APPENDIX C - Discrepancy Report

The site productivity layer contains site index estimates for a 100 m grid of points across British Columbia. The site index estimates come from one of two sources: a PEM or TEM with SIBEC site index estimates or from the biophysical site index model. The layer only provides site index estimates from one source. That is, where site index estimates from both sources exist, the SIBEC site index estimates take precedence over the biophysical site index estimates and are reported on the site productivity layer. Nevertheless, the points with two site index estimates give us the opportunity to compare the estimates. We call this comparison a discrepancy report. It is important to note, however, that this is a model-to-model comparison and consequently it is not possible to determine from the discrepancy report which model is "better".

The following steps were taken to produce the discrepancy report:

1. CloverPoint^{TM}, using a Geographic Information System (GIS), identified points that had site index estimates from both models. In this step it was necessary to use the data sets generated to build the layer, not the layer itself since the site productivity layer only contains data from one source for each point. The biophysical model has a larger coverage than the PEM/TEM/SIBEC model, so, in general the points with multiple site index estimates are the points covered by the PEM or TEM.
2. For each of these points in step 1, the site index estimates were extracted from the data sets by species. If a point had a site index for a species from one model but not the other, then the site index data were discarded for that species. Therefore, each point produced pairs of site index estimates for one or more species.
3. The absolute value of the difference in the site index from the two models for each point and species was calculated.

4. The following discrepancy report was produced by counting the number of points (recall, each point represents 1 ha of area) in each of the following difference classes: $D < 2$, $2 \leq D < 3$, $3 \leq D < 4$, $4 \leq D < 5$, $5 \leq D < 6$, $6 \leq D < 7$, $7 \leq D < 8$, $8 \leq D < 9$, $9 \leq D < 10$, and $D \geq 10$, where D (m) is the absolute value of the difference between the two site index estimates. The area (both in absolute terms and as a percentage) in each discrepancy class is reported by species in this table. Also reported in this table is 3 times the root mean squared error (RMSE) from the biophysical model development analysis, by species.

The entries in the table are interpreted in the following way, using trembling aspen (the first species in the table) as an example. The total area in the site productivity layer where a site index estimate is available from both models is 2,878,516 ha. The difference in the site index estimates from the two models is less than 2 m on 1,990,074 ha, or about 69% of the total area where there are two site index estimates for trembling aspen. The largest discrepancy between the two models for trembling aspen is less than 6 m. Based on the biophysical model development statistics (column labelled ± 3 RMSE), errors in biophysical site index estimates up to 12 m are not unexpected. Acknowledging that the PEM/TEM/SIBEC site index estimates have errors as well (which result from errors in the PEM or TEM and also in the SIBEC estimates), it is probably exceptionally good that the largest discrepancies are less than 6 m for trembling aspen. Conclusion: the two models show good consistency in the site index estimates for trembling aspen.

The discrepancy report indicates that, with the exception of white spruce (Sw) in the BWBS zone, the two models are in good agreement. There are some substantial discrepancies but most of the estimates are within a few metres of each other. To put this in

perspective, you would be doing well if you obtain an estimated site index that is within 1 - 2 m of the true site index using an accurate ground-based method.

This discrepancy report again points out the need to use caution when the site index estimates from the site productivity layer are applied on a site-specific basis. The site productivity layer is more appropriately used for strategic purposes where many points are averaged to come up with an average site index over a large area. Averaging site indexes over a large area (e.g., a management unit) tends to "average out" the errors in the site index estimates. This will not happen when averaging over a small area such as a cut block. This is because the site index estimates are highly correlated over small areas. For example, if two adjacent points (recall the points are only 100 m apart) lie in the same PEM or TEM polygon, then they will have the exact same site index estimate for a given species. The biophysical site index estimates will likely be exactly (or very close) for the same species on those two points as well. However, the true site index will also likely be the same (or very close) for the two points and therefore the errors in the site index estimates will not "average out". A site index based on ground sampling should be obtained in place of the site productivity layer site index when a site-specific site index is desired, especially if large financial investments are being made on the site.

