
**APPENDIX 14; 2002 FDP AMENDMENT STOCKING STANDARDS AND
ALTERNATE PERFORMANCE STANDARDS**

TFL 15 2002 FDP Amendment

Stocking Standards and Alternate Performance Standards

Introduction

Pursuant to Section 41 of the Forest Practices Code of B. C. Act, we hereby propose an amendment to the 2002 – 2006 Forest Development Plan for TFL 15 to include stocking standards for areas to be harvested under this plan. Attached are two tables that outline single layer and multi-layer stocking standards for the range of biogeoclimatic zones and subzones that exist within the operating area of this plan. These stocking standards will not apply to areas with approved Silviculture Prescriptions.

Weyerhaeuser has developed the proposed stocking standards to align with the forest management philosophy of TFL 15 that is outline in draft Management Plan #9. Weyerhaeuser is committed to ensuring all managed stands on TFL 15 harvested under this amendment and Management Plan #9, meet these stacking standards on or before the late free growing date.

The Establishment to Free Growing Guidebook: Kamloops Forest Region, The Site Index Estimates by Site Series; Second Approximation (Version 2002), and Weyerhaeuser Okanagan Falls / Lumby Regional Sustainable Forest Management Plan were used as references for the development of these stocking standards. Variances from the recently approved standards are based on the Reference Guide for FDP Stocking Standards, the most recent site index information, and/or historical experience in managing local site and stand conditions within the different site associations. Where a variance from the Kamloops Forest Region Reference Guide for FDP Stocking Standards is being proposed, a clear rationale has been provided below and/or in the footnotes of the table.

The following comments apply to all biogeoclimatic zones, subzones and site series on the attached tables:

Species Selection

- ◆ Species were selected as either preferred or acceptable based on the following:
 - Silviculture objectives outline in MP #9
 - their relative site index with the objective to maximize site productivity.
 - to enhance diversity and meet the goals outlined in the Regional Sustainable Forest Management Plan.
 - to enhance the level of residual retention in an effort to increase vertical and species diversity.
- ◆ For cut blocks that are transitional to another biogeoclimatic zone, subzone and site series, all preferred and acceptable species of the transitional site series, that are not already included in the stocking standards of the identified site series, will be added as acceptable.

- ◆ For complex standard units that contain more than one site series, all preferred and acceptable species of the minor site series, that are not already included in the stocking standards of the leading site series, will be added as acceptable.
- ◆ The management of Aspen will be in accordance with “ Strategies for the Management of Trembling Aspen on TFL 15” dated August 31, 2001. To address root rot issues or to include a greater component of Aspen to better reflect pre-harvest stand composition, minimum stocking requirements at free growing may be reduced. For all sites except subhygric or hygric, that contain more than 10 mature stems or residual clumps per hectare pre-harvest, the target and minimum stocking standards will be reduced by 200 sph and the MITD will be reduced to 1.0 meters. This is to allow for planting of conifers to a higher density between the mature aspen stems and clumps. For subhygric or hygric sites, that contain more than 5 well distributed mature stems or residual clumps per hectare pre-harvest, the target and minimum stocking standards will be reduced by 200 sph and the MITD will be reduced to 1.0 meters. Also, will accept as free growing spruce of good form and vigour that are over-topped by mature Aspen.
- ◆ Species selection and/or mixed species management will be used to minimize the negative impacts of forest health agents.
- ◆ Advanced Balsam regeneration will contribute toward meeting stocking requirements if it meets the acceptability criteria outlined in table A10-1 and A10-2 in the “Establishment to Free Growing Guidebook- Kamloops Forest Region – Revised Edition May 2000.

Heavy Cattle Use Areas

Standard Units having one or more of the following attributes will have an MITD of 1.6 meters to allow for obstacle planting.

