

Appendix 1. Tables of statistics of ubiquitous species of bryophytes and forest floor vegetation.

Species frequencies (f), mean percent covers (x) \pm standard deviation (sd), and mean percent covers when present (x_p) under each disturbance regime. Species are grouped according to abundance trends among disturbance regimes. For ubiquitous species, different letters within a row indicate significant differences in frequency of occurrence as tested using chi-square. $t = \text{cover} \leq 0.005\%$.

Species	Naturally regenerating forests (NF) (n = 484)				Cutover spruce plantations (CO) (n = 320)				Afforested field spruce plantations (AF) (n = 260)			
	f	x	sd	x_p	f	x	sd	x_p	f	x	sd	x_p
(1) present in NF only												
<i>Amblystegium serpens</i> (Hedw.) B.S.G.	2	t	0.02	0.28	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Amblystegium varium</i> (Hedw.) Lindb.	1	t	0.04	0.90	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Barbilophozia attenuata</i> (Mart.) Loeske	11	0.01	0.10	0.40	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Bazzania denudata</i> (Torrey) Trev.	7	t	0.05	0.31	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Chiloscyphus polyanthos</i> (L.) Corda	1	t	0.02	0.40	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Dicranum viride</i> (Sull. & Lesq. ex Sull) Lindb.	3	t	0.07	0.63	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Diplophyllum taxifolium</i> (Wahlenb.) Dum.	1	t	t	0.05	0	0.00	0.00	0.00	0	0.00	0.00	0.00

<i>Ditrichum pallidum</i> (Hedw.) Hampe	1	t	0.01	0.30	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Drepanocladus revolvens</i> (Sw.) Warnst.	1	t	t	0.05	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Frullania eboracensis</i> Gott.	4	t	0.05	0.31	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Gymnocolea inflata</i> (Huds.) Buch	3	t	0.02	0.15	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Homomallium adnatum</i> (Hedw.) Broth.	1	t	t	0.05	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Hylocomium umbratum</i> (Hedw.) B.S.G.	1	t	0.09	2.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Isopterygium distichaceum</i> (Mitt.) Jaeg.	1	t	0.02	0.45	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Isopterygium muellerianum</i> (Schimp.) Jaeg. & Sauerb.	1	t	0.02	0.35	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Leucobryum glaucum</i> (Hedw.) Angstr. ex Fries	3	0.03	0.39	4.33	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Lophozia heterocolpos</i> (Thed.) M.A. Howe	4	t	0.02	0.15	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Lophozia longidens</i> (Lindb.) Mac.	1	t	t	0.05	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Oncophorus wahlenbergii</i> Brid.	4	t	0.05	0.35	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Orthotrichum obtusifolium</i> Brid.	1	t	t	0.05	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Plagiomnium affine</i> (Funck) Kop.	1	t	0.01	0.20	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Plagiomnium ciliare</i> (C. Mull.) Kop.	1	t	t	0.05	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Plagiothecium latebricola</i> B.S.G.	4	t	0.02	0.15	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Polytrichum strictum</i> Brid.	1	t	0.05	1.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Radula complanata</i> (L.) Dum	1	t	t	0.10	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Rhizomnium punctatum</i> (Hedw.) Kop.	2	t	0.03	0.40	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Rhytidiadelphus subpinnatus</i> (Lindb.) Kop.	1	0.07	1.46	32.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Riccardia latifrons</i> Lindb.	1	t	0.04	0.90	0	0.00	0.00	0.00	0	0.00	0.00	0.00
<i>Ulota coarctata</i> (P. Beauv.) Hammar	6	t	0.02	0.13	0	0.00	0.00	0.00	0	0.00	0.00	0.00

(2) more frequent in NF relative to plantations												
<i>Bazzania trilobata</i> (L.) S. Gray	93 ^a	2.22	8.97	11.55	5 ^b	0.01	0.11	0.73	3 ^b	t	0.04	0.28
<i>Brachythecium starkei</i> (Brid.) B.S.G.	143 ^a	0.56	2.20	1.89	113 ^b	1.95	6.45	5.51	33 ^c	0.29	1.85	2.26
<i>Brotherella recurvans</i> (Michx.) Fleisch.	55 ^a	0.15	0.95	1.30	6 ^b	0.03	0.24	1.47	5 ^b	0.10	1.21	5.32
<i>Dicranum flagellare</i> Hedw.	105 ^a	0.37	1.99	1.69	35 ^b	0.15	1.33	1.37	5 ^c	0.02	0.13	0.90
<i>Dicranum montanum</i> Hedw.	174 ^a	0.31	1.06	0.86	60 ^b	0.09	0.36	0.50	25 ^c	0.04	0.20	0.41
<i>Dicranum ontariense</i> Peters.	13 ^a	0.14	1.34	5.32	3 ^b	0.02	0.24	2.00	2 ^b	0.01	0.07	0.65
<i>Dicranum polysetum</i> Sw.	167 ^a	1.49	5.23	4.33	171 ^b	3.20	7.33	6.00	76 ^c	0.77	2.64	2.62
<i>Dicranum scoparium</i> Hedw.	247 ^a	1.20	2.52	2.35	130 ^b	0.88	2.41	2.17	22 ^c	0.09	0.47	1.04
<i>Drepanocladus uncinatus</i> (Hedw.) Warnst.	38 ^a	0.23	2.74	2.91	19 ^b	0.06	0.40	0.93	20 ^b	0.04	0.22	0.52
<i>Herzogiella turfacea</i> (Lindb.) Iwats.	98 ^a	0.12	0.44	0.61	13 ^b	0.03	0.31	0.80	13 ^b	0.10	0.90	1.94
<i>Hylocomium splendens</i> (Hedw.) B.S.G.	49 ^a	0.41	2.17	4.04	16 ^b	0.17	1.24	3.38	9 ^c	0.26	2.89	7.52
<i>Hypnum imponens</i> Hedw.	76 ^a	0.40	2.00	2.54	14 ^b	0.05	0.38	1.09	22 ^b	0.48	2.36	5.64
<i>Hypnum pallescens</i> (Hedw.) P. Beauv.	100 ^a	0.26	1.19	1.25	39 ^b	0.07	0.36	0.57	8 ^c	0.04	0.38	1.24
<i>Jamesoniella autumnalis</i> (DC.) Steph.	123 ^a	0.16	0.61	0.63	15 ^b	0.03	0.20	0.70	3 ^c	t	0.03	0.17
<i>Lepidozia reptans</i> (L.) Dum.	61 ^a	0.08	0.36	0.64	3 ^b	0.01	0.07	0.73	3 ^b	0.01	0.12	0.87
<i>Lophocolea heterophylla</i> (Schrad.) Dum.	171 ^a	0.12	0.47	0.34	121 ^b	0.26	0.82	0.69	52 ^c	0.08	0.42	0.38
<i>Nowellia curvifolia</i> (Dicks.) Mitt.	57 ^a	0.08	0.40	0.64	1 ^b	t	0.01	0.10	3 ^b	t	0.01	0.08
<i>Plagiomnium cuspidatum</i> (Hedw.) Kop.	7 ^a	0.01	0.15	0.72	2 ^b	t	0.01	0.09	1 ^b	t	0.01	0.15
<i>Plagiothecium laetum</i> B.S.G.	128 ^a	0.16	0.60	0.61	52 ^b	0.13	0.43	0.79	16 ^c	0.11	0.72	1.78
<i>Platygyrium repens</i> (Brid.) B.S.G.	24 ^a	0.01	0.10	0.28	5 ^b	t	0.03	0.20	1 ^b	t	0.03	0.50
<i>Polytrichum ohioense</i> Ren. & Card.	9 ^a	0.04	0.59	2.19	4 ^b	0.05	0.45	3.95	1 ^c	0.01	0.12	2.00

<i>Ptilidium pulcherrimum</i> (G. Web.) Hampe	319 ^a	0.87	1.54	1.31	198 ^b	0.57	1.03	0.92	118 ^c	0.20	0.48	0.45
<i>Tetraphis pellucida</i> Hedw.	58 ^a	0.06	0.34	0.53	4 ^b	0.01	0.09	0.70	2 ^b	t	0.01	0.08
(3) more frequent in NF and CO than AF												
<i>Brachythecium reflexum</i> (Starke ex Web. & Mohr) B.S.G.	17 ^a	0.02	0.16	0.61	17 ^a	0.05	0.37	0.96	3 ^b	0.04	0.62	3.73
<i>Callicladium haldanianum</i> (Grev.) Crum	54 ^a	0.11	0.59	0.94	53 ^a	0.26	0.92	1.54	5 ^b	0.05	0.54	2.54
<i>Thuidium delicatulum</i> (Hedw.) B.S.G.	24 ^a	0.08	0.53	1.62	24 ^a	0.45	2.46	5.96	7 ^b	0.04	0.51	1.48
(4) present in NF and AF only												
<i>Atrichum oerstedianum</i> (C. Mull.) Mitt.	1	t	0.05	1.00	0	0.00	0.00	0.00	1	0.02	0.31	5.00
<i>Blepharostoma trichophyllum</i> (L.) Dum.	7	0.01	0.05	0.33	0	0.00	0.00	0.00	2	t	0.06	0.48
<i>Bryhnia graminicolor</i> (Brid.) Grout	1	t	0.01	0.10	0	0.00	0.00	0.00	1	t	0.01	0.10
<i>Campylium chrysophyllum</i> (Brid.) J. Lange	1	0.01	0.14	3.10	0	0.00	0.00	0.00	3	0.02	0.31	1.82
<i>Campylium stellatum</i> (Hedw.) C. Jens.	3	0.01	0.08	0.78	0	0.00	0.00	0.00	2	t	0.06	0.53
<i>Frullania oakesiana</i> Aust.	6	t	0.02	0.15	0	0.00	0.00	0.00	2	t	0.01	0.10
<i>Hypnum fertile</i> Sendtn.	3	0.01	0.15	1.50	0	0.00	0.00	0.00	1	t	t	0.05
<i>Hypnum lindbergii</i> Mitt.	1	0.02	0.46	10.00	0	0.00	0.00	0.00	3	t	0.02	0.18
<i>Ulota crispa</i> (Hedw.) Brid.	14	0.01	0.07	0.21	0	0.00	0.00	0.00	3	t	0.02	0.13
(5) present in NF and CO only												
<i>Brachythecium populeum</i> (Hedw.) B.S.G.	9	0.02	0.20	0.93	1	t	t	0.05	0	0.00	0.00	0.00
<i>Cephalozia bicuspidata</i> (L.) Dum.	6	t	0.02	0.12	4	t	0.01	0.08	0	0.00	0.00	0.00
<i>Cephalozia lunulifolia</i> (Dum.) Dum.	24	0.01	0.12	0.24	8	0.01	0.09	0.41	0	0.00	0.00	0.00
<i>Dicranella heteromalla</i> (Hedw.)	2	0.01	0.14	2.05	3	t	0.06	0.38	0	0.00	0.00	0.00

Schimp.												
<i>Eurhynchium pulchellum</i> (Hedw.) Jenn.	6	0.03	0.28	2.34	2	0.01	0.11	1.07	0	0.00	0.00	0.00
<i>Plagiothecium denticulatum</i> (Hedw.) B.S.G.	4	t	0.05	0.40	2	t	0.01	0.08	0	0.00	0.00	0.00
<i>Platydictya subtile</i> (Hedw.) Crum	3	t	0.01	0.12	1	t	t	0.05	0	0.00	0.00	0.00
<i>Pohlia lescuriana</i> (Sull.) Grout	14	0.01	0.13	0.46	8	0.01	0.07	0.34	0	0.00	0.00	0.00
<i>Pohlia nutans</i> (Hedw.) Lindb.	14	0.02	0.24	0.65	2	0.01	0.11	1.05	0	0.00	0.00	0.00
<i>Polytrichum formosum</i> Hedw.	6	0.01	0.15	1.08	2	0.03	0.42	4.25	0	0.00	0.00	0.00
<i>Scapania nemorosa</i> (L.) Dum.	4	t	0.07	0.65	1	t	0.06	1.10	0	0.00	0.00	0.00
<i>Sphagnum fallax</i> (Klinggr.) Klinggr.	2	0.07	1.45	16.43	1	0.01	0.08	1.50	0	0.00	0.00	0.00
<i>Sphagnum girgensohnii</i> Russ.	7	0.10	1.32	6.89	12	0.27	2.08	7.13	0	0.00	0.00	0.00
<i>Sphagnum nemoreum</i> Scop.	1	t	0.09	2.00	5	0.54	5.56	34.60	0	0.00	0.00	0.00
(6) ubiquitous												
<i>Brachythecium campestre</i> (C. Mull.) B.S.G.	1 ^a	t	0.01	0.30	4 ^a	0.01	0.17	1.00	3 ^a	0.01	0.05	0.47
<i>Brachythecium erythrorrhizon</i> B.S.G.	2 ^a	t	0.05	0.68	1 ^a	0.01	0.22	4.00	1 ^a	t	t	0.05
<i>Brachythecium salebrosum</i> (Web. & Mohr) B.S.G.	3 ^a	0.01	0.14	1.12	1 ^a	t	0.03	0.50	5 ^a	t	0.04	0.20
<i>Brachythecium velutinum</i> (Hedw.) B.S.G.	11 ^a	0.05	0.57	2.38	3 ^a	t	0.06	0.42	6 ^a	0.02	0.21	1.00
<i>Calypogeia muelleriana</i> (Schiffn.) K. Mull.	6 ^a	0.01	0.06	0.45	6 ^a	0.01	0.09	0.62	1 ^a	t	0.05	0.80
<i>Campylium hispidulum</i> (Brid.) Mitt.	14 ^a	0.01	0.07	0.35	12 ^a	0.01	0.08	0.27	9 ^a	0.01	0.10	0.34
<i>Climacium dendroides</i> (Hedw.) Web. & Mohr	1 ^a	t	t	0.05	6 ^a	0.04	0.34	2.05	1 ^a	0.02	0.31	5.00
<i>Dicranum fulvum</i> Hook.	2 ^a	0.02	0.36	4.08	1 ^a	t	0.03	0.60	1 ^a	t	t	0.05
<i>Dicranum fuscescens</i> Turn.	29 ^a	0.06	0.46	0.98	10 ^b	0.02	0.15	0.65	26 ^a	0.23	1.06	2.27
<i>Drepanocladus fluitans</i> (Hedw.) Warnst.	1 ^a	t	0.01	0.30	3 ^a	t	0.02	0.20	6 ^a	0.01	0.05	0.27

<i>Geocalyx graveolens</i> (Schrad.) Nees	13 ^a	0.01	0.07	0.30	10 ^a	0.02	0.11	0.51	10 ^a	0.01	0.11	0.38
<i>Herzogiella striatella</i> (Brid.) Iwats.	12 ^a	0.04	0.31	1.44	24 ^a	0.08	0.41	1.02	14 ^a	0.04	0.23	0.74
<i>Leptodictyum trichopodium</i> (Schultz) Warnst.	3 ^a	t	0.01	0.08	5 ^a	0.01	0.09	0.52	1 ^a	t	0.04	0.70
<i>Mnium spinulosum</i> B.S.G.	4 ^a	t	0.02	0.16	1 ^a	t	0.02	0.30	2 ^a	t	0.01	0.08
<i>Plagiothecium cavifolium</i> (Brid.) Iwats.	2 ^a	t	0.02	0.23	2 ^a	0.01	0.11	1.25	2 ^a	0.01	0.19	1.80
<i>Pleurozium schreberi</i> (Brid.) Mitt.	263 ^a	5.39	13.51	9.92	285 ^a	13.12	16.08	14.73	210 ^a	15.48	21.97	19.17
<i>Polytrichum juniperinum</i> Hedw.	8 ^a	0.02	0.26	1.11	8 ^a	0.05	0.47	2.11	2 ^a	0.01	0.19	1.75
<i>Ptilidium ciliare</i> (L.) Hampe	4 ^a	t	0.05	0.35	11 ^a	0.18	2.10	5.31	7 ^a	0.05	0.51	1.72
(7) most frequent in CO												
<i>Aulacomnium palustre</i> (Hedw.) Schwaegr.	3 ^a	t	0.02	0.18	19 ^b	0.13	0.95	2.24	1 ^a	t	t	0.05
<i>Brachythecium rutabulum</i> (Hedw.) B.S.G.	41 ^a	0.15	0.81	1.75	64 ^b	0.93	3.73	4.66	21 ^c	0.04	0.21	0.48
<i>Polytrichum commune</i> Hedw.	91 ^a	0.58	2.19	3.10	137 ^b	2.91	8.90	6.80	111 ^c	2.66	8.26	6.22
<i>Ptilium crista-castrensis</i> (Hedw.) De Not.	21 ^a	0.03	0.24	0.74	49 ^b	0.41	2.20	2.66	18 ^a	0.13	0.77	1.89
<i>Rhytidiadelphus triquetrus</i> (Hedw.) Warnst.	13 ^a	0.07	0.62	2.44	37 ^b	1.99	8.68	17.21	20 ^c	0.28	2.07	3.67
(8) present in CO only												
<i>Brachythecium plumosum</i> (Hedw.) B.S.G.	0	0.00	0.00	0.00	1	0.01	0.14	2.50	0	0.00	0.00	0.00
<i>Dicranum majus</i> Sm.	0	0.00	0.00	0.00	1	0.03	0.45	8.00	0	0.00	0.00	0.00
<i>Heterocladium dimorphum</i> (Brid.) B.S.G.	0	0.00	0.00	0.00	1	0.01	0.25	4.50	0	0.00	0.00	0.00

Mean percent cover of individual taxa in the year before (1995) and the fourth year after (1999) harvest in the clearcutting (C) and clearcutting with site preparation and planting (CS) treatments. Only species present in >5 quadrats in 1995 or 1999 are included. Species are listed by group in order of decreasing susceptibility to harvesting disturbance (A = disappeared in one or both treatments; B = decreased cover; C = no change in cover; D = increased cover). Sample size: C=64, CS=48 quadrats.

Group	Species	Treatment			
		C		CS	
		1995	1999	1995	1999
A	<i>Fagus grandifolia</i> *	-	-	0.010	-
B	<i>Abies balsamea</i> *	21.397	7.721	5.508	0.533
B	<i>Acer pensylvanicum</i> *	0.057	0.102	1.166	0.436
B	<i>Amelanchier spp.</i>	0.072	0.122	0.131	0.087
B	<i>Aralia nudicaulis</i> *	0.051	0.054	0.432	0.074
B	<i>Aster acuminatus</i> *	0.002	0.008	0.046	0.028

*Forest species

+ Non-native species

' The following uncommon species (present in <5 quadrats) also disappeared between 1995 and 1999 in the two harvesting treatments: C Treatment - *Cypripedium acaule**, *Dalibarda repens**, *Pyrola americana**; CS Treatment - *Acer spicatum*, *Actaea rubra**, *Goodyera tessellata**, *Lycopodium annotinum**, *Lycopodium complanatum*, *Monotropa hypopithys**, *Pyrola americana**, *Ribes lacustre**, *Streptopus amplexifolius*.

	0.078	6.44	0.019	2.08	0.186	8.75	0.222	25.58
<i>Ribes glandulosum</i> Grauer	0.261	4.58	0.010	0.83	0.128	3.75	0.008	0.42
<i>Rubus pubescens</i> Raf.	0.433	7.68	0.083	2.08	0.497	7.50	0.008	1.17
<i>Sambucus racemosa</i> L.	0.121	2.17	0.104	1.47	0.170	2.81	0.058	0.42
<i>Solidago canadensis</i> L.	0.013	1.67	0.006	1.25	0.030	1.25	0.022	2.00
<i>Solidago rugosa</i> Miller	0.138	3.33	0.013	1.25	0.020	1.56	0.060	3.17
<i>Solidago</i> spp. L.	0.008	1.50	0.008	1.67	0.005	0.63	0.010	0.75
<i>Sorbus americana</i> Marshall	0.015	0.76	0.013	2.08	0.006	0.31	0.010	1.67
<i>Spiraea alba</i> var. <i>latifolia</i> (Aiton) Dippel.	0.002	0.33			0.002	0.31	0.103	4.00
<i>Thelypteris phegopteris</i> (L.) Slosson	0.795	3.92	0.010	1.67	0.022	0.31	0.013	1.25
<i>Trientalis borealis</i> Raf.	0.799	39.06	0.256	27.37	0.148	14.06	0.143	9.08
<i>Vaccinium angustifolium</i> Aiton	0.312	17.36	0.169	15.42	1.600	48.13	0.037	4.50
<i>Vaccinium myrtilloides</i> Michx.	0.503	11.92	0.344	11.67	1.583	32.19	0.285	7.58
<i>Veronica officinalis</i> L.	0.008	0.42			0.039	2.50	0.088	5.67
<i>Viburnum cassinoides</i> L.	0.311	12.88	0.160	17.08	0.373	10.31	0.052	2.92
<i>Viola incognita</i> Brainerd	0.039	2.68			0.058	2.81	0.019	1.25
<i>Viola selkirkii</i> Pursh	0.010	1.35	0.010	1.67	0.006	1.25	0.004	0.83
<i>Viola septentrionalis</i> Greene	0.054	2.75	0.021	2.50	0.091	6.25	0.006	1.25
<i>Viola</i> spp. L.	0.014	2.42	0.004	0.83	0.013	2.19	0.008	1.25

Mean abundance (+/- standard deviation) of environmental features in mature naturally regenerating forests (NMF, 77-100 yrs.), young naturally regenerating forests (NYF, 27-66 yrs.), cutover plantations (CO, 19-64 yrs.) and oldfield plantations (AF, 31-77 yrs.). All values are percent cover except where indicated. Bold features are significantly different among stand types (ANOVA, $\alpha = 0.05$). Means with a different letter within a row are significantly different.

Environmental feature		NMF	NYF	CO	AF
Substrate	rock	0.42 +/- 1.80 b	0.12 +/- 0.51 b	0.57 +/- 2.73 a	0.05 +/- 0.39 a
	trunk	0.43 +/- 2.09	0.75 +/- 2.07	0.44 +/- 1.12	0.77 +/- 1.84
	stump	0.41 +/- 1.35	0.13 +/- 0.57	0.57 +/- 2.88	0.62 +/- 3.09
	soil	0.03 +/- 0.20	0.04 +/- 0.34	0.13 +/- 1.28	0.09 +/- 1.3
	humus	0.59 +/- 2.64 a	0.32 +/- 0.77 ab	0.56 +/- 1.14 ab	0.25 +/- 0.7 b
	cone	1.02 +/- 2.85 c	3.28 +/- 3.96 a	2.55 +/- 3.75 ab	2.39 +/- 3.72 bc
	twigs	8.89 +/- 6.11 c	7.82 +/- 4.28 c	15.58 +/- 11.00 b	20.90 +/- 20.00 a
	bark	1.00 +/- 1.74 a	0.74 +/- 1.38 a	0.30 +/- 0.76 b	0.24 +/- 0.55 b
	scat	0.10 +/- 0.26 b	0.09 +/- 0.14 b	0.31 +/- 0.88 a	0.17 +/- 0.46 b
	needle	13.89 +/- 13.10 c	16.36 +/- 15.48 c	39.68 +/- 23.40 b	46.90 +/- 26.20 a
	leaves	53.44 +/- 20.86 a	53.83 +/- 28.11 a	10.91 +/- 14.25 b	5.68 +/- 12.30 c
	root	0.38 +/- 1.67	0.27 +/- 0.78	0.61 +/- 1.90	0.33 +/- 1.91
	moss	13.72 +/- 5.39	18.96 +/- 16.77	29.63 +/- 10.12	21.68 +/- 6.94
Coarse	cwd1	0.07 +/- 1.12	0.00	0.00	0.03 +/- 0.36
woody	cwd2	0.21 +/- 1.34 b	0.06 +/- 0.68 b	0.08 +/- 0.84 b	0.58 +/- 2.39 a
debris	cwd3	0.48 +/- 2.71 ab	0.05 +/- 0.73 b	0.05 +/- 0.75 b	0.71 +/- 3.26 a
	cwd4	1.87 +/- 5.13 a	2.03 +/- 5.54 a	0.30 +/- 1.938 b	0.07 +/- 0.71 b
	cwd5	2.54 +/- 5.66 a	1.73 +/- 4.68 a	0.28 +/- 1.46 b	0.67 +/- 3.92 b
	cwd6	2.47 +/- 0.81 a	1.14 +/- 3.78 b	0.43 +/- 1.89 b	0.33 +/- 2.20 b
	cwd7	1.00 +/- 4.37 a	0.24 +/- 1.67 bc	0.64 +/- 2.79 ac	0.05 +/- 0.54 b
Canopy	deciduous	27.49 +/- 20.29 a	29.55 +/- 33.53 a	2.22 +/- 8.01 b	5.88 +/- 17.70 b
	coniferous	44.65 +/- 22.08 b	49.10 +/- 23.26 b	67.41 +/- 19.57 a	70.60 +/- 18.30 a
	Qdbh (cm)	15.28 +/- 5.49 a	11.60 +/- 3.91 b	11.58 +/- 2.75 b	15.66 +/- 5.6 a
	Qden (stems/ha)	1889 +/- 1615 c	3729 +/- 3349 a	3129 +/- 1396 b	2903 +/- 3364 b
Micro-topography	level	75.75 +/- 31.09 c	78.61 +/- 25.48 bc	81.12 +/- 24.39 b	97.39 +/- 8.64 a
	slope	8.21 +/- 26.70 a	1.30 +/- 10.77 b	N/A	N/A
	pit1	4.43 +/- 11.90 a	4.09 +/- 9.18 a	4.01 +/- 10.23 a	0.33 +/- 2.24b
	pit2	1.32 +/- 5.88 b	3.46 +/- 10.47 a	3.43 +/- 11.91 a	0.05 +/- 0.81 b
	pit3	0.90 +/- 6.66	1.19 +/- 8.19	1.10 +/- 8.05	0.23 +/- 2.63
	mound1	4.32 +/- 11.06 a	4.14 +/- 13.41 ab	4.89 +/- 14.12 a	1.56 +/- 5.59 b
	mound2	2.00 +/- 8.88 ab	4.54 +/- 15.53 a	3.30 +/- 13.40 a	0.44 +/- 5.77 b
	mound3	2.56 +/- 13.35 a	2.69 +/- 13.27 a	2.07 +/- 11.36 ab	0 b

Means (+/- standard deviation) of stand structural features in mature naturally regenerating forests (NMF, 77-100 yrs.), young naturally regenerating forests (NYF, 27-66 yrs.), cutover plantations (CO, 19-64 yrs.) and oldfield plantations (AF, 31-77 yrs.). Means with a different letter within a row are significantly different (ANOVA, $\alpha = 0.05$).

Structural feature	NMF (n=6)	NYF (n=6)	CO (n=8)	AF (n=6)
a) Overstory trees				
diameter (cm)	14.13 +/- 7.66 a	10.82 +/- 4.25 c	11.34 +/- 2.97ac	14.70 +/- 5.44 b
height (m)	10.85 +/- 3.88	9.50 +/- 2.28	9.54 +/- 1.60	10.82 +/- 3.39
live crown (%)	43.27 +/- 19.48	39.27 +/- 16.52	54.51 +/- 10.82	43.21 +/- 13.39
density (stems/ha)	1596 +/- 298 b	2913 +/- 861 a	2257 +/- 402ab	1986 +/- 1415ab
b) Understory trees				
sapling density	2346 +/- 1469	2146 +/- 1446	1144 +/- 1578	950 +/- 1646
seedling density	31135 +/- 40760	29068 +/- 45159	23622 +/- 25015	15942 +/- 15854
shrub density	180 +/- 352	538 +/- 1157	558 +/- 916	217 +/- 363
c) Tree species richness				
trees	8 +/- 2 a	7 +/- 2 a	2 +/- 1 b	3 +/- 2 b
saplings	6 +/- 3	5 +/- 2	4 +/- 1	3 +/- 2
seedlings	7 +/- 1	6 +/- 1	5 +/- 1	5 +/- 2
d) Dead woody debris				
Standing Snags:				
density (<14cm dbh)	306 +/- 75 b	482 +/- 529 a	73 +/- 116 b	108 +/- 93 b
density (³ 14cm dbh)	182 +/- 71 a	81 +/- 82 b	3 +/- 6 c	21 +/- 40 b
density (<4 decay)	281 +/- 107ab	362 +/- 354 a	41 +/- 64 b	65 +/- 83 b
density (³ 4 decay)	208 +/- 91 a	202 +/- 310 a	35 +/- 57 b	65 +/- 96 b
density (³ 14cm dbh, ³ 4decay)	80 +/- 43 a	33 +/- 44 b	0 b	17 +/- 35 b
total density (stems/ha)	489 +/- 126ab	563 +/- 589 a	76 +/- 115 c	129 +/- 100 b
Coarse Woody Debris:				
volume (³ 19cm dbh)	12.81 +/- 6.01 a	3.34 +/- 8.18 b	2.51 +/- 4.87 b	0.77 +/- 1.90 b
volume (<4 decay)	9.10 +/- 6.01 a	0.55 +/- 1.01 b	0.18 +/- 0.52 b	5.59 +/- 8.70ab
volume (³ 4 decay)	41.14 +/- 10.16 a	21.96 +/- 15.76 b	7.64 +/- 9.58 b	6.92 +/- 16.33 b
total volume (m ³ /ha)	50.24 +/- 10.33 a	22.52 +/- 16.18 b	7.83 +/- 9.53 b	12.51 +/- 15.88 b

Appendix 2. COSEWIC and NBDNRE definitions and listings of species.

(1) COSEWIC (*Committee on the Status of Endangered Wildlife in Canada*):

Species are defined as extirpated, threatened, extinct, endangered or vulnerable. Species not at risk, as well as, species with insufficient information were added to the list. Voting members of COSEWIC determine the status based on current data

Classification definition:

Special Concern: A species of special concern because of characteristics that make it particularly sensitive to human activities or natural events.

Threatened : A species likely to become endangered if limiting factors are not reversed.

Endangered : A species facing imminent extirpation or extinction.

Extirpated : A species no longer existing in the wild in Canada, but occurring elsewhere.

Extinct : A species that no longer exists.

(2) ACDC *Atlantic Conservation Data Center*

Definitions of Provincial (subnational) ranks

S1: Extremely rare throughout its range in the province (typically 5 or fewer occurrences or very few remaining individuals). May be especially vulnerable to extirpation.

S2: Rare throughout its range in the province (6 to 20 occurrences or few remaining individuals). May be vulnerable to extirpation due to rarity or other factors.

S3: Uncommon throughout its range in the province, or found only in a restricted range, even if abundant in at some locations. (21 to 100 occurrences).

S4: Usually widespread, fairly common throughout its range in the province, and apparently secure with many occurrences, but the element is of long-term concern (e.g. watch list). (100 + occurrences)

S5: Demonstrably widespread, abundant, and secure throughout its range in the province, and essentially ineradicable under present conditions

S#S#: Numeric range rank: A range between two consecutive numeric ranks. Denotes range of uncertainty about the exact rarity of the Element (e.g., S1S2)

SX: Extinct/Extirpated: Element is believed to be extirpated within the province.

S?: Unranked: Element is not yet ranked.

SE: Exotic: An exotic established in the province (e.g., Purple Loosestrife or Coldsfoot); may be native in nearby regions.

T: A T code specifies that an S-Rank has been given to a trinomial taxon, i.e. a sub-species or variety of the binomial species.

Q: A Q code indicates that some question exists concerning the validity of the taxonomy.

Qualifiers

Breeding Status

Breeding (B): Basic rank refers to the breeding population of the element in the province.

Non-breeding (N): basic rank refers to the non-breeding population of the element in the province.

Cosewic list of New Brunswick species that are at risk (May 2000).

Extinct

Birds

Common Name

Latin Name

Great Auk

Pinguinus impennis

Labrador Duck

Camptorhynchus labradorius

Passenger Pigeon

Ectopistes migratorius

Extirpated

Dwarf Wedgemussel *Alasmidonta heterodon*

: *Adiantum pedatum* L.,

Asplenium trichomanes L.,

Potamogeton zosteriformis

Fern., *Distichlis spicata* (L.)

Greene, *Carex arcta* Boott,

Carex granularis var. *haleana* (Olney) Porter,
Carex lupulina Muhl.,
Carex sagatilis L.,
Carex tenuiflora Wahl.,
Carex tuckermanii Dewey,
Arethusa bulbosa L.,
Calypso bulbosa (L.)
Oakes,
Goodyera pubescens (Willd.) R.
Br., *Spiranthes lucida* (Eat.) Ames,
Polygonum ramosissimum Michx.,
Hepatica nobilis P. Mill.,
Agrimonia gryposepala Wallr.,
Cryptotaenia canadensis (L.) DC,
Sanicula trifoliata Bickn.,
Bidens connata Muhl.

Endangered

Birds

Eskimo Curlew	<i>Numenius borealis</i>
Harlequin Duck	<i>Histrionicus histrionicus</i>
Piping Plover	<i>Charadrius melodus</i>
Roseate Tern	<i>Sterna dougallii</i>

Insects

Maritime Ringlet	<i>Coenonympha tullia</i>
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Threatened

Birds

Anatum Peregrine Falcon	<i>Falco peregrinus anatum</i>
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Fish

Lake Utopia Dwarf Smelt	<i>Osmerus sp.</i>
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Plants

Anticosti Aster	<i>Symphyotrichum anticostense</i>
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Special concern

Southern Flying Squirrel

Glaucomys volans

Birds

Ivory Gull

Pagophila eburnea

Short-eared Owl

Asio flammeus

Yellow Rail

Coturnicops noveboracensis

Bicknell's Thrush

Catharus bicknelli

Reptiles

Wood Turtle

Clemmys insculpta

Fish

Sortnose Sturgeon

Acipenser brevirostrum

Redbreast Sunfish

Lepomis auritus

Lepidopterans

Monarch

Danaus plexippus

Plants

Bathurst Aster

Symphyotrichum subulatum

Gulf of St. Lawrence Aster

Symphyotrichum laurentianum

Draft Species List from DNR

Amphibians and reptiles (info from Don McAlpine)

Species	Latin name	NB rank	rationale
Dusky Salamander	<i>Desmognathus fuscus</i>	Sensitive	Narrow habitat requirements (seepage/springs) and habitat sensitive to disturbance.
Four-toed Salamander	<i>Hemidactylium scutatum</i>	Status undetermined	Recorded from only one site in the province to date.
Wood Turtle	<i>Clemmys insculpta</i>	Sensitive	Much uncertainty regarding provincial abundance. Threats include potential pet trade, road kill, siltation due to road construction or other, loss of habitat due to degradation/development of riparian strips.

