Summary Report on the <u>Draft</u> Modeling Results for the Preferred Alternative

Amended March 3, 2004

Prepared by
Washington State
Department of Natural Resources

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Report Purpose:

Provide the Board of Natural Resources, the Department and the public with modeling information regarding the Preferred Alternative for the Final Environmental Impact Statement on Alternatives for Sustainable Forest Management on State Trust Lands in Western Washington and for determining the Sustainable Harvest level.

Caveats:

Data and results presented in this report will undergo further review and analysis for the Final Environmental Impact Statement (FEIS). Refinements and changes to the data and modeling outputs may occur during this analysis. A final report will be presented to the Board of Natural Resources along with the publication of the FEIS.

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Custoleable Timber because 0	Alternative 1
Sustainable Timber harvest flow –timber harvest flow (volume) not to vary more than a +/- 25% from one decade to the next.	Sustainable Timber harvest flow –timber harvest flow (volume) not to vary more than a +/- 25% from the long-term average.
Timber harvest levels – a policy objective of maximizing the value of the harvest from the on-base forest acres subject to other policy objectives and constraints.	Timber harvest levels – a policy objective of maximizing the volume of the harvest from the on-base forest acres subject to other policy objectives and constraints.
Westside Ownership Groups (or Sustainable Harvest units) 20 units	Westside Ownership Groups (or Sustainable Harvest units 24 units
Biodiversity pathways – employing silviculture to create, develop, enhance and/or maintain forest biodiversity and health in specified locations.	
Older Forest –a policy objective that targets the development of 10 to 15 percent of each Westside HCP Planning Unit as older forests based on structural characteristics.	Older Forest –a continuation of current policy and procedures
Maintaining mature forest components – procedure revised to remove 50/25 WAU strategy replaced by extended SEPA analysis now in place for every timber sale.	Maintaining mature forest components –50/25 WAU strategy maintained
Northern Spotted Owl management – procedure revised to reflect release of Administrative Owl circles (Status-1- Reproductive and Southwest Washington circles) in 2007, use of HCP owl management strategies and the priority of biodiversity management in northern spotted owl management areas (OESF, NRF and dispersal management areas).	Northern Spotted Owl management – harvest deferred in Administrative Owl circles (Status-1-Reproductive and Southwest Washington circles) in perpetuity and HCP owl management areas managed under procedural constraints limiting silvicultural investments (OESF, NRF and dispersal management areas).
Riparian management – procedure to be finalized with consultation with the Federal Services. Board policy is that riparian management zone will be actively managed with innovative silviculture at appropriate moderate levels (similar in area under treatment to Alternative 2 outcomes) for conservation benefits and revenue generation.	Riparian management and harvest deferred in perpetuity
Legacy and reserve tree procedure will be updated to reflect HCP strategy of retaining a least 8 trees per acre or more when stands are regeneration harvest stands.	Legacy and reserve tree procedure maintained at retaining 7% of existing stocking.
Silviculture: Uplands area with General Objectives: focus on maximizing the economic value of the stand subject to objectives of sustainability. Commercial cohorts (these are age or structural groups or sub-groups that exist in a stand or landscape) are typically managed with even-age silvicultural regimes, typical planting densities of 350 trees per acre, vegetation management, precommerical thinning as necessary. For instance, regeneration harvests might occur at approximately 55 years for a site III Douglas-fir, with different ages for other species and sites.	Silviculture: Uplands area with General Objectives and Specific Objectives: focus on maximizing the volume production of the stand subject to objectives of sustainability. Commercial cohorts managed with even-age silvicultural regimes, typical planting densities of 400 plus trees per acre, vegetation management, precommercial thinning as necessary, intermediate thinnings and/or late rotational thinnings (partial harvests) as necessary to meet objectives and regeneration harvests typically at 60 years or later for a site III Douglas-fir.
Uplands area with Specific Objectives: focus on improving forest health, developing habitat and protecting sensitive resources. Commercial cohorts typically managed managed with even-age silvicultural regimes, typical planting densities of 350-500 trees per acre, vegetation management, precommercial thinning as necessary, intermediate thinnings to reduce tree densities and promote diameter growth, recruitment treatments for snags, down woody debris and under-planting as necessary, and regeneration harvests occurring between 70 and 140 years for a site III Douglas-fir, with different ages for other species and sites.	Riparian – no management, except road access
Riparian and wetland areas: focus on improving forest health, developing older forest conditions and protecting sensitive resources. Commercial cohorts managed with uneven-age silvicultural regimes, hand vegetation management and precommercial thinning as necessary, intermediate thinnings to reduce tree densities and promote diameter growth with recruitment treatments for snags and down woody debris and under-planting as necessary.	
Preferred Alternative On-base acres by 2014 = 1,177,600 acres	On-base acres by 2014 = 654,100 acres

