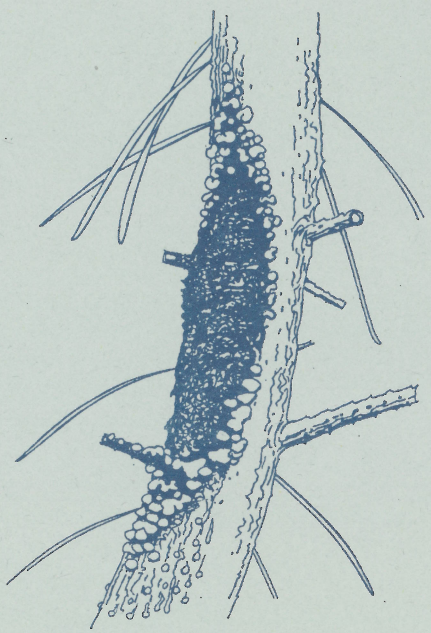
F I D S R E P O R T

FOREST INSECT AND DISEASE SURVEY

PEST REPORT ON SPECIAL PROJECTS

QUEEN CHARLOTTE ISLANDS

1995



Forest Insect and Disease Survey

Natural Resources Canada
Canadian Forest Service
Pacific and Yukon Region

Ressources naturelles Canada
Service canadien des forêts
Région du Pacifique et Yukon

Canada

FIDS Report 96-7

FOREST INSECT AND DISEASE SURVEY

PEST REPORT ON SPECIAL PROJECTS

QUEEN CHARLOTTE ISLANDS

1995

Prepared for:
South Moresby Forest Replacement Account (SMFRA)

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INTRODUCTION

As part of a continuing Memorandum of Understanding (MOU) between the Ministry of Forests (MOF) and Canadian Forest Service (CFS)-Natural Resources Canada (NRCan), several long term projects, initiated under the agreement in 1991, continued through to 1995. The results from the 1991 assessments are available from the FIDS (Forest Insect and Disease Survey) Report 92-11, the 1992 results are reported in FIDS Report 93-8 and 1993 results in FIDS Report 94-11. The main focus in 1995 was again on Project 13.3 "Alternative Silviculture Systems for Environmentally Sensitive Sites on Steep Slopes:-Operational Trial". Initially (1991) the assessment of the trial locations consisted of a general pest survey of the Gregory Creek and Hangover Creek sites. In 1992, after completion of the demonstration trails and the 250 reference control points (R.P.) at each site, 10 permanents plots were established at each location to monitor effects of various harvesting methods on forest health. The plot system was designed along the permanent trail system for incorporation in any future demonstration plans through the life of the project (Appendix A). Trees and regeneration were assessed for pests and mapped for retrieval after harvest on a plot by plot basis (Appendix B). The 1995 activities were primarily directed at assessment of seedlings at most plots at both locations for survival success and early impact on health, although assessment of general post harvest plot conditions were also included.

Other projects including PSS (permanent sampling station) sampling, western blackheaded budworm damage appraisal work and monitoring of spruce aphid plots were also continued and are documented in this report. All projects were incremental to information normally collected by FIDS during regular surveys on the Queen Charlotte Islands.

PROJECT 13.3:

Objectives:
1. to get an overview of forest health conditions at the two project sites prior to disturbance,
2. to establish a network of permanent plots and gather baseline health conditions of trees within those plots,
3. to monitor and evaluate both short term and long term health effects on plot trees relating to various harvesting regimes,
4. to monitor direct effects of harvest on natural regeneration as well as success and health effects on newly planted seedlings and natural regeneration, both in the short term and over time.

Locations: Area #1 - Gregory Creek in Rennell Sound (QCI).
Area #2 - Hangover Creek in Rennell Sound (QCI).

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SUMMARY

In Project 13.3, of the 20 plots established in 1992, 19 were found and plot centres tagged in 1993. A total of 56% of plot trees were felled and at most plots, most trees or stumps were found and tagged. Regeneration was assessed and approximately 54% was lost during logging activities. In the 1995 survey, condition of plot trees and regeneration remained unchanged. Of the 118 planted seedlings located in the plots, 16% were dead due to a variety of causes.

At the PSS's, few larvae were collected; at the blackheaded budworm plot increment cores showed growth reductions during the infestation period. At the two sites assessing affects of spruce aphid attack, continued damage was evident in the assessment areas but 1995 feeding activity was reduced from the previous year.