Mammals- Mammal status group (Don McAlpine, Rudy Stocek, Rod Cumberland, Graham Forbes)

species	Latin name	NB rank	Rationale
Gaspé Shrew	<i>Sorex gaspensis</i>	May be at risk	Specimens have been collected from only two locations in the province, both in the north. Preference for mossy, rocky habitat near streams.
Long Tailed Shrew	<i>Sorex dispar</i>	May be at risk	Known from few sites. Also- taxonomic question: <i>Sorex dispar</i> may well be the same species.
Little Brown Bat	<i>Myotis lucifugus</i>	Sensitive	The Little Brown Bat is ranked as sensitive because of its reliance on hibernacula, in

			combination with the low number of appropriate sites (solution caves, abandoned mines) and the increased interest in cave exploration and outdoor/ adventure tourism. The distribution of a significant proportion of the winter population across only a half dozen hibernacula (most in the south) increases the vulnerability of the species. The number of maternity roosts does not appear to be limiting (hundreds of appropriate sites). It is unclear as to what proportion of the summer population hibernates in the province; significant numbers may well over winter in Maine or NS. In addition to disturbance of hibernacula, threats include pesticides, loss of large old trees and new building practices that make it difficult for bats to enter homes.
Northern Long-eared bat	Myotis septentrionalis	Sensitive	The northern long-eared bat is considered sensitive because of its reliance on hibernacula and the threats to these sites as indicated in the Assessment of the little brown bat. In addition, the northern long-eared bat is more dependent on forests, and does not appear to take advantage of potential roosts in buildings. This apparently stricter habitat requirement, coupled with our lack of understanding of its particular forest habitat requirements, underline the sensitivity of the species.
Eastern Pippistrelle	Pipistrellus subflavus	Sensitive	The eastern pippistrelle is at the northern edge of its range in New Brunswick and may be naturally rare here. There have been only 8 records of occurrences in the province, all in the southern region. The threats described for hibernacula of other bats likely apply to this species as well, though the lack of data makes it difficult to draw strong conclusions.
Lynx	Lynx canadensis	At risk	Regionally endangered- low numbers.

Based on input from the NB Bird Status Group which includes: David Christie, Tony Erskine, Scott Makespeace, Dan Busby, Stuart Tingley, with input from Diane Amirault and Richard Elliot.

Species	Scientific Name	NB rank	Comment
Least Bittern	Ixobrychus exilis	MAY BE AT RISK	Pop estimate is 10-20 pair.
Red-shouldered Hawk	Buteo lineatus	May be at risk	Only 1 accepted breeding record for ABBMP, 1 other known to status group. Numbers too low to establish trends. At northern limit of range.
Yellow Rail	Coturnicops noveboracensis	May be at risk	Rare in province, with only one breeding record –in 1881. Very hard to detect.
Horned Lark	Eremophila alpestris	May be at Risk	Threats: not clear, but habitat overlap with human activity. Spread east with agriculture.
House Wren	Troglodytes aedon	May be at Risk	
Sedge Wren	Cistothorus platensis	May be at risk	Limited appropriate habitat; threatened by successional change and effects of impoundments.
Bicknell's Thrush	Catharus bicknelli	May be at Risk	
Wood Thrush	Hylocichla mustelina	May be at risk. Decline unexplained. Not found	Decline unexplained. Not found on BBS for region last year for first time, despite increase in the number of routes.
Vesper Sparrow	Poocetes gramineus	May be at risk	Believed to be in habitat driven decline. Loss of open habitat ; growing up of abandoned farmland. Other threats : effects of herbicides, fungicides, and threats on wintering grounds in SE US.
Eastern MeadowLark	Sturnella magna	May be at risk	Threats include conservation of habitat through, succession, abandonment of grasslands, and perhaps increased mowing frequencies.
Brown-headed Cowbird	Molothrus ater	May be at risk	Population was low before the turn of the century, increased in the 1940's, and is now declining. Estimate from ABMP maybe an overestimate. Declining in distribution, have stopped wintering?
Cooper's Hawk	Accipiter cooperii	May be at risk	Have always occurred in low numbers. Subject to same concerns as for Sharp-shinned hawk.
Great Blue Heron	Ardea herodias	Sensitive	Threats to pop: disturbance. Threats to habitat: development. Some protection afforded through land use management.
Green Heron	Butorides virescens	Sensitive	Not clear if new locations are simply increased detection.
Black-crowned Night-heron	Nycticorax nycticorax	Sensitive	Check pop abundance trend. Threats as for GBH. Sensitive because of few colonies.
Northern Pintail	Anas acuta	Sensitive	1940-1960 numbers increased in the Maritimes; since 1960 have declined. No significant wintering numbers.
Northern Shovler	Anas clypeata	Sensitive	Before 1948 was unknown in the province. Initial increase, population believed to have been stable over the last 10 years.
Gadwall	Anas strepera	Sensitive	Similar to shoveler. Started to come in the late 70's, still increasing. Pattern of spread and increase in eastern North America.

Based on input from NB Bird Status group which includes: David Christie, Tony Erskine, Scott Makespeace, Dan Busby, Stuart Tingley, with input from Diane Amirault, and Richard Elliot.

Species	Scientific Name	NB Rank	Comment
American Wigeon	Anas americana	Sensitive	Like Gadwell and Northern Shoveller but numbers are higher. Recent establishment as a breeding pop, may still be increasing or maybe stable.
Sharp-shinned Hawk	Accipiter striatus	Sensitive	Population declined during DDT period. It is as casually observed now as before, but population trend unknown. Of concern for toxins, but the US concerns not noted here. (The documented steady decline of the 1980's attributed to age class in migration – matures were going inland.) Merits monitoring.
Red-tailed Hawk	Buteo jamaicensis	Sensitive	Population estimate from ABBMP approaches 3000, not likely an underestimate (and may be overestimate) as the species is easy to detect. Fewer seen now.
Virginia Rail	Rallus limicola	Sensitive	Underrepresented in surveys.
Common Moorhen	Gallinula chloropus	Sensitive	First recorded in the Maeitimes in 1965. Impoundments are a contributing factor to their successful range expansion into the province. Population numbers are considered to be stable, but low.
American Coot	Fulica americana	Sensitive	
Common Tern	Sterna hirundo	Sensitive	Threats include predation, flooding and starvation events and habitat loss.
Black Tern	Chlidonias niger	Sensitive	Population estimates only a few hundred. Use new impoundments, though they were in the province before the creation of these in large numbers. Threats as for moorhen.
Short-eared Owl	Asio flammeus	Sensitive	Nomadic, sporadic breeder. Fluctuations in populations related to vole populations.
Common Nighthawk	Chordeiles minor	Sensitive	Population estimate in ABBMP puts it in the D range, but with known decline is probably now C. Is apparently now absent from towns/cities where it once bred. Do not know what is causing declines (maybe insect control programs) or if same trend is occurring away from urban centers.
Whip-Poor-Will	Caprimulgus vociferus	Sensitive	Many unanswered questions. NB picture appears to be different from that in neighbouring jurisdictions. No separate data from BBS, but decline suspected. Threats as for nighthawk.
Chimney Swift	Chaetura Pelagica	Sensitive	Population thought to be in low D range. Declining significantly everywhere, but we don't know why. Threats as for night hawks, plus pressure on nesting habitat-hollows in large trees. Lack of knowledge and nature of threats make this a high priority for attention.
Three-toed Woodpecker	Picoides tridactylus	Sensitive	Distribution of the species shifts with changes in forest or insect abundance. Most are in areas that are not monitored. Threats difficult to describe as requirements are poorly understood.

Based on input from NB Bird Status Group which includes: David Christie, Tony Erskine; Scott Makespeace, Dan Busby, Stuart Tingley, with input from Diane Amirault, and Richard Elliot.

Species	Scientific Name	NB rank	comment
Willow Flycatcher	Empidonax traillii	Sensitive	Range extension from south. First recorded in 1970's. Increasing over last 20 yrs. Threats: predation; persistence in the face of nest failures.
Great Crested Flycatcher	Myiarchus crinitus	Sensitive	Population is likely now stable, though it was increasing 30 yrs ago. Threats to habitat related to lack of protection of forests on private land, with particular concern over the fate of floodplain forests.
Northern Rough-winged Swallow	Stelgidopteryx serripennis	Sensitive	Birded only recently. Population is likely now stable, though has increased over 30 yrs. It is at its range limit and climate is probably the overriding factor in its abundance and distribution.
Marsh Wren	Cistothorus palustris	Sensitive	Population probably in 100's. Provincial distribution related to impoundments. Impoundments have had a positive influence.
Eastern Bluebird	Sialia sialis	sensitive	Threats include starlings, tree swallows. Cleaner farming practices have not helped.
Northern Mockingbird	Mimus polyglottos	sensitive	Conservation enhanced; feeders supplement other food sources.
Brown Thrasher	Toxostoma rufum	sensitive	At periphery of range.
Pine Warbler	Dendroica pinus	sensitive	Not detected before 1987. Population greater than in ABBMP. Possibly increasing. Lack of information
Pine Grosbeak	Pinicola enucleator	sensitive	The population estimate from the ABBMP was C, but the population is declining. Decline is related to decline in budworm population. Lack of good data, difficult species to detect. Winter vagrant.
Purple Finch	Carpodacus purpureus	sensitive	Uncertainty around population estimate. Unexplained declines. Captured in BBS data.
Red Crossbill	Loxia curvirostra	sensitive	Breeding distribution is erratic from year to year. Population size related to seed crop- White pine/hemlock.

List of locally endangered species (Atlantic Conservation Data Center ,November,2000)

Common Name	Latin Name	Species ranking
	Fauna	
Green Heron	<i>Butorides virescens</i>	S2B
Northern shovler	<i>Anas clypeata</i>	S2B
Greater Scaup	<i>Aythya marila</i>	S1BS1N
Peregrine Falcon	<i>Falco peregrinus anatum</i>	S1B
American Coot	<i>Fulica americana</i>	S2B
Upland Sandpiper	<i>Bartramia longicauda</i>	S1B
Wilson's Phalarope	<i>Phalaropus tricolor</i>	S1S2B
Common tern	<i>Sterna hirundo</i>	S3B
Black tern	<i>Chlidonias niger</i>	S3B
Wood turtle	<i>Clemmys insculpta</i>	S3
	Flora	
Wild chervil, hornwort	<i>Cryptotaenia canadensis</i>	SX
Three-leaved snake wort	<i>Sanicula trifoliata</i>	S1
Northern Aster	<i>Aster borealis</i>	S1
Sunflower	<i>Helianthus giganteus</i>	S1SE?
Goldenrod	<i>Solidago multiradiata</i>	S1
Rock-cress Drapa	<i>Draba arabisans</i>	S1
Goosefoot species	<i>Chenopodium simplex</i>	S1
Screw-stem	<i>Bartonia paniculata</i>	S2
2-leaf water -milfoil	<i>Myriophyllum heterophyllum</i>	S1
Slender water-milfoil	<i>Myriophyllum tenellum</i>	S3
Virginia mountain-mint	<i>Pycnanthemum virginianum</i>	S1
Rough hedge-nettle	<i>Stachys tenuifolia</i>	S1
Twin-stemmed bladderwort	<i>Utricularia geminiscapa</i>	S1
Lesser bladderwort	<i>Utricularia minor</i>	S1
Fringed polygala, Gay-wings, Bird-on the wing	<i>Polygala paucifolia</i>	S2
Mealey	<i>Primula laurentiana</i>	S1
	<i>Hepatica nobilis var. obtusa</i>	S2S2
Buttercup	<i>Ranunculus gmelinii</i>	S1T1
Entire-leaved mountain avens	<i>Dryas integrifolia</i>	S1
Black raspberry, Thimbleberry	<i>Rubus occidentalis</i>	S1
Canada burnet	<i>Sanguisorba canadensis</i>	S1
Myrtle-leaved willow	<i>Salix myrtillifolia</i>	S1
Life-long saxifrage	<i>Saxifraga paniculata</i>	S1
Rand's eyebright, small eyebright	<i>Euphrasia randii</i>	S1S2
Eastern narrow leaved sedge	<i>Carex amphibola</i>	S1
Back's sedge	<i>Carex backii</i>	S1
Hairy sedge	<i>Carex hirtifolia</i>	S1
Rosy sedge	<i>Carex rosea</i>	S3
Matted spike rush	<i>Eleocharis intermedia</i>	S3
River bulrush	<i>Scirpus fluviatilis</i>	S1S2
Whirled loosestrife	<i>Lysimachia quadrifolia</i>	S1S2
Rufous bulrush	<i>Scirpus pendulus</i>	S1
Wild leek	<i>Allium tricoccum</i>	S2S3
Arethusa orchid	<i>Arethusa bulbosa</i>	S3
Calopogon	<i>Calopogon tuberosus</i>	S3
Calypso orchid	<i>Calypso bulbosa</i>	S2
Frog orchis, long bracted green	<i>Coeloglossum viride va. virescens</i>	S2T2
Spotted coral-root	<i>Corallorrhiza maculata</i>	S3S4
White lady-slipper orchid	<i>Cypripedium parviflorum</i>	S2
Showy lady-slipper orchid	<i>Cypripedium reginae</i>	SX
Downy rattlesnake plantain	<i>Goodyera pubescens</i>	SX
Reed cinna	<i>Cinna arundinacea</i>	S1
Cypress rosette grass	<i>Dichanthelium dichotomum</i>	S1T1
Coastal salt grass	<i>Distichlis spicata</i>	S1S2
White bluegrass	<i>Poa glauca ssp glaucantha</i>	S2TQ

Tuckermans pond weed	Potamogeton confervoides	S2
Maidenhair fern	Adiantum pedatum	S3
Maidenhair spleenwort	Asplenium trichomanes	S1S2
Fragrant wood fern	Dryopteris fragrans	S3
Braun's holly fern	Polystrichum braunii	S3
Northern or alpine woodsia	Woodsia alpina	S2
Smooth woodsia or cliff fern	Woodsia glabella	S2S3
Curly grass fern	Schizaea pusilla	S1
Rock spike-moss	Selaginella rupestris	S1
Northern spike-moss	Selaginella selaginoides	

Appendix 3. IUCN Classifications and Definitions

I. **Strict Nature Reserve / Wilderness Area:** protected area managed mainly for science or wilderness protection

Ia. **Strict Nature Reserve:** protected area managed mainly for science

Def. *Area of land and/or sea possessing some outstanding or representative ecosystems, geological or physiological features and/or species, available primarily for scientific research and/or environmental monitoring.*

Ib. **Wilderness Area:** protected area managed mainly for wilderness protection

Def. *Large area of unmodified or slightly modified land, and/or sea, retaining its natural character and influence, without permanent or significant habitation, which is protected and managed so as to preserve its natural condition.*

II. **National Park:** protected area managed mainly for ecosystem protection and recreation

Def. *Natural area of land/or sea designated to (a) protect the ecological integrity of one or more ecosystems for present and future generations, (b) exclude exploitation or occupation inimical to the purposes of designation of the area and (c) provide a foundation for spiritual, scientific, educational, recreational and visitor opportunities, all of which must be environmentally and culturally compatible.*

III. **Natural Monument:** protected area managed mainly for conservation of specific natural features.

Def. *Area containing one, or more, specific natural/cultural features which is of outstanding or unique value because of its inherent rarity, representative or aesthetic qualities or cultural significance.*

IV. **Habitat/Species Management Area:** protected area managed mainly for conservation through management intervention.

Def. *Area of land and/or sea subject to active intervention for management purposes so as to ensure the maintenance of habitats and/or to meet the requirements of specific species.*

V. **Protected Landscape/Seascape:** protected area managed mainly for landscape/seascape conservation and recreation.

Def. *Area of land with coast and sea as appropriate, where the interaction of people and nature over time has produced an area of distinct character with significant aesthetic, ecological and/or cultural value, and often with high biological diversity. Safeguarding the integrity of this traditional interaction is vital to the protection, maintenance and evolution of such an area.*

VI. **Managed Resource Protected Area:** protected area managed mainly for the sustainable use of natural ecosystems.

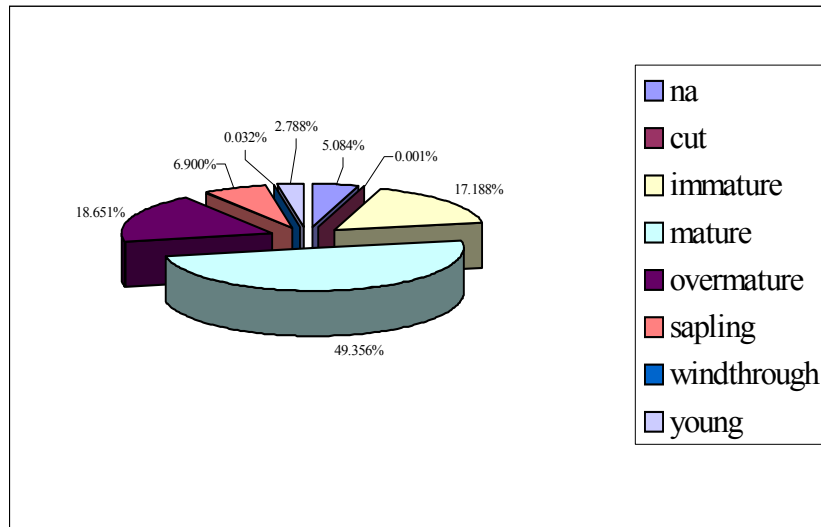
Def. *Area containing predominantly unmodified natural systems, managed to ensure long term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs.*

Examples:

Land use category	IUCN Category
1. Standing timber	na (not applicable)
2. Numbered highways	na
3. Linear Coastlines / Parks	V
4. Special sites / research areas	VI
5. Fundy National Park	II
6. Aboriginal sites	III
7. Ecological reserves	Ia - I b
8. Conservation Areas	III
9. Western Hemi. Shorebird Reserve	Ib
10. Migratory Game Bird Sanctuary	II
11. National Wildlife Areas	II
12. Agricultural Areas	na
13. Municipal Water Supplies	na
14. Historical Sites	III
15. NB Nature Trust Properties	III

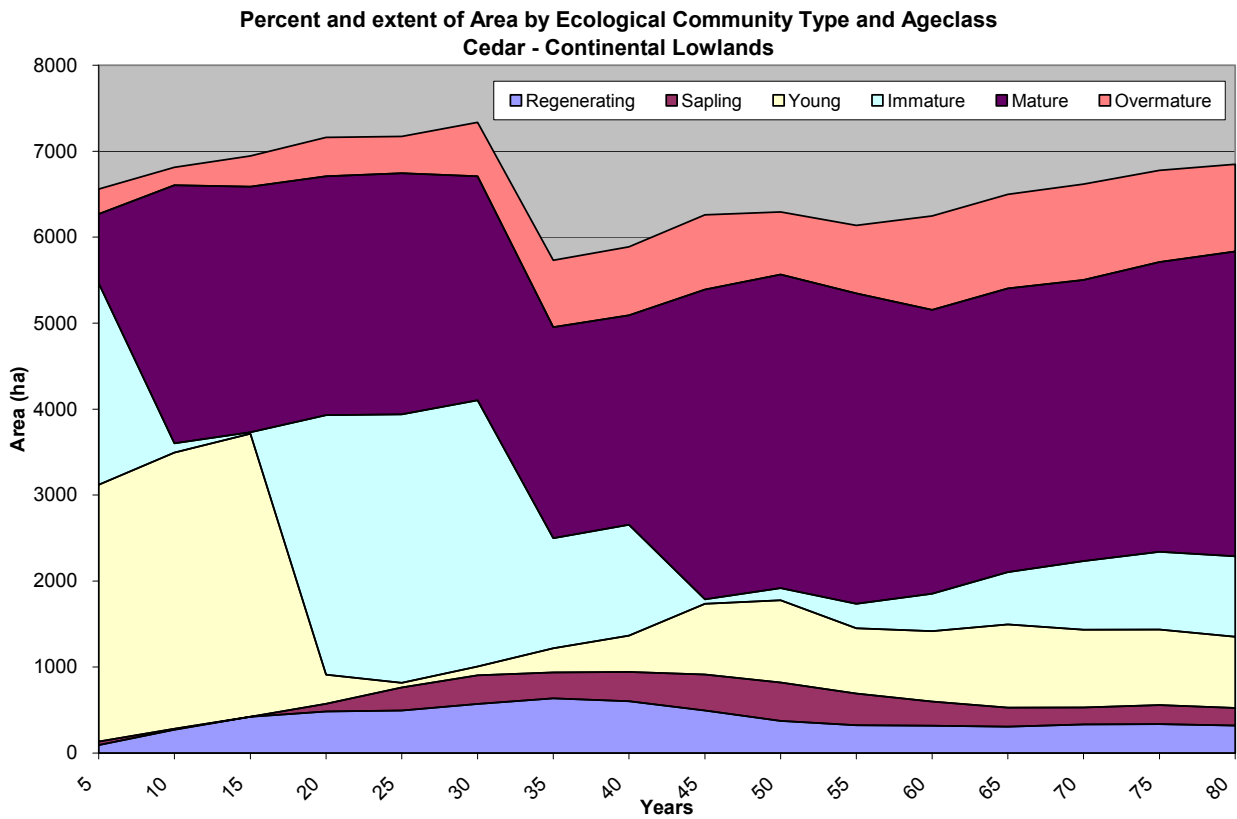
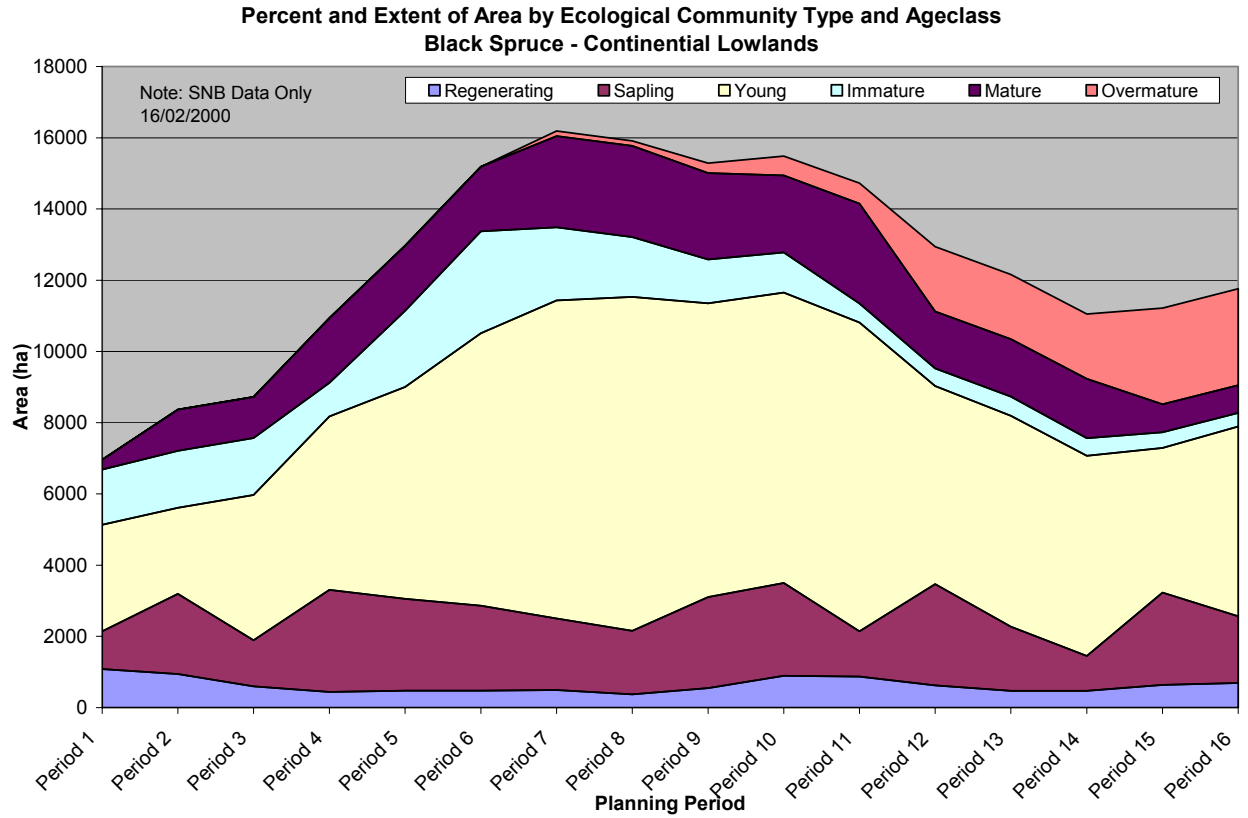
Reference: IUCN (1994). Guidelines for Protected Area Management Categories. IUCN. Gland, Switzerland. 261 pp.

Percentage of Area in Protected Areas by Age Class

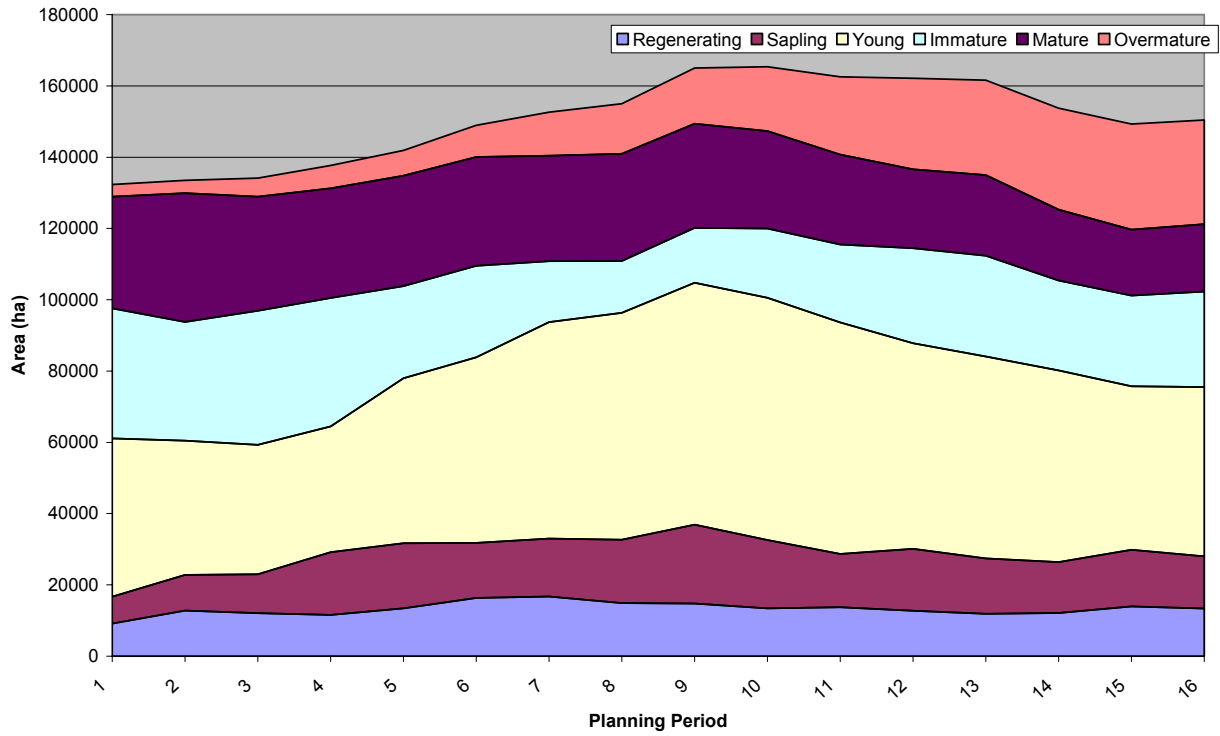


Appendix 4. Ecological Community Types by Ecoregion

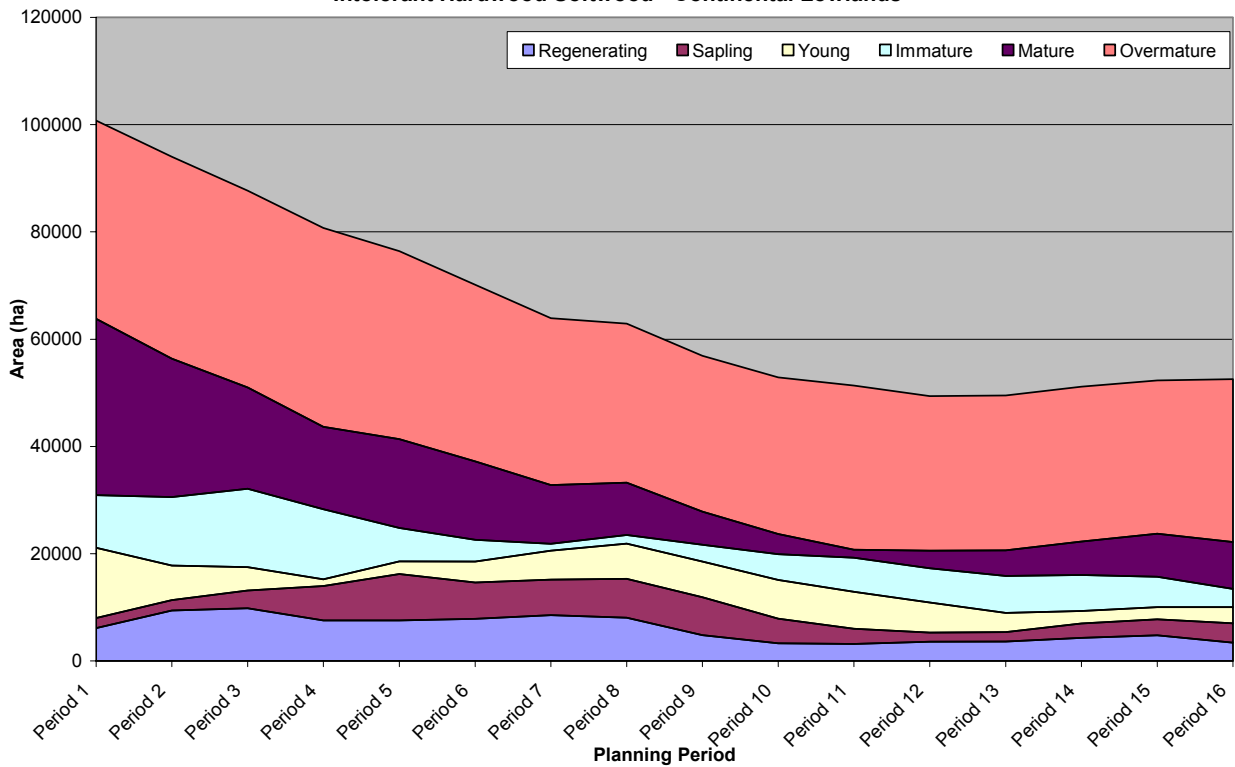
CONTINENTAL LOWLANDS



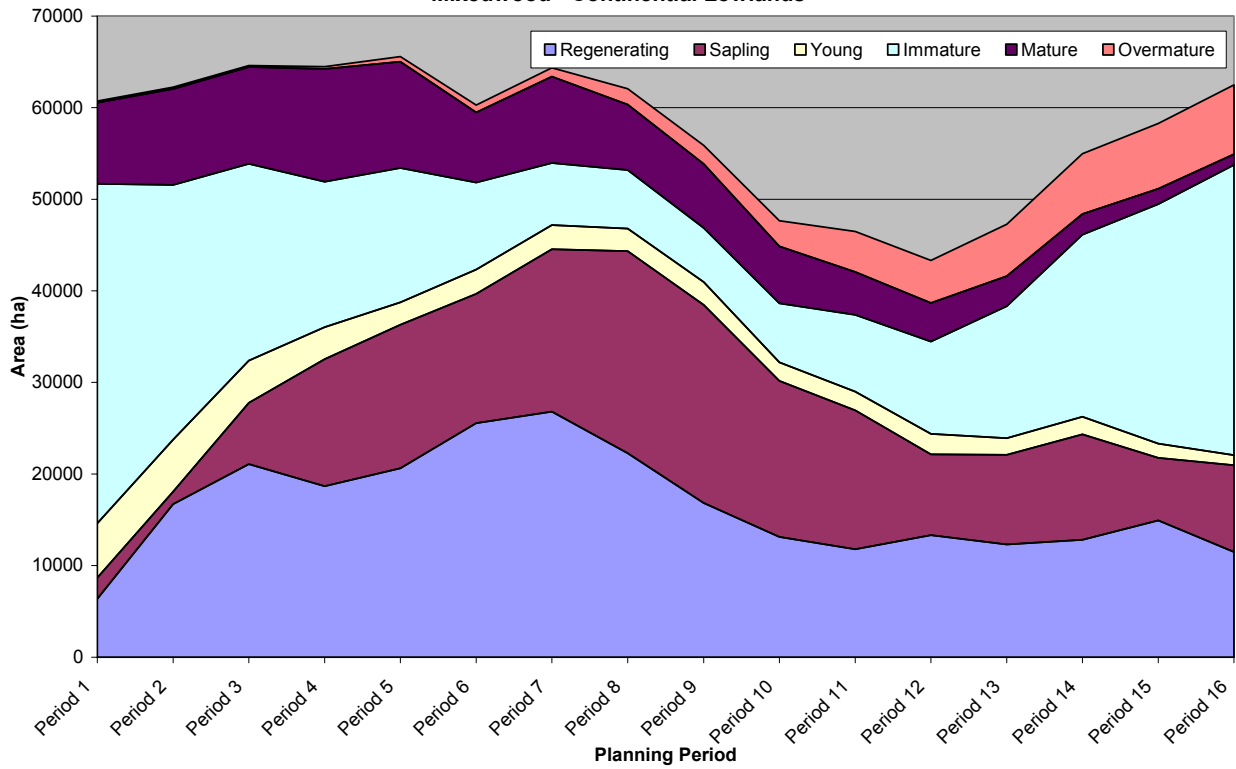
**Percent and Extent of Area by Ecological Community Type and Ageclass
CONIFER - Continental Lowlands**



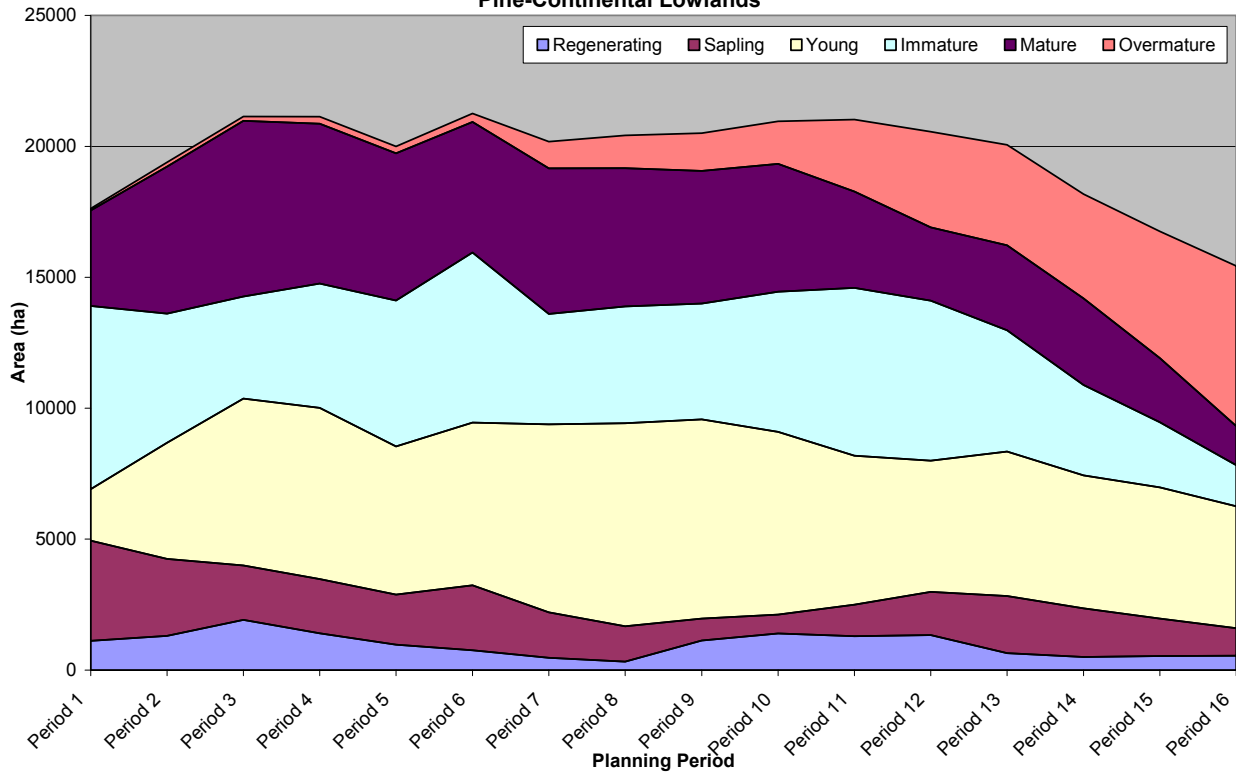
**Percent and Extent of Area by Ecological Community Type and Ageclass
Intolerant Hardwood Softwood - Continental Lowlands**



