

**Tanana Valley Allowable Cut
For TVSF Agency Review Draft
June 23, 2000**

This paper calculates the allowable cut of timber from 3,295,700 acres of State owned timberland in the Tanana Valley, which includes the Tanana Valley State Forest and 1,495,000 acres of other state land with forest as a primary classification. A periodic sustained yield for this land was calculated by Parsons and Associates in June, 2000. That analysis is the basis of this paper. This paper and The Parson Report use the following management assumptions:

1. Evenaged Management:

Forests will be managed to further stands in which most trees are of the same age. This is consistent with the natural ecology of Interior forests. Individual tree selection will not be used to create unnatural multi-aged stands.

2. Single Entry Silviculture:

There will be a single regeneration harvest to renew forest stands. The sustained yield calculations will not assume extra yield from intermediate thinning or single species removals prior to the regeneration cut, even though these operations are feasible.

3. Utilization:

Only volume from trees over 6 inches in diameter and logs over 4 inches at the small end are useable.

4. Low Productivity Sites:

Sites which cannot grow crops of useable timber are excluded from the timber base. These sites are primarily black spruce.

5. Reforestation Sequence:

It is assumed that all harvested areas will be reforested in accordance with the Forest Practice Act. White spruce and mixed stands will be naturally or artificially reforested with white spruce. Harvested stands are assumed to regrow to maturity along a natural successional sequence. It is assumed that hardwoods will become established in all stands.

<u>Harvested</u>		<u>Reforested</u>
Hardwood	to	Hardwood
Mixed	to	Mixed
Spruce	to	Mixed

6. Natural stocking levels

Mature harvest volumes are based on measurements of natural unmanaged stands. White spruce is significantly understocked in these stands resulting in low volumes. The Forest practices Act requires reforestation to full stocking, but lower volume unmanaged densities are used for harvest calculations.

7. Rotation Ages

This is the period of time between timber harvests which includes reforestation and growth. Rotations are based on the time required to yield the highest average annual growth of a spruce sawtimber or hardwood fiber, while maintaining healthy stands. A 70 year rotation is used for hardwoods. Spruce rotation is based on an average of 10 years for establishment plus a growth period, which depends on each area's productivity. Parsons used 100 years for spruce. We received comments from professionals that this period may be short for areas with productivity lower than published yield curves present. We recalculated white spruce rotations based on the median site productivity for each area. Spruce rotations will be used that range from 90 to 120 years for different locations and vegetation types. Rotation calculations are shown in table 1 below.

Table 1. Spruce Rotation Ages

Median White Spruce Site Index, calculated from Crimp p.70

Vegetation Type	Kantishna	Fairbanks	Delta	Tok
White Spruce	66	65	63	61
Poplar/Spruce	88	85	71	63
Hardwood/Spruce	65	77	68	64

Rounded site index curve chosen from Parson Table 1 (p.6)

Vegetation Type	Kantishna	Fairbanks	Delta	Tok
White Spruce	70	70	60	60
Poplar/Spruce	90	90	70	60
Hardwood/Spruce	70	80	70	60

Age at culmination of mean annual increment from curve

Vegetation Type	Kantishna	Fairbanks	Delta	Tok
White Spruce	100	100	110*	110*
Poplar/Spruce	90	80	100	110*
Hardwood/Spruce	100	90	100	110*

* Because published SI curves are all above 70, SI 60 curves are extrapolated.

Rotation period (rotation plus 10 years reforestation)

Vegetation Type	Kantishna	Fairbanks	Delta	Tok
White Spruce	110	110	120	120
Poplar/Spruce	100	90	110	120
Hardwood/Spruce	110	100	110	120

Procedure

The inputs used in the Parsons reports are adjusted to the guidelines and allocations of the TVSF management plan. Adjustments include rotation periods and withdrawals for non-timber uses and general retention guidelines.

1. Use G.I.S. to summarize the acres within withdrawals of all commercial timber strata which constitute the timber base listed in Table 3 of the Parsons & Associates report. Areas withdrawn from timber harvest are:

Kantishna Area - Oblique Lake RNA
 Caribou Crossing RNA

Fairbanks Area - Bonanza Creek Experimental Forest
 Unit 4B Chatanika River

Delta Area - Rosa Dunes RNA
 Tamarack RNA
 Volkmar RNA
 Cathedral Bluff RNA

Table 2. Acres of Commercial Timberland within RNAs and Bonanza Creek Experimental Forest withdrawn from sustained yield.

Vegetation Type	Strata	Management Area				Total
		Kantishna	Fairbanks	Delta	Tok	
White Spruce	1	482	1,261	0	0	
	2	10	11	26	0	
	Total	492	1,272	26	0	
Poplar / Spruce	5	0	0	0	0	
	6	0	435	0	0	
	11	0	61	0	0	
	12	48	221	0	0	
	23	0	39	0	0	
	27	0	8	11	0	
	Total	48	764	11	0	
Hardwood/ Spruce	8	123	1,442	0	0	
	9	476	1,442	1,112	0	
	25	0	2,095	2,184	0	
	26	501	1,494	895	0	
	Total	1,100	6,473	4,191	0	
Hardwood	7	1,079	660	242	0	
	24	189	1,154	462	0	
	Total	1,268	1,814	704	0	
All Forested Land		2,908	10,323	4,932	0	18,163

2. Subtract the withdrawn acres (Table 2) from the total timber base presented in Table 3 of Parsons & Assoc.
3. Divide the resulting acres by the decades in the rotation period which results in the allowable periodic harvest of acres per decade.
4. Multiply the periodic harvest acres by the mature volume per acre to get to the periodic harvest volume.
5. Reduce the periodic harvest volume by the following retention factors listed in Table 2-10 of the TVSF Management Plan.