METHOD

At both Gregory and Hangover creeks, 10-100 m^2 circular plots were established a minimum of 100 m apart. Plots were located in all treatment types. At Gregory Creek Trail A, plot 1 and 2 were located in the single tree selection treatment, 3, 4 and 5 in the patch clearcut (25%) treatment. At Trail B, plot 6, 7 and 8 were in treatment #3, patch clearcut (50%), and plot 9 and 10 were located in the clearcut treatment area. At Hangover Creek, plot 11, 12 and 13 were in the single tree selection treatment, plot 14 and 15 in the patch clearcut (25%), plot 16 and 17 in the clearcut, plot 18 and 19 in the patch clearcut (50%) and plot 20 in the control area (Appendix A). All trees and regeneration over 0.5 m in the plots were mapped and assessed in the summer of 1992, prior to harvest, to determine baseline conditions for plot areas with which post harvest and longer term effects could be compared. The demonstration trails along which the plots were to be located were in place and 250 permanent reference points per site had been established and flagged. The trails and reference points were used as a guide for locating plot centers. Proximity to the demonstration trails was considered an essential element so that these plots could be incorporated into future demonstration projects.

After harvest, the trails had been re-established at or near their original line. Unfortunately, minor changes in trail locations at some points affected some plots which had been established at mileage posts on the original trail. Plot centres were however located. The permanent reference markers were also relocated after harvest and these were most commonly used as plot centres. Several plots originally choosen in part for their proximity to the demonstration trail are now at some distance from the trail. All plot centers once relocated were marked with aluminum stakes and yellow numbered tags. Using the 1992 plot maps, plot trees (or in many cases stumps) were tagged with blue numbered tags and regeneration (over 0.5 m in height) was relocated and its presence or absence noted. Cedar and spruce seedlings were planted after harvest and, where they occurred in the plots, they were assessed and added to the plot maps (Appendix B).

Assessments in the plots was directed primarily to examination of planted seedlings for early health effects as well as any variability that might be related to treatment type. Plot trees were examined for any changes that may have occurred from the previous season especially related to the potential for continued blowdown. Regeneration was assessed particularly in relation to changes in exposure.

RESULTS AND DISCUSSION

Of the total of 122 plot trees in the 20 plots established, 54 trees remained standing, 62 trees were harvested or at least felled, two standing trees were damaged by harvesting, one of which died, one tree died possibly in 1995 and showed extensive Pseudohylesinus sp. damage at the base and six trees were windthrown as a result of the change in stand structure (table).

The regeneration was also affected by the harvest; many saplings were buried under the heavy slash which predominated all active areas. Overall, approximately 54% of regeneration (over 0.5 m tall) was lost due to logging. This loss average includes a control plot and three plots in leave areas of patch clearcuts, all of which had 100% survival of regeneration. Percent losses of regeneration were: single tree selection - 50%; patch clearcut (25%) - 65%; patch clearcut (50%) - 38%; clearcut - 97%; control - 0%. In several plots 100% of the regeneration was lost. Sample size was small and results were somewhat skewed by the chance of a plot falling inside or outside the cut segment of the patch harvest methods. The fact that helicopter extraction predominated probably reduced losses. It is likely however that understory young trees should not be considered as the next crop in these types of alternate harvest systems.

Table Locations and contents by treatment type of pest monitoring plots at Gregory and Hangover Creeks, QCI, Vancouver Forest Region, 1995.

Location/Plot		No. trees		No. regeneration		Seedlings planted		
Plot	Ref. loc.	before	after	before	after	spruce	cedar	Treatment
Gregory Creek								
1	180	3	1	8	4	3	5	Single tree
2	188	10	5	0	0	3	6	Single tree
3	0+533 m	9	0	5	0	0	0	Patch (25%)
4	113	8	3	22	0	2	6	Patch (25%)
5	104	10	10	10	10	3	6	Patch (25%)
6	0+182 m	4	0	2	0	-	-	Patch (50%)
7	0+314.8 m	12	12	10	10	-	-	Patch (50%)
8	74	7	0	12	0	-	-	Patch (50%)
9	37	7	0	27	?	?	?	Clearcut
10	48	12	0	0	0	3	6	Clearcut
Hangover Creek								
11	213	5	3(1 d.)	3	1	3	5	Single tree
12	230	4	3	5	3	3	6	Single tree
13	249	4	3	4	2	3	6	Single tree
14	0+528.9 m	3	3	2	1	-	-	Patch (25%)
15	181	3	3	9	6	3	5	Patch (25%)
16	134	3	0	1	1	3	6	Clearcut
17	132	1	0	6	0	3	6	Clearcut
18	85	8	3	15	7	3	5	Patch (50%)
19	89	4	0	19	19	3	6	Patch (50%)
20	35	5	5	18	18	3	3	Control
TOTALS		122	54	178	82	41	77	