	# of hectares (points)											
	% of total area for species										Total	
Species	D < 2	2 ≤ D < 3	3 ≤ D < 4	4 ≤ D < 5	5 ≤ D < 6	6 ≤ D < 7	7 ≤ D < 8	8 ≤ D < 9	9 ≤ D < 10	D ≥ 10	# of ha	± 3 RMSE
Trembling aspen	1,990,074	532,353	249,681	80,582	20,344	4,687	665	120	10	-	2,878,516	11.89
	69	18	9	3	1	0	0	0	0	-		
Amabilis fir	424,997	153,076	101,986	58,736	33,113	22,199	19,193	19,545	18,208	123,511	974,564	11.55
	44	16	10	6	3	2	2	2	2	13		
Subalpine fir	5,954,328	1,631,208	968,269	691,175	417,574	185,647	108,206	33,654	15,018	6,735	10,011,814	10.87
	59	16	10	7	4	2	1	0	0	0		
Western redcedar - coast	497,533	200,066	167,311	130,386	104,693	87,502	60,215	39,008	20,578	50,112	1,357,404	12.97
	37	15	12	10	8	6	4	3	2	4		
Western redcedar - interior	716,509	166,724	92,379	39,202	27,574	9,231	2,340	1,372	1,074	328	1,056,733	9.73
	68	16	9	4	3	1	0	0	0	0		
Paper birch	747,767	124,560	8,844	66	-	-	-	-	-	-	881,237	9.87
	85	14	1	0	-	-	-	-	-	-		
Douglas-fir - coast	360,255	110,408	75,415	79,588	37,129	35,614	32,187	29,890	21,183	44,071	825,740	17.57
	44	13	9	10	4	4	4	4	3	5		
Douglas-fir - interior	5,134,152	887,941	460,786	374,347	217,712	64,567	33,635	12,812	3,190	1,246	7,190,388	11.48
	71	12	6	5	3	1	0	0	0	0		
Western hemlock - coast	403,415	157,570	120,769	88,673	65,808	58,793	62,029	58,323	49,682	85,982	1,151,044	16.66

	35	14	10	8	6	5	5	5	4	7		
Western hemlock - interior	643,159	170,436	86,932	31,961	9,866	2,642	1,130	527	11	-	946,664	11.63
	68	18	9	3	1	0	0	0	0	-		
Western larch	661,510	322,136	182,520	74,590	25,773	16,325	5,591	369	-	-	1,288,814	10.59
	51	25	14	6	2	1	0	0	-	-		
Lodgepole pine	10,867,586	2,469,138	1,323,210	1,139,881	1,031,478	891,675	219,918	163,457	122,731	36,745	18,265,819	8.94
	59	14	7	6	6	5	1	1	1	0		
Ponderosa pine	388,036	112,402	59,029	25,159	11,573	5,303	2,741	796	307	672	606,018	10.27
	64	19	10	4	2	1	0	0	0	0		
Black spruce	1,026,592	408,201	364,697	182,973	26,791	69	-	-	-	-	2,009,323	7.46
	51	20	18	9	1	0	-	-	-	-		
Englemann spruce	1,606,870	559,904	515,016	348,882	188,230	132,827	80,394	37,225	22,238	19,305	3,510,891	11.59
	46	16	15	10	5	4	2	1	1	1		
Sitka spruce	248,707	118,238	123,270	104,569	75,022	57,748	40,904	28,853	30,069	74,263	901,643	16.83
	28	13	14	12	8	6	5	3	3	8		
White spruce	71,806	40,171	43,733	39,616	46,477	39,258	46,153	59,865	82,555	184,744	654,378	8.99
	11	6	7	6	7	6	7	9	13	28		
Interior spruce	6,261,400	1,172,043	580,937	348,826	187,075	167,551	94,567	47,633	28,766	19,590	8,908,388	11.64
	70	13	7	4	2	2	1	1	0	0		
All species	38,004,696	9,336,575	5,524,784	3,839,212	2,526,232	1,781,638	809,868	533,449	415,620	647,304	63,419,378	

	60	15	9	6	4	3	1	1	1	1