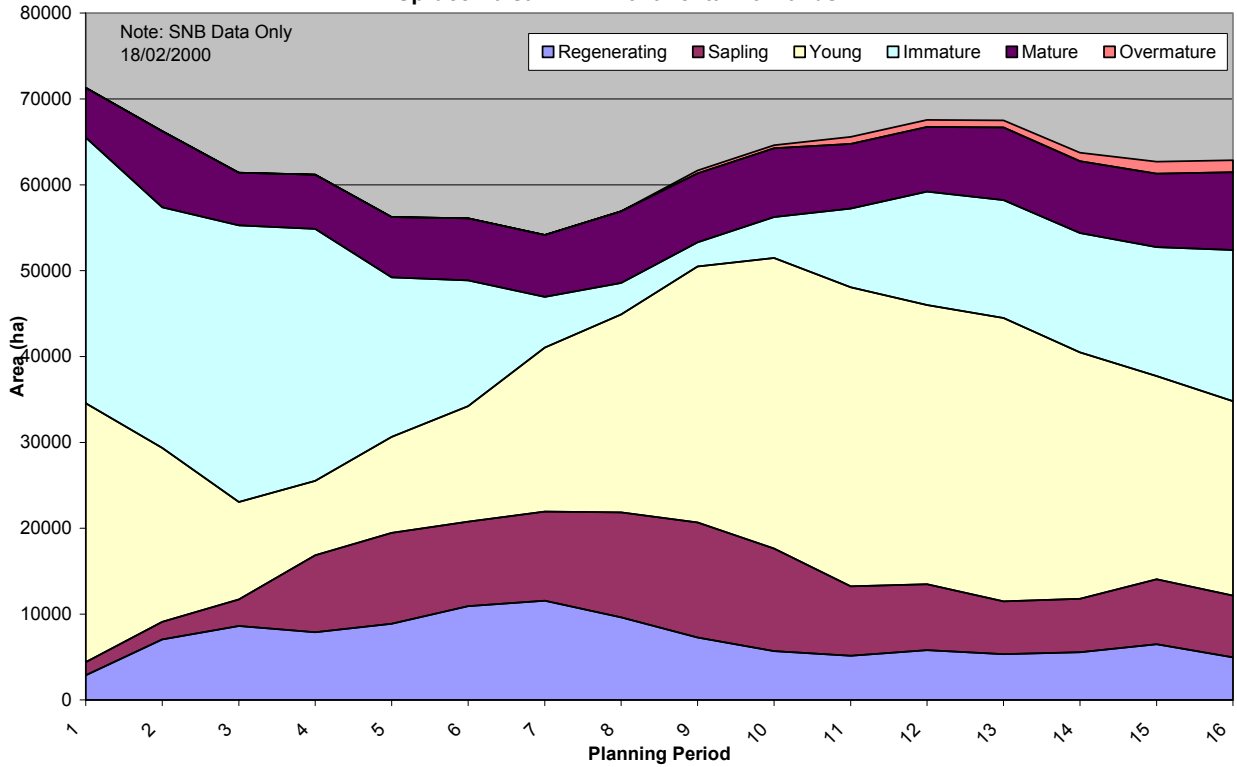
**Percent and Extent of Area by Ecological Community Type and Ageclass
Mixedwood - Continental Lowlands**



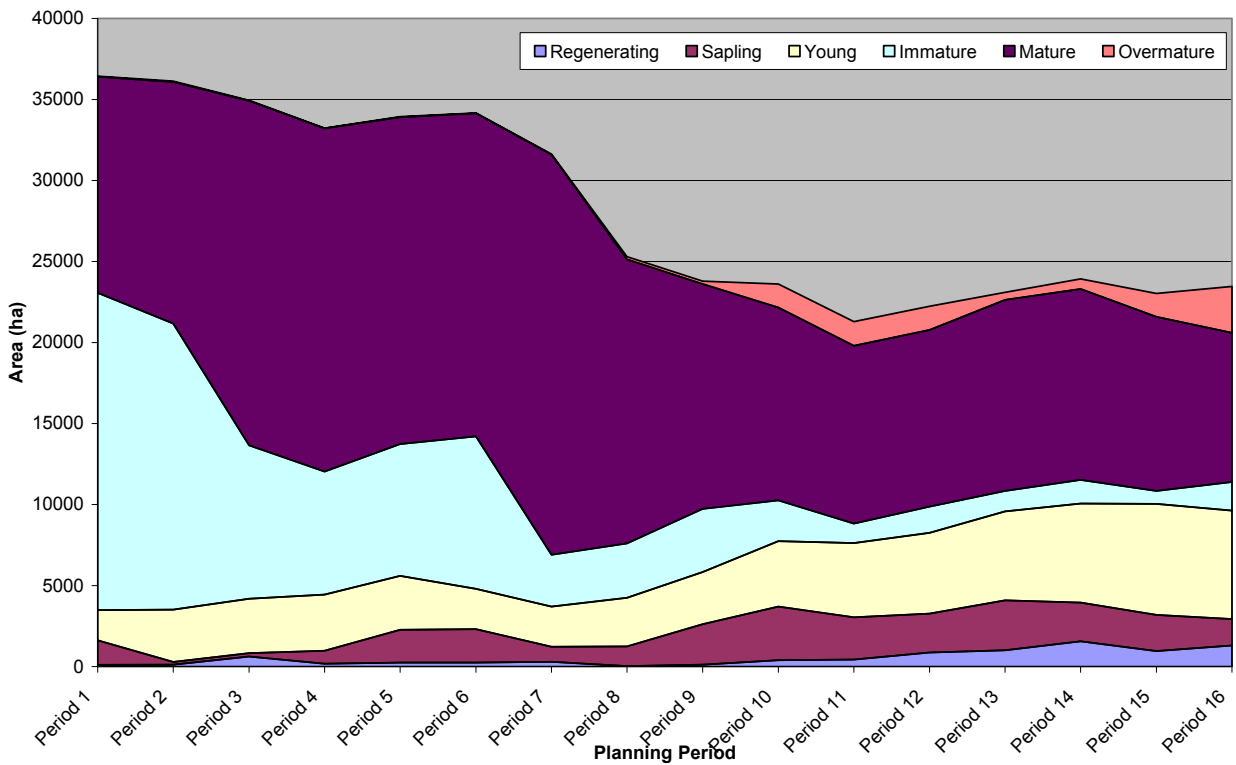
**Percent and Extent of Area by Ecological Community Type and Ageclass
Pine-Continental Lowlands**



**Percent and Extent of Area by Ecological Community Type and Ageclass
Spruce Balsam Fir - Continental Lowlands**

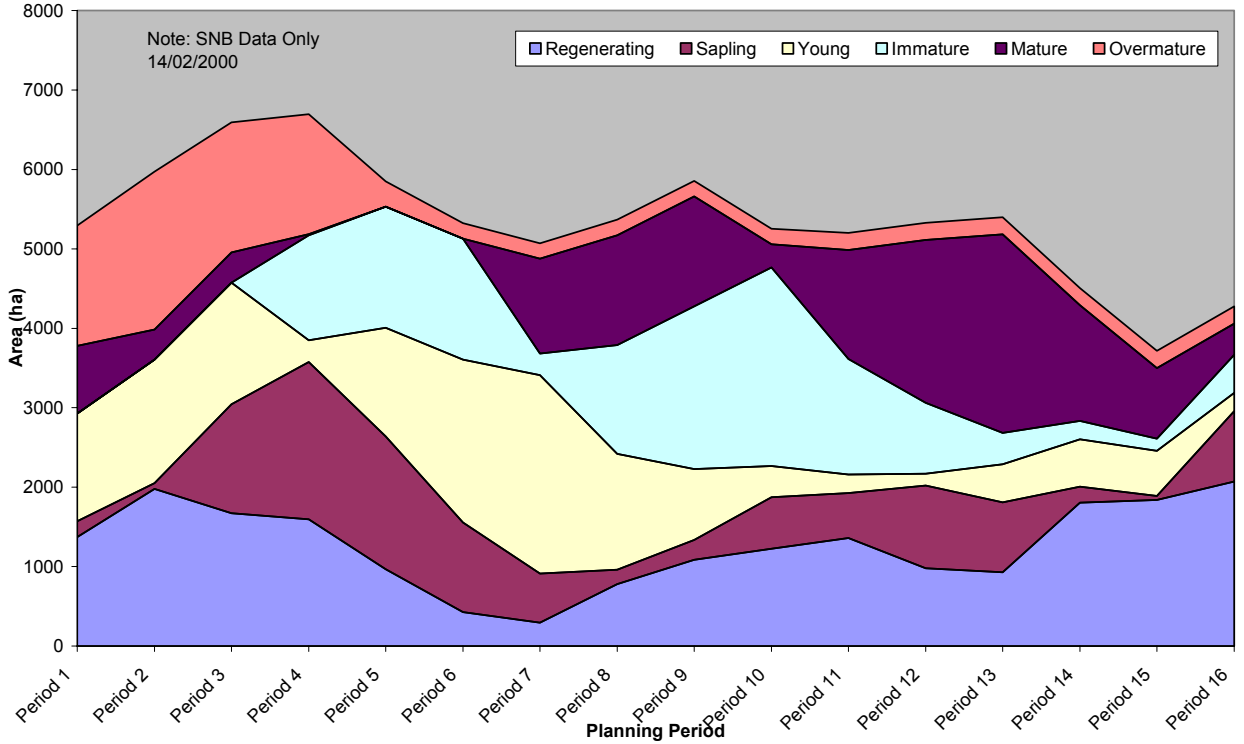


**Percent and Extent of Area by Ecological Community Type and Ageclass
Tolerant Hardwood-Continental Lowlands**

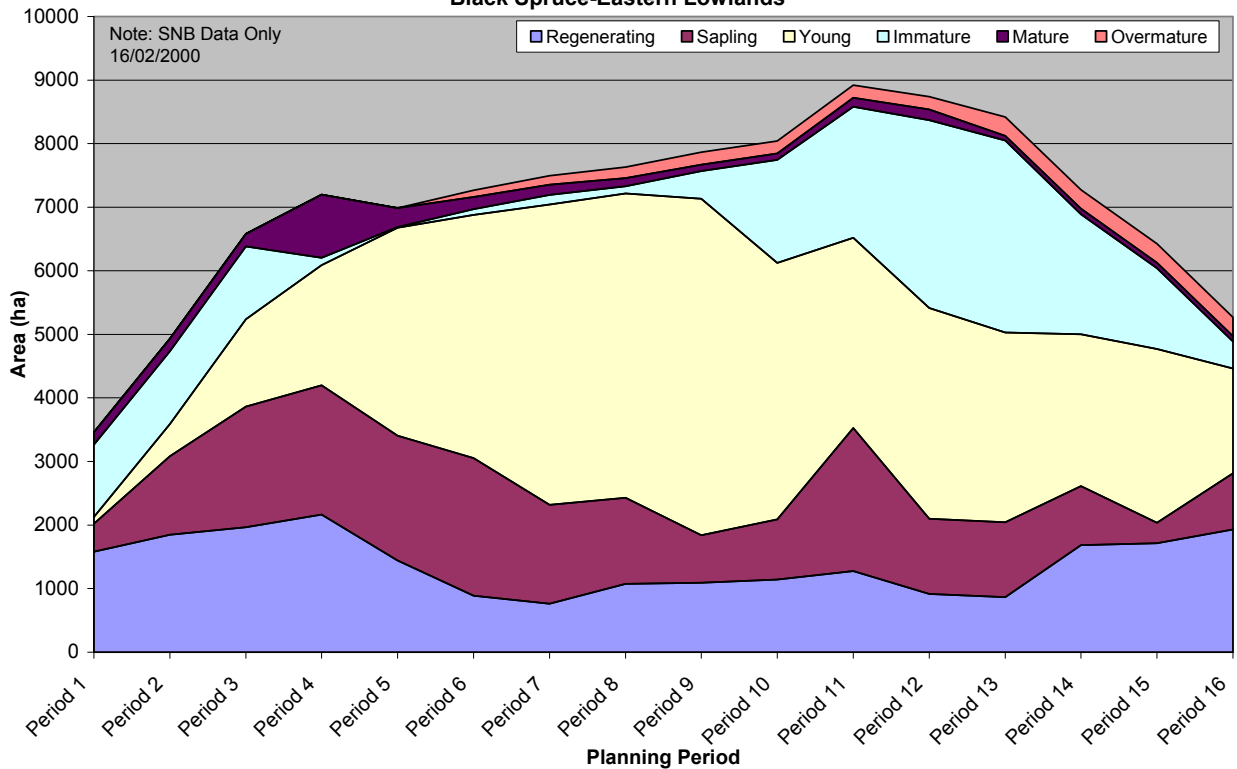


EASTERN LOWLANDS ECOREGION

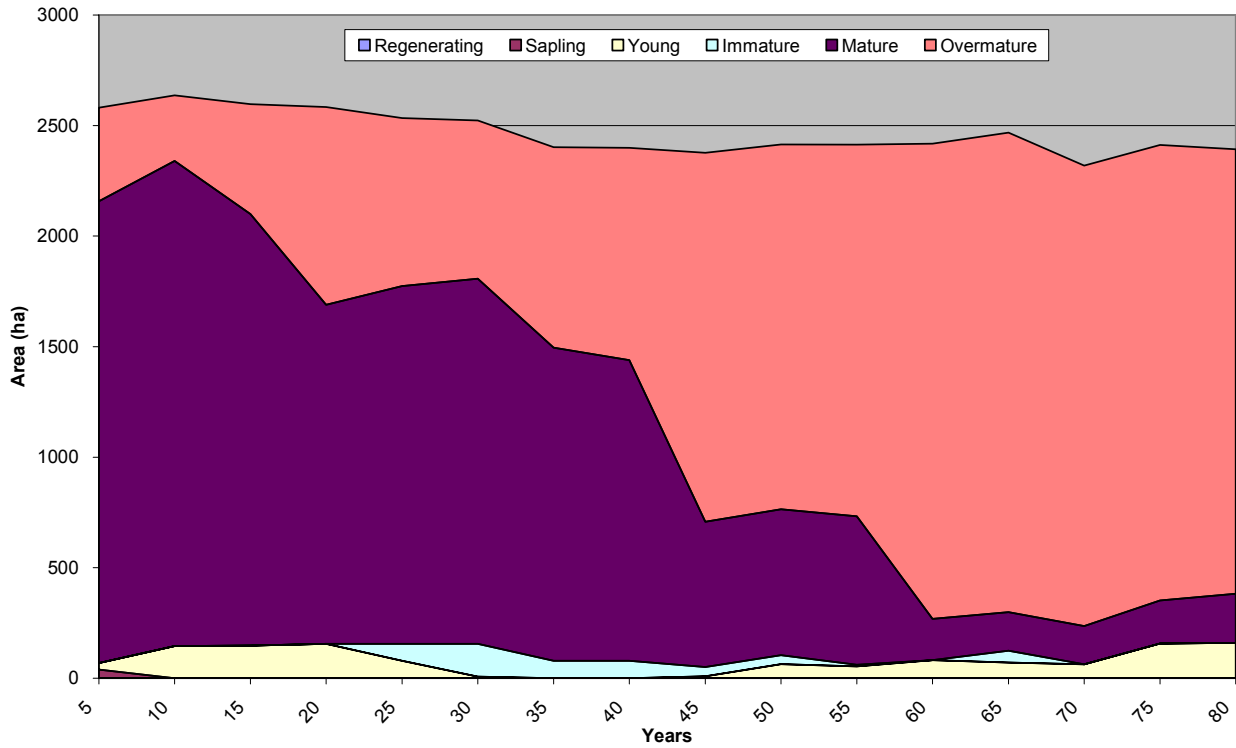
**Percent and Extent of Area by Ecological Community Type and Ageclass
Balsam Fir - Eastern Lowlands**



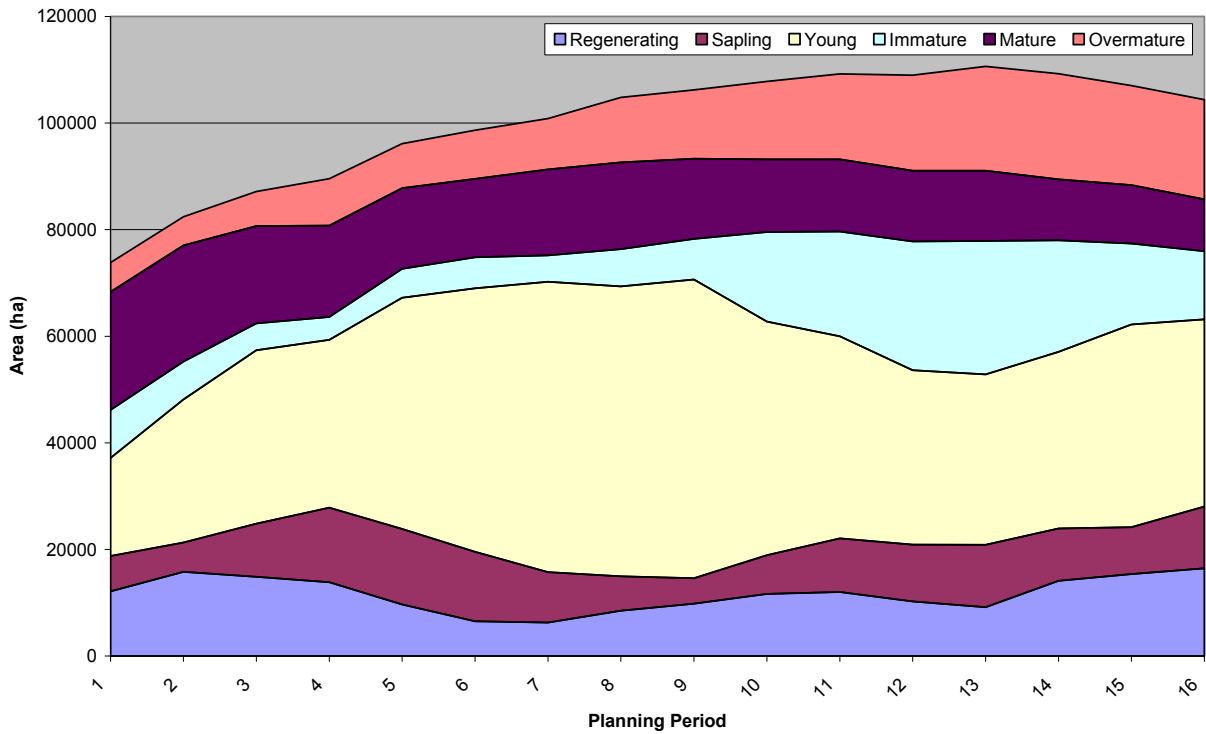
**Percent and Extent of Area by Ecological Community Type and Ageclass
Black Spruce-Eastern Lowlands**



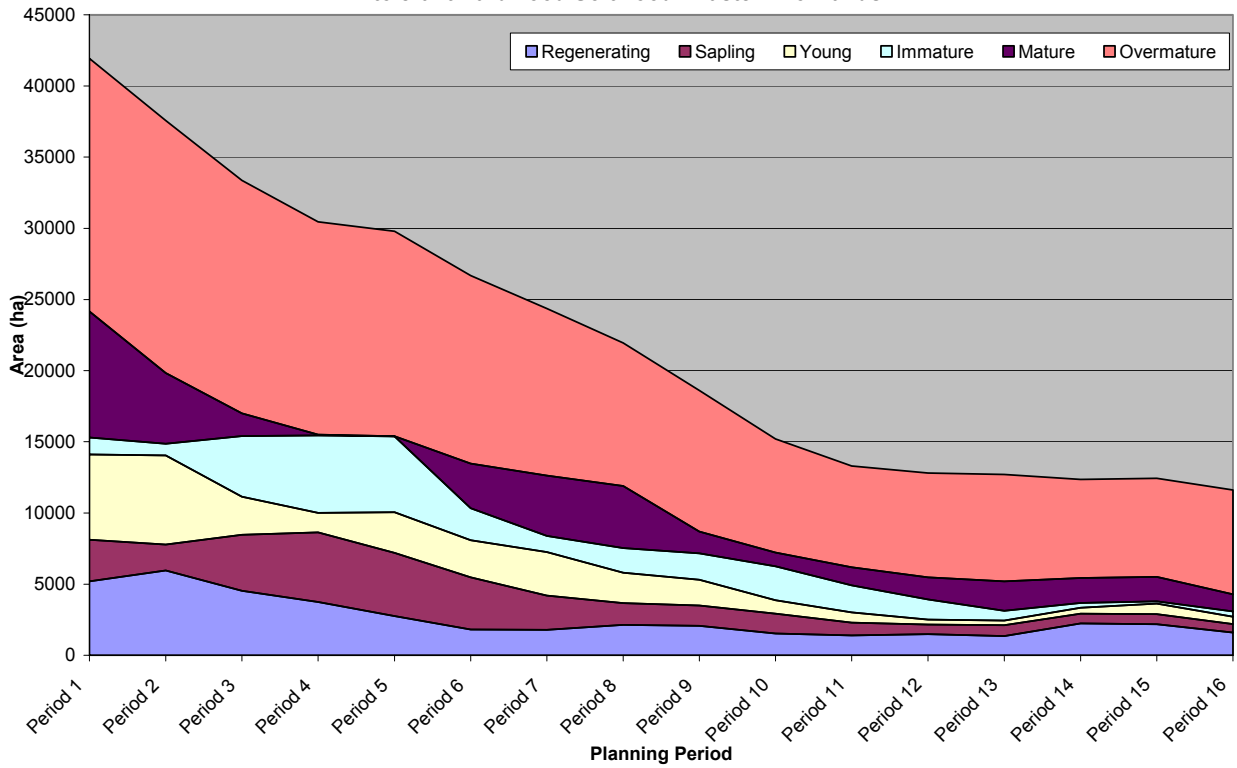
**Percent and Extent of Area by Ecological Community Type and Ageclass
Cedar - Eastern Lowlands**



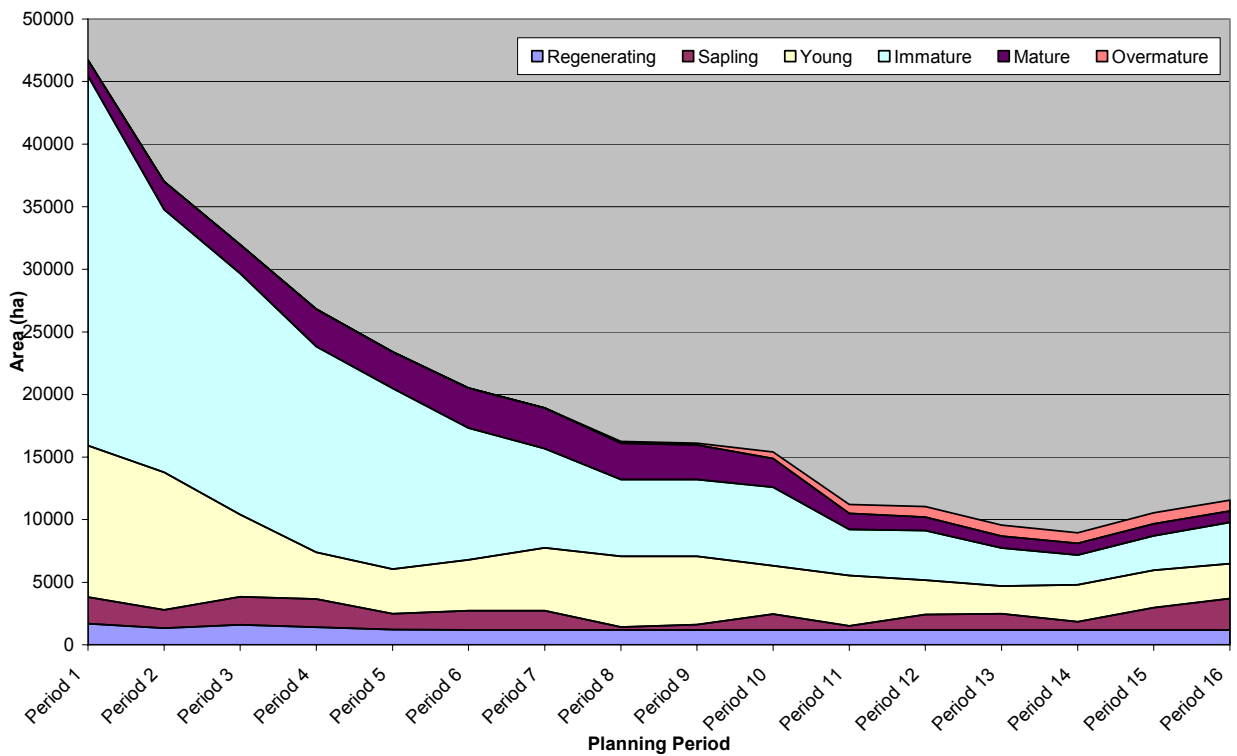
**Percent and Extent of Area by Ecological Community Type and Ageclass
CONIFER - Eastern Lowlands**



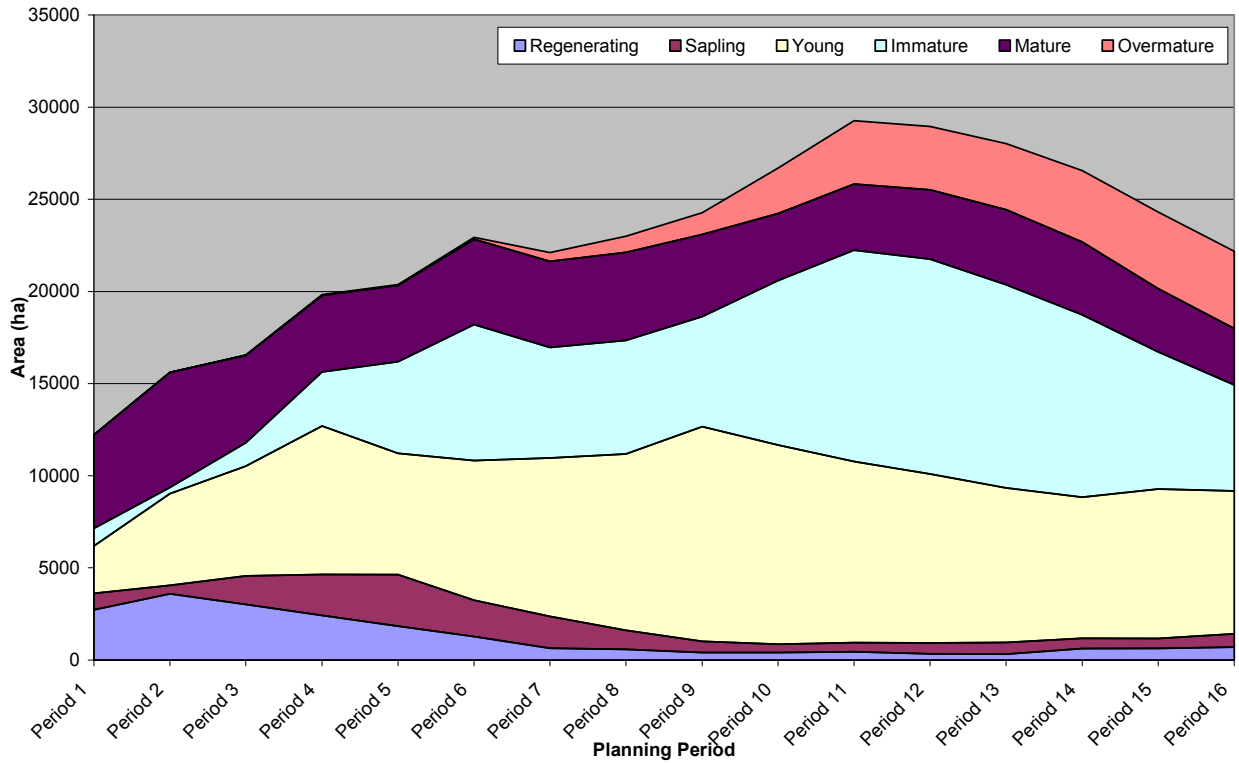
**Percent and Extent of Area by Ecological Community Type and Ageclass
Intolerant Hardwood Softwood - Eastern Lowlands**



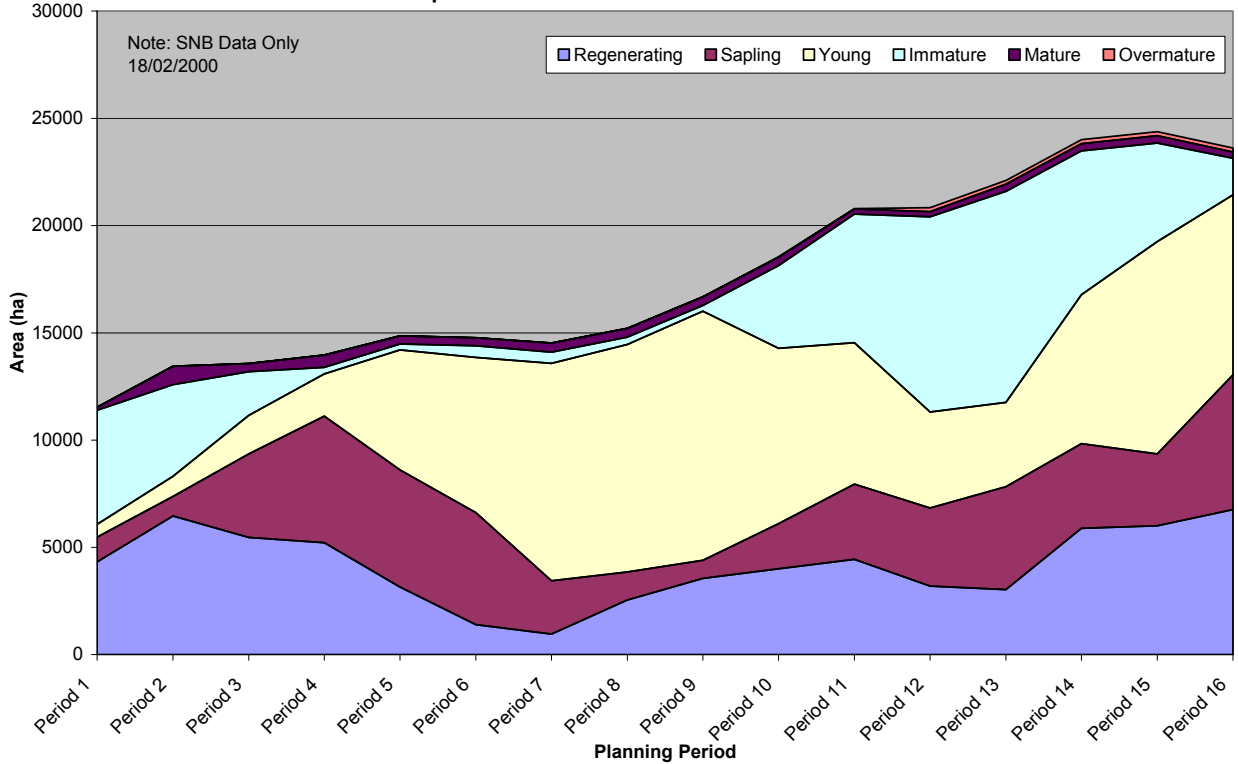
**Percent and Extent of Area by Ecological Community Type and Ageclass
Mixedwood - Eastern Lowlands**



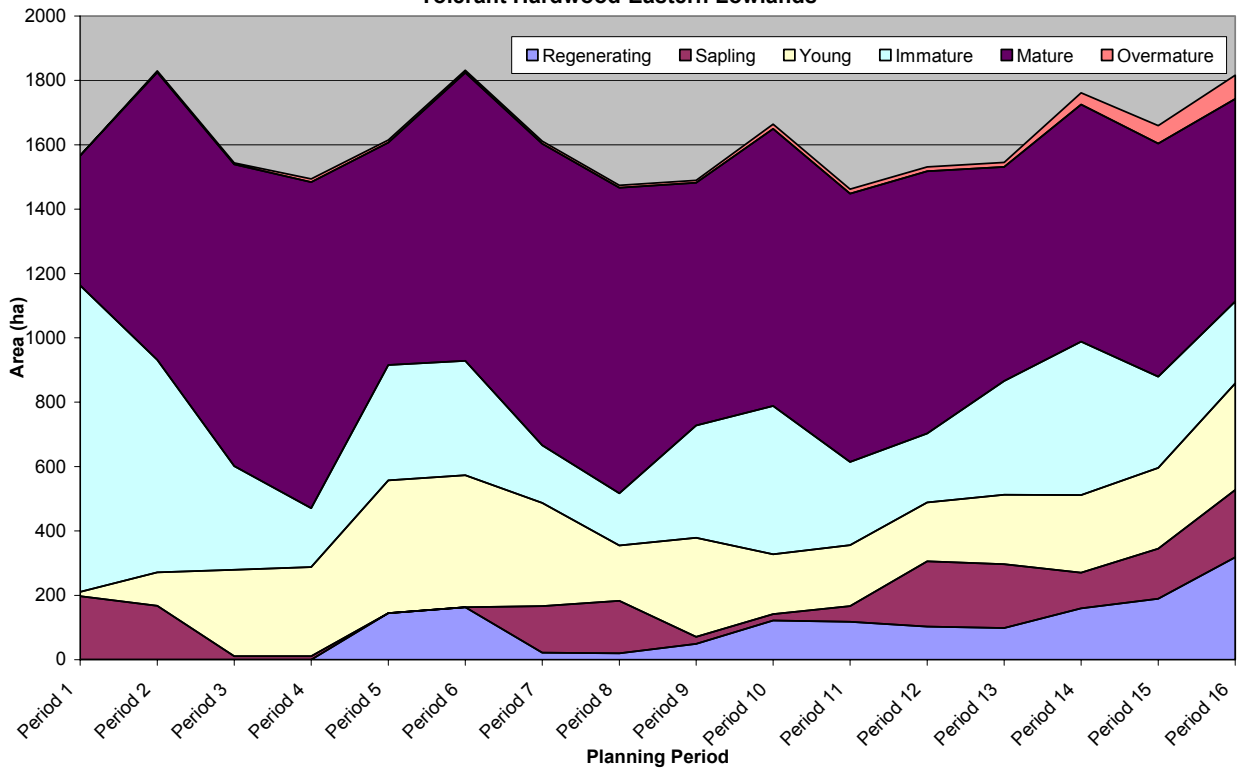
**Percent and Extent of Area by Ecological Community Type and Ageclass
Pine-Eastern Lowlands**



