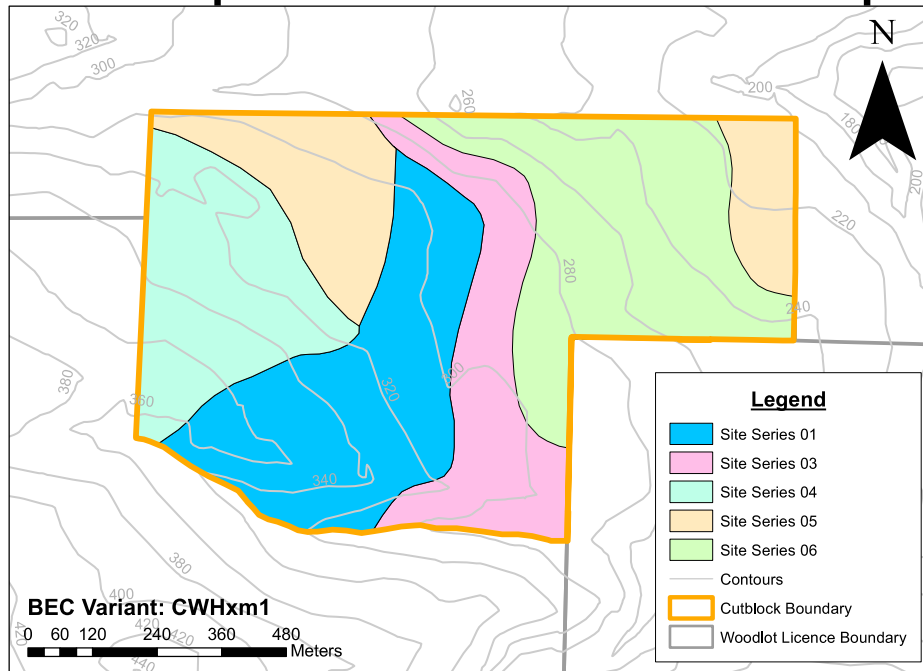
### **Cut block 4**

The final block is going to be comprised of polygons 8,9, and 12. These polygons make up an area of 9.2 hectares and have 4304m<sup>3</sup> in them. As this area needs 7% retention in it the actual volume harvested is going to be 4,022m<sup>3</sup>. This block will need a spur road put into it to allow for the whole block to be harvested. The road will be built out of local material and will not need to be ballasted. There will be one 600mm culvert needed to access the timber. When this block is harvested the culvert may be removed and used in another location if needed, since this road will only need to be a temporary one.

## **c. Silviculture**

### **i. Reforestation**

# Group 4 - Site Series Map



**Figure 5. Site Series Map**

As posted in the VIU woodlot license plan, for a site series 06 (figure 5) the preferred species are red cedar, Douglas fir, and western hemlock. The acceptable species is red alder. The target stocking standard (TSS) is 500sph, the min stocking standard (MSS) is 300sph for preferred and acceptable, and the MSS for acceptable is 250sph for preferred. For a site series 05 (figure 5) the preferred species are western cedar and Douglas fir. The acceptable species is white pine. The TSS is 400 sph, the MSS for preferred and acceptable is 200 sph, and the MSS for acceptable is 200 sph. This being said the majority of the cut block is site series 06 and a small portion on the east side of the cut block is 05. Since I am managing for bioenergy I thought I would take advantage of the fact that red alder is an acceptable species for the 06 site series.

Both 06 and 05 site series portions will be planted right after harvest to reduce competition from under brush. The 06 site series portion of the initial harvest unit will be planted with 80 percent alder (hard wood) and 20 percent western red cedar (soft wood). The reason for this is that hard wood trees can grow volume much faster than soft wood trees. The 05 site series portion will be planted with Douglas fir

because it is an early seral species like the red alder and will produce the most volume in the shortest amount of time out of the preferred and acceptable species for this site series. The 06 site series will be planted at 1000 SPH, this will allow for the most volume is being grown. This will also promote less foliage and more desirable bioenergy. The site series 05 will be planted at 1000 SPH to allow for death of saplings in the Douglas fir. The western red cedar for site series 06 was chosen over Douglas fir because the cedar will be able to survive under the alder where as the Douglas fir cannot.

