

Stocking Survey on area of Managed Forest 281 Harvested in 2002

prepared for: The Private Managed Forest Land Council

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Introduction

An inspection of MF 281 was conducted on August 12, 2009 by Nancy Pezel, RPF of Islands West Forestry. At the time, stocking levels in the harvested portions of the property could not be adequately assessed because of the heavy concentrations of brush competition, mainly bracken fern, ocean spray and alder. However, it was felt that because of the dry southerly aspect and brush competition on much of the area harvested in 2002, the natural regeneration strategy may not have provided the required minimum 400 trees per hectare to achieve “restocked” status.

The Private Managed Forest Land Council Regulation 2007 (PMFLC Reg) states in Section 31(3): *If all or part of private managed forest land becomes a disturbed area after the area becomes an owner’s land, the owner must reforest the disturbed area by:*

- (a) restocking the disturbed area within 5 years of the completion of timber harvesting activity on the cutblock, or the date the timber was destroyed as applicable, and*
- (b) establishing a successfully regenerated stand on the disturbed area within 15 years of the completion of timber harvesting activity on the cutblock, or the date the timber was destroyed, as applicable.*

In the PMFLC Regulation Section 31:

“disturbed area” means all or part of private managed forest land where

- (a) timber harvesting has been completed within a cutblock, or
- (b) timber was destroyed

but does not include an area occupied by roads referred to in section 13 or logging trails referred to in section 14(1);

“restock” means to establish a stand of trees

- (a) that contains at least
 - (i) 400 crop trees per hectare reasonably well distributed across the disturbed area if the stand is on the Coast;

“crop tree” means a tree that

- (a) is of a commercial species that is consistent with the species of trees specified in the management commitment for use in reforestation, and
- (b) is unencumbered by pathogens;

Islands West Forestry Ltd. was retained by the Private Managed Forest Land Council to complete a stocking survey to determine the stocking levels in the area of MF 281 that was harvested in 2002 (cutblock) and prepare a map showing stocked and any unstocked areas.

Methodology

A 1:5000 scale map of the managed forest property was developed during the inspection and is based on the legal survey map included in the management commitment as well as information obtained from the web based GeoBC. The BCGeo GoogleEarth orthophoto property lines do not exactly match the bearings and distances on the legal survey map so the maps attached to this report are a “best fit”.

The Ministry of Forests and Range (MFR) silviculture survey procedures (updated 2008) were used to plan the survey and assess the stocking and plantability of the area harvested on MF 281



in 2002. A crew of two certified silviculture surveyors carried out the survey on November 28th and December 6th, 2009. The crew consisted of Nancy Pezel, RPF and John Pezel, RFT.

Based on the expected stocking variability within the cutblock, a grid pattern was used to pre-determine the plot location (see map). One plot per hectare was established at a 100 m interval. During the survey, plots were dropped when they landed in unharvested timber (leave tree patches) or non-productive ground (rock outcrops).

The PMFLC Reg. does not specify target stocking standards, so a target of 800 trees per hectare was used (for statistical purposes only), which allows a maximum of 4 trees in a 1/200th hectare (3.99 m radius) plot. As the PMFLC Reg. requires a minimum 400 crop trees per hectare, this is the minimum stocking standard used in the survey. “Reasonably well distributed” is not defined in the Regulation, so a minimum inter-tree distance of 2.0 m was used, as this is generally the minimum defined as “well spaced” in the MFR stocking standards. The crop trees identified in the landowners’ original management commitment were: Douglas-fir (Fd) and western red cedar (Cw). A recent amendment to the management commitment was approved by the PMFLC to include western hemlock (Hw), red alder (Dr), bigleaf maple (Mb) and lodgepole pine (Pl) as commercial species. The crop trees were selected on a plot by plot basis, depending on their ecological suitability. On drier salal and/or ocean spray dominated sites Hw, Dr, and Mb were not considered acceptable. During the survey it was observed that Grand fir (Bg) is also ecologically suitable in some portions of the property (moister and richer), so it was also tallied when found in suitable microsites.