**Percent and Extent of Area by Ecological Community Type and Ageclass
Spruce Balsam Fir - Eastern Lowlands**

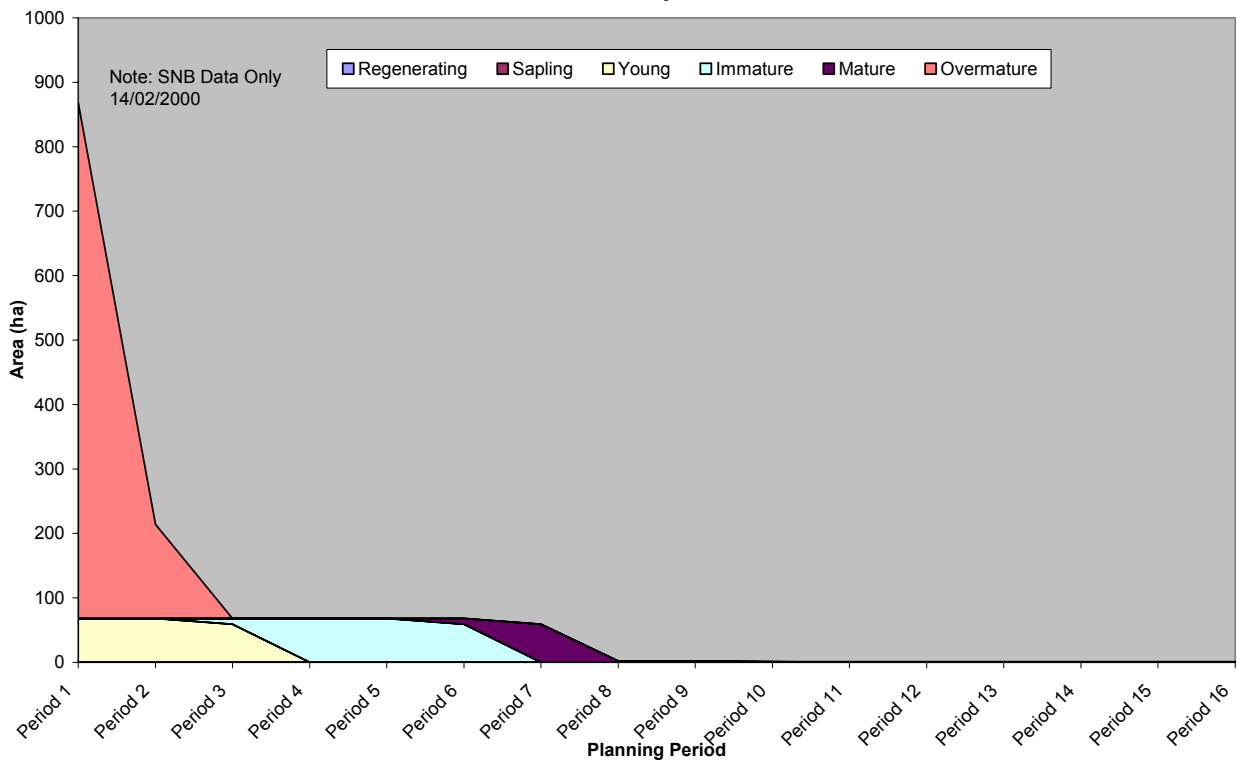


**Percent and Extent of Area by Ecological Community Type and Ageclass
Tolerant Hardwood-Eastern Lowlands**

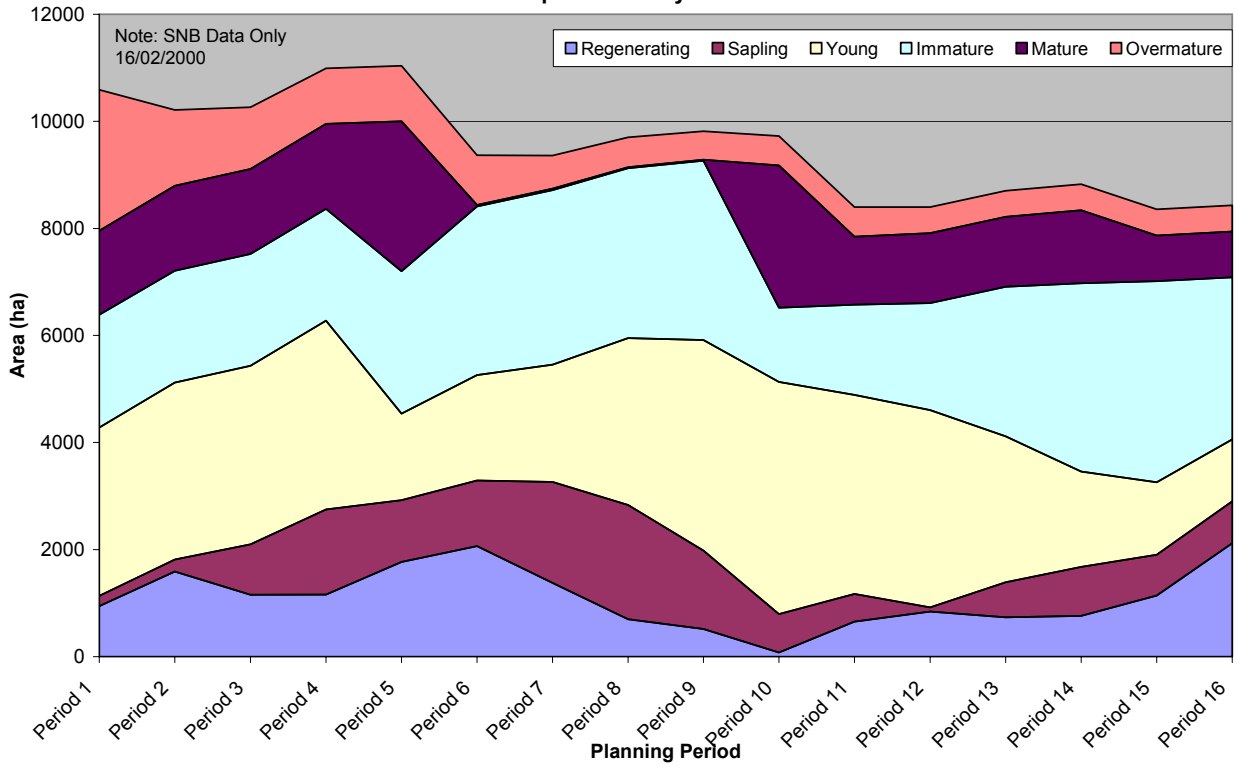


FUNDY COASTAL ECOREGION

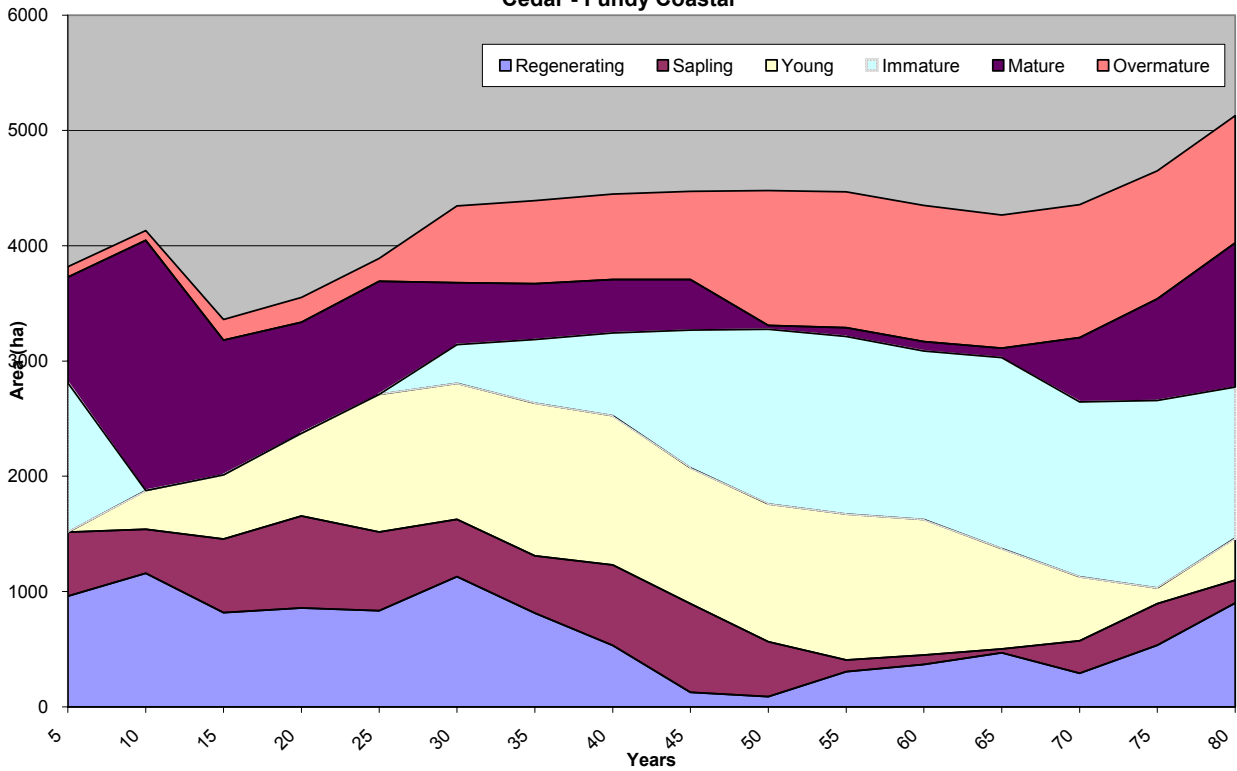
**Percent and Extent of Area by Ecological Community Type and Ageclass
Balsam Fir - Fundy Coastal**



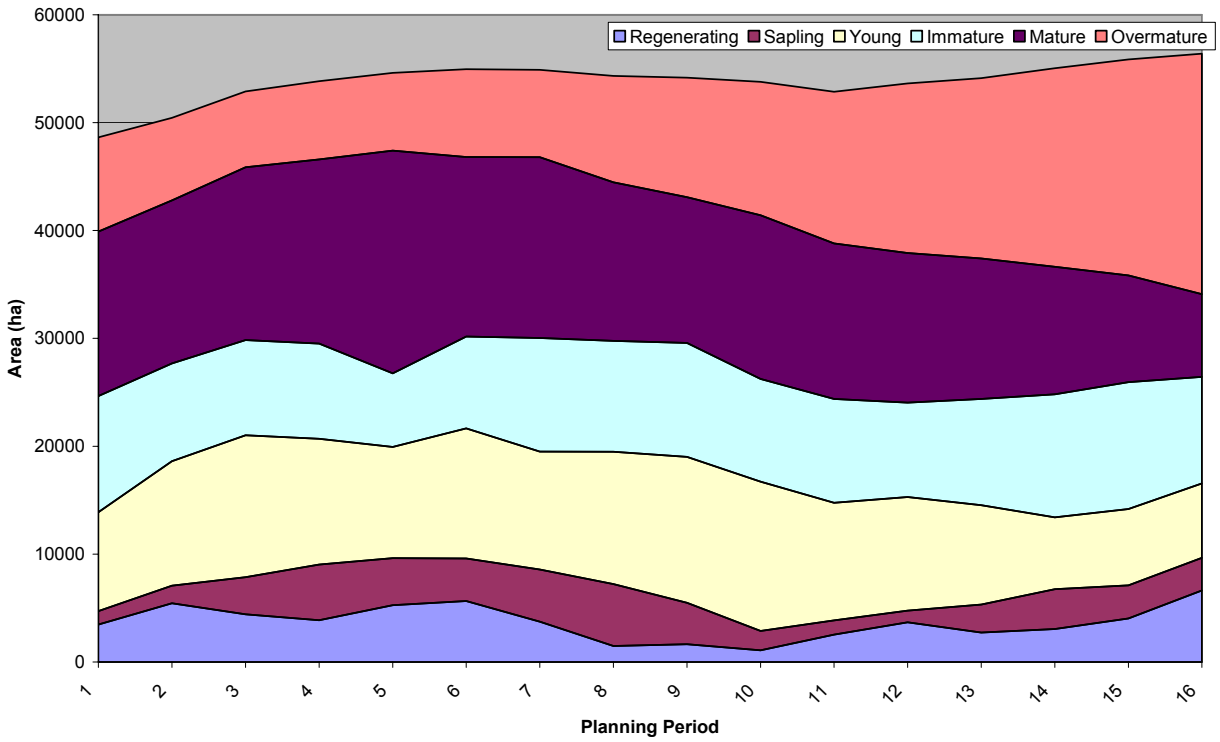
**Percent and Extent of Area by Ecological Community Type and Ageclass
Black Spruce - Fundy Coastal**



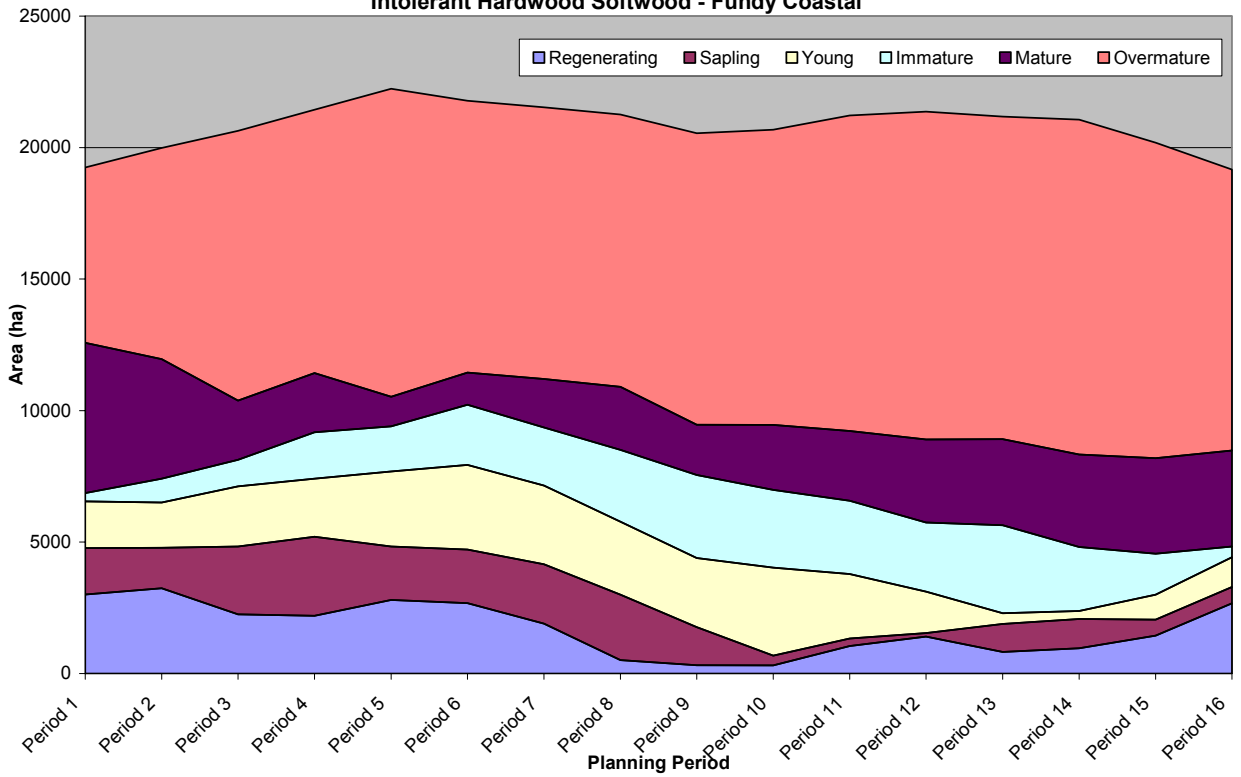
**Percent and Extent of Area by Ecological Community Type and Ageclass
Cedar - Fundy Coastal**



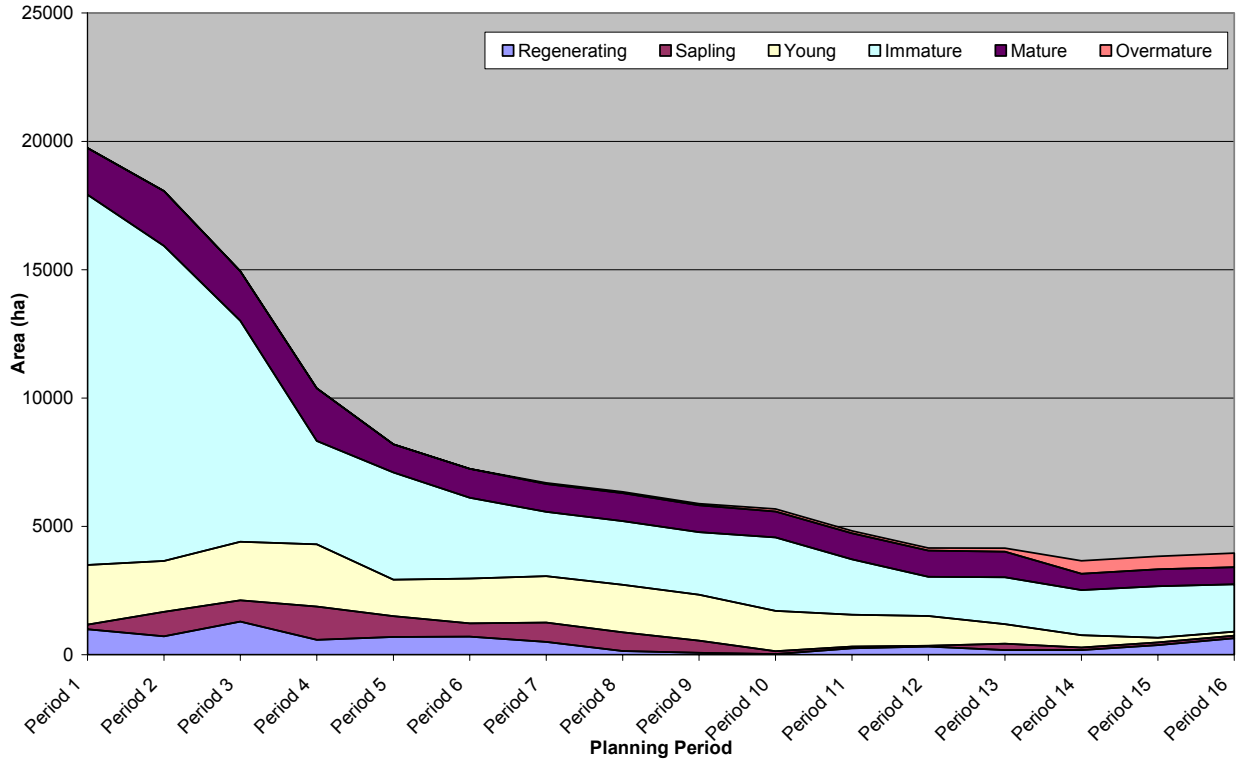
**Percent and Extent of Area by Ecological Community Type and Ageclass
CONIFER - Fundy Coastal**



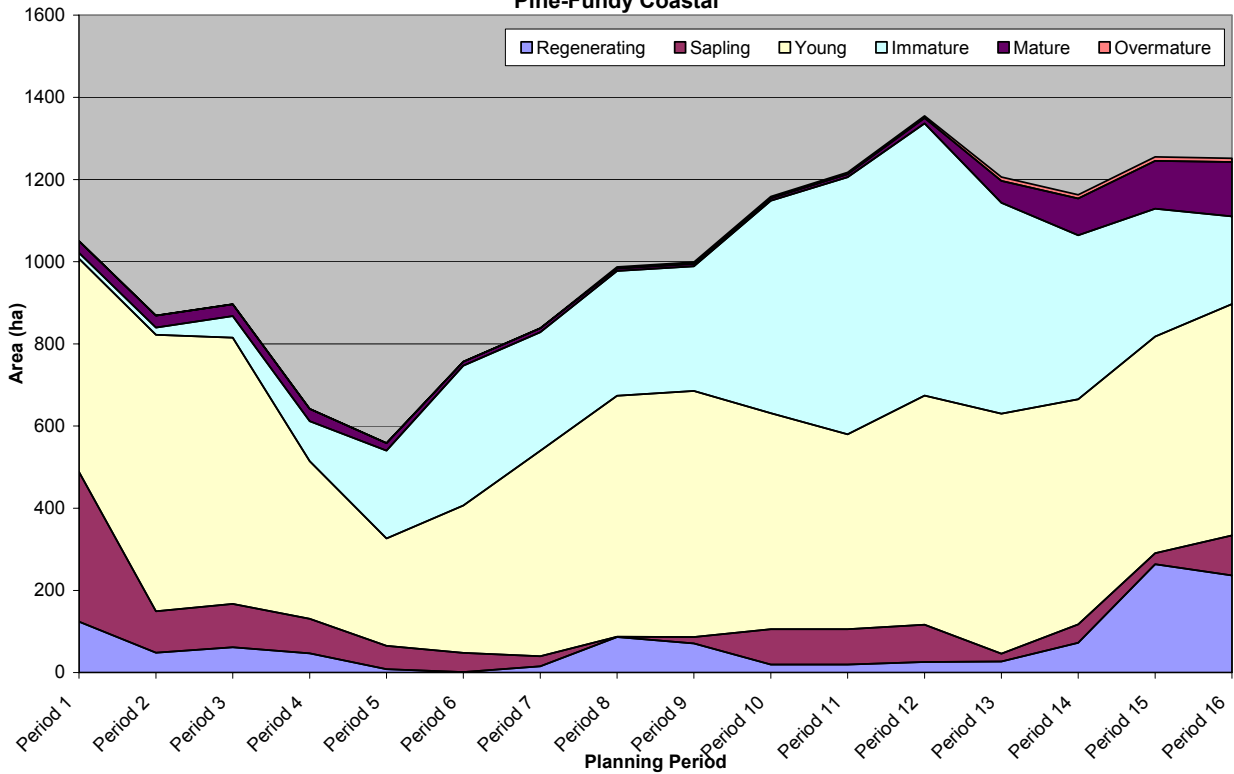
**Percent and Extent of Area by Ecological Community Type and Ageclass
Intolerant Hardwood Softwood - Fundy Coastal**



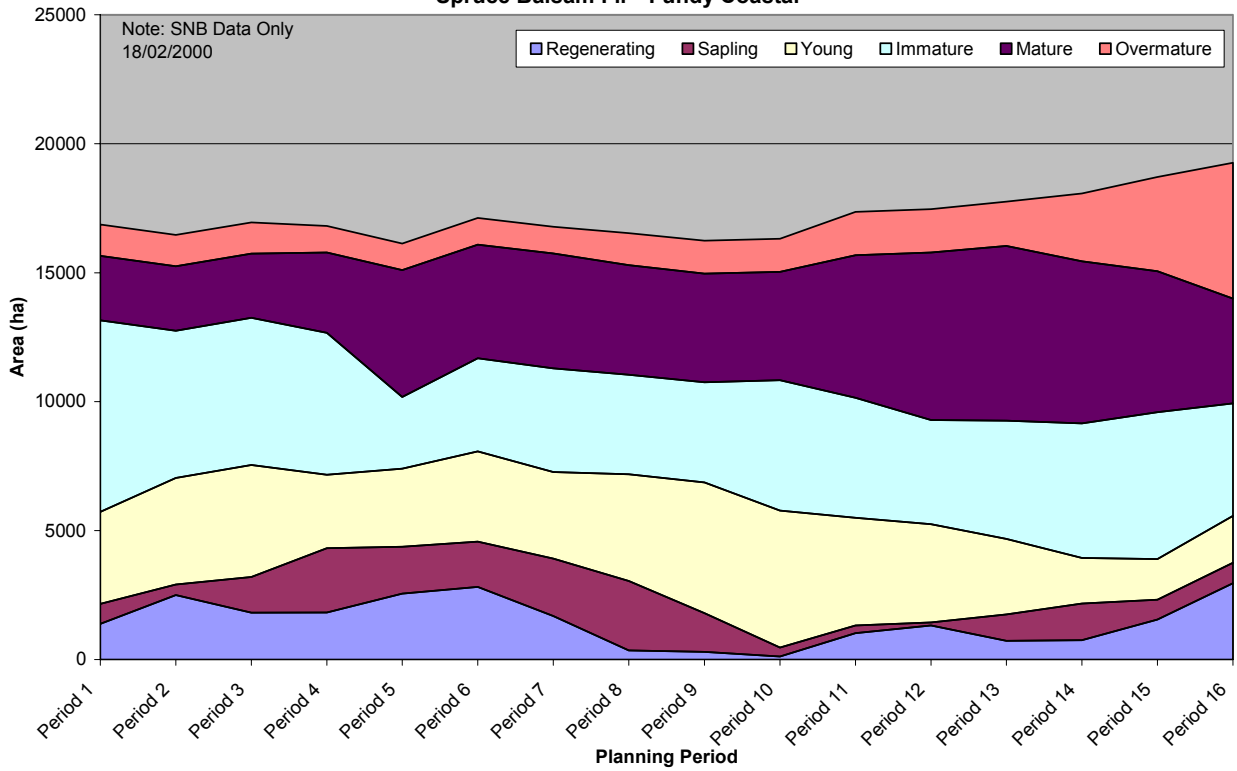
**Percent and Extent of Area by Ecological Community Type and Ageclass
Mixedwood - Fundy Coastal**



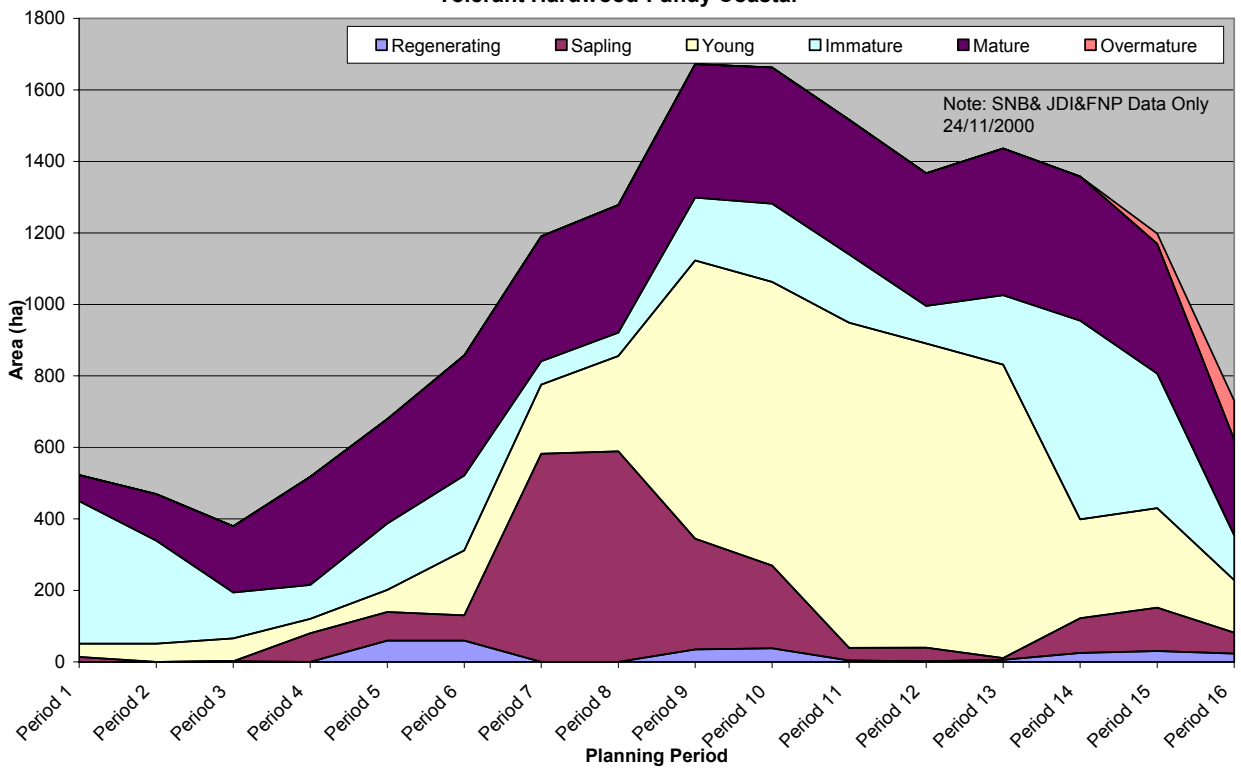
**Percent and Extent of Area by Ecological Community Type and Ageclass
Pine-Fundy Coastal**



**Percent and Extent of Area by Ecological Community Type and Ageclass
Spruce Balsam Fir - Fundy Coastal**

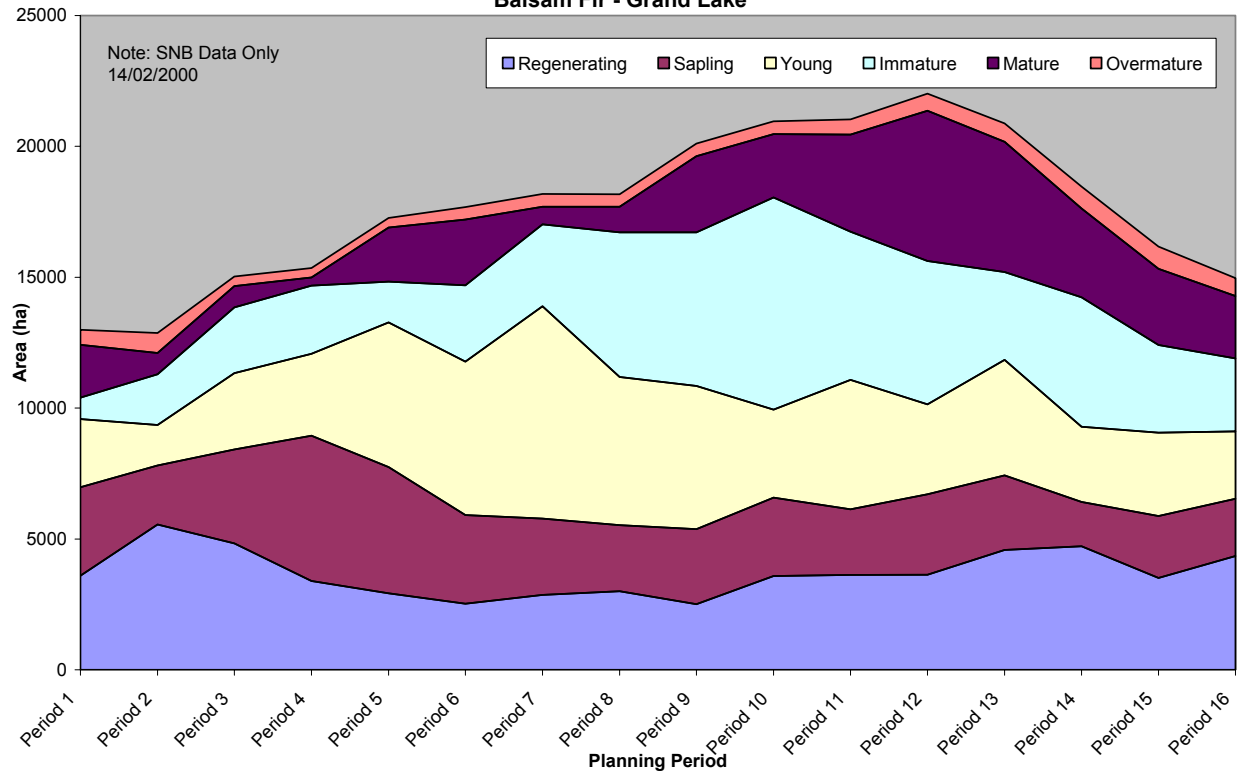


**Percent and Extent of Area by Ecological Community Type and Ageclass
Tolerant Hardwood-Fundy Coastal**

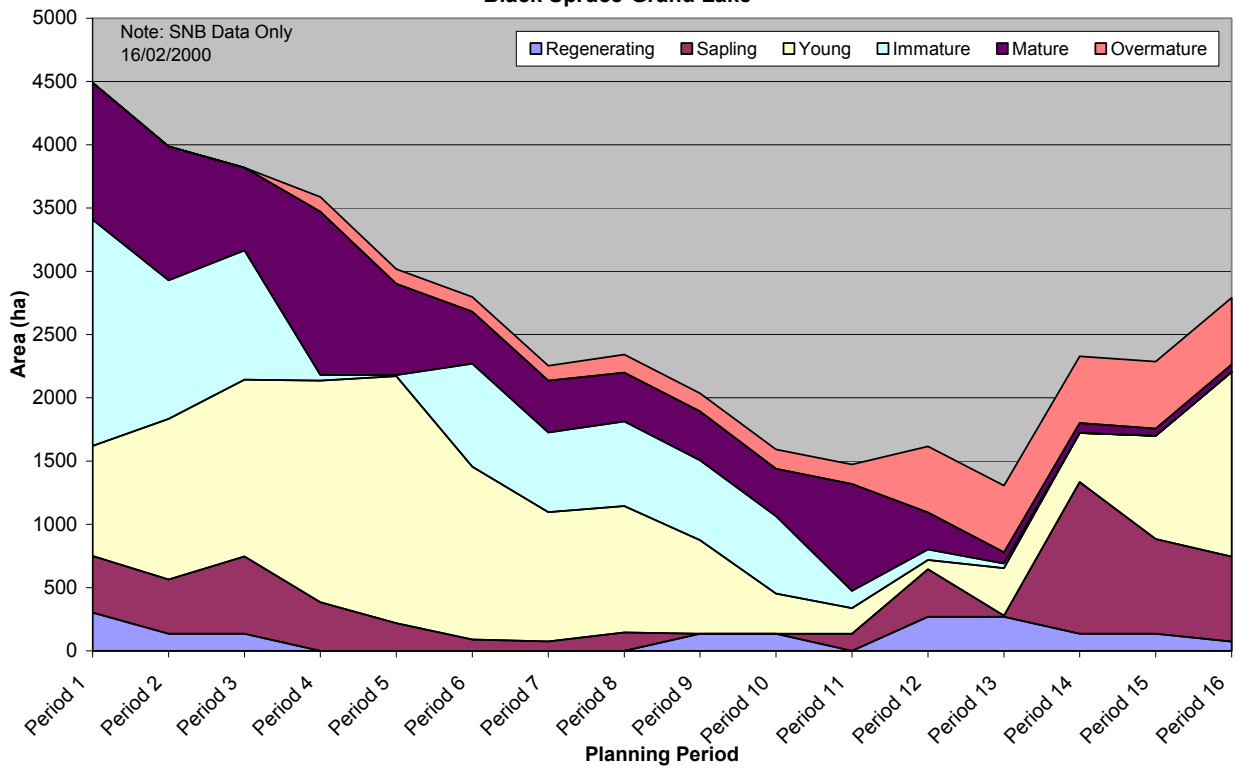


GRAND LAKE ECOREGION

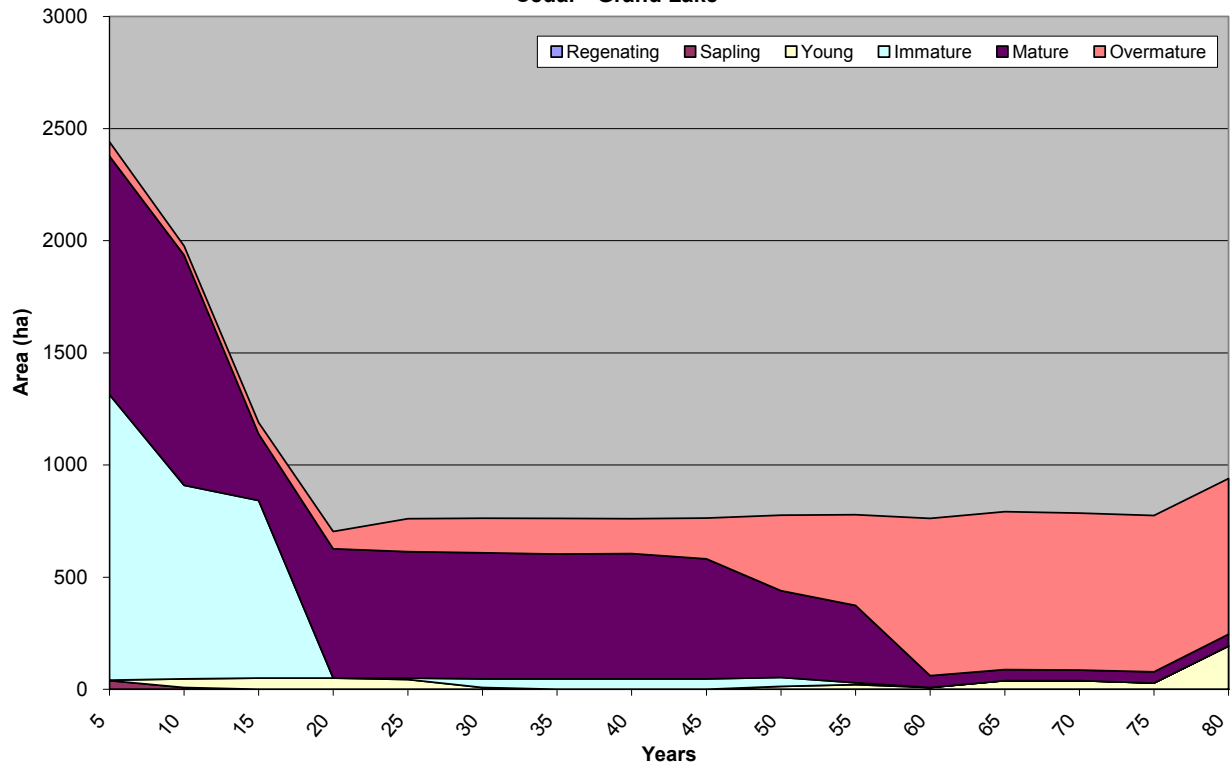
Percent and Extent of Area by Ecological Community Type and AgeClass Balsam Fir - Grand Lake