- ◆ Documented pre-harvest during a meeting with the Range Tenure Holder as a potential or existing cattle congregation area.
- ◆ A range fence is existing or is proposed within or immediately adjacent (within 20m) to the SU.
- ◆ There is a permanent access structure and a riparian area or water source within or immediately adjacent (within 20m) to the SU.
- ◆ There is documented evidence that greater than 25% of the SU is being directly affected by heavy cattle use.

Climatic Factors

- ◆ Drought / Moisture Deficit Areas; For submesic and dryer sites within the PP and IDF biogeoclimatic zones the MITD will be reduced to 1.6 meters to allow for shade planting.
- ◆ Cold Sites / Short Growing Season Length; For subhygric or wetter sites and all others sites above 1800 meters within the ESSF. Balsam will be the preferred species but its percentage of the preferred free growing stems will be limited to the

percentage of its pre-harvest stand composition. The MITD will be reduced to 1.6 meters to allow for the planting of elevated microsites.

Soils

- ◆ Rock/ Shallow Soils Over Rock/ Other Natural Non-Productive; SU's with areas of dispersed non-mappable rock, shallow soil over rock, or other natural non-productive will have their target and minimum stocking standards reduced proportionate to the amount of this type of area within it. Each stocking standard will be rounded to the nearest 100 sph.
- ◆ Swamp / Natural Non-Productive; SU's with areas of dispersed non-mappable swamp, or natural non-productive will have their target and minimum stocking standards reduced proportionate to the amount of this type of area within it. Each stocking standard will be rounded to the nearest 100 sph.
- ◆ Subhygric and Wetter Sites; Where the site preparation method is mounding, the MITD will be reduced to 0.75 meter to allow for the planting of two trees per mound. Between or off the mounds the MITD will be 1.6m. Where no site preparation is completed prior to planting the MITD will be reduced to 1.6 meters to accommodate planting of elevated microsites.

Silviculture Systems

- ◆ Residual Retention; Advanced regeneration and leave trees are retained to provide structural diversity in the future for wildlife and biodiversity purposed. Residual retention will contribute to free growing stocking targets. Where retention levels exceed 1000 total sph the MITD will be reduced to 1.6 meters to allow for planting adjacent to and within areas of retention.
- ◆ Partial Cutting; In areas of partial cutting the MITD will be reduced to 1.6 meters to accommodate the clumpy nature of the residuals and the anticipated new regeneration. If planting is required, the reduction will allow flexibility for planting adjacent to and within the existing residual stocking.

Forest Health

- Root Disease; SU's showing signs of or being confirmed to have root disease, identification of root disease species and incidence will be gathered during a prescription walk through and in conjunction with a sketch map, if required. The identified will be stratified into three differing root disease incidence levels. Each incidence strata should be broken down into treatment strata to a minimum size of 2 hectares. For each incident level the following prescription will apply.
- ◆ Low pest incidence – Generally no restrictions on regeneration strategy will apply. Species mixed are still desirable for general forest health reasons, and may be prescribed depending on species ecologically suitable for the site. Normal target densities will apply.

- ♦ Moderate pest incidence – A more intensive strategy is required than above. A minimum of 2 species to be planted, with a target of 3 species, unless ecologically unsuited for the site. Good quality, ‘acceptable’ [as per ‘stocking standards’] natural regeneration on site will be considered as ‘preferred’ to enhance species diversity. Broad leaf species, particularly birch, should be encouraged up to 200 stems/ha.
- ♦ High pest incidence – Due to probable significant impact on potential rotation production, reduction of inoculum will be the first priority on treatable areas, with the emphasis on spot vs. broadcast treatments to minimize soil disturbance. If a significant portion of an area is prescribed for inoculum reduction [stump removal], consider the pest incidence to be reduced to moderate or low, with associated strategies.
- ♦ If no inoculum reduction is feasible due to site constraints or other resource values, other strategies of risk reduction must be introduced. Recommended strategies are [1]. Species mixes-on those subzones where opportunities exist, 3 species should be planted. Where not ecologically suitable, or where similar sites have a definite history of filling in with other species i.e. Cw/Hw, a minimum of two species should be planted. [2]. To minimize the impact on volume losses, minimum intertree distance will be reduced to 1.5m. Broad-leaved mixtures will be encouraged up to 200 stems per ha. As in moderate levels, good quality, natural regeneration will be considered ‘preferred’, as per those conditions outlined in ‘moderate’.