Changes in Forest Structure

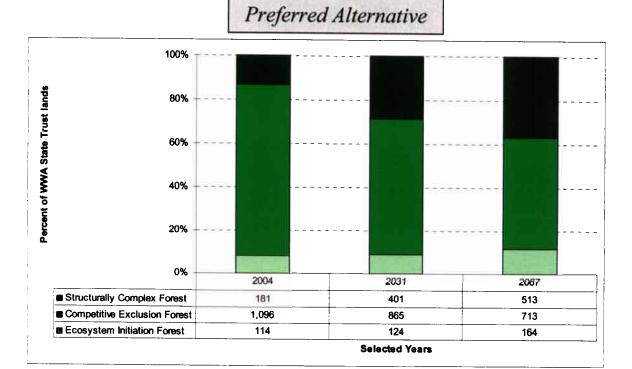


Figure 1 Stand Development Stage area (thousands of acres) for the Preferred Alternative

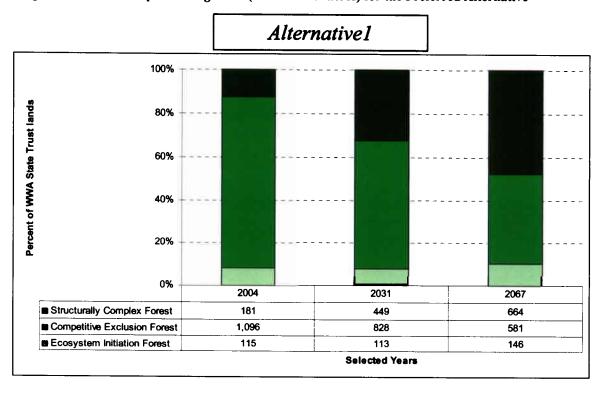


Figure 2 Stand Development stage areas (thousands of acres) for Alternative 1

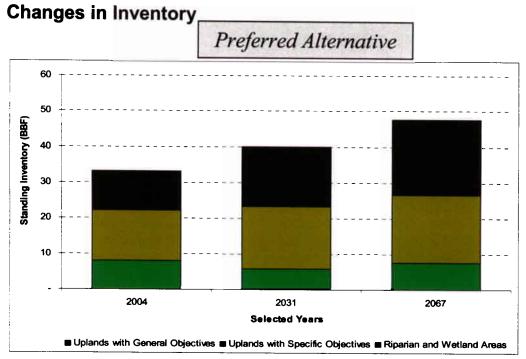


Figure 3 Standing inventory effects with the Preferred Alternative

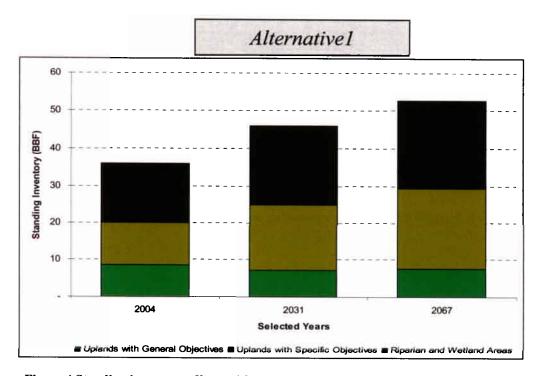


Figure 4 Standing inventory effects with Alternative 1

Land Class distribution and Harvest Deferrals

Preferred Alternative

Table 1 Land class and harvest deferrals for the Preferred Alternative

		Harvest deferrals					
	Long-term	Short-term	Not deferred	Total			
Uplands with General Objectives	8,500	44,900	309,300	362,700			
Uplands with Specific Objectives	124,100	149,200	328,000	601,300			
Riparian and Wetland Areas	80,500	108,400	237,800	426,700			
WWA total	213,100	302,500	875,100	1,390,700			