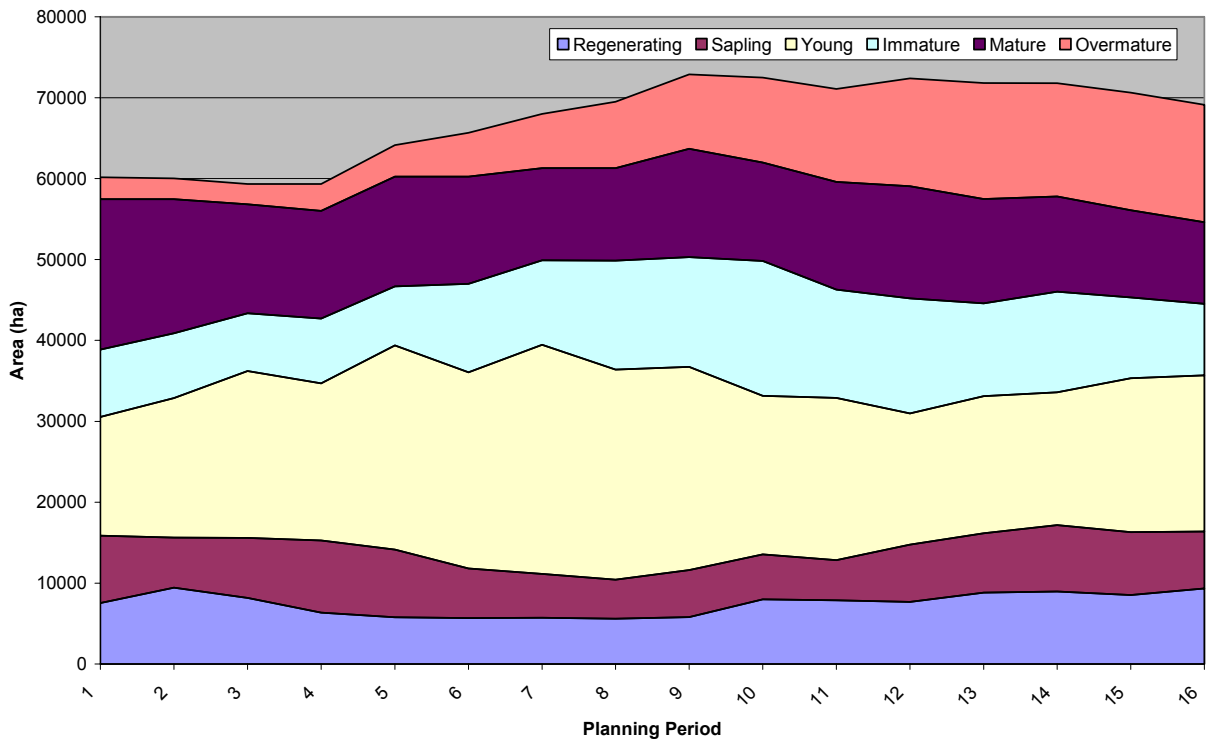
Percent and Extent of Area by ecological Community Type and Ageclass Black Spruce-Grand Lake



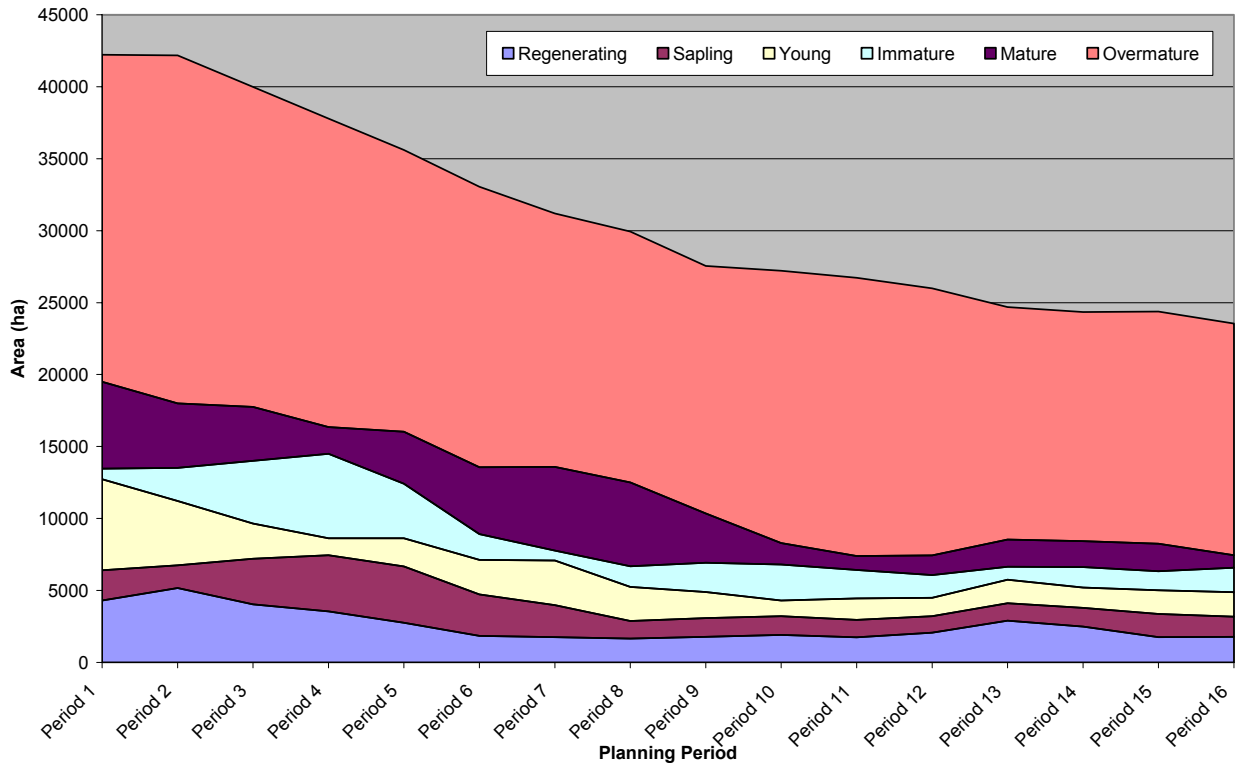
**Percent and Extent of Area by Ecological Community Type and Ageclass
Cedar - Grand Lake**



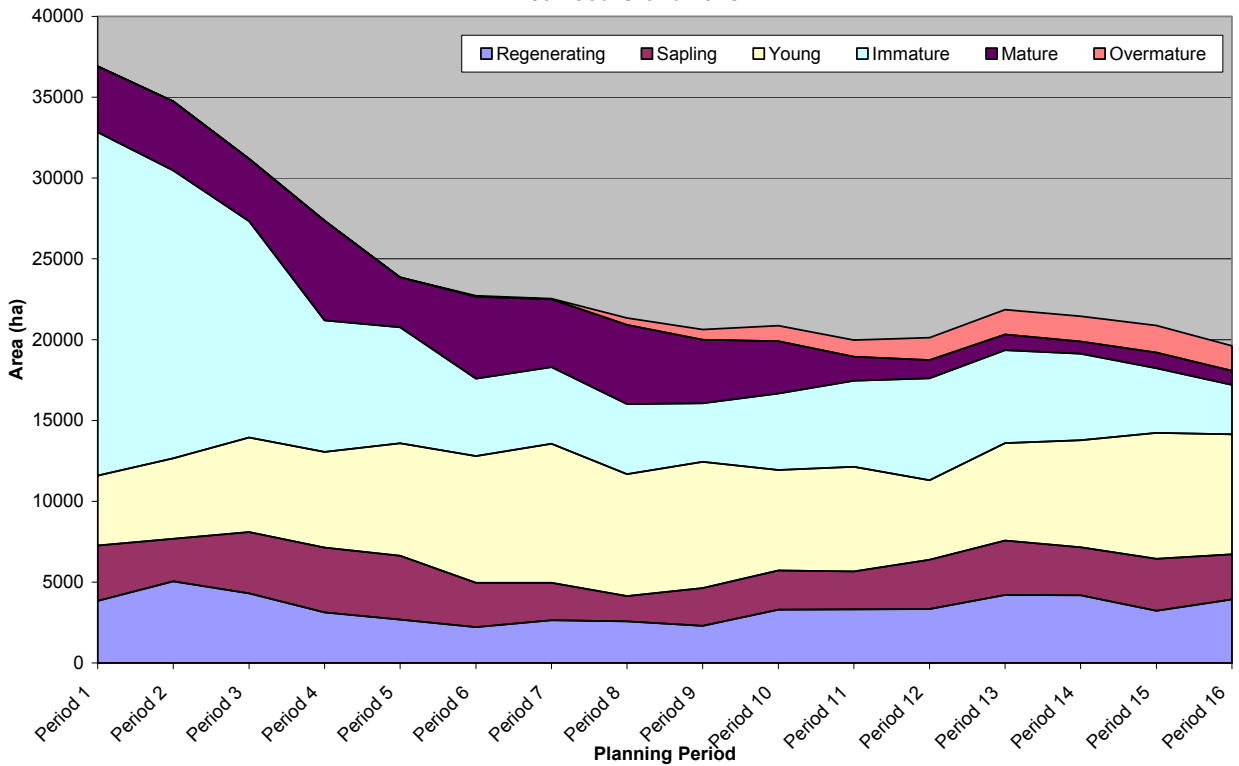
Percent and Extent of Area by Ecological Community Type and Ageclass CONIFER - Grand Lake



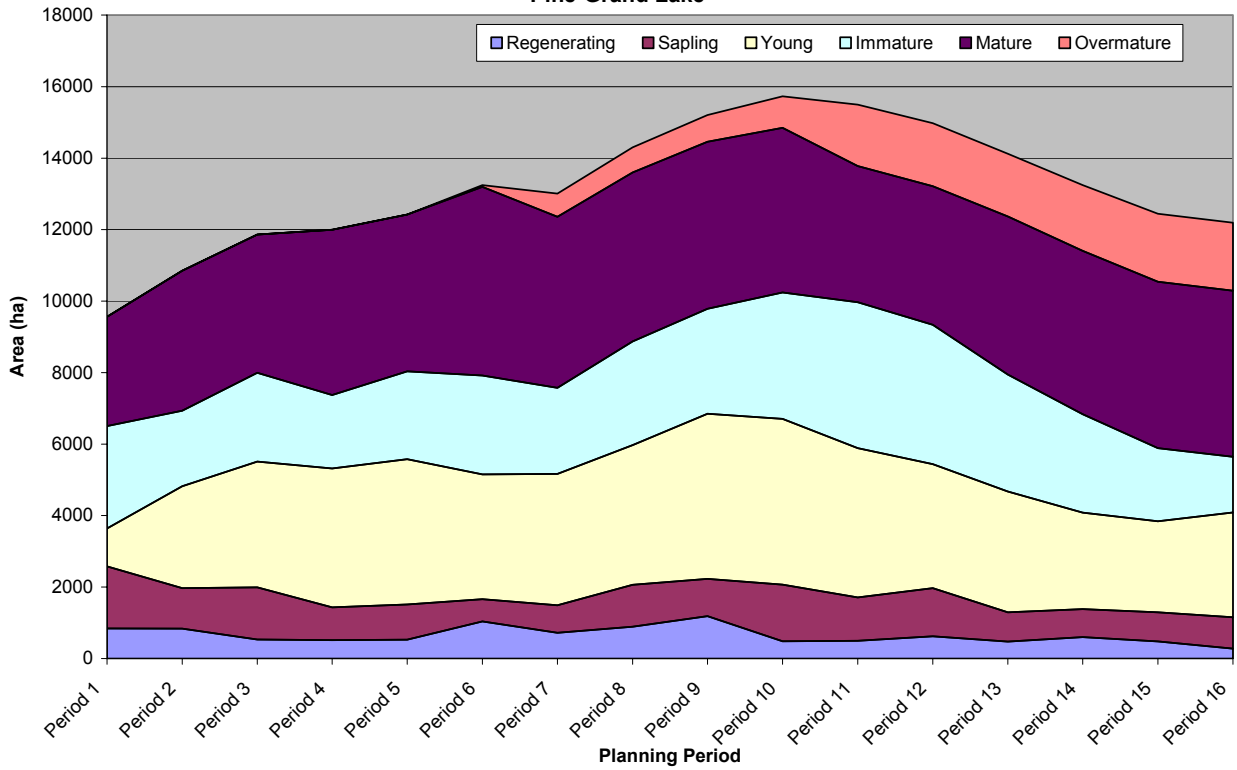
**Percent and Extent of Area by Ecological Community Type and Ageclass
Intolerant Hardwood Softwood-Grand Lake**



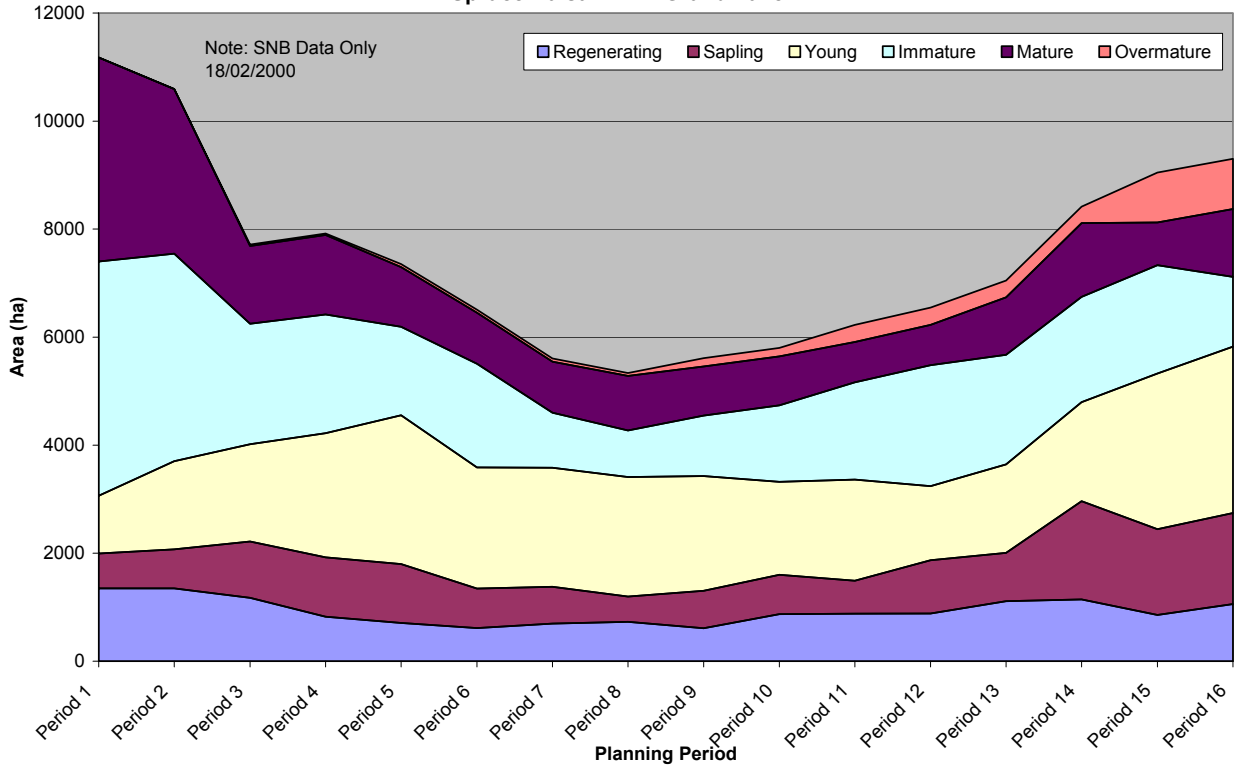
**Percent and Extent of Area by Ecological Community Type and Ageclass
Mixedwood-Grand Lake**



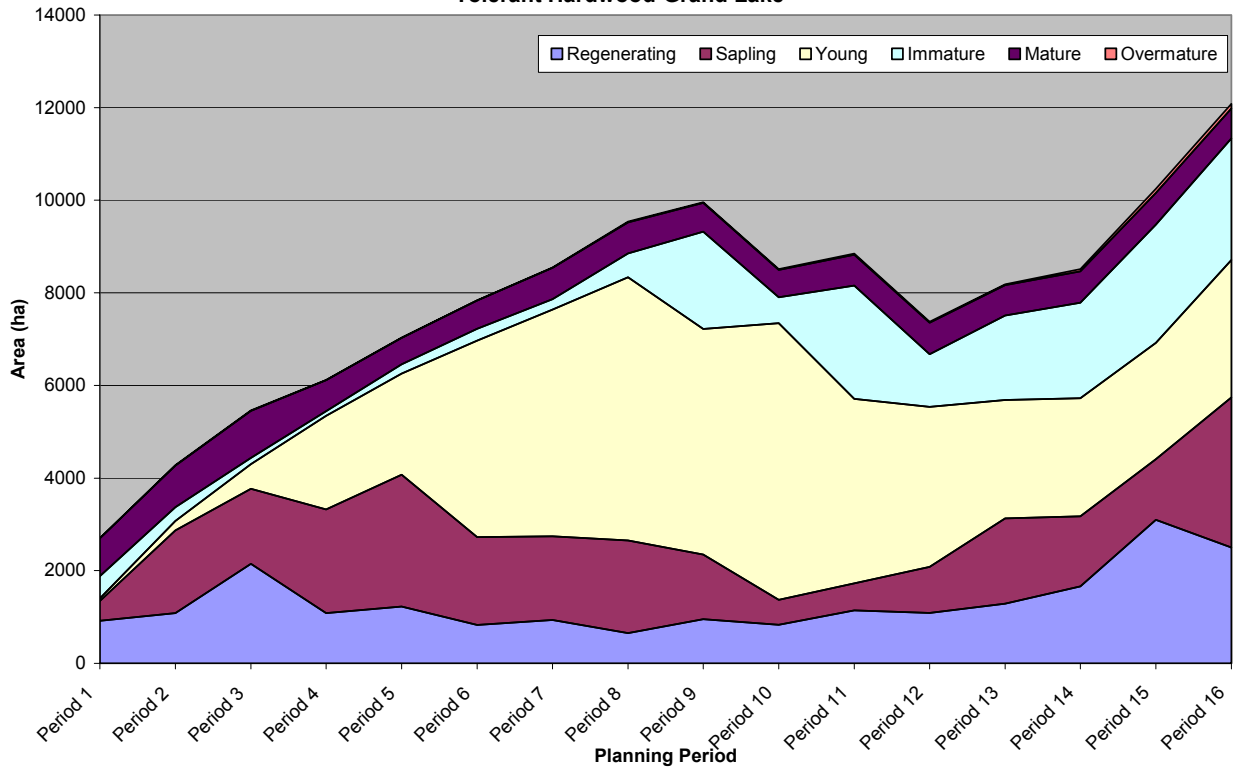
**Percent and Extent of Area by Ecological Community Type and Ageclass
Pine-Grand Lake**



**Percent and Extent of Area by Ecological Community Type and Ageclass
Spruce Balsam Fir - Grand Lake**

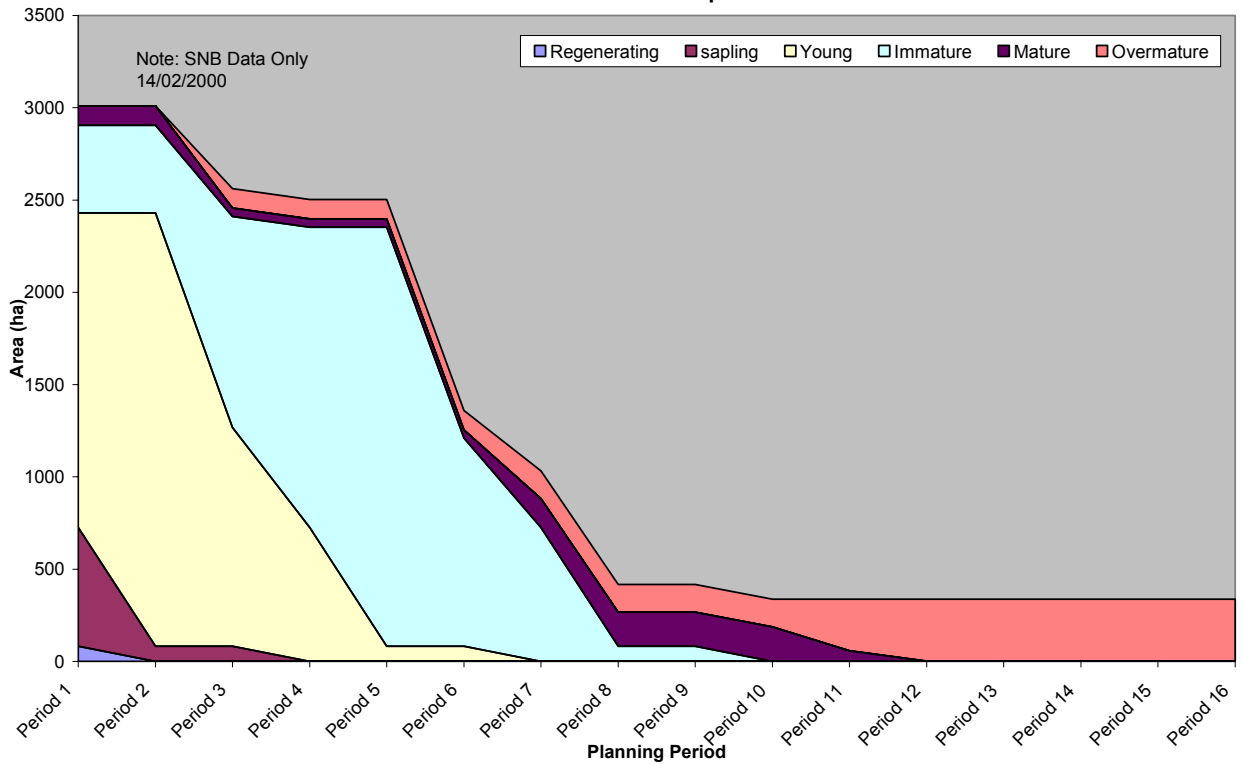


**Percent and Extent of Area by Ecological Community Type and Ageclass
Tolerant Hardwood-Grand Lake**

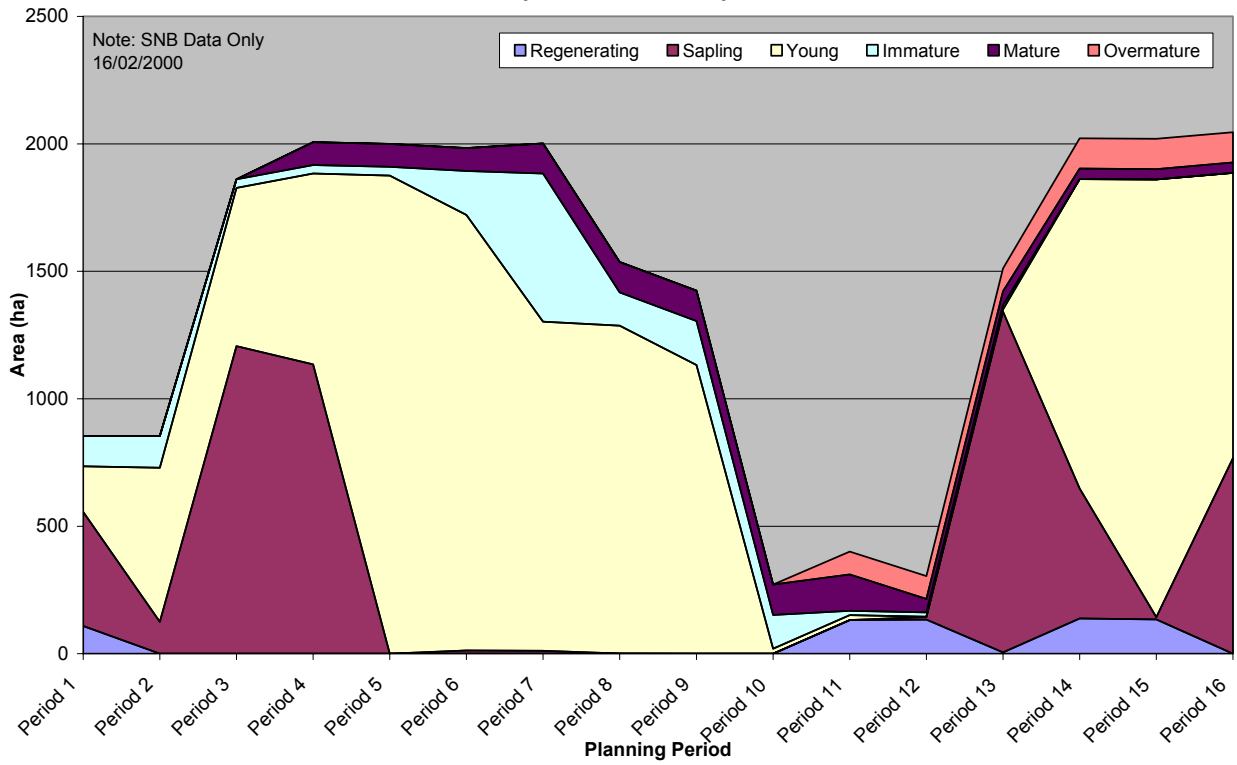


SOUTHERN UPLANDS ECOREGION

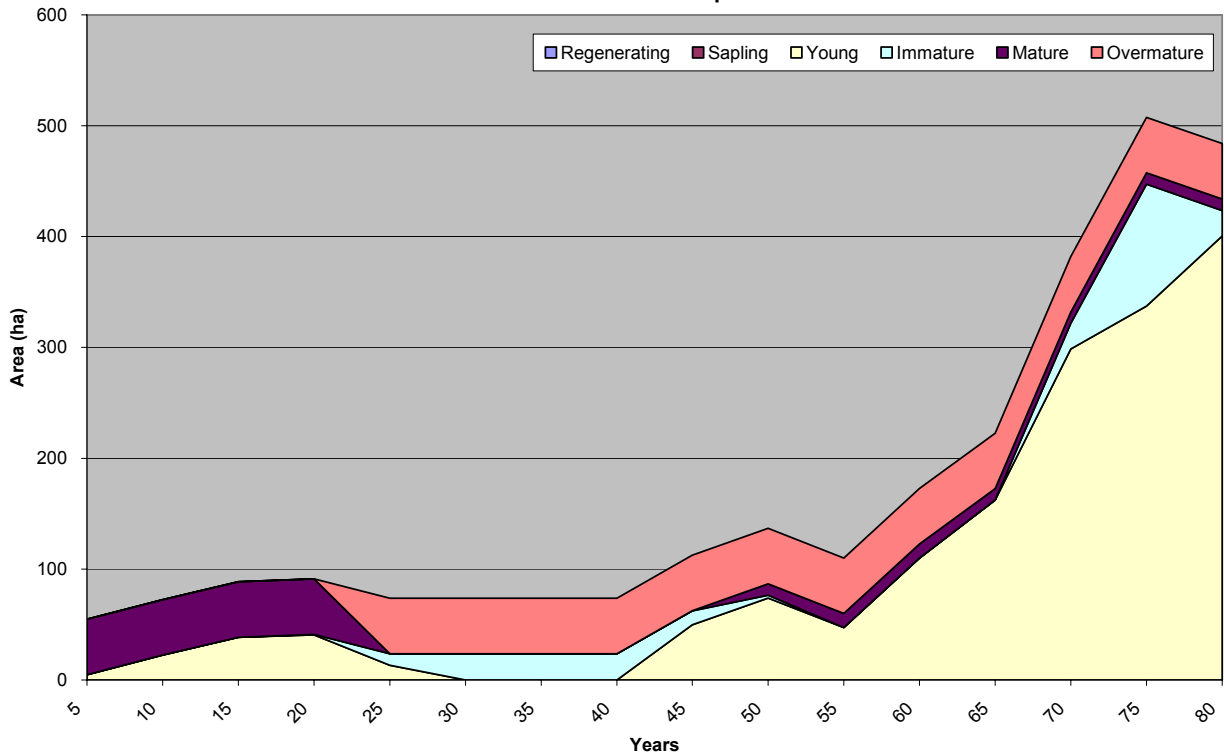
**Percent and Extent of Area by Ecological Community Type and Ageclass
Balsam Fir - Southern Uplands**



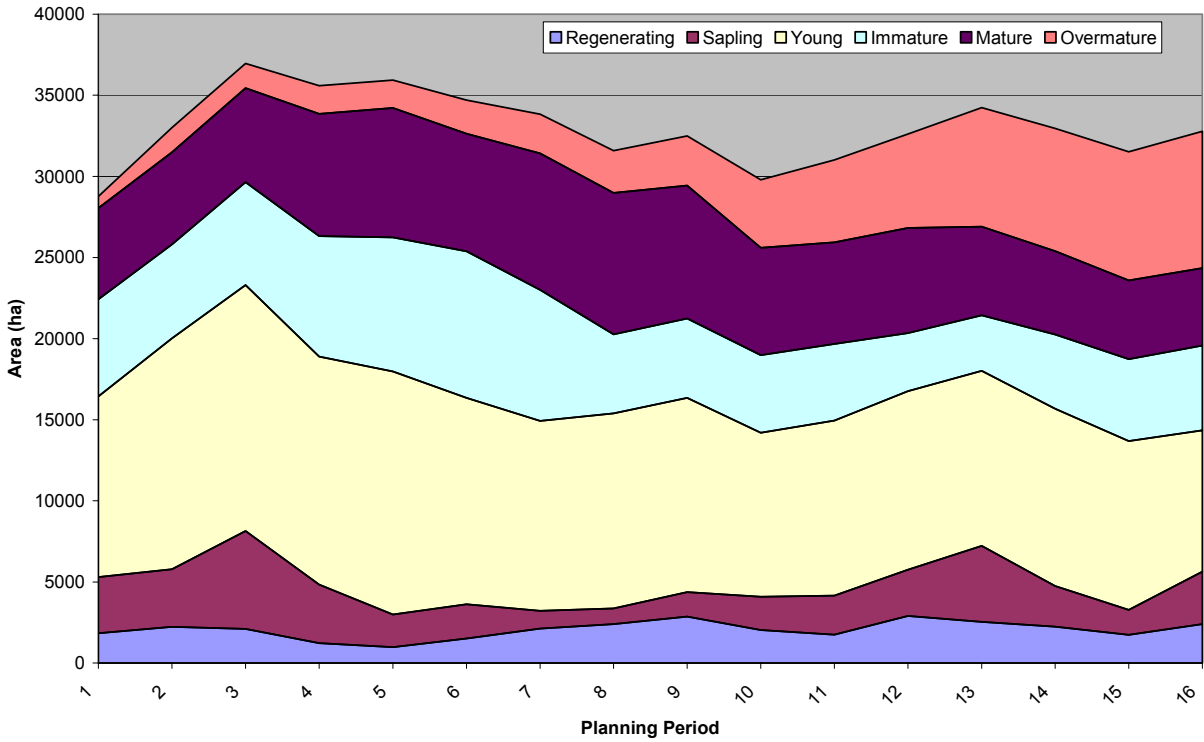
**Percent and Extent of Area by Ecological Community type and Ageclass
Black Spruce - Southern Uplands**