The incidence levels will be based on the following general stand condition definitions, resulting from observations made during the root disease walk through:

Low:

Little or no root disease symptoms in the stand such as dead and dying trees, thinning or chlorotic foliage, distress cone crops, blowdown with root balls. Stand structure is generally intact, with little or no reduction in volume.

Moderate:

Some of the above symptoms scattered throughout the stand in single trees or small patches. No large centres showing advanced signs of root disease within the strata. (Greater than 1 ha.) Overall volume in the strata is in decline, but volume reductions are minor in nature.

High:

Numerous small patches having root disease symptoms or scattered smaller patches in conjunction with larger patches with advanced root disease symptoms. Stand structure is declining, with a noticeable reduction in volume from that expected from a similar uninfected stand.

- Commandra Blister Rust; For SU's having >10% of the stems showing signs or having the rust and maximum density is exceeded, the post spacing density for PI will be increase to 5,000 sph.

- PL Forest Health Agents; The maximum post spacing density will be increased to 5000sph for lodgepole pine leading stands that have > 20% of the stems showing signs or have one or more of the following forest health agents; commandra blister rust, western gall rust (stem galls), dwarf mistletoe, and pine terminal weevil.

Stocking Density

Management intent within machine-restricted zones is focused toward protecting water quality. Lower and variable stocking levels are expected as a result of wet soil conditions, leave tree retention and restricted opportunities for site preparation and planting.

Silviculture plots will not be established within these areas.

On extremely harsh sites (xeric, hygric) target and minimum stocking standards have been reduced to better reflect pre-harvest stocking levels.

Riparian Management Areas are anticipated to have low or variable stocking as a result of leave tree retention. While silviculture plots may fall within these areas, they will not be treated as a separate site unit when conducting regeneration or free growing surveys.

Regeneration Delay

Where harvesting activities are prolonged as a result of forest health issues or blowdown in a cutblock and the delay in harvesting will prevent the regeneration delay requirements from being met, the regen delay period will be extended by two years from the completion of harvest activities.

Where planting is prescribed to meet stocking requirements the regeneration delay will be 4 years. If natural regeneration alone or when combined with fill planting is anticipated to achieve stocking requirements, the regeneration delay will be 7 years.

Wood Quality

The primary objective of increasing post spacing densities above the levels given in the guidebooks is to increase wood quality. Increased density improves wood quality by reducing the juvenile wood component, reducing taper and reducing knot size. For lodgepole pine leading stands (75% of the inventory component) the maximum post spacing density is 2400 sph.

Complex Standard Units

In many cases, standard units contain more than one site series that are unmappable due to size and distribution. Although each has a different set of standards, the areas are combined if treatments are expected to be the same. For these complex standards units the prescribed stocking requirements will be those associated with the leading site series. For complex standards units containing 3 or more site series, site series having similar stocking standards that together occupy greater than 50% of the NAR, will apply. In situations where the minor site series is most restrictive to regeneration success and occupies greater than 30% of the NAR of the SU, then the standards will be weighted

proportionate to the amount of each site series within it. Each stocking standard will be rounded to the nearest 100 sph.

For complex standards units that contain site series having different minimum free growing height requirements for the same species, the tallest height will be the standard for the SU.

For complex standards units that contain site series having different late free growing dates, the latest free growing date will apply to the SU.