Table 2 On and Off-base acres for the Preferred Alternative

Year	Off-base	On-base	Total
2004	515,600	875,100	1,390,700
	37%	63%	100%
2014	213,100	1,177,600	1,390,700
	15%	85%	100%

Table notes:

The off-base acreage includes long and short-term harvest deferrals.

Alternative1

Table 3 Land class and harvest deferrals for Alternative 1

	Harvest deferrals						
	Long-term	Short-term	Not deferred	Total			
Uplands with General Objectives	57,000	200	305,600	362,800			
Uplands with Specific Objectives	252,900	25,800	322,500	601,200			
Riparian and Wetland Areas	176,200	13,700	236,800	426,700			
WWA total	486,100	39,700	864,900	1,390,700			

Table 4 On and Off-base acres for Alternative 1

Year	Off-base	On-base	Total
2004	762,600	628,100	1,390,700
	55%	45%	100%
2014	736,600	654,100*	1,390,700
	53%	47%	100%

Note:

^{*}The off-base acreage includes long, short-term harvest deferrals and the riparian management area.

Financial Summary

Figure 5 Western Washington State Trust lands annual average Gross Revenue and Harvest volume

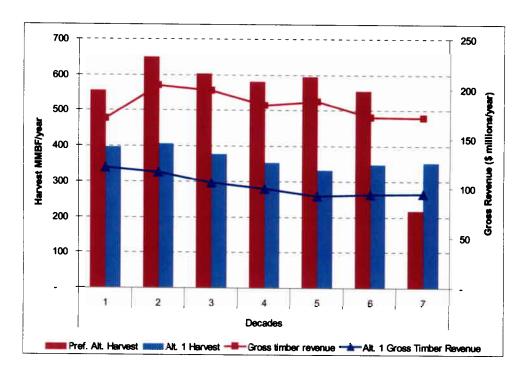


Table 5 Average annual revenue and cost (\$ millions) for Preferred Alternative

		Decades							
Revenue	1	2	3	4	5	6	7		
Westside timber	170	203	198	183	188	172	171		
Eastside timber	20	20	20	20	20	20	20		
Non-timber	19	19	19	19	19	19	19		
Total	208	242	237	222	226	210	210		
Total Costs	57	61	59	58	59	58	56		
Net Revenue	152	181	178	164	167	153	154		
Costs as percentage of gross revenue	27%	25%	25%	26%	26%	27%	27%		
Westside Harvest (MMBF)	554	650	602	580	594	555	544		
Westside Area ('000 acres)	17	18	16	18	18	18	20		

Table Notes:

Revenues and Costs are based on 2003-04 values

Summary Information Trust-by-Trust Performance under Preferred Alternative and Alternative 1

Table 6 Estimated annual average net revenue (\$ millions/year) to the Trust for decade 1

Trust	Alternative 1	Preferred Alternative	Difference
Agricultural School	2.5	3.8	1.3
Capitol Grant	7.6	10.8	3.2
CEP&RI	4.7	6.0	1.3
Community College Forest Reserve	0.2	0.1	-0.1
Common School and Indemnity	45.4	62.4	17.0
Escheat	0.4	0.3	-0.1
State Forest Board Purchase	5.4	6.9	1.5
State Forest Board Transfer	33.0	53.4	20.4
Normal School	1.6	2.4	0.8
Scientific School	5.9	7.0	1.1
University - Original	0.3	0.2	-0.1
University - Transferred	0.4	2.1	1.7
Overall	107.2	155.2	48.0

Table Notes:

CEP&RI = Charitable/Educational/Penal & Reformatory Institution.