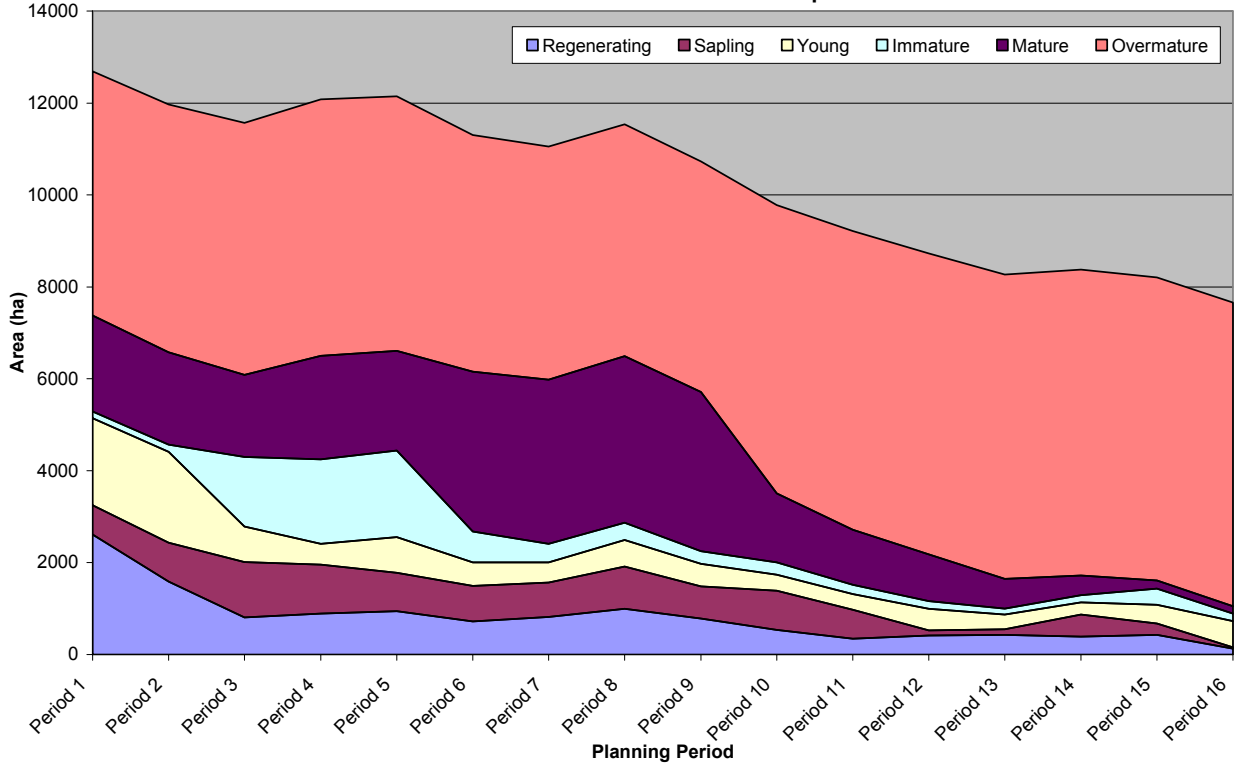
**Percent and Extent of Area by Ecological Community Type and Ageclass
Eastern Cedar - Southern Uplands**



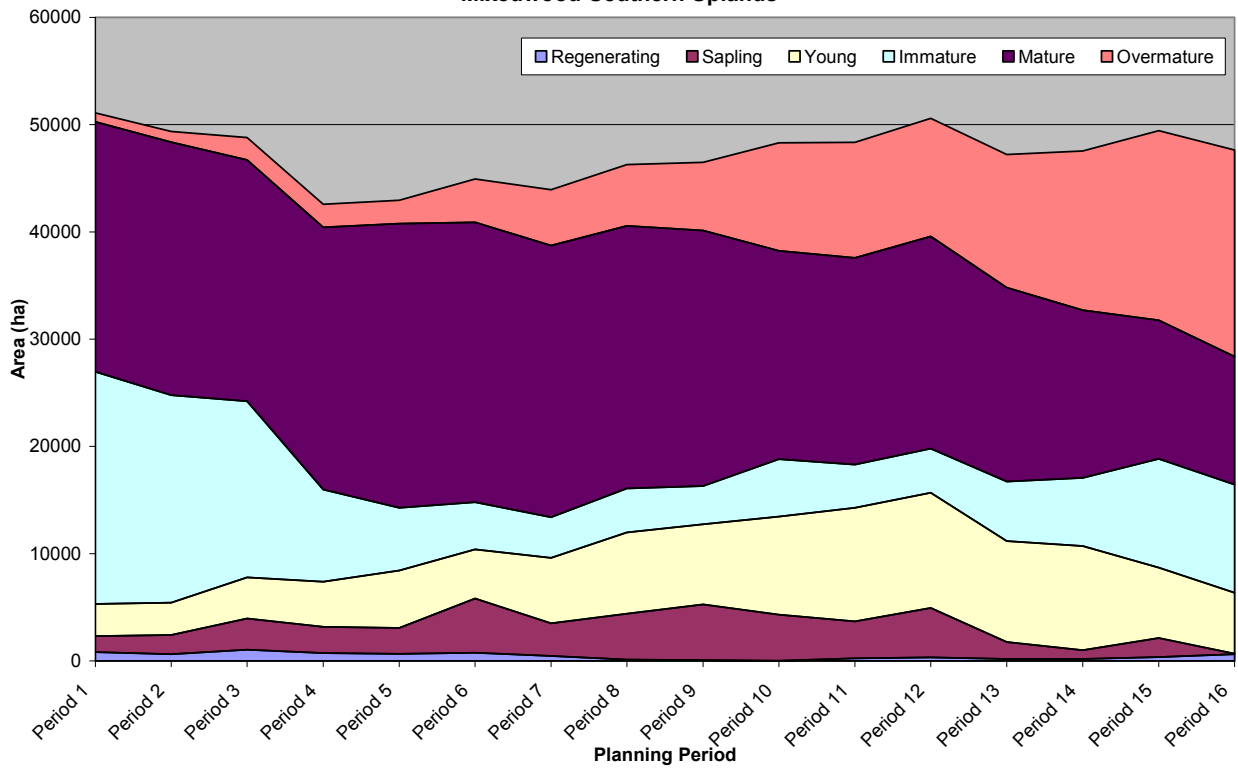
**Percent and Extent of Area by Ecological Community Type and Ageclass
CONIFER - Southern Uplands**



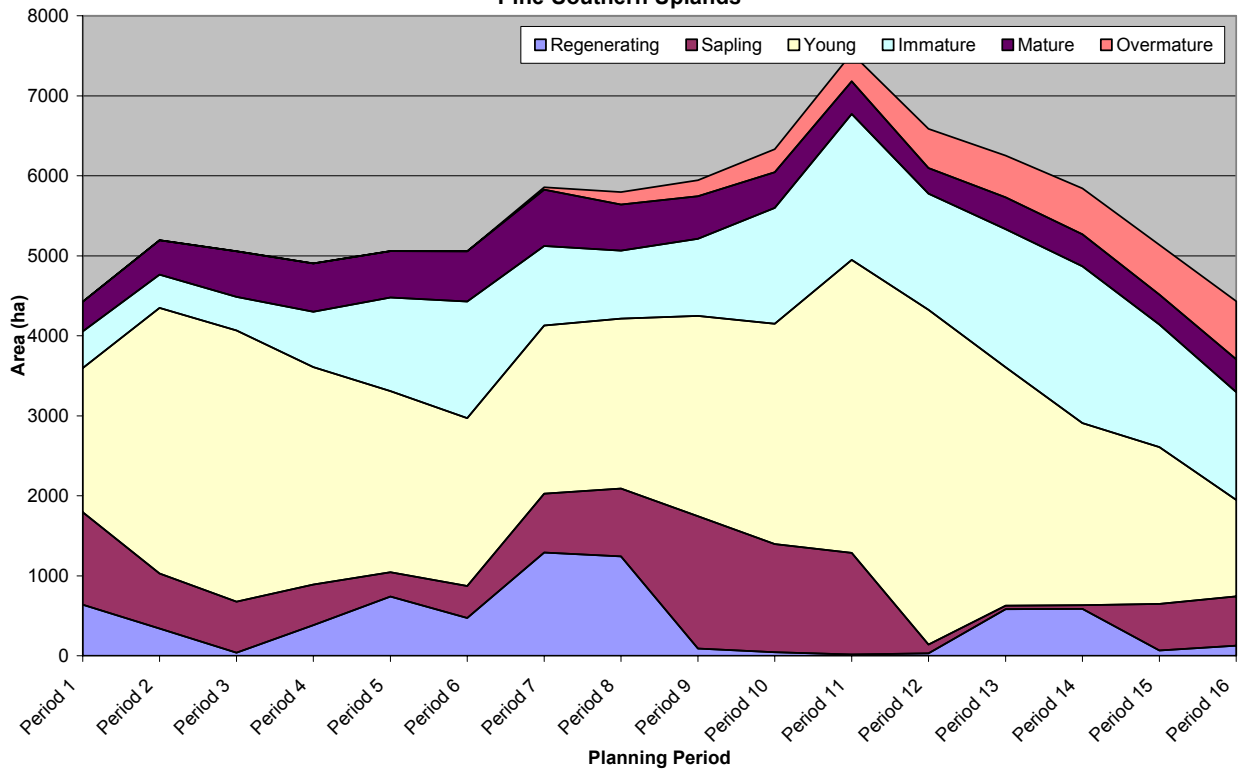
**Percent and Extent of Area by Ecological Community Type and Ageclass
Intolerant Hardwood Softwood - Southern Uplands**



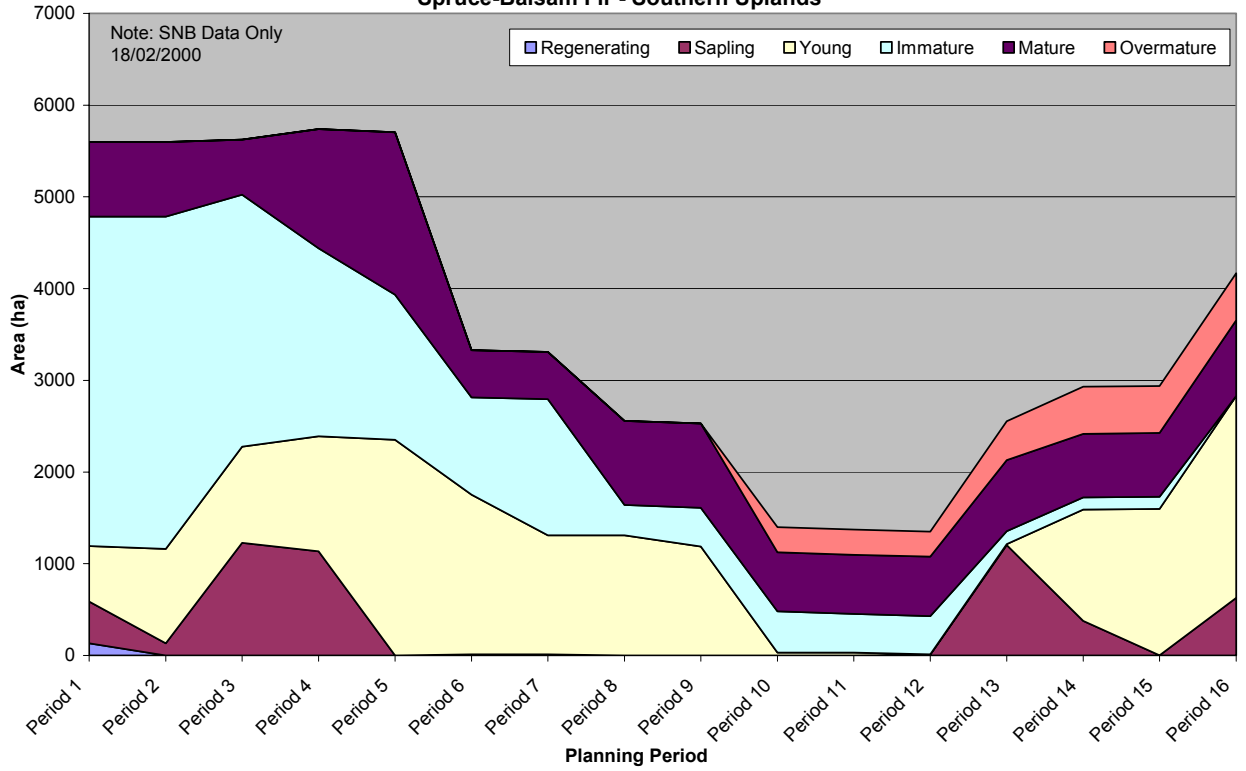
**Percent and Extent of Area by Ecological Community Type and Ageclass
Mixedwood-Southern Uplands**



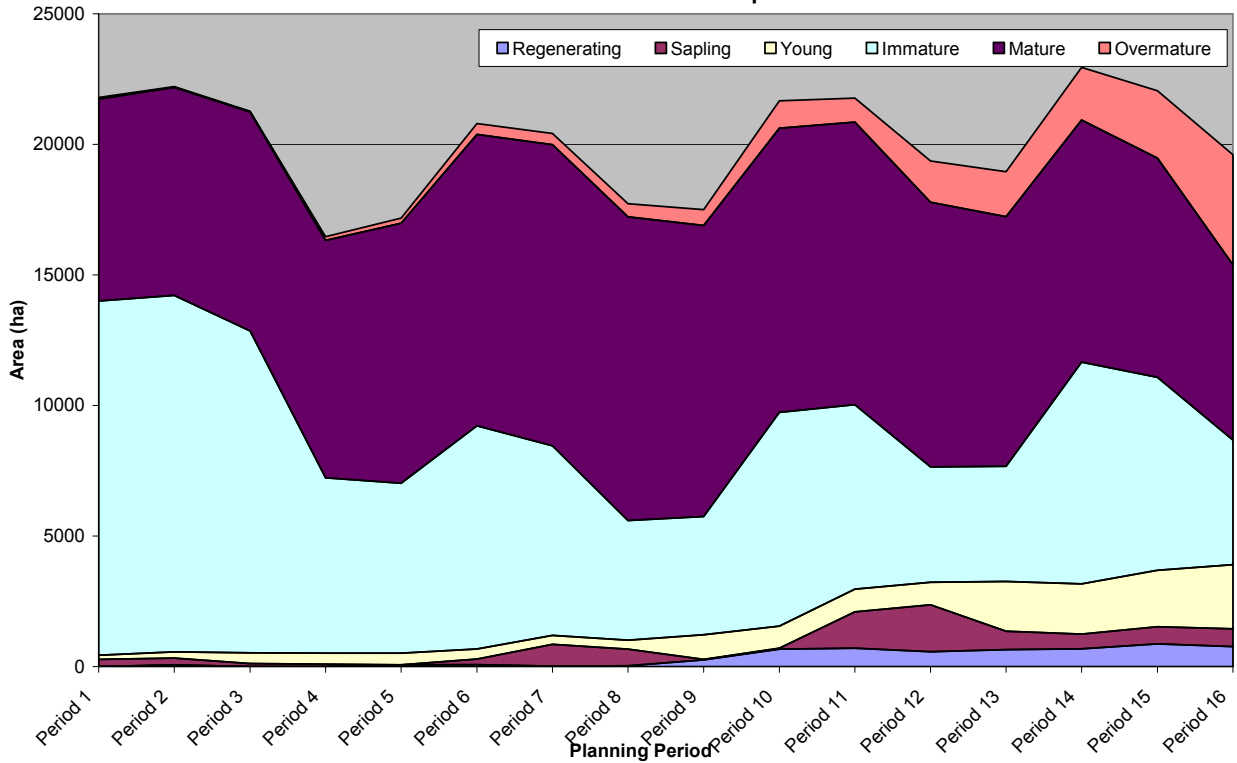
**Percent and Extent of Area by Ecological Community Type and Ageclass
Pine-Southern Uplands**



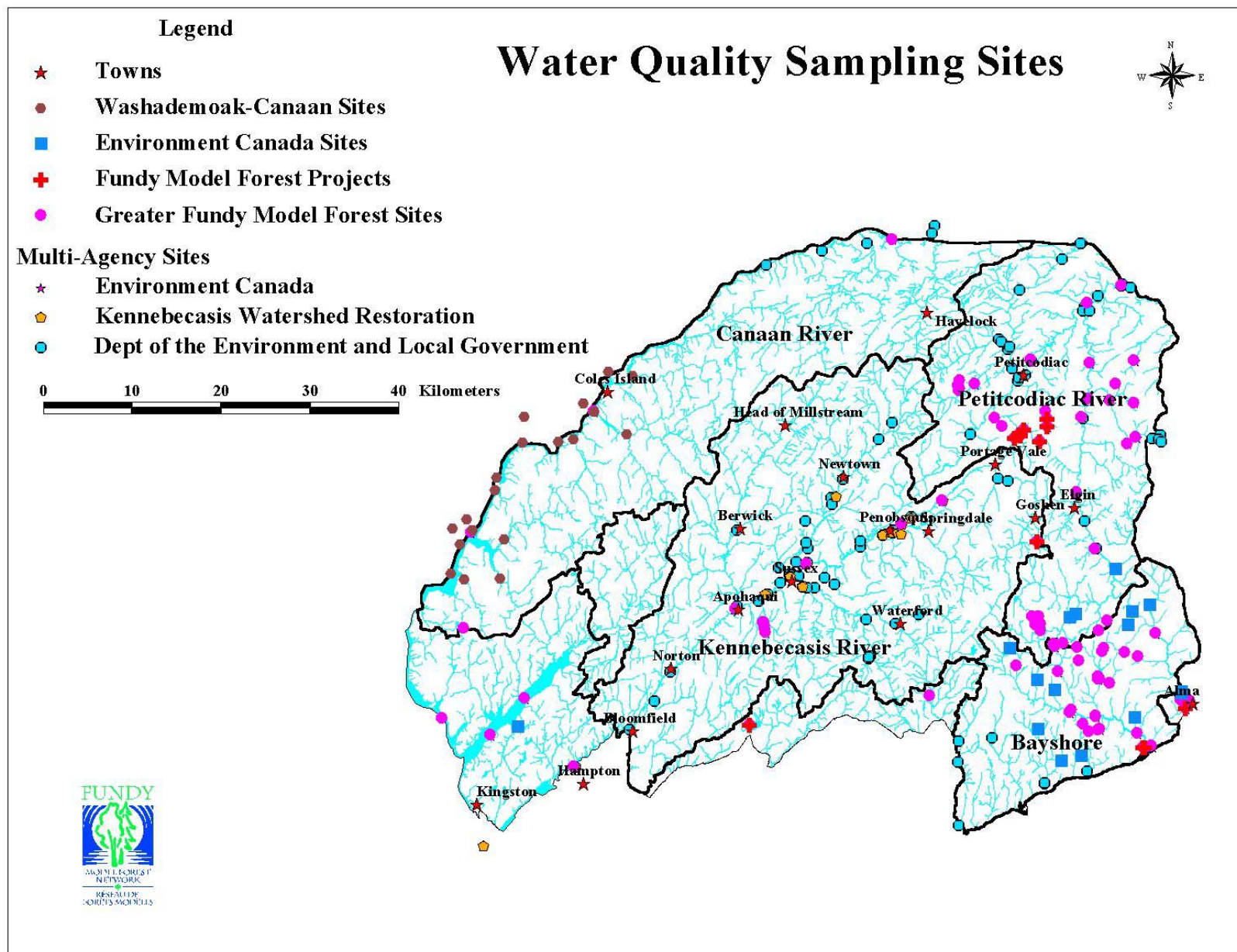
**Percent and Extent of Area by Ecological Community Type and Ageclass
Spruce-Balsam Fir - Southern Uplands**



**Percent and Extent of Area by Ecological Community Type and Ageclass
Tolerant Hardwood - Southern Uplands**



Appendix 5. Water Quality Monitoring sites by various agencies in the Fundy Model Forest.



Appendix 6. Tabular results showing affected 1st order catchments for the Hayward Brook Watershed.

The percent cut condition is shown for each catchment in recent cut condition.

Catchment	Total Area (ha)	Harvest by Catchment (ha)	Percent by Catchment
4	36.7	0.9	2.4
6	44.3	5.5	12.4
7	125.4	1.1	0.9
10	95.1	31.4	33.0
18	130.1	30.0	23.1
19	49.2	7.5	15.3
20	99.6	7.9	8.0
24	57.7	2.1	3.6
27	177.3	16.0	9.0
Total:	815.4	102.4	12.6

Appendix 7 Graphic summaries of riparian zone status in two watersheds of the FMF.

Status of Riparian Zones in the Anagance Watershed. Forested areas are shown in green while non-forested areas are shown in other colors. Riparian status is shown as two lines (e.g. left and right stream banks) being read upstream from the mouth to the headwaters for the mainstem and each of the tributaries. Corresponding photos give an idea of the ground conditions of each situation.

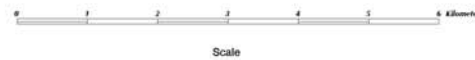
The graphs represent the area and nature of Forested Buffers in the Anagance and Pollett watersheds, and the status of Non-Forest buffers in the Anagance and Pollett river watersheds.

Anagance Watershed Riparian Zone Status



Legend

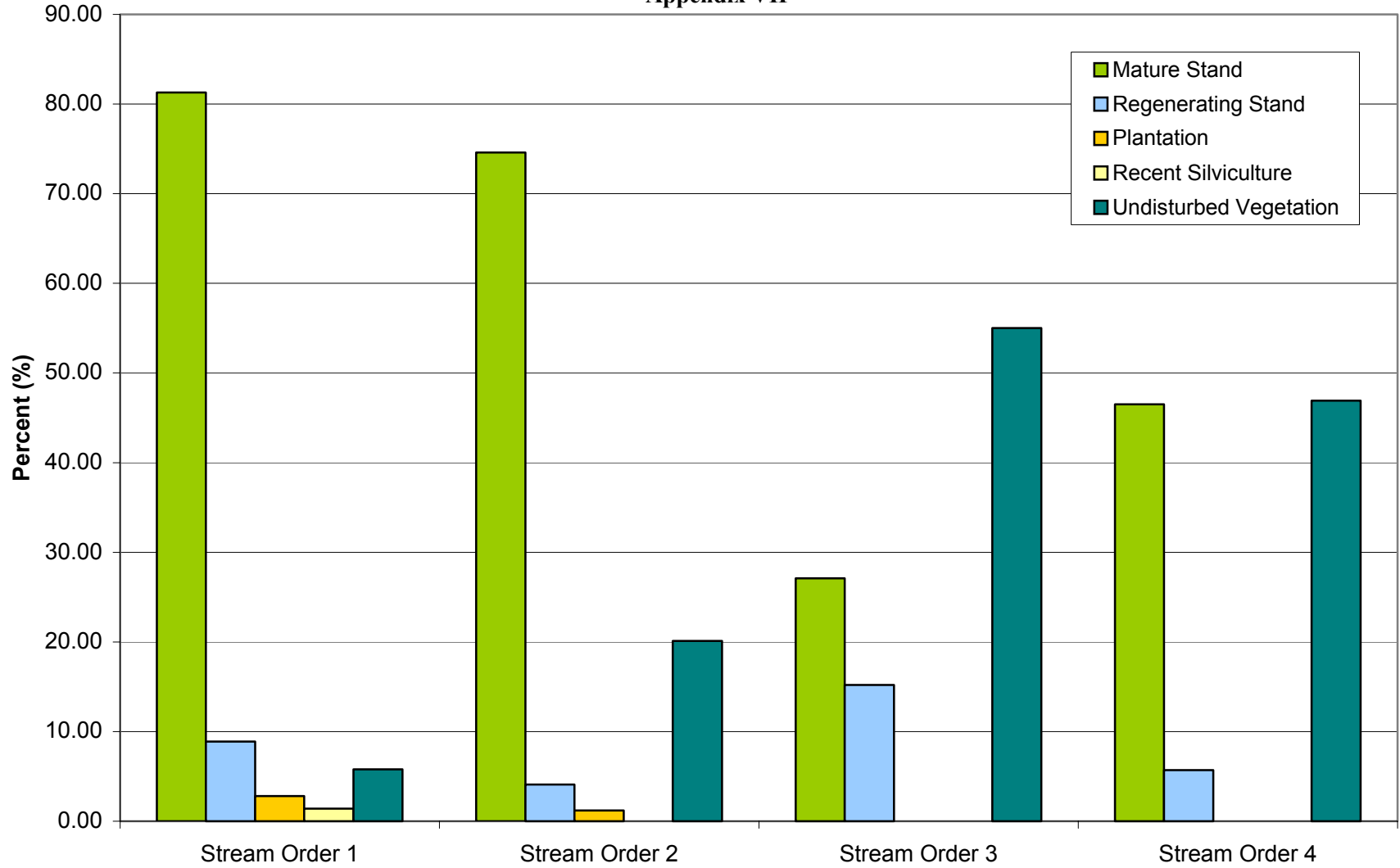
- Roads
 - Primary DOT Highway
 - Secondary DOT Highway
 - Tertiary Forest Road
 - Fore Road
 - Railway
 - Transmission Lines
- Left Streambank Riparian Status
 - Bar
 - Fringe
 - Adequate
 - Forested
- Right Streambank Riparian Status
 - Bar
 - Fringe
 - Adequate
 - Forested
- Watershed
 - Watershed
 - Wetlands
- Non-Forested Areas
 - Alder Cut
 - Alder Field
 - Cultivated Pasture
 - Grassed Pit
 - Occupied Residential
 - Forest



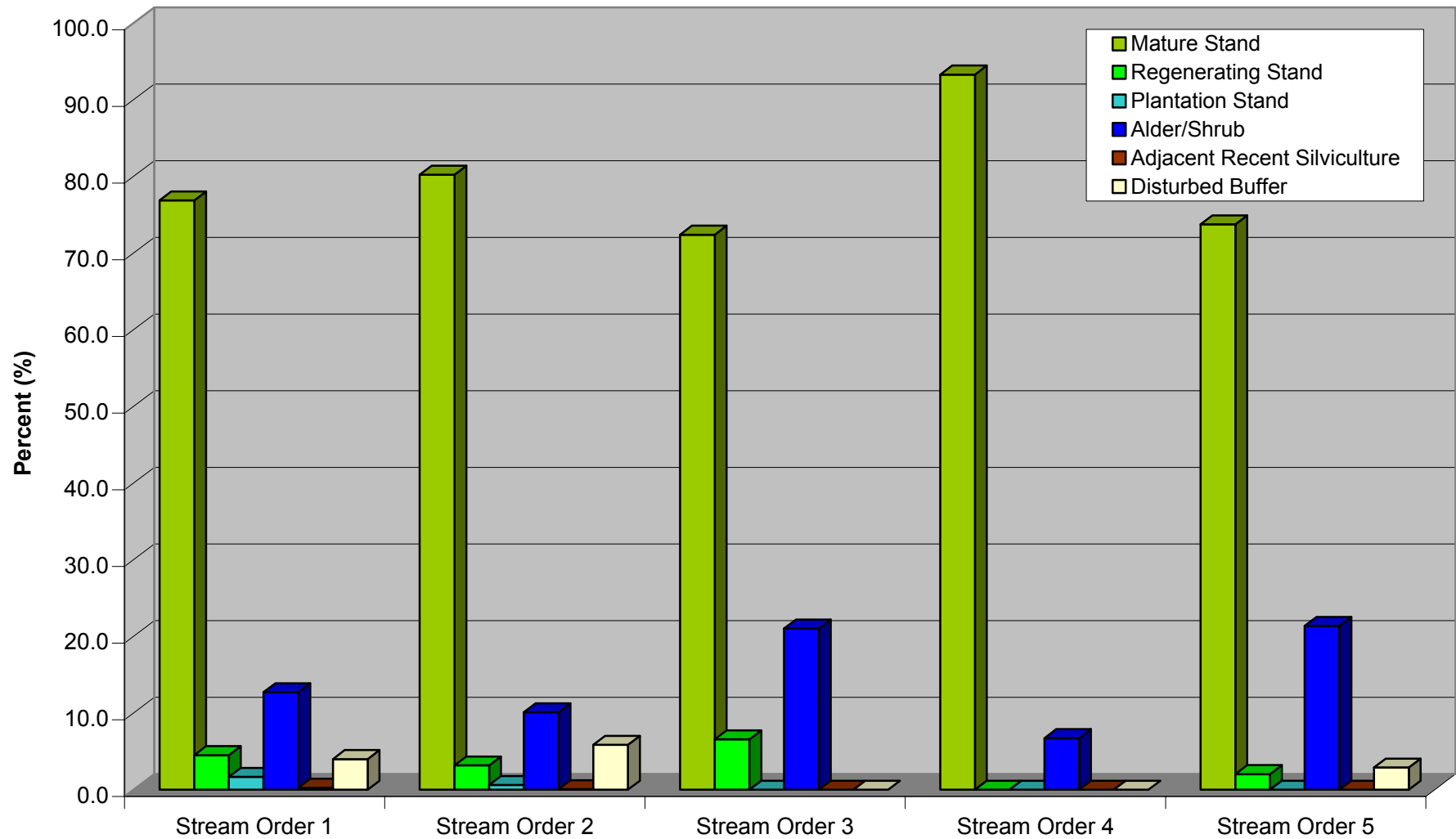
Nature of Forested Buffers in the Anagance Watershed

Singleline Hydrographic Features - approx 95% of the watershed

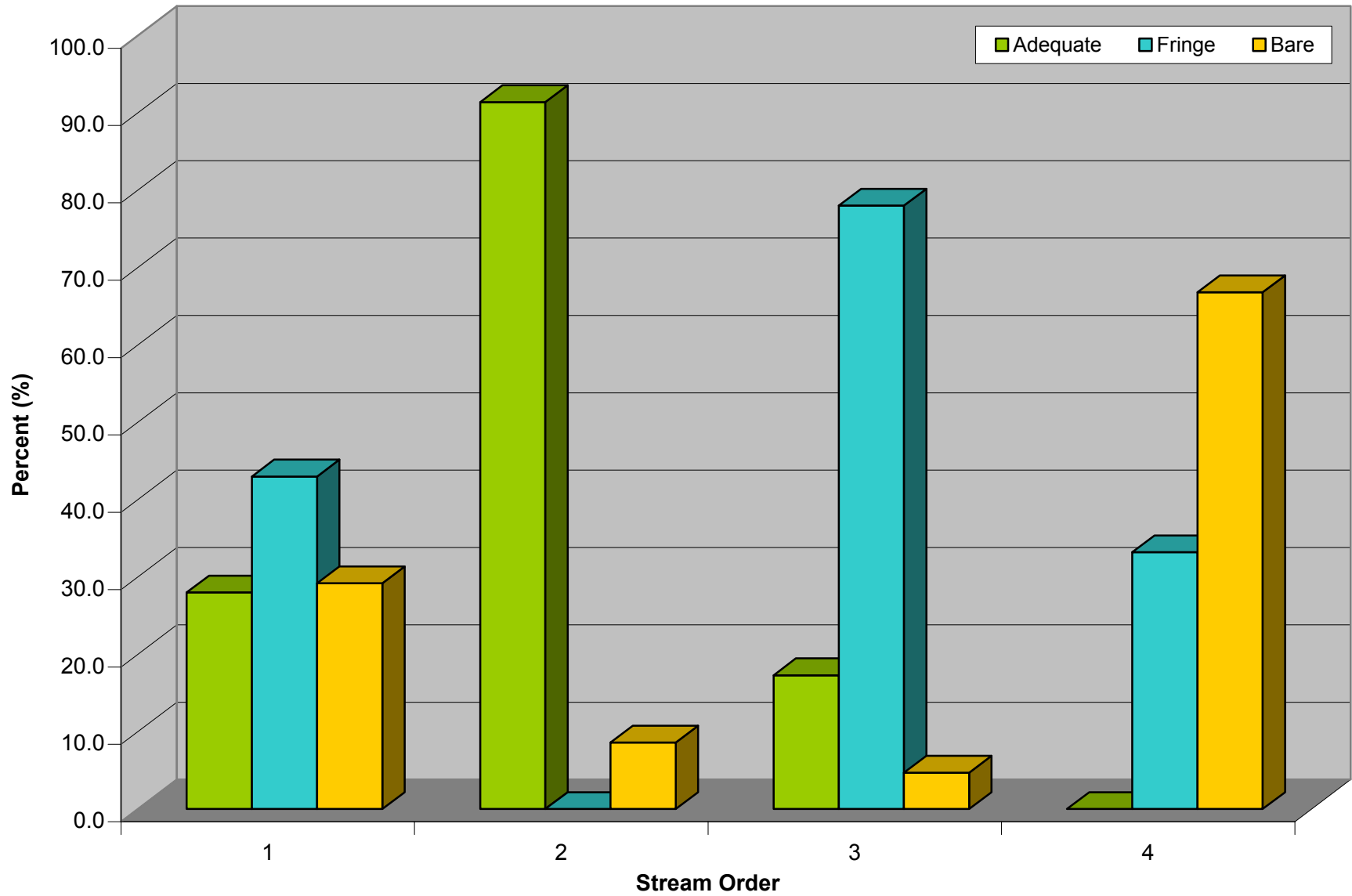
Appendix VII



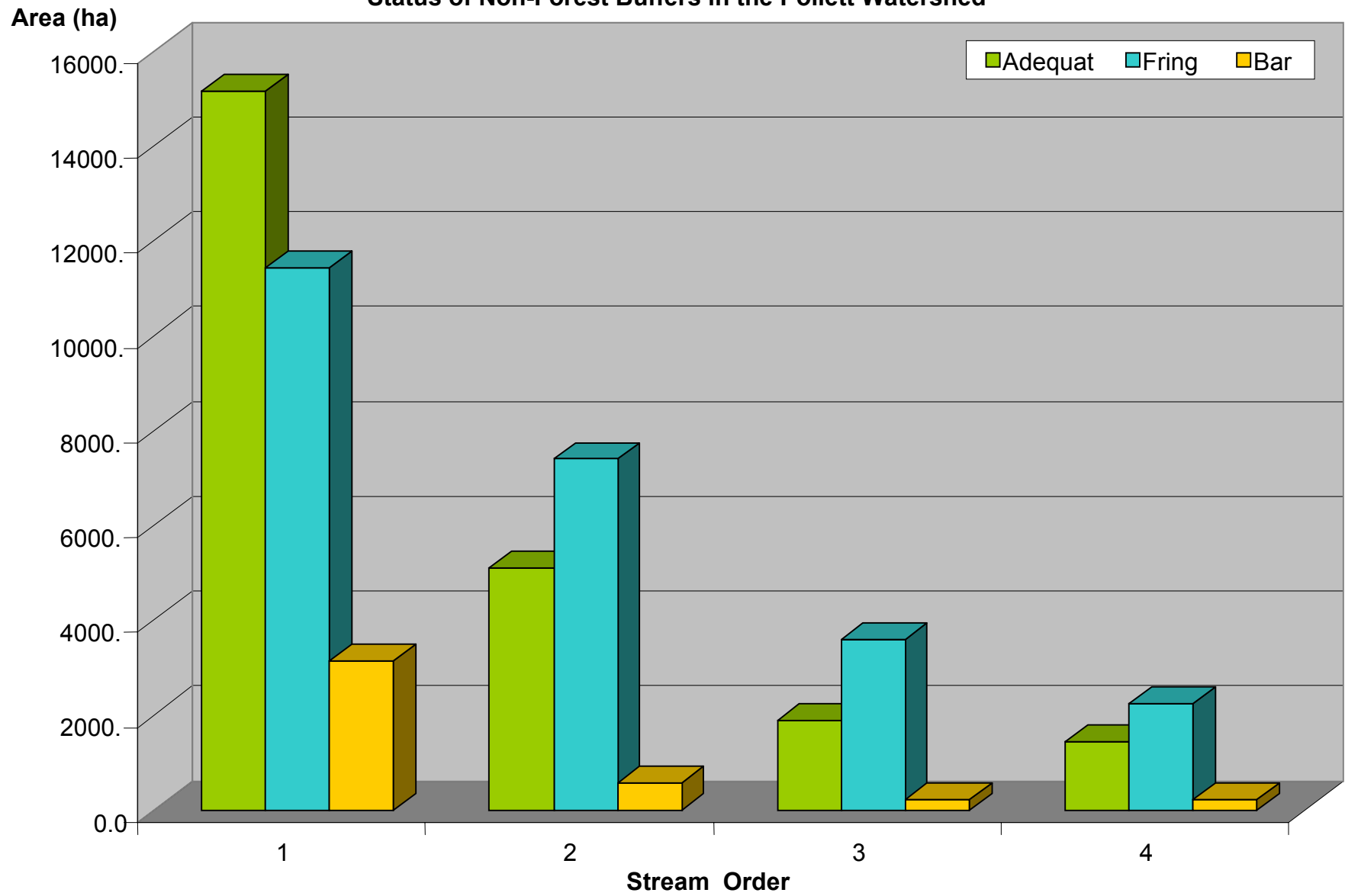
Nature of Forest Buffers in the Pollett River Watershed (All Buffers are 30.0m by legislation)



Status of Non-Forest Buffers in the Anagance Watershed



Status of Non-Forest Buffers in the Pollett Watershed



Appendix 8. Compliance Survey Results

Route selection by ownerships, road types and landuses in kilometers

Ownerships (km of roads)					
Crown	Freehold	Private	Park	Total	
117.9 km.	86.8 km.	227.8 km.	37.6 km.	470.1	
Roads Types (km. of roads)					
Primary DOT	Secondary Dot	Primary Forest	Secondary Forest	Woodlot	Total
114.5 km.	194.6 km.	68.1 km.	86.1 km.	6.8 km.	470.1
Landuses (km of roads)					
Forest	Agriculture	Municipal, Private	Park	Total	
290.8 km.	109.9 km.	35.5 Km.	33.9 Km	470.1	

Activities done without a permit under the regulations and guidelines of WAR, FMM and done in a manner consistent with standard permit requirements or BMPs

Activity without permit	Met requirements	Minor departure from requirements	Major departures from requirements	No requirements met	Activity with permit	
Agriculture-cropping	3			7		
Agriculture-grazing				8		
Agriculture-tilling				6		
Bridges	34	11	2	1	16	

Construction				3		11
Culverts	5	131	86	70		9
Ditching	1					
Draining						1
Ford				2		2
Heavy equipment oper.						1
Other			1	1		
Physical alteration						2
Pond				6		2
Riprap						10
Residential Landscaping				15		
Tree Harvesting				1		8
Water removal						2
Total	43	142	89	120		64
Total # of sites						458

Culverts without Permits and The Associated Land Uses								
Culvert Standards	Crown Land	Farm	Fundy Park	Large Freehold	Municipal	Residential	Woodlot	Total
Met requirements	1	3		1				5
Minor Departure	25	36	10	18	1	24	17	131
Major Departure	14	24	12	7		10	19	86
No Requirements Met	24	13	12	9	1	4	7	70

Total # of Sites	64	76	34	35	2	38	43	292
Culverts with Permits and The Associated Land Uses								
Culvert Standards	Crown Land	Farm	Fundy Park	Large Freehold	Municipal	Residential	Woodlot	Total
Met Conditions		1				2		3
Minor Departure		1						1
Major Departure	1						1	2
Total Failure to Comply		2					1	3
Total # of Sites	1	4				2	2	9

ECO-REGIONS

Route #	Eco-Region	# of sites			Route #	Eco-Region	# of sites
2	Grand Lake	4			14	Continental Lowlands	34
	Continental Lowlands	3			15	Southern Uplands	33
3	Grand lake	14			17	Eastern Lowlands	17
4	Continental Lowlands	45			18	Southern Uplands Fundy Coastal	15 4
5	Fundy Coastal	3			19	Southern Uplands	10
	Southern Uplands	9			20	Southern Uplands	4
6	Southern Uplands	12			21	Southern Uplands	11

7	Continental Lowlands	16			23	Grand Lake	24
8	Eastern Lowlands Continental Lowlands Southern Uplands	13 11 6			24	Southern Uplands	58
9	Eastern Lowlands	15			26	Southern Uplands	8
	Continental Lowlands	3					
10	Continental Lowlands	35					
11	Continental Lowlands	17					
12	Southern uplands Fundy Coastal	8 4					
13	Grand Lake	18					

Appendices 9 – 13 pertain to the socio-economic chapter of the report.