If a plot contained two or more “reasonably well distributed” crop trees that are free of pathogens, it is considered restocked. Not satisfactorily restocked plots contain less than two “reasonably well distributed” crop trees. If a seedling can be planted at a minimum inter-tree distance of 2 m from a crop tree, then the plot contains a “plantable spot”. Both stocked and non-stocked plots were assessed to determine if additional trees could be planted. Crop tree heights and leader lengths as well as brush heights and percent cover were also recorded.

Results

Based on the plot data, ecology, and general observations made during the survey, the cutblock has been divided into two treatment units (see map for location of treatment units).

Treatment Unit 1 is approximately 13.5 ha and is not adequately restocked (ie. below the minimum even if other commercial species are included). This area contains only 347 well distributed trees per hectare consisting of 36% Fd, 24% Dr, 18% Cw, 9% Mb, 9% Bg and 3% Hw. When Bg is not included (it is not currently listed as a commercial species in the management commitment) the stocking is further reduced to 315 well distributed trees per hectare. The conifers range in height from 0.50 m to 1.9 m with growth ranging 10 cm to 40 cm per year. Scattered leave trees and timbered reserves are evident throughout this area as well.

Brush composition and coverage in Treatment Unit 1 is variable and consist of dense patches of bracken fern 1.5 m in height and up to 90% cover, some dense patches of sword fern 0.8 m and 40% cover, and in the poorer areas, salal averaging 0.5 m in height and 45% cover. Dense



patches as well as scattered clumps of ocean spray, 2 m in height are predominantly found on the drier southwest facing slopes and around rock knobs. Blackberry is more prevalent within 10 m of the road, but is found scattered throughout the area and averages 1.7 m in height. Scattered maple coppices and single stems of maple are evident in the richer swordfern dominated slopes on the west and northwest side of the cutblock. Alder is present throughout the area. The deciduous trees range in height from 4.5 m to 6.5 m.

The silviculture label is: NSR Fd36 Dr24 Cw18 Bg9 Mb9 Hw3-6-1.3-32/E-347(09)

Treatment Unit 2 covers an area of approximately 3.8 ha and is stocked with 600 well distributed trees per hectare consisting of 47% Fd, 40% Cw, 7% Hw and 6% Bg. Even if Bg is not considered, the area contains 560 crop trees per hectare. The well distributed crop trees include approximately 160 trees per hectare that are good quality mature (mainly Fd) or small poles (mainly Cw) left after harvesting.

The regenerating crop trees range in height from 0.40 m to 1.0 m with annual growth ranging from 15 cm to 20 cm. Scattered leave trees, timbered reserves and advanced regeneration (regen present at time of harvesting) are evident throughout the harvest area, with the saplings averaging 2.9 m, the poles 6.0 m and the mature 15 m+. Brush consists mainly of a continuous cover of salal, averaging 0.40 m in height and 50% cover. Patches of bracken fern are also evident and average 1.3 m in height. Alder is evident throughout the stratum, is concentrated on skid trails, and ranges 4.0 to 5.0 m in height.

The silviculture label is SR Fd47 Cw40 Hw7 Bg6-5-0.5-32/E-600(09)

Observations

Stocking throughout the cutblock is variable because the trees naturally regenerated where soil conditions, microclimate, brush levels and seed supply were most suitable to their specific requirements for survival and growth. In disturbed areas where soils are exposed, such as skid trails, stocking of Douglas-fir and alder is often higher because these species prefer exposed mineral soil. However, if the trails are compacted, trees often grow poorly because their roots have difficulty growing through the compacted soil and moisture has difficulty penetrating into the soil. Because of the southeasterly aspect and some thin soils over rock in a large portion of the harvested area, drought is another factor likely limiting the survival of the regeneration.

Stocking is often higher near timber edges (as in TU 2 for example), where a seed supply is more regular. Small seeds species like hemlock and alder spread further distances in the wind. Although the landowner has left pole-sized (7.5 cm +) and larger trees within the harvested area, some of the pole-sized leave trees have broken tops, poor form, or have died. This limits their suitability as potential crop trees or as a seed source. Some of the hemlock leave trees are also not ecologically suitable on the drier, salal dominated sites. Seed supply is often unreliable, with Douglas-fir having good cone crops only once every 5 to 7 years. Few germinants (less than 1 year old seedlings) were observed in the harvested area and no germinants were observed in the plots.