Table 7 Trust annual average net revenue (\$ millions/year) over 7 decades for the Preferred Alternative

Trust				Decades				Average
	1	2	3	4	5	6	7	
Agricultural School	4	4	5	3	4	3	4	4
Capitol Grant	11	12	11	9	8	12	9	10
CEP&RI	6	5	5	5	4	5	5	5
Community College Forest Reserve	0	1	1	1	0	0	1	1
Common School and Indemnity	62	76	77	74	76	71	75	73
Escheat	0	0	0	1	0	0	0	0
State Forest Board Purchase	7	7	7	6	6	6	4	6
State Forest Board Transfer	53	62	60	55	56	44	45	54
Normal School	2	3	4	3	4	4	4	3
Scientific School	7	11	8	6	9	8	8	8
University - Original	0	0	1	0	0	0	1	0
University - Transferred	2	4	4	5	3	3	3	3
WWA (total)	155	185	182	168	171	157	158	168

Trust annual average harvest volume (MMBF/year) over 7 decades

Preferred Alternative

Table 8 Trust annual average harvest volume (MMBF/year) over 7 decades for the Preferred Alternative

	Decades								
	1	2	3	4	5	6	7		
Agricultural School	16	15	18	11	13	12	16		
Capitol Grant	46	49	40	33	32	46	35		
CEP&RI	18	14	13	14	9	16	13		
Community College Forest Reserve	0	3	4	2	1	1	3		
Common School and Indemnity	166	217	205	209	223	209	215		
Escheat	1	2	1	2	2	1	1		
State Forest Board Purchase	39	43	38	36	30	31	20		
State Forest Board Transfer	220	241	227	212	222	177	181		
Normal School	9	10	12	12	17	14	17		
Scientific School	26	38	26	20	30	30	27		
University - Original	0	1	1	1	1	1	1		
University - Transferred	11	18	16	29	16	16	13		
Overall	554	650	602	580	594	555	544		

Table Notes:

CEP&RI = Charitable/Educational/Penal & Reformatory Institution.

Alternative1

Table 9 Trust annual average harvest volume (MMBF/year) over 7 decades for Alternative 1

				Decades	}		
	11	2	3	4	5	6	7
Agricultural School	9	10	6	6	5	8	6
Capitol Grant	34	29	22	20	17	19	19
CEP&RI	15	11	9	10	6	8	6
Community College Forest Reserve	2	2	1	2	2	1	3
Common School and Indemnity	114	127	121	111	110	109	120
Escheat	2	1	1	0	2	1	2
State Forest Board Purchase	32	29	28	24	19	29	31
State Forest Board Transfer	157	155	144	145	135	139	136
Normal School	6	5	9	7	6	8	6
Scientific School	23	25	18	17	14	14	12
University - Original	1	0	1	1	0	1	1
University - Transferred	1	10	16	7	15	13	12
WWA (total)	396	404	377	352	332	348	353

Table Notes:

CEP&RI = Charitable/Educational/Penal & Reformatory Institution.

Trust Performance over life of HCP

Preferred Alternative

Table 10 Trust Performance over life of HCP under Preferred Alternative

	Net Present Value (\$ millions) at year				
Trust	10	20	40	64	
Agricultural School	30.5	50.4	71.7	78.9	
Capitol Grant	85.5	144.7	193.8	213.0	
CEP&RI	47.9	73.9	99.1	108.8	
Community College Forest Reserve	0.6	4.7	9.0	9.6	
Common School and Indemnity	492.3	862.9	1,229.3	1,379.7	
Escheat	2.3	4.0	6.1	6.9	
State Forest Board Purchase	51.3	84.5	112.8	122.7	
State Forest Board Transfer	421.7	729.0	1,008.9	1,112.7	
Normal School	18.7	31.6	48.1	56.2	
Scientific School	54.8	109.7	144.9	162.2	
University - Original	1.2	2.4	4.5	5.3	
University - Transferred	16.3	34.6	54.8	60.9	
Overall	1,223.2	2,132.4	2,983.2	3,317.0	

Table Notes:

CEP&RI = Charitable/Educational/Penal & Reformatory Institution.