APPENDIX 9

Table II-A. Harvest of fish species by NB anglers (DFO, 1997).

Species	Residents		Non-residents		Total	
	Caught	Kept	Caught	Kept	Caught	Kept
Salmon						
Bright	8 877	0	4 771	0	13 648	0
Black	8 729	19	1 807	0	10 536	19
Landlocked	25 862	055	427	1 357	32 289	412
Salmon Grilse						
Bright	17 342	8 486	819	3 961	25 161	12 447
Black	6 395	693	1 497	603	7 892	1 296
Trout						
Brook	1 463 111	713 170	45 697	21 291	1 508 808	734 461
Grey	11 801	4 431	25	25	11 826	4 456
Brown	23 821	12 090	1 364	771	25 185	12 861
Rainbow	51 017	30 052	3 005	1 416	54 022	31 468
Arctic Char	2 403	688	40	0	2 443	688
Bass						
Small mouth	244 376	5 742	48 692	574	293 068	316
Striped	12 654	1 379	382	55	13 036	1 434
Pickrel	147 680	11 773	2 077	349	149 757	12 122
Splake	6 726	4 226	40	0	6 766	4 226
Perch						
White	57 432	18 184	6 724	4 591	64 156	22 775
Yellow	260 592	56 146	8 163	395	268 755	56 541
Chubb	186 067	16 348	6 660	0	192 727	16 348
Smelt	232 185	203 550	0	0	232 185	203 550
Flounder	107 856	31 526	0	0	107 856	31 526
Mackerel	157 068	101 075	102	0	157 170	101 075
Shad	4 398	1 825	45	0	4 443	1 825
Other	150 875	49 100	1 838	130	152 713	49 230
Total	3 187 265	1 276 557	147 176	35 517	3 334 440	1 312 074

Table II-B. Fish species in Washademoak lake (Weatherley, pers. comm., 2001).

Sea lamprey	Alewife, gaspareau	Rainbow smelt	Fallfish
Shortnose sturgeon	American shad	Chain pickerel	Blacknose dace
Atlantic sturgeon	Atlantic salmon	Common shiner (redfin)	White sucker
Blueback	Lake whitefish	Lake chub	Brown bullhead (catfish)
American eel	White perch	Burbot (ling)	Striped bass

Table II-C. Game bird species surveyed, survey locations in southern NB and time of survey (Bateman, pers. comm., 2001).

Species	Plot	Location	Year of Survey
Mallard	51A	45.95° and 64.70°	1990 through 1994, 1998
Black duck	52A	45.92° and 64.97°	1990 through 1996, 1999 and 2000
Green-winged teal	53A	46.18° and 65.03°	1990 through 1996, 2000
Blue-winged teal	54A	46.22° and 65.45°	1990 through 1994, 1998
Common merganser	55A	46.13° and 65.70°	1990 through 1994, 1998 and 1999
Pintail	89	46.10° and 65.17°	1997 and 1998
Wigeon	90	46.28° and 64.97°	1997 and 1998
Unknown merganser species			
Wood duck			
Hooded merganser			
Common goldeneye			
Canada goose			
Ring-necked duck			

Table II-D. Facilities and activities offered in the FMF area (Tourism NB, 2001).

Facility	Activity
Outdoor Day Adventures	
Cape Enrage Adventures, Allison	Rock climbing/rappelling, kayaking, and canoeing
Baymount Outdoor Adventures Inc., Hillsborough	Interpretative walk and cave tour, kayaking
Broadleaf Guest Ranch, Hopewell Hill (year-round)	Horseback riding, canoeing and biking with an interpretive guide
Sheffield Stables Trail Rides, Petitcodiac	Guided tour on horseback
Reversing Falls Jet Boat Tours, Saint John	Boat sightseeing tour and jet boat rides
FreshAir Adventure Ltd., Alma	Kayaking and/or camping with guides
FPN, Alma	Discovery tour of the Bay of Fundy's tides, interactive nature program for children, birdwatching, hiking, canoeing, golfing, interpretative trails, camping and saltwater pool, biking, tubing, and alpine skiing.

Table II-D cont'd. Facilities and activities offered in the FMF area (Tourism NB, 2001).

Facility	Activity
Outdoor Day Adventures	
Poley Mountain Resort, Waterford Adair's Wilderness Lodge, Sussex	Alpine skiing, snowboarding, tubing, snowmobiling, mountain biking, hiking, and outdoor concerts and venues Cross-country skiing, snowshoeing, snowmobiling
Learning Quest Day Adventures	
Pump House Brewery, Moncton	Micro-brewery tour
New River Beach Provincial Park, Saint John	Salmon smoking and instruction
Cultural Multi-Day Adventures	
The Ship's Lantern Inn & Dining Rooms, Hillsborough	Tour of mushroom farm and culinary lessons
Aubergine & Spa, Riverside-Albert	Mud baths and massage
Family Multi-Day Adventures	
Evelyn's Bed & Breakfast, Bloomfield Captain's Lookout Cottages, Alma	Feed farm animals, milk a cow and boat rides Rock hunting and beach combing
Golf Adventures	
Covered Bridge Inn, Sussex	Golfing
Romance/SPA Adventures	
Florentine Manor Heritage Inn, Alma Bamara Inn, Hampton	Biking and picnic Historic Inn, massage
Skiing Adventures	
Blue Bird Hotel and Restaurant, Sussex Covered Bridge Inn, Sussex	Alpine skiing Alpine skiing

Table II-E. Tourism events and activities that exist in the FMF area (Tourism NB, 2001).

Events	Activity
Atlantic Balloon Fiesta, Sussex	Hot air balloon rides, skydiving demonstrations, and crafts show
Jamboree 2001	ATV run and poker rally
Canada Cup National Mountain Bike Championship, Poley Mountain Resort, Sussex	Biking competition and beer garden
Hopewell Rocks	Ocean tidal exploration - sightseeing and beach exploration
Irving Nature Park	Saint John eco-tourism
Cape Enrage	Fundy adventure challenge - hiking, kayaking, canoeing, rock climbing, or rappel
Cannontown and Herring Cove, Fundy National Park, Alma	Discovery beaches
Dennis Beach and Waterside Beach, Alma	Wilderness beaches

Table II-F. The type and number of recreational opportunities that exist on Crown lands in the FMF area (Stanton pers. comm., 2001).

Type of Lease	Number
Recreational	336
Campsite	316
Parks/campground Big Salmon River Angling Association (Saint John) Grand Lake Park (Queens) Lakeside Park (Queens) Oak Point Provincial Park (Kings) Parc de l'Aboiteau (Westmorland)	5
Interprovincial trails NB Federation of Snowmobile Clubs Inc.	2 (2 645.03 km)

Table II-G. Summary of the 2000 Spring Bird Survey (FNP, 2001).

Species	Count	Species	Count	Species	Count
Common Loon	3	American Crow	15	Black&White Warbler	18
Common Eider	3	Common Raven	12	American Redstart	69
Common Merganser	1	Black-c Chickadee	13	Ovenbird	45
Ring-neck Duck	11	Boreal Chickadee	6	Northern Waterthrush	1
American Black Duck	1	Red-b Nuthatch	5	Mourning Warbler	5
Ruffed Grouse	3	Brown Creeper	3	Common Yellowthroat	29
Spotted Sandpiper	3	Winter Wren	45	Canada Warbler	5

Table II-G cont'd. Summary of the 2000 Spring Bird Survey (FNP, 2001).

Species	Count	Species	Count	Species	Count
Common Snipe	1	Golden-c. Kinglet	70	Cape May Warbler	4
Killdeer	6	Ruby-c Kinglet	38	Wilson's Warbler	1
Ring-billed Gull	1	Swainson's Trush	62	Chipping Sparrow	3
Mourning Dove	1	Hermit Thrush	12	Savannah Sparrow	1
Ruby-t Hummingbird	2	American Robin	92	Song Sparrow	3
Belted Kingfisher	3	Gray Catbird	1	Lincoln's Sparrow	4
Yellow-b Sapsucker	7	Cedar Waxwing	9	Swamp Sparrow	2
Downy Woodpecker	1	Solitary Vireo	20	White-t. Sparrow	58
Hairy Woodpecker	2	Red-eyed Vireo	39	Vesper Sparrow	1
Northern Flicker	8	Nashville Warbler	24	Dark-eyed Junco	59
Pileated Woodpecker	3	Tennessee Warbler	4	Common Grackle	21
Olive sided Flycatcher	2	Northern Parula	18	Purple Finch	9
E. Woodpewee	6	Yellow Warbler	2	White-w. Crossbill	1
Yellow-b Flycatcher	39	Magnolia Warbler	84	Indigo Bunting	1
Least Flycatcher	15	Black-t Blue Warbler	17	American Goldfinch	1
Alder Flycatcher	6	Yellow-r Warbler	54	Evening Grosbeak	6
Tree Swallow	4	Black-t. Green Warbler	127	Red-w. Blackbird	1
Barn Swallow	6	Blackburnian Warbler	27	Number of species	76
Blue Jay	5	Bay-breasted Warbler	29	Total Count	1 319

Table II-H. Average (1992-1996) annual wood flow in the FMF (m³) (MacFarlane *et al.*, 1998a).

Product Type & Code	Crown License 7	Industrial Freehold	Other Industrial Freehold	SNB	Total
Spruce & Fir					
Sawlog (SPFL)	135 769	89 173	6 089	74 008	305 039
Pulp (SPFP)	105 283	111 364	23 360	155 773	395 780
Fencing (SPFF)	221	0	0	11	232
Studwood (SPFS)	116 572	59 707	9 018	100 131	285 428
Veneer log (SWV)	0	0	0	624	624
Cedar					
Sawlog (CEL)	0	0	0	193	193
Fencing (CEF)	54	0	772	6 046	6 872
Hemlock					
Sawlog (HEML)	115	0	0	679	794
Pulp (HEMP)	0	0	100	406	506
White pine					
Sawlog (WPL)	7 118	12 879	2 178	12 770	34 945
Pulp (WPP)	0	0	188	6	194
Veneer log (WPV)	0	0	0	633	633
Red pine					
Pole (RPPO)	0	0	0	98	98
Larch					
Sawlog (LL)	0	0	0	66	66

Table II-H cont'd. Average (1992-1996) annual wood flow in the FMF (m³) (MacFarlane *et al.*, 1998a).

Product Type & Code	Crown License 7	Industrial Freehold	Other Industrial Freehold	SNB	Total
Hardwood					
Sawlog (HWL)	698	3 571	0	1 334	5 603
Pulp (HWP)	37 722	51 528	66 145	11 105	166 500
Veneer log (HWVL)	319	0	94	371	784
Chips (HWC)	5	102	0	0	107
Full-tree chips (HWFC)	15 230	16 156	0	6 290	37 676
Firewood (HWF)	10	300	0	0	310
Poplar					
Pulp (PP)	7 518	7 515	6 350	11 163	32 546
Veneer log (PV)	70	0	77	1 224	1 371
Lath (LATH)	3 683	0	0	0	3 683
Total	430 387	352 295	114 371	382 931	1 279 984

Table II-I. License sales and animals harvested in the FMF in 1998 (NBDNRE, 1999).

Game	WMZ	Number of Hunters		Harvest	
		Total	Proportion of NB Licenses (%)	Total	Proportion of NB Licenses (%)
Deer	22	6 895		1 864	
	23	4 173		558	
	24	2 682		391	
	FMF Total	13 750	25.4	2 813	27.6
Moose	22	77		10	
	23	216		93	
	24	55		42	
	FMF Total	348	7.3	145	0.06
Bear	22	168		61	
	23	131		46	
	24	160		54	
	FMF Total	459	na*	161	11.5
Varmint	22	na		na	
	23	na		na	
	24	na		na	
	FMF Total	na	13.0	na	na

*na = not available

Table II-J. Number of furs or pelts exported from NB in 1998-1999 (NBDNRE, 1999).

Species	Total Exports		Percent Change
	1997-1998	1998-1999	
Coyote	814	753	-7
Red fox	1 383	1 191	-14
Bobcat	279	251	-10
Beaver	12 823	12 018	-6
Fisher	824	648	-21
Raccoon	3 633	2 903	-20
Otter	457	433	-5
Marten	3 771	1 891	-50
Mink	795	889	12
Muskrat	39 386	28 617	-27
Weasel	1 028	1 000	-3
Squirrel	412	669	62
Skunk	30	12	-60
Total	65 635	51 275	-22

Table II-K. Number of licenses issued for deer and small game in 2000 (Lawlor, pers. comm., 2001).

Region 3	Non-Resident	Resident	65+ Resident	Minor	Replacement	Total
Buctouche	12	1794	281	23	8	2118
Harcourt	7	155	25	5	1	193
Moncton	47	6088	683	62	26	6906
Sackville	29	1656	237	22	7	1951
Petitcodiac	24	1368	206	23	12	1633
Sussex	58	1975	254	33	12	2332
Hampton	35	3889	413	36	16	4389
Coles Island	46	870	119	0	6	1041
Chipman	29	1262	180	34	5	1510
SNB Moncton	3	65	6	0	1	75
SNB Saint John	13	1462	180	53	19	1727
SNB Sussex	12	159	25	20	6	222
FMF Total	315	20743	2609	311	119	24 097
NB Total	2 130	65 601	7 973	902	292	76 898

Table II-L. Number of angling licenses sold and revenue generated for Region 3 (NBDNRE, 2000).

Location	Non-Resident				Resident				Total Revenue (\$)	
	Salmon		Non-Salmon		Salmon		Non-Salmon			
	7D	3D	7D	3D	Season	12-15/65	Season	65+		
	Season	Season	Season	Season	Season	Season	Season	Season		
Buctouche	1	2	3	16	226	40	849	258	1 397	12 160
Harcourt	1	9	5	2	32	2	84	16	152	1 716
Moncton	6	18	16	26	1782	209	3 532	773	6 378	63 487
Sackville	8	6	3	28	157	19	839	231	1 312	12 067
Petitcodiac	1		11	17	155	23	838	186	1 234	10 706
Sussex		5	4	26	185	35	1 004	298	1 563	12 894
Hampton	1	1	7	8	812	99	3 822	514	5 271	48 247
Coles Island		1	6	19	81	11	370	96	598	5 457
Chipman	1	1	3	23	189	29	766	167	1 189	10 725
SNB Moncton		3	2	1	24	2	33	5	70	860
SNB Saint John	1	8	13	29	281	28	575	264	1 211	11 880
SNB Sussex	2		1	4	30		84	43	165	1 530
	13	22	54	64	3954	497	12 796	2 851	20 098	191 729

Table II-M. Day adventure attendance for 1998.

Activity	Visitors per Day	
	Average Number of People	%
Whale watching	2 765	7.2
Canoeing	511	1.3
	515	1.3
	432	1.1
	na*	na
Kayaking	na	na
	14 454	37.6
	1 742	4.5
Horseback riding	1 867	4.9
	156	0.4
	16 009	41.6
Sailing		
Fishing		
Walking		
Interpretative History Culture		
Boat Tours		
Other		
Total	38 451	100

*na = not available.

Table II-N. The number hectares in Crown License 7 that had silvicultural treatments applied in 1999-2000 (ha) (NBDNRE, 2000c).

	Crown Licence 7	NB	% of NB
Reforestation	1 624	9 846	16.5
Stand Improvement	2 863	31 896	9.0
Aerial herbicide	1 959	12 824	15.3
Total	6 446	54 566	11.8

Table II-O. Forest fires and area burned in Region 3 and NB between 1990-1999 (NBDNRE, 2000c).

Year	Region 3		NB		% of NB	
	Fires	Area (ha)	Fires	Area (ha)	Fires	Area

1990	42	31	175	6 113	24.0	0.5
1991	52	43	359	3 325	14.5	1.3
1992	63	1 163	354	5 071	17.8	22.9
1993	48	40	234	551	20.5	7.3
1994	91	56	336	472	27.1	11.9
1995	76	129	355	415	21.4	31.1
1996	57	209	272	1 769	21.0	11.8
1997	70	65	262	172	26.7	37.8
1998	62	28	199	284	31.2	9.9
1999	102	391	452	1 213	22.6	32.2
Total	663	2 155	2 998	19 384	22.1	11.1
Average	66	216	300	1 938	22.0	11.1

Table II-P. Volume* harvested on Crown licence 7 in 1999 (m³) (NBDNRE, 2000c).

	Crown Licence 7	NB	% of NB
Softwood	334 740	3 457 060	9.7
Hardwood	181 420	1 332 965	3.8
Total	516 160	4 790 025	10.8

*The volume harvested does not include harvests under First Nations agreements.

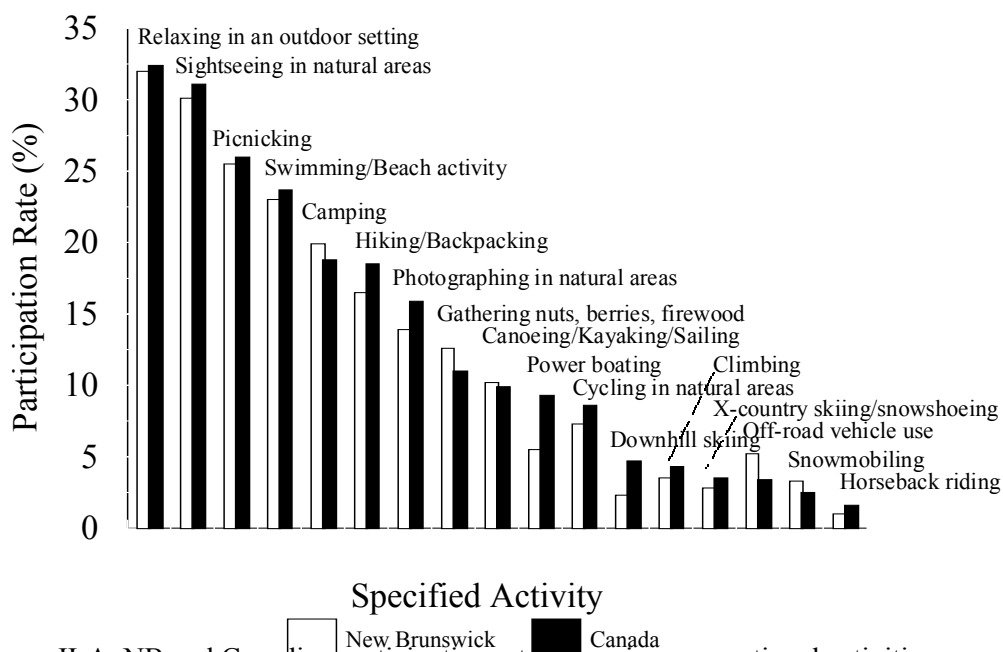


Figure II-A. NB and Canadian participation rates in various recreational activities.

APPENDIX 10

Table III-A. Estimated value of wood flow in the FMF.

	Crown (m ³)	Private (m ³)	Crown Royalty (\$/m ³)	Market Value (\$/m ³)	SNB Stumpage (\$/m ³)	Worth (\$)
Spruce & Fir						
Sawlog (SPFL)	135 769	169 270	14.67	19.30	23.23	5 923 873.33
Pulp (SPFP)	105 283	290 497	9.45	12.43	10.86	4 149 721.77
Fencing (SPFF)	221	11	na	na	na	na
Studwood (SPFS)	116 572	168 856	14.67	19.30	21.51	5 342 203.80
Veneer log (SWV)	0	624	17.08	22.47	na	14 023.58
Cedar						
Sawlog (CEL)	0	193	7.05	9.28	na	1 790.33
Fencing (CEF)	54	6 818	8.06	10.61	na	72 741.92
Hemlock						
Sawlog (HEML)	115	679	7.27	9.57	na	7 331.22
Pulp (HEMP)	0	506	6.00	7.90	na	3 997.40
White pine						
Sawlog (WPL)	7 118	27 827	14.67	19.30	21.39	699 640.59
Pulp (WPP)	0	194	6.00	7.89	na	1 531.58
Veneer log (WPV)	0	633	17.09	22.48	na	14 230.01
Red pine						
Pole (RPPO)	0	98	22.57	29.70	na	2 910.34
Larch						
Sawlog (LL)	0	66	7.27	9.56	na	630.99
Hardwood						
Sawlog (HWL)	698	4 905	14.73	19.38	6.42	105 348.18
Pulp (HWP)	37 722	128 778	6.55	8.62	na	1 073 833.86
Veneer log (HWVL)	319	465	21.54	28.34	na	20 050.34
Chips (HWC)	5	102	6.55	8.62	na	911.83
Full-tree chips (HWFC)	15 230	22 446	6.55	8.62	na	293 205.58
Firewood (HWF)	10	300	6.55	8.62	na	2 651.03
Poplar						
Pulp (PP)	7 518	25 028	4.90	6.45	5.03	162 729.04
Veneer log (PV)	70	1 301	10.85	14.28	na	19 332.99
Lath (LATH)	3 683	0	13.62	17.92	na	50 162.46
Total	430 387	849 597	na	na	na	17 962 852.17

Table III-B. Average end product prices for softwood lumber for the period covering January 2001-June 2001 (WPG, 2001).

Average Price for NB (\$C/1000 fbm, delivered at mill)					
Dimension	2x3	2x4	2x6	2x8	2x10
SPF - r/l ^a (Green, #2 and Btr.)	262.50	372.88	375.19	367.12	459.04
Studs - 8 ft	247.62	376.23	368.58	na	na
White pine (S4S Dry)	1x4	1x6	1x8	1x10	1x12
Select	1,816.23	2,128.85	2,095.92	2,208.88	2,389.81
Grades 1 & 2	928.54	926.54	910.08	958.54	1,157.35
Grade 3	607.04	705.04	684.73	701.00	789.54

^a R/l = random length

Table III-C. Average end product prices for softwood lumber for the period covering January 2001-June 2001 (WPG, 2001).

Average Price (\$US/1000 fbm, delivered at the mill)								
	Dry				Green			
Dimension	1x3	1x4	1x6	1x8	1x3	1x4	1x6	1x8
SPF Boards - r/l ^a (Util. And Btr.)	272.69	237.88	373.85	383.46	258.27	227.12	333.08	368.46

^a R/l = random length

Table III-D. Average end product prices for hardwood lumber for the period covering January 2001-June 2001 (WPG, 2001).

Average Price (\$US/1000 fbm, delivered at the mill)				
	Dimension	FAS ^a	#1 COM	#2 COM
Yellow Birch AD ^b /Green Dry	4/4 ^c	1 174.42	694.42	447.88
	8/4	1 338.65	811.35	456.73
	4/4	1 455.00	995.96	612.69
Red Oak AD/Green Dry	4/4	1 330.00	903.27	643.46
	8/4	1 421.73	980.77	na
	4/4	1 657.29	1 201.15	883.27
Soft Maple AD/Green Dry	4/4	1 052.88	619.04	300.00
	8/4	1 211.54	862.12	409.04
	4/4	1 425.21	825.19	479.23
Hard Maple AD/Green Dry	4/4	1 654.42	1 063.85	648.65
	8/4	1 874.62	1 228.85	662.31
	4/4	2 029.38	1 372.31	752.88
	8/4	2 396.46	1 576.73	992.69

^a FAS = finished on all sides

^b AD = air dried (as opposed to KD = kiln dried)

^c 4/4 = 4 quarters thick = 1 inch; 8/4 = 2 inches thick

Table III-E. Proportion of NB big game licenses sold, harvest and revenue attributed to the FMF in 1998.

Game	Number of Hunters / WMZ ^a				Proportion of NB Licenses (%)	Revenue (\$)
	22	23	24	Total		
Deer	6 895	4 173	2 682	13 750	25.4	307 116.73
Moose	77	216	55	348	7.3	55 419.05
Bear	168	131	160	459	na	na
Varmint	na ^b	na	na	na	13.0	3 408.08
Total	7 140	4 520	2 897	14 557	na	365 943.86

^a WMZ = wildlife management zones. The FMF is made up of three WMZ's; 22, 23, and 24.

^b na = not available.

Table III-F. Average 1994 expenditures for FMF and non-FMF resident deer hunters (\$).

Item	FMF Resident	Non-FMF Resident	Average
Transportation	69.47	99.07	88.88
Accommodations or campsite fees	8.28	29.26	22.04
Food/Alcoholic beverages	68.14	121.48	103.11
Equipment purchase/rental	90.76	114.23	106.22
License fees	21.40	21.40	21.40
Other	8.41	9.77	9.30
Total	266.46	395.31	350.95

Table III-G. Number of furs or pelts exported from NB in 1998-1999 (NBDNRE, 1999).

Species	Total Exports		Percent Change	Value per Pelt (\$)		Total Value (\$)
	1997-1998	1998-1999		1997-1998	1998-1999	
Coyote	814	753	-7	22.20	18.55	13 966.12
Red fox	1 383	1 191	-14	23.27	17.41	20 740.90
Bobcat	279	251	-10	51.23	41.08	10 310.93
Beaver	12 823	12 018	-6	32.93	23.69	284 748.66
Fisher	824	648	-21	46.48	34.95	22 646.14
Raccoon	3 633	2 903	-20	19.97	12.42	36 049.02
Otter	457	433	-5	71.25	46.63	20 190.23
Marten	3 771	1 891	-50	29.99	24.09	45 557.90
Mink	795	889	12	17.83	15.99	14 215.97
Muskrat	39 386	28 617	-27	3.67	2.66	76 128.22
Weasel	1 028	1 000	-3	4.59	3.55	3 552.23
Squirrel	412	669	62	1.00	0.62	416.56
Skunk	30	12	-60	2.71	3.80	45.59
Total	65 635	51 275	-22	na	na	548 568.50

Table III-H. Number of licenses issued in the FMF and revenue generated (Lawlor, pers. comm., 2001).

Region 3	Licenses Issued	Revenue (\$)
Buctouche	2118	37 180.00
Harcourt	193	3 527.00
Moncton	6906	123 032.00
Sackville	1951	35 386.00
Petitcodiac	1633	29 606.00
Sussex	2332	44 335.00
Hampton	4389	78 839.00
Coles Island	1041	21 493.00
Chipman	1510	27 049.00
SNB Moncton	75	1 580.00
SNB Saint John	1727	31 758.00
SNB Sussex	222	4 665.00
Total	24097	438 450.00
NB Total	76 898	1 408 289.00

Table III-I. Direct expenditures for recreational fishing in NB (\$) (DFO, 1997).

	Food & Lodging	Transportation	Fishing Services	Fishing Supplies	Other	Total
Resident	6 235 871	6 648 295	1 101 611	1 918 707	290 743	17 028 770
Non-resident	8 353 182	7 596 253	2 233 441	2 213 672	341 074	27 096 671
Total	14 589 053	14 604 548	3 335 052	4 132 379	631 817	44 125 441

Table III-J. Major purchases made for recreational fishing in NB (\$) (DFO, 1997).

	Fishing Equipment	Boating Equipment	Camping Equipment	Special Vehicles	Land/Real Estate	Other	Total
Resident	2 430 062	4 346 990	1 884 634	6 287 949	5 633 540	981 883	21 565 058
Non-resident	320 295	52 257	0	0	1 735 287	115 397	2 223 282
Total	2 750 357	4 399 247	1 884 634	6 287 949	7 368 827	1 097 280	23 788 340

Table III-K. Participation, visitor expenditures and revenue by facility/activity.

Facility/Activity	Participation	Expenditures (\$)	Revenue (\$)
FNP	268 000 visitors	9.3 million	4.3 million
Poley Mountain Resort	54 500 - 57 500 visitors	1.5 million ^a	1.4 million/year
Kings County Museum	1 825 visitors	Na	Na
Snowmobile Clubs		Na	
Goshen Snowmobile	254 members		51 000/year
Millstream Snowmobile	243 members		20 000/year
Fundy Trail Riders	330 members		50 000/year
ATV Clubs			100 million/year ^b
Chignecto Cross-Country Ski Club	15 - 20 members	Na	3 000/year

Table III-K. Participation, visitor expenditures and revenue by facility/activity.

Facility/Activity	Participation	Expenditures (\$)	Revenue (\$)
Birdwatching Christmas Bird Survey Mary's Point			na
Wildlife Viewing	na	969 400.00	13/day

^a This figure represents an underestimate because it does not account for summer visits.

Skiers/snowboarders/tubers pay \$20.00 per visit with a season pass and \$40.00 per visit without season passes. Thus, an average of \$30.00 was used to estimate visitor expenditures.

^b This figure represents revenue generated from all ATV related business - direct and indirect expenditures (e.g., equipment purchases, gas, repairs, food and lodging etc.).

Table III-L. Number of mills utilizing FMF wood (MacFarlane *et al.*, 1998a).

Type of Mill	Number of Mills	
	FMF Region	FMF
Saw/Planing	23	3
Pulp & paper	6	0
Plywood/Veneer	2	0
Composite board	2	0
Specialty	10	1
Total	43	4

Table III-M. Average (1992-1996) aggregated wood volume for mills receiving FMF wood (m³) (MacFarlane *et al.*, 1998a).

Product & Code	Saw/Planing	Pulp & Paper	Plywood & Veneer	Composite Board	Other	Total
Spruce & Fir Sawlog (SPFL)	331 216					331 216
Pulp (SPFP)	66 026	350 140				416 166
Fencing (SPFF)	232					232
Studwood (SPFS)	491 518					491 518
Veneer log (SWV)			617		7	624
Cedar Sawlog (CEL)	183					183
Fencing (CEF)	15 000					15 000
Hemlock Sawlog (HEML)	733					733
Pulp (HEMP)		506				506
White pine Sawlog (WPL)	41 115					41 115
Pulp (WPP)		194				194
Veneer log (WPV)			633			633
Larch Sawlog (LL)	66					66

Table III-M cont'd. Average (1992-1996) aggregated wood volume for mills receiving FMF wood (m³) (MacFarlane *et al.*, 1998a).

Product & Code	Saw/Planing	Pulp & Paper	Plywood & Veneer	Composite Board	Other	Total
Hardwood						
Sawlog (HWL)	4 987				683	5 670
Pulp (HWP)	74 562	111 705		6 179		192 446
Veneer log (HWVL)			177		607	784
Full-tree chips (HWFC)		31 386		6 290		37 676
Firewood (HWF)					310	310
Poplar						
Pulp (PP)	33 179	7 313		2 018		42 510
Veneer log (PV)			808		563	1 371
Sawlog	17					17
Lath (LATH)					3 683	3 683
Total	1 058 834	501 244	2 235	14 487	5 853	1 582 653

APPENDIX 11

Table IV-A. Provincial GDP by forest sector (\$ millions) (Statistics Canada, 2001).

