

8. RE-ADJUSTMENT OF THE OKANAGAN IFPA VRI

Memo

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To: Albert Nussbaum, Jeff Stone
 From: Guillaume Thérien
 cc: René de Jong
 Date: November 6, 2002
 Project: OKI-004
 Location: P:\Okanagan IFPA\oki-005\Reports\AAC application Jan 31 2003\Appendix V\App-V_JST appendix V main.doc
 Re: Re-adjustment of the Okanagan IFPA VRI

Albert:

Following your request, I re-analyzed the Vegetation Resources Inventory (VRI) data for the Okanagan Innovative Forest Practices Agreement (IFPA) to look for a volume adjustment that you would find more appropriate than the options presented in a meeting in Kamloops on October 23rd, 2002.

The best model form I found was:

DBHq = 0: ground volume = 0

DBHq > 0: ground volume = $b_0 + b_1 \times \text{volume} + b_2 \times \text{age} + b_3 \times (\text{DBHq} - \text{utilization level})$

where volume is the VDYP volume at the polygon utilization limit (12.5 cm if the polygon is PI leading or 17.5 otherwise), age is the projected age of the polygon, and DBHq is the projected mean quadratic diameter at the polygon utilization limit. Each observation was weighted by the inverse of the age squared to reflect the fact that we are more confident about the inventory volume in young stands. Note that DBHq will be either 0 or equal or larger than the utilization limit. Therefore (DBHq > 0) really means (DBHq >= utilization limit).

I tried four different post-stratification options (by species group, by biogeoclimatic zone, by age group, and by utilization level). None of these post-stratifications significantly improved the model. Therefore, the final model was:

DBHq = 0: ground volume = 0

DBHq > 0: ground volume = $63.802 + 0.652 \times \text{volume} + 0.843 \times \text{age} - 5.146 \times (\text{DBHq} - \text{utilization level})$

The root mean squared error (RMSE) was 147 m³/ha. The residual plots show no apparent bias (Figure 1).