As part of the long term plan, spruce and cedar seedlings were planted at predetermined locations and densities. A total of 118 seedlings were found in the plots of which one was dead the first year, probably due to planting problems. In 1995, of 41 spruce seedlings, 37% were healthy while 52% were affected by deer browse (see Fig. 1). Browse was also the major problem in the unprotected cedar seedlings, with 66% of 38 seedlings (Fig. 3) affected and only 3% healthy. The use of protective collars on cedar reduced deer browse to only 18% of 39 seedlings while 23% remained healthy (Fig. 2).

Queen Charlotte Islands -- Gregory and Hangover Creeks Special Project Survey

Results of Seedling Assessments

Fig. 1 Spruce

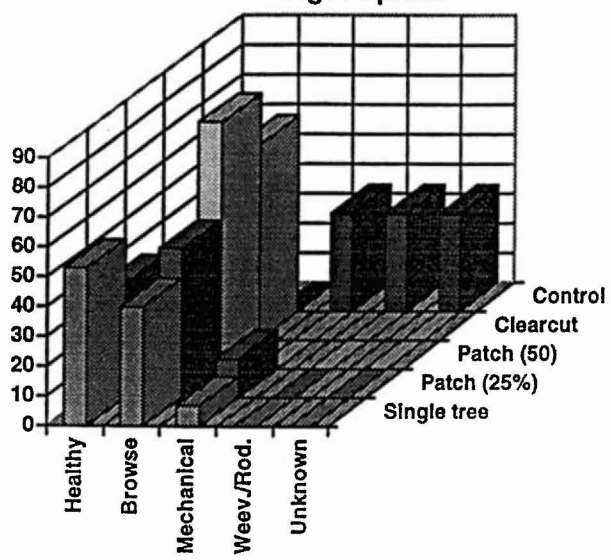


Fig. 2 Cedar--collared

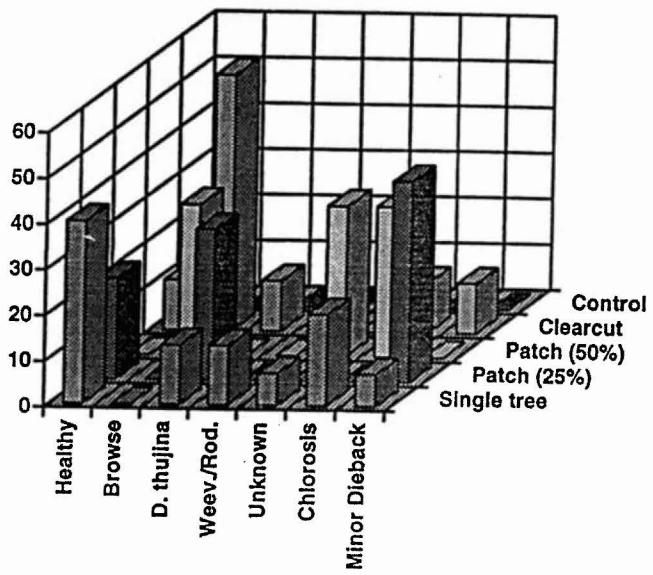


Fig. 3 Cedar--not collared

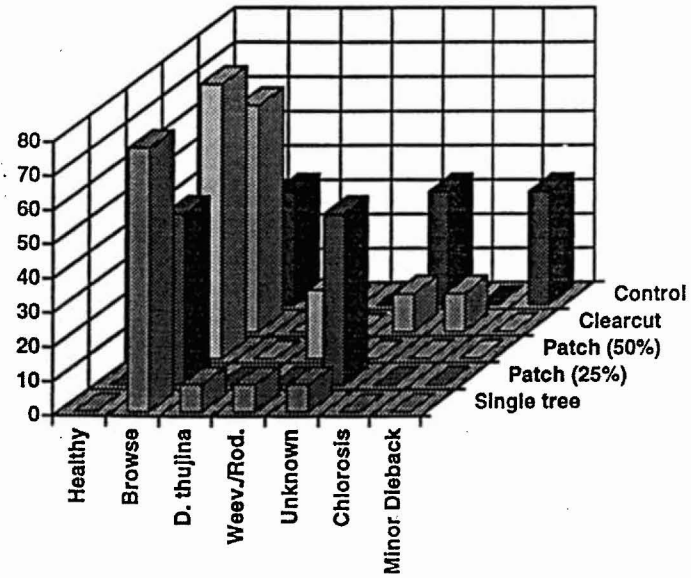
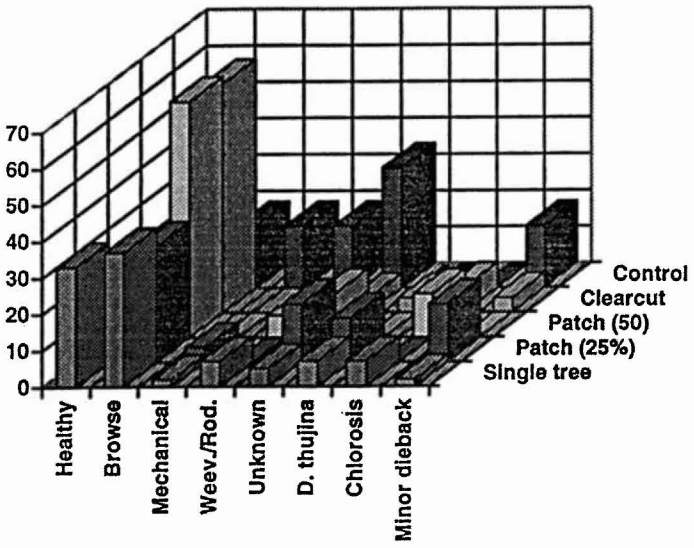


Fig. 4 All seedlings



Overall only 21% of seedlings were healthy and 16% were dead in 1995 (two years after planting). While browse was the most serious problem, affecting 45% of seedlings (Fig. 4), cedar leaf blight infected 6% of seedlings, bark stripping by a root collar weevil or rodents killed 4% of seedlings, 6% of seedlings were chlorotic, minor dieback was found in 6% of seedlings, mechanical damage affected 3% of seedlings while 9% of seedlings were damaged or killed by unknown agents.

Assessments were also broken down by the treatment types. While the single tree selection treatment and patch cut (25%) had the highest percent healthy trees with 33% and 20% respectively, sample size was too small to draw any conclusions. Indications however were that deer are active everywhere (although in this case apparently more active in clearcuts and patch (50%)-Fig. 4) as are, but to a lesser degree, small rodents and root collar weevils. Cedar leaf blight, chlorosis and minor dieback seem also unaffected by harvest method. Planting under a 100% closed canopy in a mature stand is not effective; 67% of seedlings in the control plot were dead and none were healthy.