All trust revenues listed and departmental costs (excluding capital costs) included in the net present value calculation

Real Interest rate: 5%

Alternative1

Table 11 Trust Performance over life of HCP under Alternative 1

	Net Present Value (\$ millions) at year				
Trust	10	20	40	64	
Agricultural School	17.8	27.5	34.6	37.3	
Capitol Grant	56.8	84.4	104.4	111.1	
CEP&RI	36.3	53.2	67.6	72.6	
Community College Forest Reserve	1.6	4.0	5.0	5.5	
Common School and Indemnity	345.0	553.1	742.2	815.0	
Escheat	2.9	3.5	4.4	5.0	
State Forest Board Purchase	39.2	59.6	77.6	84.2	
State Forest Board Transfer	247.7	395.8	523.7	569.7	
Normal School	12.0	17.7	25.6	28.2	
Scientific School	43.7	72.8	92.3	98.7	
University – Original	1.9	2.5	3.3	3.6	
University – Transferred	2.6	10.7	19.6	23.7	
Overall	807.6	1,284.8	1,700.2	1,854.4	

Table Notes:

CEP&RI = Charitable/Educational/Penal & Reformatory Institution.

All trust revenues listed and departmental costs (excluding capital costs) included in the net present value calculation

Real Interest rate: 5%

State Trusts Forest Board Transfer and Forest Board Purchase County-by-County

Table 12: Average annual volume and gross revenues over 7 decades

	Alternative 1	Preferred Alternative	Alternative 1	Preferred Alternative		
County	Volume (MI	MBF/year)	(\$ million	(\$ million /year)		
Clallam	10	39	2.5	12.1		
Clark	11	13	3.0	4.3		
Cowlitz	4	5	1.2	1.7		
Grays Harbor	12	14	3.4	4.6		
Jefferson	4	5	1.1	1.8		
King	8	8	2.0	2.5		
Kitsap	2	2	0.5	0.8		
Lewis	15	19	4.1	6.3		
Mason	6	8	1.6	2.8		
Pacific	5	12	1.4	3.8		
Pierce	5	5	1.4	1.8		
Skagit	28	36	7.2	11.8		
Skamania	7	14	1.9	4.8		
Snohomish	23	29	5.7	9.1		
Thurston	18	19	4.9	6.4		
Wahkiakum	4	7	1.0	2.1		
Whatcom	10	15	2.6	5.2		
WWA total	172	250	45	82		

Table 13: Forest Board Transfer and Forest Board Purchase estimated average annual gross revenues (\$millions/year) from timber harvests over 7 decades for the Preferred Alternative

	Preferred .	Alternativ					
				Decades			
County	1	2	3	4	5	6	7
Clallam	12.4	14.2	13.0	10.0	11.9	9.5	13.3
Clark	3.3	4.5	4.4	5.0	5.6	3.6	3.7
Cowlitz	1.8	1.9	2.0	1.9	1.7	1.3	1.1
Grays Harbor	5.7	5.8	5.7	5.3	3.0	4.6	2.4
Jefferson	1.8	2.5	2.1	2.3	1.6	1.3	1.2
King	2.5	2.9	1.6	2.4	2.7	2.0	3.1
Kitsap	0.8	8.0	0.5	0.9	0.9	0.9	0.8
Lewis	5.8	7.1	7.8	7.8	6.5	4.6	4.4
Mason	1.5	2.6	3.0	3.6	3.4	3.0	2.6
Pacific	4.7	3.9	3.1	3.9	3.4	3.8	3.5
Pierce	2.6	1.9	1.8	1.9	1.5	1.6	1.5
Skagit	12.1	13.3	10.7	11.4	13.1	9.8	12.4
Skamania	5.5	5.2	4.9	4.0	4.3	4.4	5.5
Snohomish	8.9	10.2	11.7	8.5	9.3	7.5	7.4
Thurston	6.2	8.0	7.7	7.4	6.5	4.4	4.7
Wahkiakum	1.9	2.4	2.5	2.3	2.1	1.5	2.1
Whatcom	5.3	5.9	5.9	4.2	6.0	4.3	4.9
WWA total	82.9	93.1	88.6	82.9	83.5	68.4	74.7