Year	Wood Industries	Paper and Allied Products*	Pulp and Paper	Logging	Forestry Services	Total
1990	150.4	167.8	151.2	272.3	24.0	765.7
1991	158.3	183.6	164.5	202.5	28.5	737.4
1992	151.2	207.4	186.5	172.9	28.2	746.2
1993	143.7	247.3	224.5	143.8	29.6	788.9
1994	154.2	238.5	210.9	196.7	32.0	832.3
1995	141.1	324.4	292.0	201.2	62.4	1 021.1
1996	199.1	341.6	312.7	191.7	75.3	1 120.4
1997	230.7	323.7	300.3	151.8	77.1	1 083.6
1998	253.2	340.8	317.5	155.7	72.5	1 139.7
1999	265.0	348.3	323.9	144.6	72.5	1 154.3
Average	184.69	272.34	248.40	183.32	50.21	938.96
% Change	76	108	114	-47	202	51

Table IV-B. Provincial GDP for the fishing and trapping industries (\$ millions) (Statistics Canada, 2001).

Year	GDP
1990	131.5
1991	113.2
1992	112.0
1993	114.6
1994	95.4
1995	86.6
1996	86.0
1997	80.1
1998	68.8
1999	81.3
Average	96.95
% Change	38

Table IV-C. Provincial GDP for the accommodation, food and beverage industries (\$ million) (Statistics Canada, 2001).

Year	Accommodation Service	Food & Beverage Service	Total
1990	96.8	210.8	307.8
1991	88.1	198.0	285.8
1992	90.1	198.5	288.5
1993	95.2	216.6	311.8
1994	100.6	230.9	331.4
1995	101.8	244.9	346.7
1996	100.8	257.2	358.0
1997	101.9	258.1	360.0
1998	106.2	269.0	375.2
1999	104.6	285.6	390.2
Average	98.61	236.96	335.54
% Change	8.1	35.5	26.8

Table IV-D. Average earnings for the forestry sector* (Statistics Canada, 2001).

	1997		1998		1999		2000		% Change
	Week	Year	Week	Year	Week	Year	Week	Year	
NB	653.05	33 959	696.42	36 214	676.43	35 174	721.23	37 504	10.4
Canada	719.30	37 404	732.41	38 085	736.28	38 587	750.11	39 006	4.3
	66.25	3 445	35.99	1 871	59.85	3 413	28.88	1 502	

*The forestry sector is defined here as forestry and logging, wood products manufacturing and paper products manufacturing.

Table IV-E. Crown royalty rates for 1995 and 2001 (\$/m³) (Bringloe, pers. comm., 2001).

Product	1995	2001	% Change
Logs			
White pine	13.356	14.668	9.8
Red pine	13.356	14.668	9.8
Cedar	5.271	8.056	52.8
Hemlock	5.817	7.266	24.9
Tamarack (Larch)	5.817	7.266	24.9
Spruce, Fir, Jack pine	13.356	14.688	9.8
Red maple	na	15.527	na
Logs			
Sugar maple	12.061	15.527	28.7
Yellow birch	12.061	15.527	28.7
White birch	na	15.527	na
Poplar	5.572	9.219	65.5
Mixed hardwood	na	15.527	na
Other hardwood	12.061	na	na
Logs (non-classified)			
Other hardwood	na	14.396	na
Poplar	na	8.918	na
Veneer			
White pine	16.625	17.085	2.8
Spruce, Fir, Jack pine	16.625	17.085	2.8
Other softwood	na	17.085	na
Red maple	na	22.701	na
Sugar maple	16.674	22.701	36.1
Yellow birch	16.674	22.701	36.1
White birch	na	22.701	na
Poplar	6.776	11.438	68.8
Other hardwood	16.674	22.701	13.1
Tree Length (1)			
White pine	11.963	13.801	15.4
Red pine	na	13.625	na
Hemlock	5.817	6.635	14.1
Tamarack (Larch)	na	6.635	na
Cedar	4.004	7.053	76.1
Spruce, Fir, Jack pine	11.963	13.625	13.9
Poplar	4.452	7.060	58.6
Other hardwood	4.603	7.449	61.8
Tree Length SP, F, JP (2)	na		na
Log		13.625	
Studwood (2.54 m)		13.625	
Studwood (2.84 m)		13.625	
Studwood (3.14 m)		13.625	
Lathwood		13.625	
Chips		13.625	
Pulpwood		13.625	
Tree Length Cedar (3)			
Unsorted (2.54 m)	na	7.053	na

Table IV-E cont'd. Crown royalty rates for 1995 and 2001 (\$/m³) (Bringloe, pers. comm., 2001).

Product	1995	2001	% Change
Semi Tree Length			
Mixed hardwood	na	13.816	na
Pulpwood			
Spruce, Fir, Jack pine	6.392	9.454	47.9
White pine	6.392	6.004	-6.1
Red pine	na	9.454	na
Hemlock	5.817	6.004	3.2
Tamarack (Larch)	6.392	6.004	-6.1
Other softwood	6.392	6.004	-6.1
Poplar	3.332	4.902	47.1
Birch	na	6.551	na
Maple	na	6.551	na
Mixed birches	na	6.551	na
Mixed hardwood	na	6.551	na
Other hardwood	3.774	na	na
Oriented Strand Board			
Poplar	3.930	3.046	-22.5
Other hardwood	4.454	3.046	-31.6
Poles			
Jack pine	25.270	22.572	-10.7
Red pine	25.270	22.572	-10.7
Cedar	25.270	22.572	-10.7
Pallet Wood	na		na
Poplar		4.902	
Other hardwood		6.551	
Studwood			
Cedar	5.271	8.056	52.8
Spruce, Fir, Jack pine	13.356	14.668	9.8
Other softwood	5.817	6.316	8.6
Poplar	5.572	9.219	65.5
Hemlock	na	6.316	na
Red pine	na	14.668	na
Spruce, Fir, Jack pine 2.84 m	na	14.668	na
Spruce, Fir, Jack pine 3.14 m	na	14.668	na
Lathwood			
Spruce, Fir, Jack pine	13.356	14.668	9.8
Cedar	na	8.056	na
Other softwood	5.817	6.316	8.6
Poplar	5.572	9.219	65.5
Fencing			
Cedar	4.004	8.056	101.2
Posts and Rails			
Cedar	4.004	6.050	51.1
Shinglewood			
Cedar	4.004	6.050	51.1
Studwood			
Cedar (3.14 m)	na	8.056	na

Table IV-E cont'd. Crown royalty rates for 1995 and 2001 (\$/m³) (Bringloe, pers. comm., 2001).

Product	1995	2001	% Change
Fuelwood Hardwood	3.774	6.551	73.6
Spoolwood Birch Other hardwood	na	22.701 22.701	na
Chips Spruce, Fir, Jack pine White pine Poplar Green Dry Maple Birch Mixed birches Other hardwood Green Dry	na na 3.332 3.332 na na na na na na 3.774 3.774	9.454 6.004 4.902 6.551 6.551 6.551 6.551	na na na na na na na na na na
Weir Stakes Softwood Hardwood	25.280 22.830	25.280 27.191	0 19.1

Table IV-F. Royalty collected from Crown license 7 in 2000-2001 (Bringloe pers. comm., 2001).

Species & Product	Discount	Volume (m ³)	Royalty (\$/m ³)	Royalty (\$)	Levy (\$)	Revenue (\$)
Spruce, Fir & Jack pine						
Logs	Prescription	2396.294	11.00	26 361.63	2 995.37	29 357.00
Tree Length	Prescription	319.69	10.22	3 266.83	399.61	3 666.44
Pulpwood	Prescription	1130.546	7.09	8 016.14	1 413.18	9 429.32
Tree Length	CT, PCT	264.087	10.22	2 698.64	330.11	3 028.75
Pulpwood	CT, PCT	2214.9	7.09	15 704.75	2 768.63	18 473.38
Studwood 2.54m	CT, PCT	779.897	11.00	8 579.65	974.88	9 554.53
Logs	None	113 769.41	14.67	1 668 769.79	142 213.73	1 810 983.52
Veneer	None	1278.74	17.08	21 847.25	1 598.43	23 445.68
Tree Length	None	18 639.725	13.62	253 966.24	23 299.93	277 266.17
Pulpwood	None	64 723.13	9.45	611 892.27	80 905.13	692 797.40
Studwood 2.54m	None	80 539.073	14.67	1 181 347.07	100 675.13	1 282 022.20
Chips (green)	None	28 622.97	9.45	270 601.55	35 779.18	306 380.73
Pulpwood	Prescription	150	7.09	1 063.58	187.50	1 251.08
Logs	None	890	14.67	13 054.52	1 112.50	14 167.02
Tree Length	None	500	13.63	6 812.51	625.00	7 437.51
Pulpwood	None	2764	9.45	26 130.86	3 455.00	29 585.86
Studwood 2.54m	None	391	14.67	5 735.19	488.75	6 223.94
Sub-total						4 525 070.53

Table IV-F cont'd. Royalty collected from Crown license 7 in 2000-2001 (Bringloe pers. comm., 2001).

Species & Product	Discount	Volume (m ³)	Royalty (\$/m ³)	Royalty (\$)	Levy (\$)	Revenue (\$)
Other Hardwood						
Logs	Prescription	1 001.542	11.05	11 063.78	500.76	11 564.54
Veneer	Prescription	281.042	16.15	4 539.81	140.52	4 680.33
Pulpwood	Prescription	200.919	4.91	987.17	100.46	1 087.63
Chips (green)	Prescription	14 675.92	4.91	72 106.47	7 337.97	79 444.44
Pulpwood	CT, PCT	5.783	4.91	28.41	2.89	31.30
Logs	None	5 928.301	14.73	87 317.87	2 964.24	90 282.11
Veneer	None	670.056	21.54	14 431.69	335.01	14 766.70
Tree Length	None	12 167.958	6.56	79 882.43	6 084.03	85 966.46
Pulpwood	None	25 340.328	6.55	166 004.45	12 670.51	178 674.96
Oriented Strand Board	None	1 050.673	3.82	4 015.67	525.36	4 541.03
Fuelwood	None	21.451	6.55	140.53	10.73	151.26
Chips (green)	None	95 601.559	6.55	626 285.83	47 801.32	674 087.15
Tree Length	None	490	7.37	3 610.81	245.00	3 855.81
Other Hardwood						
Pulpwood	None	1995	6.55	13 069.26	997.50	14 066.76
Sub-total						1 163 200.48
White pine						
Logs	None	14 005.388	14.67	205 430.89	17 506.99	222 937.88
Tree Length	None	8	13.80	110.41	10.00	120.41
Pulpwood	None	1 211.797	6.00	7 275.61	1 514.75	8 790.36
Sub-total						231 848.65
Red pine						
Pulpwood	None	3.502	9.45	33.11	4.38	37.49
Poles	None	211.66	22.57	4 777.58	264.60	5 042.18
Studwood 2.54m	None	585.122	14.69	8 594.27	731.42	9 325.69
Sub-total						14 405.36
Cedar						
Tree Length	None	76.734	7.05	541.20	38.37	579.57
Fencing	None	286.384	8.06	2 307.11	143.19	2 450.30
Shinglewood	None	152.805	6.05	924.46	76.40	1 000.86
Sub-total						4 030.73
Hemlock						
Logs	None	5.571	7.27	40.48	6.96	47.44
Tree Length	None	38	6.64	252.13	47.50	299.63
Sub-total						347.07
Larch						
Pulpwood	None	111	6.00	666.44	138.75	805.19
Sub-total						805.19

Table IV-F cont'd. Royalty collected from Crown license 7 in 2000-2001 (Bringloee pers. comm., 2001).

Species & Product	Discount	Volume (m ³)	Royalty (\$/m ³)	Royalty (\$)	Levy (\$)	Revenue (\$)
Poplar						
Logs	None	190.744	8.75	1,668.62	95.37	1,763.99
Veneer	None	1031.565	10.85	11,195.55	515.83	11,711.38
Tree Length	None	546.416	4.95	2,707.38	273.25	2,980.63
Pulpwood	None	2370.054	4.90	11,617.98	1,185.09	12,803.07
Oriented Strand Board	None	18904.135	3.82	72,251.53	9,452.34	81,703.87
Oriented Strand Board	None	160	3.82	611.52	80.00	691.52
Sub-total						111 654.46
Total		518702.884		5540338.92	511,023.55	6,051,362.47

Table IV-G. Labour force employment (experienced Labour Force Age 15 Years and Over) for the FMF region (MacFarlane *et al.*, 1998a, Statistics Canada, 2001).

	1991		1996	% Change (NB)
	FMF	NB	NB	
Total - All Industries	159 730	351 120	388 280	10.6
Logging	1 095	5 715	6 165	7.9
Forestry Services	520	2 430	2 475	1.9
Wood Industries	1 430	5 395	7 220	33.8
Paper & Allied Industries	1 570	6 935	6 725	-3.0
Total - Forest Related	4 615	20 475	22 585	10.3

Table IV-H. Annual average employment in NB for the forestry sector (forestry and logging, wood products manufacturing and paper products manufacturing). (Statistics Canada, 2001).

Year	NB	Canada
1990	14 000	318 200
1991	11 200	290 500
1992	10 100	279 800
1993	11 500	292 900
1994	11 300	310 900
1995	15 000	325 300
1996	14 800	319 100
1997	16 000	314 700
1998	15 600	332 400
1999	17 000	331 200
2000	18 200	343 100
% Change	30	7.8

* Labour force survey.

Table IV-I. Annual average employment in NB for the recreation/tourist sector (fishing, hunting and trapping, accommodations, and food services) (Statistics Canada, 2001)*.

Year	NB	Canada
1990	21 900	811 300
1991	21 600	805 200
1992	22 500	813 100
1993	22 500	821 400
1994	24 100	842 300
1995	24 900	846 500
1996	24 000	884 700
1997	22 100	905 200
1998	23 500	953 500
1999	25 000	955 600
2000	25 600	991 100
% Change	16.9	22.2

*Labour force survey.

Table IV-J. Workplace Health and Safety Commission statistics for the forestry sector (Morin pers. comm, Aug. 2001).

Number of Lost-time Claims By Industry Type				
Year	Contract Logging Industry	Logging Industry (Except Contract Logging)	Forestry Services Industry	Total
1995	0	236	29	265
1996	0	237	43	280
1997	0	213	57	270
1998	0	195	68	263
1999	1	171	59	231
2000	1	156	46	203
Payrolls by industry type (\$)				
1995	0	104 019 267	22 060 255	126 079 522
1996	136 959	102 553 978	24 794 727	127 485 664
1997	95 843	109 042 626	34 865 959	144 004 428
1998	88 445	107 870 918	37 524 250	145 483 613
1999	260 553	104 633 019	34 853 806	139 747 378
2000	824 902	104 917 548	29 742 870	134 917 548
Number of lost-time claims per \$1 000 000 of payroll				
1995	na	2.3	1.3	2.1
1996	0	2.3	1.7	2.2
1997	0	2.0	1.6	1.9
1998	0	1.8	1.8	1.8
1999	3.8	1.6	1.7	1.7
2000	1.2	1.5	1.5	1.5

Table IV-K. Communities with a significant forestry economic base in the FMF area (Belyea, pers. comm., 2001).

Heavily Dependent Forest Based Communities			
Community		%	Index of Diversity
Chipman – Village		64.4	Diversified
Chipman – Parish		58.2	Diversified
Moderately Dependent Forest Based Communities			
Westfield - Village		28.1	Dual
Minto - Village		24.2	Diversified
Fairvale - Village		23.0	Diversified
Rothsay - Village		22.9	Diversified
Hampstead - Parish		22.0	Diversified
Hammond - Parish		20.1	Diversified
Elgin - Parish		19.6	Diversified
Quispamsis - Town		18.7	Dual
Westfield - Parish		18.5	Dual
Salisbury - Parish		18.4	Diversified
Saint John - City		18.1	Diversified
Grand Bay - Town		17.2	Diversified

Table IV-K cont'd. Communities with a significant forestry economic base in the FMF area (Belyea, pers. comm., 2001).

Moderately Dependent Forest Based Communities			
Simonds - Parish	14.3	Dual	
Norton - Village	13.8	Diversified	
Havelock - Parish	12.7	Diversified	
Gondola Pt. - Village	12.6	Diversified	
Studholm - Parish	12.4	Diversified	
Musquash - Parish	12.4	Diversified	
Greenwich - Parish	12.3	Diversified	
Waterborough - Parish	11.5	Diversified	
Hampton - Parish	11.2	Diversified	
Norton - Parish	10.9	Dual	
Brunswick - Parish	10.9	Dual	

Table IV-L. Diversity of forest use in forest dependant communities in the FMF (Belyea, pers. comm., 2001).

Community	Logging	Forestry Services	Wood Industries	Paper & Allied	Total
Brunswick, PAR	X		X		2
Chipman, PAR	X	X	X		3
Chipman, VL	X	X	X		3
Elgin, PAR	X	X	X		3
Fairvale, PAR	X		X	X	3
Gondola Pt., VL		X	X	X	3
Grand Bay, T			X	X	2
Greenwich, PAR	X		X		2
Hammond, PAR	X				1
Hampstead, PAR	X				1
Hampton, PAR	X		X	X	3
Havelock, PAR		X	X		2
Minto, VL	X	X	X		3
Musquash, PAR				X	1
Norton, PAR	X				1
Norton, VL	X		X	X	3
Rothesay, T		X		X	2
Saint John, City	X	X	X	X	4
Salisbury, PAR	X	X	X	X	4
Studholm, PAR	X	X	X	X	4
Waterborough, PAR			X		1
Quispamsis, T	X	X	X	X	4
Simonds, PAR		X	X	X	3
Westfield, PAR	X			X	2
Westfield, VL	X			X	2
Total	18	12	18	14	62
Diversity of Forest Use (%)	29	19	29	23	

Table IV-M. The most predominant forest industry in terms of employment by geographical areas (MacFarlane *et al*, 1998a).

Geographic Area	Major forestry industry
Canada	Paper and allied
NB	Paper and allied
FMF Region	Paper and allied
Saint John County	Paper and allied
Albert County	Logging
Westmorland County	Wood
Kings County	Paper and allied
Sunbury County	Wood
Queens County	Wood
Blissville (Sunbury)	Forestry Services
Gladstone (Sunbury)	Wood
Tracy (Sunbury)	Wood
Fredricton Jct (Sunbury)	Wood
Northfield (Sunbury)	Wood
Wickarm (Queens)	Wood and paper
Johnston (Queens)	Wood
Brunswick (Queens)	Logging and wood
Minto (Queens)	Wood
Hammond (Kings)	Logging

Table IV-N. 1999 average stumpage rates and delivered prices for SNB (SNB, 2000).

Product	Average Stumpage*		Destination	Average Delivered Price*	
	\$/cord	(\$/m ³)		\$/unit	(\$/m ³)
8 foot softwood pulp	20.37	9.61	Irving, Saint John	78.69/cd	37.12
8 foot softwood pulp	25.66	12.10	Repap, Miramichi	106.35/cd	50.17
TL softwood pulp	31.03	14.64	Gr. Northern Milinockett	66.63/ton	51.25
Softwood sawlogs	49.24	23.23	Irving, Sussex	347.82/mbf	57.02
8 foot softwood studwood	44.14	20.82	Irving, Sussex	67.56/ton	51.97
TL softwood studwood	41.15	19.41	Irving, Chipman	65.81/ton	50.62
TL softwood studwood	48.13	22.70	Irving, Sussex	67.56/ton	51.97
TL softwood studwood (spruce)	47.50	22.41	Geo. Pacific, Woodland, Maine	83.40/ton	64.15
TL softwood studwood (fir)	43.90	20.70	Geo. Pacific, Woodland, Maine	73.40/ton	56.46
TL spruce & #2 studwood	48.76	23.00	Champion, Costigan, Maine	74.40/ton	57.23
8 foot & TL poplar	14.50 (6.04/ton)	5.03	Geo. Pacific, Woodland, Maine & Sussex	34.51/ton	28.76

Table IV-N cont'd. 1999 average stumpage rates and delivered prices for SNB (SNB, 2000).

Product	Average Stumpage*		Destination	Average Delivered Price*	
	\$/cord	(\$/m ³)		\$/unit	(\$/m ³)
TL poplar	17.09 (7.12/ton)	5.93	Louis. Pacific, Houlton, Maine	40.05/ton	33.38
8 foot & TL hardwood pulpwood	11.84	6.42	Geo. Pacific, Woodland, Maine & Sussex	33.00/ton	40.24

1. Average stumpage rates and delivered prices were taken from a SNB publication titled "Woodlot Advance", Vol. 11(1), Winter 2000, p. 6.

2. Average stumpage rates and delivered prices were converted from \$/unit to \$/m³ using the following:

Softwood: \$/cord ÷ 2.12 = \$/m³ \$/ton ÷ 1.3 = \$/m³ \$/mbf ÷ 6.1 = \$/m³

Poplar: \$/ton ÷ 1.2 = \$/m³

Hardwood: \$/cord ÷ 1.84 = \$/m³ \$/ton ÷ 0.82 = \$/m³.

APPENDIX 12

Table V-A. Fuelwood permits issued and wood harvested in the FMF area (m³) (NBDNRE, 1999).

	Roadside Clean-up		Fuelwood Clean-up		Fuelwood Stands		Total	
	Permits	Harvest	Permits	Harvest	Permits	Harvest	Permits	Harvest
Peticodiac	89	na	63	436	298	1 803	450	2 239
Sussex	0	na	0	0	23	152	35	152
Coles Island*	63	na	0	0	174	1 356	242	1 356
Moncton	31	na	41	255	36	245	108	500
Total	183	na	104	691	531	3 556	818	4 247

* Generally, firewood producers in Coles Island supply wood to areas outside the FMF.

Table V-B. Economic value of nature-related activities for NB in 1996 (Leigh *et al.*, 2000).

Activity	Average Value per Participant (\$)	
	Yearly	Daily
Outdoor activities in natural areas	110.4	7.4
Wildlife viewing	56.1	6.1
Recreational fishing	87.6	8.8
Hunting		
Large mammals	110.0	12.4
Small mammals	46.4	4.8
Waterfowl	100.6	14.3
Other birds	64.5	8.0
All hunting	139.3	12.5

Table V-C. Direct expenditures for recreational fishing in NB (\$) (DFO, 1997).

	Food & Lodging	Transportation	Fishing Services	Fishing Supplies	Other	Total
Resident	6 235 871	6 648 295	1 101 611	1 918 707	290 743	17 028 770
Non-resident	8 353 182	7 596 253	2 233 441	2 213 672	341 074	27 096 671
Total	14 589 053	14 604 548	3 335 052	4 132 379	631 817	44 125 441

Table V-D. Major purchases made for recreational fishing in NB (\$) (DFO, 1997).

	Fishing Equipment	Boating Equipment	Camping Equipment	Special Vehicles	Land/Real Estate	Other	Total
Resident	2 430 062	4 346 990	1 884 634	6 287 949	5 633 540	981 883	21 565 058
Non-resident	320 295	52 257	0	0	1 735 287	115 397	2 223 282
Total	2 750 357	4 399 247	1 884 634	6 287 949	7 368 827	1 097 280	23 788 340

Table V-E. 1994 net willingness to pay of deer hunters in the FMF by user group (\$) (MacGregor, 1998).

User Group (Residency, Age)	Willingness to Pay	Willingness to Pay per Hunting Trip
FMF, under 35 & over 54	167 704	30
FMF, 35-44	124 700	30
FMF 45-54	129 187	30
Non-FMF, 35 & over 54	374 179	75
Non-FMF, 35-44	277 951	75
Non-FMF, 45-54	288 240	75
No hunting zone, 35 & over 54	15 379	84
No hunting zone, 35-44	11 436	84
No hunting zone, 45-54	11 847	84
Total	1 400 623	63

Table V-F. Willingness to pay for recreational fishing in NB (%) (DFO, 1997).

Additional Cost Per Day (\$)	Residents	Canadian	Non-Canadian	Total
0.00	37.5	26.7	31.5	36.5
less than 10.00	11.6	5.5	3.1	10.7
10.00	19.6	7.1	8.4	18.1
20.00	13.9	18.9	12.4	14.1
30.00	6.0	6.1	3.4	5.8
40.00	2.8	0.0	0.9	2.5
50.00	4.5	14.1	14.9	5.7
60.00	0.6	2.2	1.4	0.7
70.00	0.2	1.5	1.7	0.4
80.00	0.5	1.4	2.5	0.7
90.00	0.2	1.1	0.0	0.2
100.00	1.8	7.6	6.9	2.5
more than 100.00	1.0	7.8	13.0	2.2
Total additional cost	\$11 798 398.00	\$772 237.00	\$1 365 366.00	\$13 936 001.00
Average active angler (WTP>\$0)	\$291.90	\$251.06	\$400.90	\$297.13
Average all active anglers	\$182.37	\$184.11	\$274.63	\$188.68
Average per day fished	\$13.70	\$41.48	\$45.02	\$15.31

APPENDIX 13

The survey on the importance of nature to Canadians addresses several nature-related activities (prior to 1996, the survey pertained to wildlife related activities) to see how Canadians value them. These include and are defined by Leigh *et al.*, (2000):

outdoor activities in natural areas: one or more of 17 specified recreational activities that take place on trips to natural areas such as forests, water bodies, wetlands, open fields and other areas such as scrublands and caves. Types of outdoor activity included are: sightseeing in natural areas, photographing natural areas, gathering nuts, berries or firewood, picnicking, camping, swimming/beach activity, canoeing/kayaking/sailing, power boating, hiking/backpacking, climbing, horseback riding, cycling, off-road vehicle use, downhill skiing, cross-country skiing/snowshoeing, snowmobiling and relaxing in an outdoor setting.

residential wildlife related activities: activities that take place around the residence and involve watching, photographing, feeding or studying wildlife, or maintaining shrubs, plants or birdhouses for wildlife.

wildlife viewing: watching, photographing, feeding or studying wildlife on trips taken for the purpose of enjoying wildlife and natural areas. Wildlife encounters on trips taken for purposes such as vacation or business are excluded from the definition. In the report, wildlife viewing taking place as the main activity on trips is distinguished from wildlife viewing that takes place as a secondary activity on trips taken for outdoor activities in natural areas.

recreational fishing: catching or attempting to catch fish for non-commercial purposes. In the report, recreational fishing that takes place as the main activity on trips is distinguished from fishing as a secondary activity on trips taken for outdoor activities in natural areas.

hunting: searching for, pursuing, stalking, trailing or lying in wait for game which may or may not be harvested. In the survey, hunting that took place as the main activity is distinguished from hunting that takes place as a secondary activity on trips taken for outdoor activities in natural areas.

indirect nature related activities: activities include reading and/or watching a program about nature, buying art, crafts, or posters, visiting zoos, game farms, aquariums, or natural history museums, joining or contributing to naturalist, conservation or sportsmen's clubs and maintaining, restoring or acquiring land for conservation

APPENDIX 14

Critical Element 5.1 Productive Capacity - this is a measure of the ability of the forest landbase to provide a flow of benefits to society. It applies to both timber and non-timber resources. This element should reflect the level of and changes in the capital stock as well as the flow of physical outputs. It should also indicate the actual flow of outputs relative to what is estimated to be sustainable.

Productive capacity is a measure of the ability of the forest landbase to provide a flow of benefits to society. It applies to both timber and non-timber resources. This element should reflect the level of and changes in the capital stock as well as the flow of physical outputs. It should also indicate the actual flow of outputs relative to what is estimated to be sustainable.

An important element of this is the distribution of stocks and flows of benefits (goods and/or services) by ownership. Ownership provides an indication of the access to benefits by different societal groups.

While reference is made to habitat for wildlife and area in parks, the focus of this critical element is on capacity for and production of marketed products such as timber, Christmas trees, and maple syrup. This section also includes values for hunting/fishing/trapping and recreational activities, which might be quantifiable by way of numbers of participants and expenditures. There is some overlap between this critical element and indicators with those in 5.4 (Non-marketed values) and 5.5 (Non-economic values). There is also overlap between this critical element and those involving biodiversity and ecosystem condition and productivity.

Critical Element 5.2 Competitiveness of Resource Industries - this is a measure of the ability of an industry to efficiently combine inputs in producing and selling goods and services. The focus here is primarily on commercial timber production but also included are commercial non-timber products such as Christmas trees and maple syrup, crafts and so on. Indicators should be considered for non-timber products or services such as consumptive wildlife (*e.g.*, hunting/fishing), and commercial recreational activities.

Competitiveness affects the ability of the sector to provide benefits such as jobs and income. And, increased competitiveness may permit increased use of resources for other activities (*e.g.*, non-timber, non-consumptive).

Critical Element 5.3 Contribution to the Economy - This element consists of quantitative estimates of the benefits to society jobs and income (wages and salaries, rent, stumpage, taxes, and return on capital) for forest resource owners, and service providers. The focus here is on marketed goods and services and does not include those consumed for domestic use (*e.g.*, firewood, lumber - see 5.4). Recreational or wildlife related activities for which numbers of participants, expenditures, and impacts (*i.e.*, jobs, income) can be estimated are also included in this section. Other activities and values that are difficult to quantify or value are included in 5.4 (Non-marketed Values).

It is important to estimate not only the quantity of these benefits but also the quality (jobs) and their distribution. Are benefits concentrated among a few or they widely distributed? What percentage of the total jobs and income generated from products and services in the model forest accrue to residents?

Critical Element 5.4 Non-marketed Values - These are goods and services provided by the forest resources which are not traded in traditional markets. Some impacts such as those from domestic use (firewood, lumber) can be quantified and valued but for others there are no readily available quantifiable estimates. These values are nevertheless important because they provide goods and services that society wants. They include values from recreation (*e.g.*, birdwatching, hiking, cross-country skiing, *etc.*) and from cultural and heritage interests. An estimate of value may be determined from the number of participants or expenditures such as travel to sites or for equipment (snowmobiles). Also, there has been considerable research using methods such as contingency valuation - surveying participants to estimate what they would pay for the good or service. These methods might be used for these indicators.

Critical Element 5.5 Non-economic Values - These are essentially non-monetary and non-use values. Benefits include those values that come from the knowledge that our forest and related resources will

continue to survive in sustainable numbers for current and future generations regardless of whether they are being “used” for any specific purpose. People value our forests and wildlife in a protected state. This provides us with the opportunity to pass these on to future generations, to have future options.

The principal indicator for this element is protected areas - the number, size, location, and percentage of total area by degree of protection. The IUCN system or some variant may classify degree of protection. Another indicator is the population of wildlife species both plant and animal which are not included in other estimates (*e.g.*, 5.1.2 c). Of particular interest here are species which may be endangered. There Obviously is overlap of this indicator with biological diversity.

This section includes those values that come from knowledge that our forest and related resources will continue to survive in sustainable numbers for current and future generations regardless of whether they are being “used”. It might also include areas of spiritual significance.

***Appendix 15. Acronyms from the Fundy Model Forest Report on
the Status of Local Level Indicators of Sustainable
Forest Management***

AAC	Annual Allowable Cut
ACDC	Atlantic Conservation Data Center
ARNEWS	Acid Rain National Early Warning
ATV	All Terrain Vehicle
AWMA	Air and Waste Management Association
BF	Balsam Fir
BFP	Balsam Fir - Pine
BMP	Best Management Practices
BS	Black Spruce
CCFM	Canadian Council of Forest Ministers
CCREM	Canadian Council of Resource and Environment Ministers
CE	Cedar
CEF	Cedar Fencing
CEL	Cedar Sawlog
CFS	Canadian Forest Service
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CSA	Canadian Standards Association
CSD	Community Subdivisions
CWS	Canadian Wide Standards
DBH	Diameter Breast Height
DEDT	Department of Economic Development and Tourism
DELG	Department of Environment and Local Government
DFA	Defined Forest Area
DFO	Department of Fisheries and Oceans
DNRE	Department of Natural Resources and Energy
DSS	Decision Support Systems
DTM	Digital Terrain Model
DWA	Deer Winter Area
EC	Environment Canada
EL	Eastern Larch
ELC	Ecological Land Classification
EMEP	The Cooperative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe
EMS	Environmental Management System
SBW	Spruce Budworm
FCG	Forest Community Group
FDS	Forest Development Survey
FIDS	Forest Insect and Disease Survey
FMF	Fundy Model Forest
FNP	Fundy National Park
FR	Fundy Region
FSC	Forest Stewardship Council
FWI	Forest Wire Index
GDP	Gross Domestic Product

GFE	Greater Fundy Ecosystem
GFERG	Greater Fundy Ecosystem Research Group
GIS	Geographic Information Systems
GPP	Gross Provincial Product
HEML	Hemlock Sawlog
HEMP	Hemlock Pulp
HWC	Hardwood Chips
HWF	Hardwood Firewood
HWFC	Hardwood Full-Tree Chips
HWL	Hardwood Sawlog
HWP	Hardwood Pulp
HWVL	Hardwood Veneer Log
IHSW	Intolerant Hardwood – Softwood
IPM	Integrated Pest Management
ISO	International Standards Organization
IUCN	International Union for the Conservation of Nature
JDI	JD Irving, Limited
JP	Jack Pine
LATH	Lath
LL	Larch Sawlog
LMWH	Large Mixed Wood Habitat
MAI	Mean Annual Increment
MCFH	Mature Coniferous Forest Habitat
MWDH	Moderate Winter Deer Habitat
MXWD	Mixed Wood
NAAQO	National Ambient Air Quality
NAPS	National Air Pollution Surveillance
NB	New Brunswick
NBATVF	New Brunswick All Terrain Vehicle Federation
NBDOT	New Brunswick Department of Transportation
NFA	Nova Forest Alliance
NGO	Non-Governmental Organizational
NOX	Nitrogen Oxides
NRC	Natural Resources Canada
OHWH	Old Hardwood Habitat
OMWH	Old Mixedwood Habitat
OPIH	Old Pine Habitat
OSFH	Older Spruce-Fir Habitat
OTHH	Old Tolerant Hardwood Habitat
PAI	Periodic Annual Increment
PES	Pre-European Settlement
PI	Pine
PP	Poplar Pulp
PROPS	Protection Planning System
PSP	Permanent Sample Plot
PV	Poplar Veneer Log
RM	Red Maple
RPPO	Red Pine Pole
RS	Remote Sensing

SBWDSS	Spruce Budworm Decision Support System
SFM	Sustainable Forest Management
SIMFOR	Social Indicator Model Forest
SNB	Southern New Brunswick Wood Co-op
SP	Spruce
SPFF	Spruce and Fir Fencing
SPFL	Spruce and Fir Sawlog
SPFP	Spruce and Fir Pulp
SPFS	Spruce and Fir Studwood
SPP	Species
SWDH	Severe Winter Deer Habitat
SWV	Spruce and Fir Veneer Log
TA	Trembling Aspen
THP	Tolerant Hardwood Pure
THSW	Tolerant Hardwood – Softwood
TL	Tree Length
TOHW	Tolerant Hardwood
UNB	University of New Brunswick
UNBF	University of New Brunswick – Fredericton Campus
UNBSJ	University of New Brunswick – Saint John Campus
VOC	Volatile Organic Compounds
WB	White Birch
WHSCC	Workplace Health and Safety Commission
WMZ	Wildlife Management Zone
WP	White Pine
WPG	Wood Products Group
WPL	White Pine Sawlog
WPP	White Pine Pulp
WPV	White Pine Veneer Log
WS	White Spruce