10% - Balsam poplar/white spruce
1% - Hardwood

5% - Hardwood/white spruce
5% - White spruce

Results of steps 2 to 5 are shown in Table 3. Table 3 summarizes final area and volume periodic allowable cuts by Management Area.

Table 3. Allowable Cut Adjusted For Withdrawals and Retention Factors

Vegetation Type	Total Acres (from Parson table 3)	Withdrawn acres (from table 1)	Net Acres	Rotation (decades)	Periodic Acres (10 yrs)	Mature Volume / Acre (cf)	Periodic Volume (mcf/10 yrs)	Minus Reten. factor	Net Per. Vol (mcf/10 yrs)
Kantishna									
White Spruce	28,301	492	27,809	11	2,528	3,045	7,698	5%	7,313
Poplar/Spruce	20,745	48	20,697	10	2,070	2,189	4,531	10%	4,078
Hardwood/Spruce	288,189	1,100	287,089	11	26,099	2,404	62,742	5%	59,605
Hardwood	201,082	1,268	199,814	7	28,545	1,290	36,823	1%	36,455
Total	538,319	2,908	535,411		59,242		111,824		107,455
Fairbanks									
White Spruce	20,508	1,272	19,236	11	1,749	3,460	6,052	5%	5,749
Poplar/Spruce	15,132	764	14,366	9	1,598	1,936	3,098	10%	2,788
Hardwood/Spruce	300,304	6,473	293,831	10	29,383	2,790	81,979	5%	77,880
Hardwood	202,933	1,814	201,199	7	28,743	1,395	40,096	1%	39,695
Total	538,877	10,323	528,554		61,473		131,225		126,112
Delta									
White Spruce	24,902	26	24,876	12	2,073	3,145	6,520	5%	5,938
Poplar/Spruce	12,074	11	12,063	11	1,097	1,891	2,074	10%	1,867
Hardwood/Spruce	305,103	4,191	300,912	11	27,356	2,506	68,544	5%	62,182
Hardwood	143,520	704	142,816	7	20,402	1,769	36,091	1%	35,730
Total	485,599	4,932	480,667		50,928		113,239		105,717
Tok									
White Spruce	42,720		42,720	12	3,560	2,309	8,220	5%	7,809
Poplar/Spruce	8,890		8,890	12	741	3,192	2,365	10%	2,129
Hardwood/Spruce	236,767		236,767	12	19,731	1,138	22,453	5%	21,331
Hardwood	45,907		45,907	7	6,558	739	4,846	1%	4,797
Total	334,283		334,283		30,590		37,884		36,066

Table 4. Area Control Summary

Sustained Yield for Regulation by Management Area Per 10 Year Period			
Management Area	Net Acres	Periodic Harvest Acres	Periodic Harvest Volume (mcf)
Kantishna	535,411	59,242	107,455
Fairbanks	528,554	61,473	126,112
Delta	480,667	50,928	105,717
Tok	334,283	30,590	36,066
Total	1,878,915	171,643	375,350

6. Allocate the allowable cut volume to species by substituting the volumes in Table 4 for the volumes in Table 7a of the Parsons Report. The revised table is shown below as Table 5.

Table 5. Volume of 10 Year Periodic Allowable Cut by Species

Management Area	Periodic Volume	White Spruce	Black Spruce	Tamarack	Paper Birch	Balsam Poplar	Aspen	Total Volume
Kantishna	107,455 mcf							
Species %		39.7	2.6	0.1	39.6	2.7	15.3	100
Volume (mcf)		42,660	2,794	107	42,552	2,901	16,441	107,455
Fairbanks	126,112 mcf							
Species %		42.4	6.4	0.0	31.8	2.8	16.6	100
Volume (mcf)		53,471	8,071	2	40,103	3,531	20,934	126,112
Delta	105,717 mcf							
Species %		46.1	2.6	0.1	34.1	5.4	11.7	100
Volume (mcf)		48,736	2,748	106	36,049	5,709	12,369	105,717
Tok	36,066 mcf							
Species %		68.0	7.0	0.0	11.0	2.2	11.8	100
Volume (mcf)		24,525	2,524	0	3,967	793	4,255	36,066
Total		169,392	16,137	218	122,671	12,933	54,000	375,350

7. Allowable cut will be controlled by coniferous and deciduous volume harvested over a 10-year rolling period. White spruce, black spruce and tamarack volumes will combine into a coniferous allowable cut. The two latter species are minor components of the commercial forest types. At the current insignificant level of birch, aspen and balsam poplar harvest, it is effective to combine them into a deciduous allowable cut. Using volume to control allowable cut provides a convenient means to balance harvest over sites with variable volumes and account for partial cuts. Using acres to control the cut could discourage partial cutting and harvest of poor or damaged timber.

Table 6. Allowable Cut (MCF per 10 years)

Management Area	Coniferous	Deciduous
Kantishna	45,561	61,894
Fairbanks	61,544	64,598
Delta	51,590	54,127
Tok	27,049	36,064
Total	185,747	189,604