The primary immediate effect of harvesting was the loss overall of the majority of the regeneration. Blowdown initially reduced the number of plot trees by six, averaging 10% of leave trees, and occurred in plot one and six at Gregory Creek in the single tree and 50% patch clearcut treatments respectively. Blowdown continued to be a problem even into 1995 with four new trees down at the edge of a cut between plot 6 and 7 (patch (50%)), and severel trees down at a cut edge near plot 15 (patch (25%)). The increased light has also had an apparent positive early effect, with notable growth on young regeneration and numerous new natural seedlings in some areas; particularly in the area of plot 2 (single tree select) and 16 (clearcut).

Conditions have changed throughout both sites. Blowdown may yet affect some plots in the near future. The increased light, heat and wind exposure will continue to affect especially regeneration and planted seedlings in various ways. The opening of the canopy and increased light may over the long term affect the development and spread of mistletoe in those areas where it occurs (see references for previous reports containing details on mistletoe). Affects of harvesting on the activities of other pests are undetermined but should be monitored over time.

OTHER PROJECTS

Several other special projects were also assessed. The permanent sampling areas were sampled using the standard three-tree beating method (2.5 m pole over a 2x3 m sheet to dislodge defoliating insect larvae from branches of each of three trees). At Gregory Creek no larvae were found while at Hangover Creek two blackheaded budworm larvae and one green-striped forest looper larva were collected. These results reflect an overall increase in blackheaded budworm populations in the district.

Western blackheaded budworm, Acleris gloverana

In continued assessments, in young stands, of long term effects of the western blackheaded budworm infestation of 1985-88, one plot (#4-east of the Honna River area and MB mainline on Graham Island) was sampled. This plot was part of a system of plots established by BCFS in 1987 throughout the infested areas. Each of these plots consisted of a large number of trees tagged and tallied with 1987 defoliation estimates documented for about 25% of the trees. The plot 4 area was spaced in 1988 and only 10 of the tagged hemlock appropriate for increment core sampling, were found. Most trees cored were not among those originally assessed for defoliation, although overall defoliation in this area was moderate to severe in 1987, based on plot information and aerial overview survey. In 1986 defoliation in the area was generally light to moderate, based on aerial surveys and reports, and in 1988 defoliation was much reduced in extent and only light according to reports.