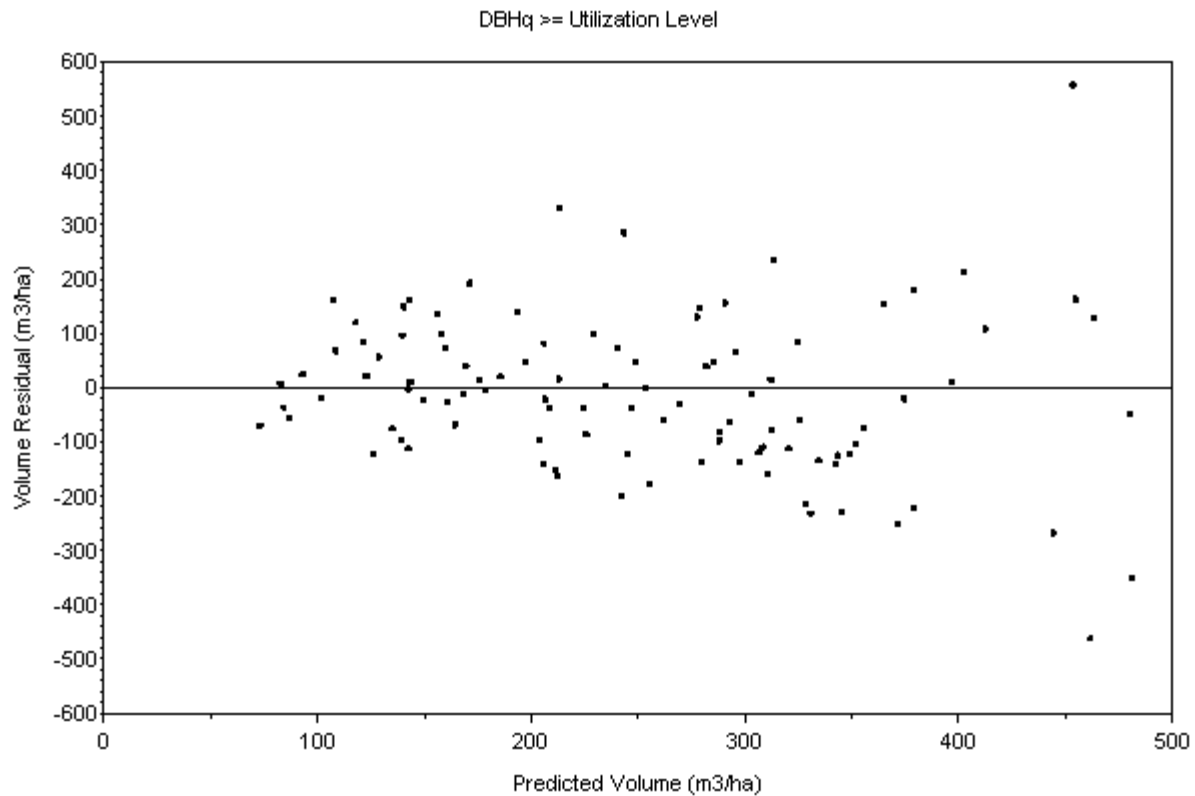


Figure 1. Residual plots for the for stands where DBHq is greater than the utilization limit.

The average ratio adjustment varied by inventory volume class, age class, and diameter class (Tables 1 to 3). Polygons with large volume tended to decrease after adjustment. This decrease was also observed in polygons with large DBHq. However the trend is less noticeable when average volume is analyzed by age class. Older stands did not decrease in volume, but their volume was in general minimally adjusted.

Table 1. Comparison between adjusted and inventory volumes by inventory volume class for the operable vegetated treed land base over 20 years in the Okanagan IFPA.

Inventory Volume (m ³ /ha)	Area (ha)	Adjusted Volume (m ³ /ha)	Inventory Volume (m ³ /ha)	Difference	
				(m ³ /ha)	%
50	208,345	95.9	39.3	56.6	144
150	213,088	199.0	150.7	48.3	32
250	296,644	281.4	253.2	28.2	11
350	236,429	338.1	341.2	-3.1	-1
450	69,741	398.7	441.4	-42.7	-10
550	22,180	457.5	543.9	-86.4	-16

<i>Total</i>	<i>1,046,427</i>	<i>252.1</i>	<i>228.3</i>	<i>23.7</i>	<i>10</i>
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Table 2. Comparison between adjusted and inventory volumes by age class for the operable vegetated treed land base over 20 years in the Okanagan IFPA.

Age Class (yrs)	Area (ha)	Adjusted Volume (m ³ /ha)	Inventory Volume (m ³ /ha)	Difference	
				(m ³ /ha)	%
2	72,507	28.5	3.8	24.7	647%
3	41,696	117.5	59.8	57.7	96%
4	133,417	170.4	125.6	44.8	36%
5	99,179	208.1	183.0	25.0	14%
6	162,883	255.5	253.2	2.3	1%
7	135,266	283.2	284.3	-1.1	0%
8	325,838	311.5	281.6	29.9	11%
9	75,639	423.0	393.8	29.3	7%
<i>Total</i>	<i>1,046,427</i>	<i>252.1</i>	<i>228.3</i>	<i>23.7</i>	<i>10</i>

Table 3. Comparison between adjusted and inventory volumes by diameter class for the operable vegetated treed land base over 20 years in the Okanagan IFPA.

DBHq Class (yrs)	Area (ha)	Adjusted Volume (m ³ /ha)	Inventory Volume (m ³ /ha)	Difference	
				(m ³ /ha)	%
0	51,987	0.0	0.1	-0.1	-100%
15	33,032	117.3	40.5	76.7	189%
20	154,326	187.4	134.5	52.9	39%
25	194,480	246.9	218.9	28.0	13%
30	173,215	253.9	229.4	24.5	11%
35	202,513	292.3	270.1	22.2	8%
40	135,082	314.9	298.4	16.5	6%
45	47,380	319.4	318.6	0.9	0%
50	24,978	378.5	396.4	-18.0	-5%
55	14,814	413.0	458.7	-45.7	-10%
60	8,820	445.3	508.8	-63.5	-12%
65	5,800	446.3	552.5	-106.2	-19%
<i>Total</i>	<i>1,046,427</i>	<i>252.1</i>	<i>228.3</i>	<i>23.7</i>	<i>10</i>