Where brush competition is high, unless the crop trees were able to establish and grow quickly, the brush has completely shaded the crop trees from light (a common occurrence in dense bracken patches) or severely damaged the trees by smothering them. Dense brush also limits the exposed areas in which seeds can land to grow.

No deer browsing was observed on the regenerating Cw, but deer sign and deer were observed on the property. Scattered root disease infected hollow stumps and upturned roots were observed. One dwarf mistletoe infected pole sized Hw was observed.

Discussion / Recommendations

All recommendations are based on the net area of the cutblock. The gross area of the cutblock was netted out for roads, rock, and existing timber reserves (see map). For netting out the main road, an average width of 4 m was used for its length within each treatment unit. Numerous rock outcrops were mapped and the estimated area netted out of the corresponding treatment unit. The larger timbered reserves were also netted out of each area.

Treatment Unit 1 (13.5 ha approximate net area)

Terrain in this treatment unit is variable, ranging from fairly level terrain to steeper 40% slopes, to undulating terrain with exposed rock knobs and some moister areas between. Soils in the salal and bracken fern dominated areas are silt loams with medium to coarse textures (40 to 50% gravels and cobbles). Richer soils with medium to coarse textures are evident in the swordfern dominated areas. On the steeper southwest facing slopes soils are moderately dry and are expected to be drier during the summer months.

Treatment Unit 1 is not restocked and planting is recommended. Fertilizer (using tea bag sized packs) is recommended at time of planting to help the crop trees reach the required 50% height above the brush by the 15th year after harvest. In dense bracken fern patches protection of the seedlings with Sinocast tree protector cones is recommended to minimize vegetation press. Treatment of the alder is recommended because alder is not ecologically suitable in much of the area, is competing with the conifers for moisture and light, and is overtopping the crop trees so they will not achieve the required 50% above brush height by the 15th year after harvest. Cutting of the maple coppices to one or two dominant stems (“single stemming”) is recommended to reduce the competition with the conifers.

Because drought conditions may limit growth during the summer and some thin soils over rock are evident throughout the area, the use of shorter plug sizes is recommended. However, larger stock sizes are recommended to help the seedlings get above the brush competition. Dense patches of alder are evident throughout this treatment area, and much of it is not ecologically suitable. Alder and maple are ecologically acceptable in the swordfern sites.

To achieve required stocking levels and satisfactory regeneration:

- Fill plant with 1+0 PSB 512 stock (preferred) or 412 stock with 95% Fd and 5% Cw and fertilize the Fd at time of planting. Plant the Cw around hollow stumps and



- upturned root systems and moister areas. Space 5 m off any maple clumps. Plant early in the spring.
- Plant 500 seedlings per hectare at a 4 m spacing off existing Fd and Cw (ignore Hw, Bg and Dr because most are not ecologically acceptable); estimated total of 6750 seedlings.
 - Protect seedlings in dense bracken patches from vegetation press with Sinocast cones. Annual maintenance/check of the Sinocast cones and brushing of the bracken fern around the crop trees is recommended.
 - Girdle alder greater than 5 cm in diameter and cut alder less than 5 cm in diameter within 5 m of existing conifers and planted seedlings in the late spring following planting, or no later than 2 years after planting. Alder can be left untreated if not within 5 m of a conifer. Monitor alder resprouting and retreat if necessary to achieve successful regeneration by the 15th year after harvest (2017).
 - Cut maple coppices leaving one or two large main stems in the centre of the clump. Retreat as required to achieve successful regeneration of conifers.
 - Monitor brush and manually treat brush around crop trees annually or as required to maintain adequate growth of conifers to achieve successful regeneration.

Treatment Unit 2 (3.8 ha approximate net area)

This area is currently restocked, but stocking is variable and at minimums in some areas. Fill planting is recommended to ensure stocking levels are maintained to the 15th year after harvest. If left unplanted and some trees die as a result of drought, root disease or other factors during the next 8 years, stocking could be reduced to below minimums and the area will become not stocked. Fertilization at time of planting is recommended to assist the seedlings in becoming a “successfully regenerated stand” within the 15 years post harvest. Dense patches of alder are overtopping the conifers in this treatment unit and treatment of the alder is recommended to achieve the 50% height above the brush by the 15th year after harvest.