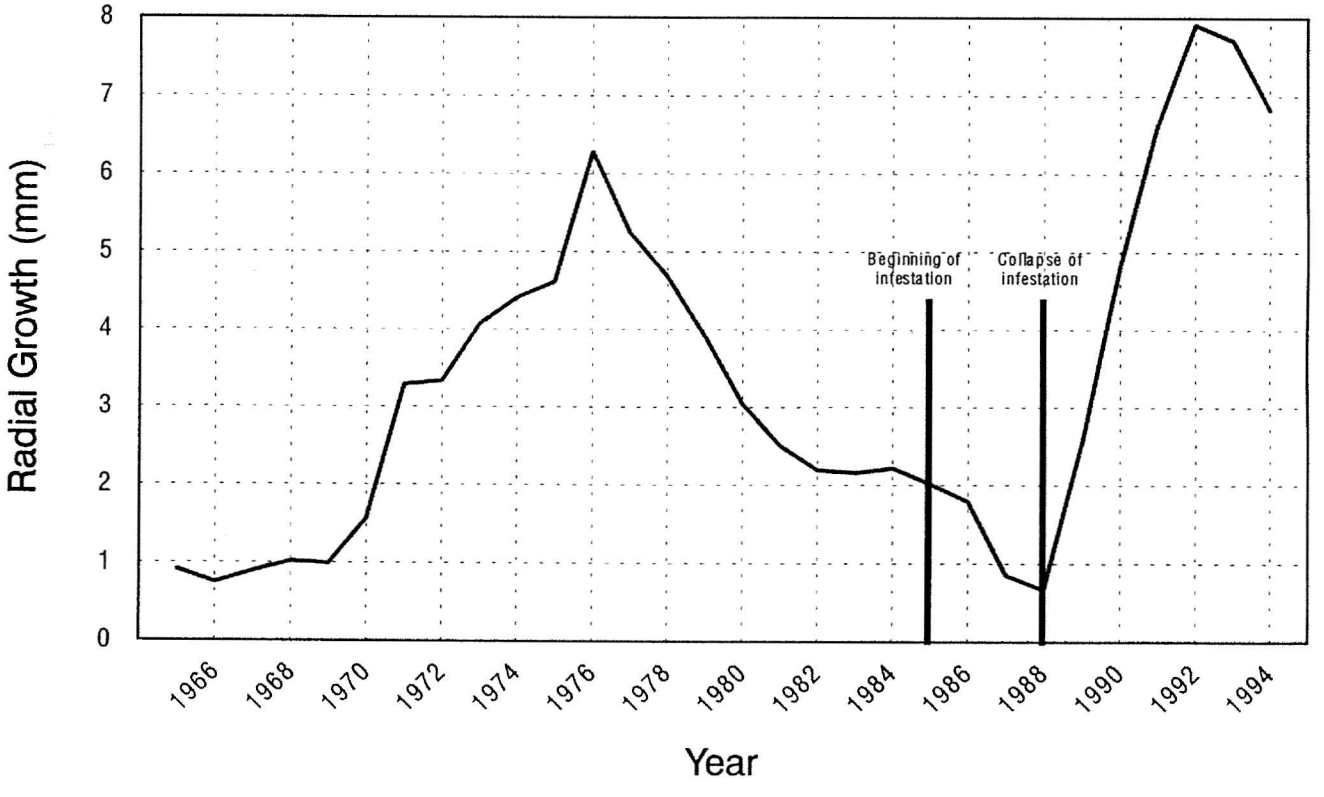


Figure Radial increment of western hemlock in the Honna R. plot (#4), defoliated by western blackheaded budworm. Q.C.I., 1995.

An assessment of the 10 cores showed a dramatic reduction in radial increment during the outbreak period (see graph). Increment averaged only .67 mm in 1988, one year after the most severe recorded defoliation. This average is 363% less then the annual average of 2.42 mm for the 5 year period prior to the onset of the outbreak. Recovery was already evident in 1989 with a growth rate of 2.53 mm, although part of this dramatic recovery was doubtless associated with the spacing in 1988.

Spruce aphid, Elatobium abietinum

Twenty semi-mature trees assessed for levels of defoliation at each of two sites in 1992 were assessed for the fourth time in 1995. At Chinukundl Creek, no new defoliation or discoloration was noted and trees were generally showing good recovery. In 1994, 8 trees were severely and 5 trees moderately affected, in 1995, only 5 trees were severely and 6 trees moderately impacted, while 6 trees showed only trace remaining damage or no damage at all. No branch dieback or tree mortality was noted.