FDP STOCKING STANDARDS
Uneven-aged Stocking Standards - Single-Tree selection only

Target from Table A standards	Layer	Stocking ***			Target from Table A standards	Layer	Stocking ***		
		Target pa	MIN pa	MIN p			Target pa	MIN pa	MIN p
(stems/ha)		(well-spaced/ha)			(stems/ha)		(well-spaced/ha)		
1200	1	600	300	250	800	1	300	150	150
	2	800	400	300		2	400	200	200
	3	1000	500	400		3	600	300	300
	4	1200	700	500		4	800	400	400
1000	1	400	200	200	600	1	300	150	150
	2	600	300	250		2	400	200	200
	3	800	400	300		3	500	300	300
	4	1000	500	400		4	600	400	400
900	1	400	200	200	400	1	200	100	100
	2	500	300	250		2	300	125	125
	3	700	400	300		3	300	150	150
	4	900	500	400		4	400	200	200

MIN - minimum

* For those areas without regeneration objectives:

Maximum regeneration delay is seven years. For a seven-year regeneration delay, the early free growing is 12 years and the late free growing is 15 years. Regeneration delay can be met immediately following harvest if the residual stand has no significant damage or pest problems and meets minimum stocking standards. If regeneration is achieved immediately following harvest, earliest free growing date is 12 months after completion of harvest and the latest date is 24 months after completion of harvest.

*****Stand Lay Definition**

Layer 1 Mature trees > 12.5 cm dbh
 Layer 2 Pole trees 7.5cm to 12.4 cm dbh
 Layer 3 Sapling trees > = 1.3m height to 7.4 cm dbh
 Layer 4 Regeneration trees < 1.3m height

***pa - preferred and acceptable species p - preferred species

Preferred and acceptable species and "Target from Table A standards" are as specified in Table A by biogeoclimatic ecosystem classification (BEC) site series.

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FDP STOCKING STANDARDS
LICENCE: TFL 15

ID Number	BGC Classification		Regeneration Guide						Free Growing Guide						Spacing Density		
			Species		Stocking (i)			Regen Delay (Max yrs)	Assessment		Min. Height (ii)		MITD (m)	% of Brush Height			
	Target	MIN pa			MIN p	Earliest (yrs)	Latest (yrs)		Species	Ht. (m)							
			Preferred (p)	Acceptable (a)							(well spaced/ha)						
	ESSFdc1	01	PI, Sx	BI	1200	700	600	4	RD+8	20	PI Others	1.6 0.8	2.0	125	1200	PI other	2400 1800
		02	PI	BI *21, Sx	1000	500	400	7*14	RD+8	20	PI Others	1.2 0.6	1.6*12	125	1000	PI other	2400 1800
		03	PI	BI *21, Sx	1000	500	400	7*14	RD+8	20	PI Others	1.2 0.6	2.0	125	1000	PI other	2400 1800
		04	PI, Sx	BI	1200	700	600	4	RD+8	20	PI Others	1.6 0.8	2.0	125	1200	PI other	2400 1800
		05	PI, Sx	BI*21*29	1000	500	400	4*10	RD+8	20	PI Others	1.2 0.6	2.0	125	1000	PI other	2400 1800
		06	PI,Sx BI*4		1000	500	500	4	RD+8	20	PI Others	1.2 0.6	2.0	125	1000	PI other	2400 1800
		06*6	PI,Sx BI*4		700	400	400	4	RD+8	20	PI Others	1.2 0.6	1.0*26	125	400		1000
		07	non-forested														
	ESSFdcu	FH	Sx,PI,BI		1000	500	500	4	RD+8	25	PI Others	1.6 0.8	1.6 *24	125	1000		2400
		PP	PI,Sx*13*4, BI*13*4		1000	500	400	4	RD+8	25	PI Others	1.2 0.6	1.6 *24	125	1000		2400
		PJ	PI		600	300	300	4	RD+8	25	PI Others	1.2 0.6	1.6 *24	125	600		2400
		FV	PI,Sx,BI		1000	400	400	4	RD+8	25	PI Others	1.2 0.6	1.6 *24	125	1000		2400
		SG	non-forested														
		CC	non-forested														
	IDFdm1	01	Fd,Lw,PI	Py*2*28,Sx*18/*21	1000	500	400	7	RD+5	15	PI,Lw Fd Others	1.0 0.8 0.6	2.0	125	1000	PI other	2400 1800
		02	non-forested														
		03	Fd Py*1*28	PI	600	400	400	7	RD+5	15	PI Fd Others	1.0 0.8 0.6	1.6*12	125	400	PI other	2400 1800