Table 14: Forest Board Transfer and Forest Board Purchase estimated average annual gross revenues (\$millions/year) from timber harvests over 7 decades for Alternative 1

	Altern	ative1	D	ecades			
County	1	2	3	4	5	6	7
Clallam	3.1	2.7	2.6	2.1	2.3	2.8	2.1
Clark	3.0	3.3	3.2	3.1	2.7	2.9	2.5
Cowlitz	1.3	1.3	1.3	1.2	1.2	1.2	1.1
Grays Harbor	3.2	3.4	4.0	3.4	2.3	3.8	3.4
Jefferson	1.4	1.4	1.2	1.1	0.8	0.8	1.0
King	2.6	2.3	2.3	2.0	2.2	1.2	1.2
Kitsap	0.8	0.6	0.6	0.4	0.4	0.4	0.4
Lewis	4.5	4.3	3.9	4.4	3.7	3.9	3.9
Mason	2.3	2.3	2.0	1.9	1.2	0.9	1.0
Pacific	1.3	1.5	1.5	1.3	1.3	1.4	1.2
Pierce	1.6	1.2	1.5	1.4	1.3	1.5	1.4
Skagit	8.3	6.9	5.2	7.0	7.3	7.9	7.8
Skamania	1.4	1.8	1.8	1.9	1.9	2.2	2.4
Snohomish	5.9	5.8	5.7	5.6	4.9	5.6	6.1
Thurston	6.3	5.3	4.6	4.5	4.2	4.7	4.9
Wahkiakum	1.0	1.0	0.9	0.9	0.9	1.0	1.0
Whatcom	2.7	2.8	2.8	2.3	2.6	2.4	2.6
WWA total	50.8	48.1	45.0	44.4	41.3	44.5	44.1

Table 15 Forest Board Transfer and Forest Board Purchase harvest volumes (MMBF/year) over 7 decades for the Preferred Alternative

	Preferred Alter	rnative		Decades	**		
County	1	2		4	5	6	7
Clallam	41	47	38	32	41	31	44
Clark	10	14	13	15	17	11	11
Cowlitz	6	6	6	5	5	4	3
Grays Harbor	17	18	18	16	9	14	7
Jefferson	5	8	7	6	5	4	4
King	8	10	5	7	9	7	11
Kitsap	2	2	1	2	3	3	2
Lewis	18	22	24	23	18	13	13
Mason	5	8	9	10	9	8	7
Pacific	15	13	10	12	11	12	11
Pierce	7	6	5	5	4	4	5
Skagit	40	35	34	34	39	30	38
Skamania	16	16	15	11	12	12	15
Snohomish	29	33	34	27	28	25	25
Thurston	18	25	23	22	18	13	14
Wahkiakum	6	8	7	7	6	5	7
Whatcom	16	16	16	13	18	13	15
WWA (total)	259	284	265	248	252	208	232

Table 16 Forest Board Transfer and Forest Board Purchase harvest volumes (MMBF/year) over 7 decades for Alternative 1

917	Alterna	tive1	De	ecades			
County	:1	2	3	4	5	6	7
Clallam	12	10	10	8	9	11	9
Clark	11	12	11	11	10	11	9
Cowlitz	4	5	5	4	4	4	4
Grays Harbor	11	12	16	13	9	14	12
Jefferson	5	5	4	4	3	3	4
King	10	10	10	8	9	5	4
Kitsap	3	2	2	2	2	1	1
Lewis	16	16	15	16	13	14	14
Mason	9	8	7	7	4	3	4
Pacific	5	6	6	5	5	5	5
Pierce	6	5	6	5	5	6	5
Skagit	32	29	20	27	27	30	32
Skamania	5	7	7	7	7	8	8
Snohomish	24	24	23	23	19	22	24
Thurston	22	19	17	16	15	17	17
Wahkiakum	4	4	3	3	3	4	4
Whatcom	10	11	11	9	10	10	10
WWA total	189	183	172	169	154	167	167

Sustainable Harvest Calculation Group Information

Table 17 Western Washington Harvest Flow (MMBF/year) over 7 decades by Sustainable Harvest Group