At Gray Bay, where one tree was killed in 1993 a second is likely to succumb in 1995 and two others are suspect and may not recover. The remaining 16 trees are showing new growth and some recovery, although not as quickly as at the Chinukundl Creek site. Few aphids were noted in the stand and no new feeding damage was evident. If all four trees (one dominant, two codominant and one intermediate) die, this implies 20% tree mortality due to spruce aphid. It also indicates that mortality can occur several years after an infestation has subsided and implies that extreme populations at a specific site over several years are likely to have a severe impact. Mortality due to spruce aphid attack has been recorded a number of times over the years on the Queen Charlotte Islands, although protracted losses have not been often mentioned.

PROPOSALS FOR 1996

1. Monitoring at the Gregory and Hangover creek sites could now be reduced to less frequent intervals, possibly every five years.

2. The PSS's at the above locations should continue to be monitored annually and any dramatic increase in defoliator larval numbers would be used to initiate surveys within the project plots even if unscheduled.

3. Semi-mature trees flagged and assessed at Gray Bay and Chinukundl Creek for the spruce aphid, should continue to be monitored to note recovery or further mortality.

4. At the least, partial aerial surveys should continue on an annual basis. The long range pattern of infestations recurring every 10 years, coupled with a continued increase in positive larval sampling in 1995 for western blackheaded budworm indicates the possible early stage of the next infestation period.

REFERENCES

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Vallentgoed J. 1992. Forest Insect and Disease Survey Pest Report on Special Projects, Queen Charlotte Islands, 1991. FIDS Report 92-11. 9p.

Vallentgoed J. 1993. Forest Insect and Disease Survey Pest Report on Special Projects, Queen Charlotte Islands. 1992. FIDS Report 93-8. 14p.

Vallentgoed J. 1994. Forest Insect and Disease Survey Pest Report on Special Projects, Queen Charlotte Islands, 1993. FIDS Report 94-11. 30p.