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ID Number	BGC Classification		Regeneration Guide						Free Growing Guide						Spacing Density		
			Species		Stocking (i)			Regen Delay (Max yrs)	Assessment		Min. Height (ii)		MITD	% of Brush Height			
	Target	MIN pa			MIN p	Earliest (yrs)	Latest (yrs)		Species	Ht. (m)							
	Zone/Sz	Series	Preferred (p)	Acceptable (a)	(well spaced/ha)										Min	Max	
		04	Fd,Lw,PI Py*1*28		1000	500	500	4*15	RD+5	15	PI,Lw Fd Others	1.0 0.8 0.6	2.0	125	1000	PI other	2400 1800
		05	Fd,Lw,Sx*5 PI	Py*2*28	1200	700	600	7*16	RD+5	15	PI,Lw Fd Others	1.4 1.0 0.8	2.0	125	1200	PI other	2400 1800
		06	Fd,Lw,PI,Sx	BI*18*21	1200	700	600	4	RD+5	15	PI,Lw Fd Others	1.4 1.0 0.8	2.0	125	1200	PI other	2400 1800
		07	PI,Sx	Fd, Lw BI*18*21	1000	500	400	4	RD+5	15	PI,Lw Fd Others	1.0 0.8 0.6	2.0	125	1000	PI other	2400 1800
	IDFxh1	01	Fd,Py	Lw*18/*21	1000	500	400	4*15	RD+5	15	All	0.6	2.0	125	500		1600
		02	N/A														
		03	Py,Fd		600*17	400 *17	400 *17	4*15	RD+5	15	All	0.6	2.0	125	400		1200
		04	Py,Fd	Lw*18/*21	600*17	400 *17	400 *17	4*15	RD+5	15	All	0.6	2.0	125	400		1200
		05	Py,Fd	Lw*18/*21	600*17	400 *17	400 *17	4*15	RD+5	15	All	0.6	2.0	125	400		1200
		06	FdPy	Lw*18/*21	1000	500	400	4*15	RD+5	15	All	0.6	2.0	125	500		1600
		07	FdPy	Lw*18/*21 Sx*7	1000	500	400	4	RD+5	15	All	0.6	2.0	125	500		1600
		08	Fd,Sx,PI*4*5 Py*4*1		1200	700	600	4	RD+5	15	PI, Lw Others	1.0 0.8	2.0	125	700		1800
		09	non-forested														
	MSdm1	01	PI,Sx,Lw*1 Fd*1	BI	1200	700	600	7	RD+5	15	PI, Lw Others	1.4 0.8	2.0	125	1200	PI other	2400 1800
		02	Fd, PI Lw		600	400	400	7	RD+5	15	PI,Lw Fd	1.0 0.6	1.6*12	125	600	PI other	2400 1800