Harvest flow (MN	ARE/year)			ſ	Decades	3		
rial vest now (will	ibi /year)	1	2	3	4	5	6	7
Federal Grant Trust and Fo	rest Board Purchase	256	284	263	234	259	260	254
OESF		66	107	91	106	114	109	102
Capital For	rest	38	47	46	52	,	29	24
	Clallam	23	23	21	17	16	15	18
	Clark	8	13	13	14	12	10	10
	Cowlitz	5	5	6	5	4	4	3
	Grays Harbor	0.3	0.3	0.3	0.5	0.2	0.2	
	Jefferson	5	8	7	6	5	4	4
	King	8	10		7	9	7	1
	Kitsap	2	2		2	3	2	2
	Lewis	16	20	22	20	17	11	1
Forest Board Transfer	Mason	5	8	9	10	9	8	7
	Pacific	9	9	7	7	8	7	3
	Pierce	5	4	4	4	3	2	3
	Skagit	40	35	34	34	39	30	3
	Skamania	12	13	14	10	10	11	1
	Snohomish	29	33	34	27	28	25	2
	Thurston	5	4	4	5	3	3	3
	Wahkiakum	6	8	7	7	6	5	7
	Whatcom	16	15	15	12	17	13	1
All Trusts in Western W	ashington (total)	554	650	602	580	594	555	55

Table Notes:

Shaded cells: not all sustainable harvest groups comply with the policy expectation of +/ 25% inter-decadal variation in this model run.

Additional summary information about the Preferred Alternative

Preferred Alternative

Table 18 Average annual silvicultural harvest treatments (acres/year) for Preferred Alternative in decade 1

Silvicultural Harvest Treatment	Uplands with General Objectives	Uplands with Specific Objectives	Riparian and Wetlands	Total	% of
Regeneration	7,500	3,900		11,400	66%
Variable Density thinning		3,700	1500	5,200	30%
Traditional Thinning	700	3037.33.72.49	Part Comment of Company of Comments	700	4%
Total	8,200	7,600	1,500	17,300	100%

Alternative1

Table 19 Annual average silvicultural harvest treatments (acres/year) for Alternative 1 in decade 1

Silvicultural Harvest Treatment	Uplands with General Objectives	Uplands with Specific Objectives	Riparian and Wetlands	Total	% of
Regeneration	7,900	2,300		10,200	70%
Partial harvest	300	1,600		1,900	13%
Traditional Thinning	1,400	1,000		2,400	17%
Total	9,600	4,900	900*	14,500	100%

Table Notes:

Modeled riparian activities in Alternative 1 are not expected to remove volume from the riparian area. Total does not include riparian area activity

Preferred Alternative

Table 20 Average Annual Area (as percent of on-base land class category) receiving a silviculture harvest treatment in the Preferred Alternative

Decade	Uplands with General Objectives	Uplands with Specific Objectives	Riparian and Wetlands	Total
1	2.3%	1.6%	0.4%	1.5%
2	2.2%	1.2%	1.3%	1.5%
3	1.8%	1.4%	0.9%	1.4%
4	2.4%	1.5%	0.7%	1.6%
5	1.5%	1.8%	1.1%	1.5%
6	2.1%	1.5%	1.0%	1.6%
7	1.5%	2.1%	1.2%	1.5%
Overall	2.0%	1.6%	1.0%	1.5%

Table Notes:

All harvest activities are included. On-base acres in 2014

Alternative1

Table 21 Average Annual Area (as percent of on-base land class category) receiving a silviculture harvest treatment in Alternative 1

Decade	Uplands with General Objectives	Uplands with Specific Objectives	Riparian and Wetlands	Total
1	3.1%	1.4%		2.2%
2	3.1%	1.7%		2.3%
3	2.7%	1.9%		2.3%
4	2.7%	1.6%		2.2%
5	3.0%	1.8%		2.4%
6	2.7%	1.9%		2.3%
7	3.1%	0.7%		2.4%
Overali	2.9%	1.6%		2.3%

Table Notes:

All harvest activities are included. On-base acres in 2014