To maintain/improve stocking levels and ensure satisfactory regeneration is achieved:

- Fill plant with 1+0 Fd PSB 512 stock
- Plant 200 seedlings per hectare at a 4 m spacing; total approx. 760 seedlings
- Girdle alder greater than 5 cm in diameter and cut alder less than 5 cm in diameter within 5 m of existing conifers and planted seedlings in the late spring following planting. Alder can be left untreated if not within 5 m of a conifer. Monitor alder resprouting and retreat if necessary to achieve successful regeneration by the 15th year after harvest (2017).

For both treatment units, planting prescriptions are based on a target of 800 trees per hectare.





Overview of southwest facing slopes of MF 281 from Milligan Road



Dense bracken fern patch in Treatment Unit 1 (west of plot 20) with few crop trees evident.



Vegetation damage to Cw in bracken fern patch between plots 21 and 22 (in Treatment Unit 1).

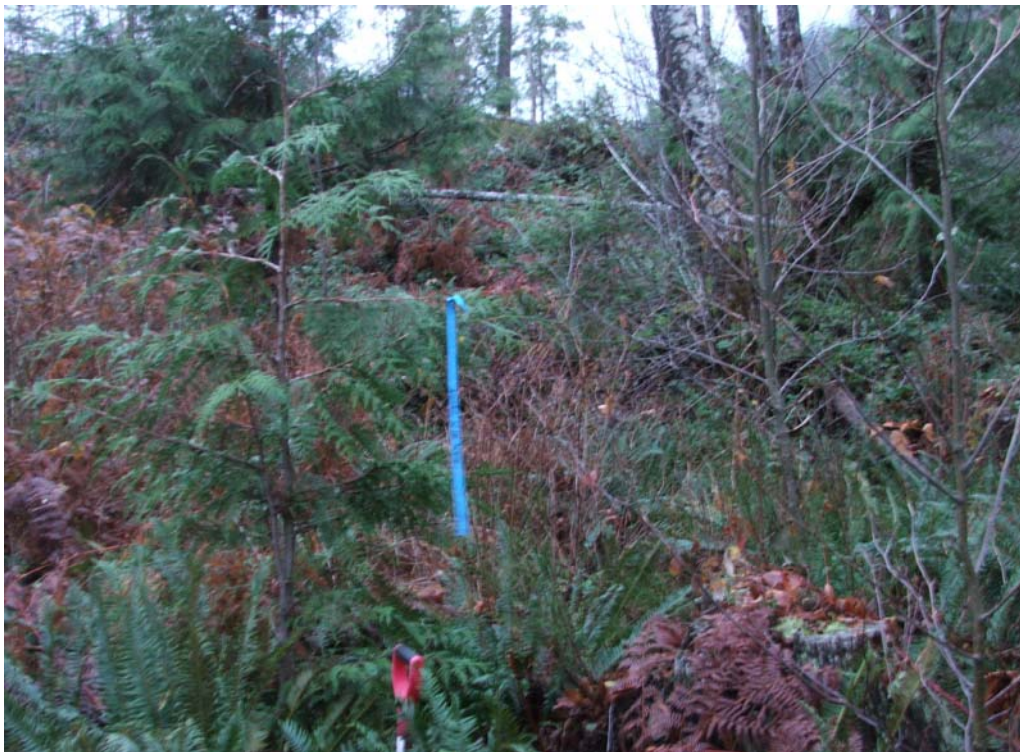


Few conifers are evident on the swordfern and maple dominated slope east of plot 1 (in Treatment Unit 1).





Some good Fd growth (right) and poor Bg growth (left) in Treatment Unit 1 on the drier ocean spray dominated slopes south of plot 7.



Some good Cw growth in the moister swordfern sites (plot 17) in Treatment Unit 1.





The stocked area northeast of plot 10 is overtopped by alder (Treatment Unit 2).



Retention patches are evident throughout both Treatment Units.