Hardwoods are more desirable for bio energy because they have a higher bulk density, for example when in the form of chips hardwoods weigh  $320\text{kg/m}^3$  vs. the soft woods  $250\text{kg/m}^3$ . This being said a harvestable stand for the purpose of bio fuels will have maximum potential if it's majority composition is hardwoods. Some soft woods are also needed for diversity in the area. Another reason soft woods are worse is they have higher nitrogen content then soft woods making them harmful to the environment when burnt and creating more ash.

Cut blocks 2, 3, and 4 will need to be assessed by a forester at the time of planting to decide what species should be planted for those individual locations.

### **ii. Stand tending**

This stand will not need to much tending because the alder will shade out most underbrush, so brushing wont be needed. The cedar will be stunted until the alder is harvested again but at that time the residuals that were left in the previous block can be cut down and the stunted will be able to be left as residuals in the stand for retention. There will be no need for juvenile or commercial thinning or fertilization. The cedar will need to have plastic cones put over them to deter the deer from eating them and to prevent the leaf litter from the alders and other foliage from smothering them.

### **iii. Forest health**

There are minimal forest health issues within the management area. However, there are some small areas that have root rot and white pine blister rust. Since all the harvestable volume is going to be logged and that is where the problem areas are the diseases will be eradicated from the standing trees. The trees that have root rot (will be easier to see at time of harvest) will be the first to be stumped and taken away for biofuels. This will ensure the disease is removed from the area. 50% of the stumps are going be taken out of the area. The

white pine that is infected with blister rust will be cut down if it is found and removed. Stumping is not a priority with this disease.

#### **d. Other Resource Values**

##### **i. Biodiversity**

As the management areas main objective is bioenergy, there will be very little large or small woody debris left within the cut blocks. It wouldn't make sense to leave it. This will take away from habitat for small critters. By leaving retention within the cutblocks there will be enough biodiversity and habitat left for animals to not be negatively effected to a large extent.

##### **ii. First Nations**

As of now there are no documented cultural values within the management area, however if any cedar trees that resemble canoes or bark strips or even trees that might be usable for bark stripping present they will be noted and made available to the local tribes (Snuneymuxw and the Nanoose first nations).

##### **iii. Wild life**

Wildlife issues in this management area come from deer, fish, blue and red listed species. The issue with the deer is the browsing they do on seedlings and immature trees. To avoid the destruction of the trees they all get coned when planting happened so the deer cannot get to them. Fish are an issue because they can possibly be affected by harvesting from our management area. There is a possibility of blue and red listed species, but none have been found in our area.

##### **iv. Sensitive ecosystem**

Some ecosystems have been found within the management area that have the potential of containing red and blue listed species. These areas are rock out crops and open woodlands. The species that can live within these ecosystems are Deltoid balsamroot (*Balsamorhiza deltoidea*), Redstem Springbeauty (*Claytonia rubra* ssp. *Depressa*), and yellow montane violet (*Viola praemorsa* ssp. *Praemorsa*). On the wetter sites there is the potential for the phantom orchid (*Cephalanthera austiniae*) and Cup Clover (*trifolium cyathiferum*). These dry and wet areas will have 10m buffers around them and will be included in the retention left in each cut block.

##### **v. Invasive species**

The invasive species that were found in the management area are English Holly (*Ilex aquifolium*) and Yellow Archangel (*Lamium galeobdolon*). To manage for these species under the section 1.7 of the VIU woodlot license plan all new roads must be seeded with



agronomic grass seed mix. This will be done when the construction of the road in block 4 is put in. It is important to manage for invasive species as they can colonize new cut blocks and out compete the plantation.

## **References**

- 1. Vancouver Island University Woodlot License Plan**
- 2. Vancouver Island Land Use Plan**
- 3. Critical biomass attributes of the most common bioenergy and biofuel applications**