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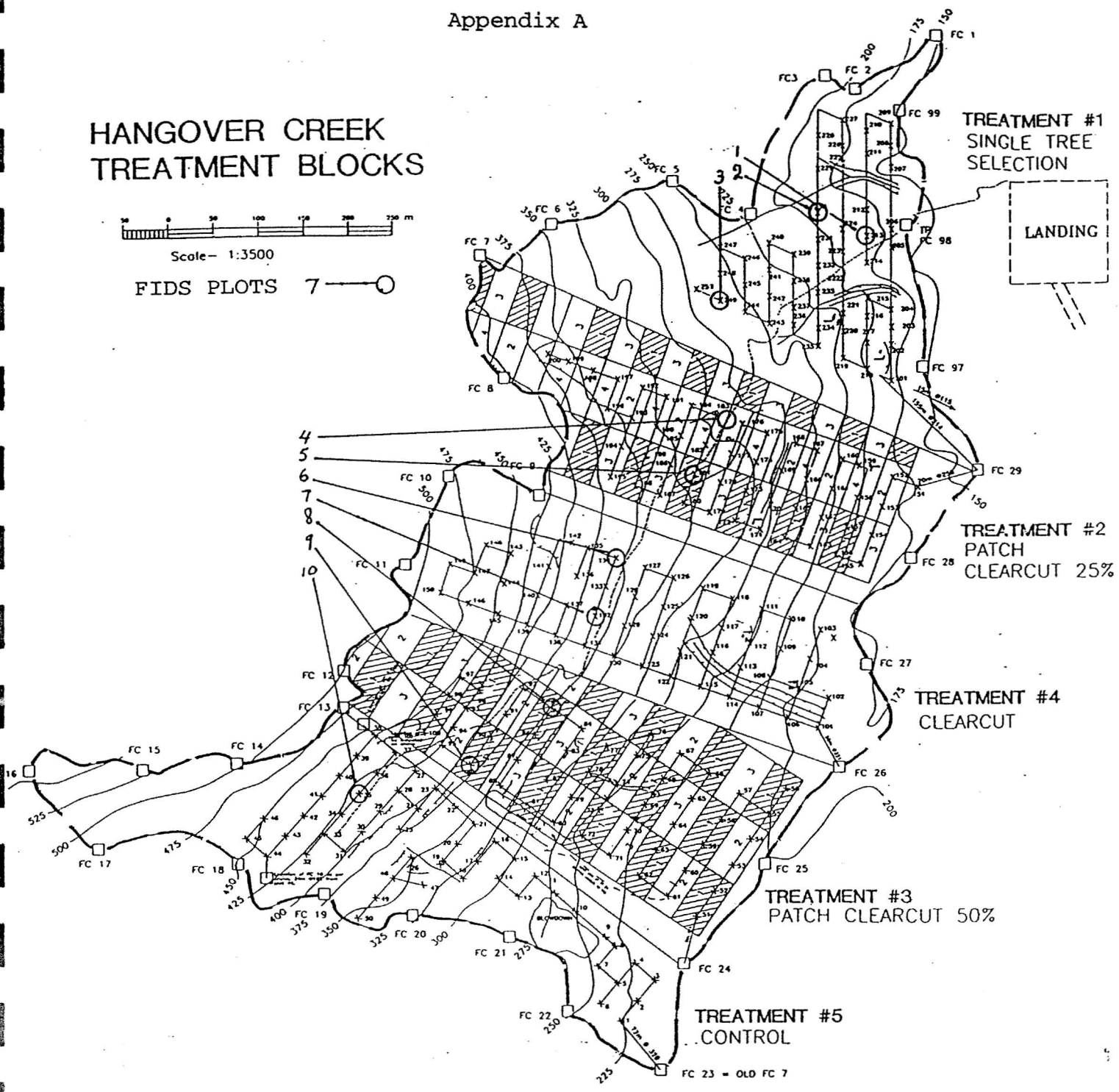
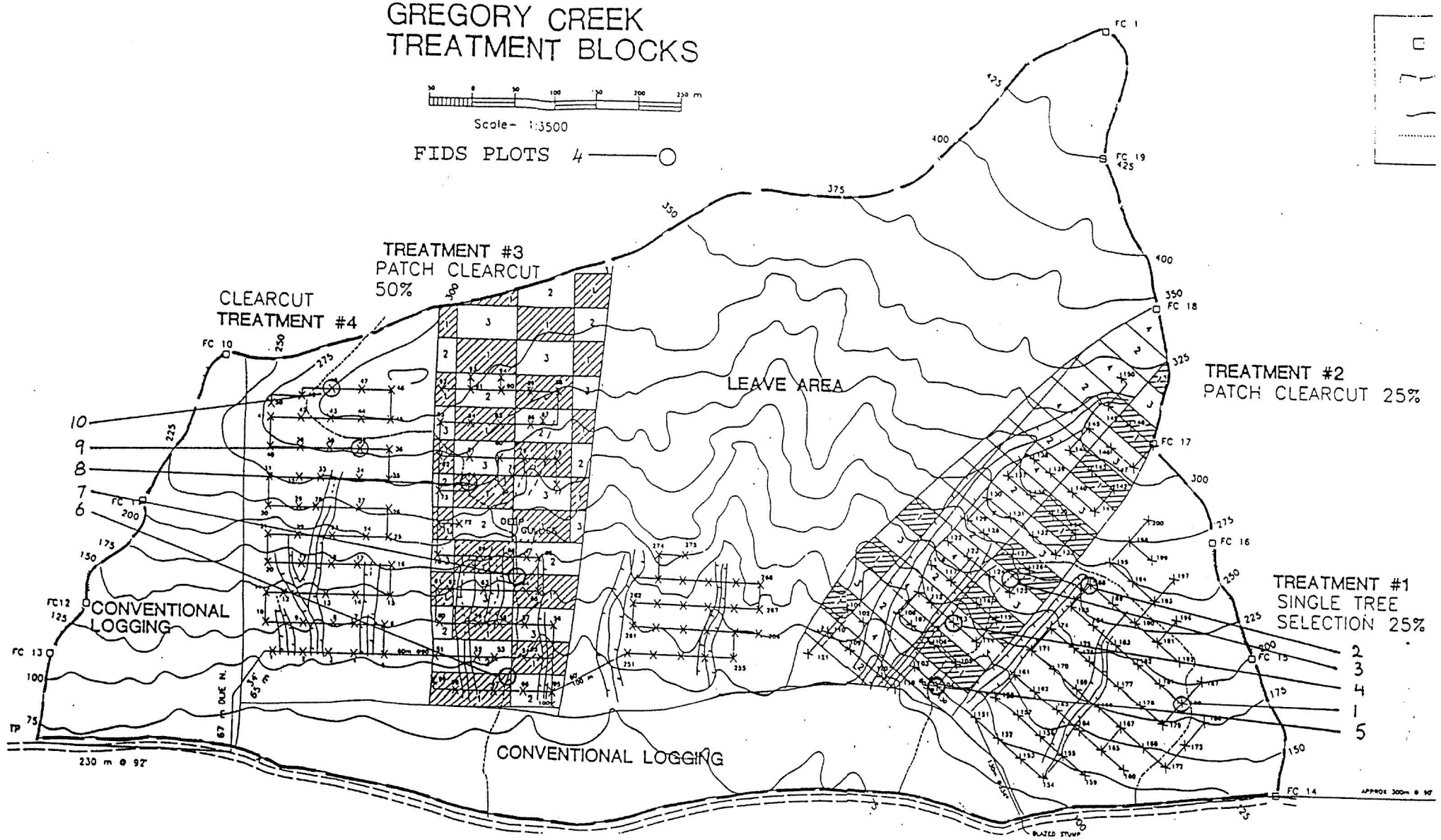
APPENDICES