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ID Number	BGC Classification		Regeneration Guide						Free Growing Guide						Spacing Density		
			Species		Stocking (i)			Regen Delay (Max yrs)	Assessment		Min. Height (ii)		MITD	% of Brush Height			
	Target	MIN pa			MIN p	Earliest (yrs)	Latest (yrs)		Species	Ht. (m)	Min	Max					
	Zone/Sz	Series	Preferred (p)	Acceptable (a)	(well spaced/ha)												
		03	PI,Fd,Lw,		1000	500	400	7	RD+5	15	PI,Lw Others	1.0 0.6	2.0	125	1000	PI other	2400 1800
		04	PI,Fd,Lw,	Sx*21	1200	700	600	7	RD+5	15	PI, Lw Others	1.4 0.8	2.0	125	1200	PI other	2400 1800
		05	PI, Fd*1, Sx	BI*21*29 Lw*2*28	1200	700	600	7*14	RD+5	15	PI, Lw Others	1.4 0.8	2.0	125	1200	PI other	2400 1800
		06	PI, Sx	Fd*2*28, Lw*2*28,BI	1200	700	600	4	RD+5	15	PI, Lw Others	1.4 0.8	2.0	125	1200	PI other	2400 1800
		07	PI, Sx BI*4		1000	500	400	4	RD+5	15	PI Others	1.4 0.8	2.0	125	1000	PI other	2400 1800
		07*6	PI, Sx BI*4		700	400	300	4	RD+5	15	PI Others	1.4 0.8	1.0*26	125	400		1000
		08	non-forested - no stocking standards														
	PPxh1	01	Fd*27, Py		400		200	7*9	RD+5	15	All	0.6	2.0	125	400		1000
		02	Fd*27, Py		400		200	7*9	RD+5	15	All	0.6	2.0	125	400		1000
		03	non-forested														
		04	Fd*27, Py		400		200	7*9	RD+5	15	All	0.6	2.0	125	400		1000
		05	Fd*27, Py		400		200	7*9	RD+5	15	All	0.6	2.0	125	400		1000
		06	FdPy		400		200	7*9	RD+5	15	All	0.6	2.0	125	400		1000
		07	FdPy		1000	500	400	4*15	RD+5	15	All	0.6	2.0	125	500		1600
		08	Fd,Sx	Py	1000	500	400	4	RD+5	15	All	0.6	2.0	125	500		1800

Footnotes:

- 1 Preferred at mid to lower elevations of BEC zone, otherwise acceptable.
- 2 Acceptable but restricted to mid to lower elevation of BEC zone
- 3 Preferred but limited to the pre-harvest stand composition within the standards unit.
- 4 Preferred but limited to the pre-harvest stand composition within the standards unit.
- 5 Preferred at Mid to upper elevation of BEC zone, otherwise acceptable
- 6 As per guidelines stated within Grizzly Bear Resource Management Zone of the OSLRMP
- 7 Acceptable if > 20% of the pre-harvest stand composition within the standards unit.
The mature stand must be of good quality and demonstrate proven PI performance.
- 8 Preferred if greater than 40% of the pre-harvest stand composition in the stand table, otherwise acceptable.
- 9 If planted, regen delay will be 4 years and EFG date will be RD + 5 years
- 10 If lodgepole pine leading on-site pre-harvest and natural regeneration anticipated, will have a 7 year regen delay.
- 11 Preferred if root disease is present at a level where >8% of the stems are infected or are showing above ground symptoms.
- 12 Clumpy stem distribution resulting from harsh site conditions
- 13 Preferred only on north and east aspects, otherwise acceptable.
- 14 If planted, regen delay will be 4 years and EFG date will be RD + 8 years
- 15 If seed source is present and conditions are adequate for natural regeneration, regen delay = 7 yrs
- 16 If brush problems are not anticipated
- 17 Targets and minimums can be reduced to reflect pre-harvest stocking levels as defined in the stand table of the cruise.
- 18 Acceptable if > 10% of the pre-harvest stand composition within the standards unit.
- 19
- 20 Preferred but limited to 50% of the free growing stems.
- 21 Acceptable at mid to upper elevation of BEC zone.
- 22 If not planted Pw will only be an acceptable species up to 20% of the free growing stems if pruned to 1 meter in height.
- 23 Preferred up to 50% of the preferred free growing stems if rust resistant white pine planted, otherwise acceptable.
- 24 MITD at 1.6m between mounds and .75m between trees on the same mound for thermal mass protection from frost, snow creep and adjacent understory retention
- 25 Restricted to northern portion of biogeoclimatic unit in region
- 26 Cluster planting as per guidelines stated within Grizzly Bear Resource Management Zone of the OSLRMP - MITD = 1.0 m.
- 27 Partial canopy cover required for successful regeneration establishment
- 28 Restricted to southerly aspects.
- 29 Restricted to northerly aspects.