Appendix A



GREGORY CREEK
TREATMENT BLOCKS

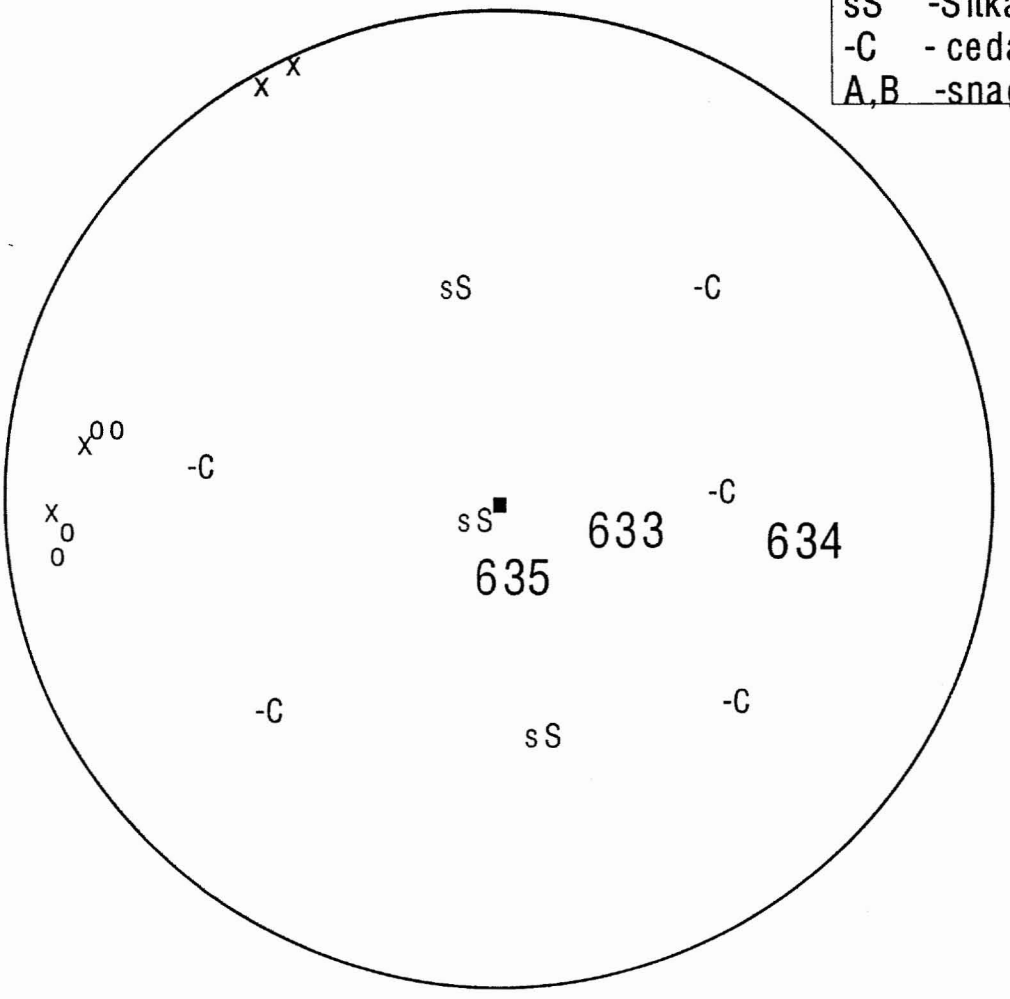


Appendix B
Gregory Creek - Demonstration Trail B
Plot 1 (R.P. - 180)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND
999 - tagged tree #
xx - natural regen.
oo - regen. destroyed
sS -Sitka spruce seedling
-C - cedar seedling
A,B -snags



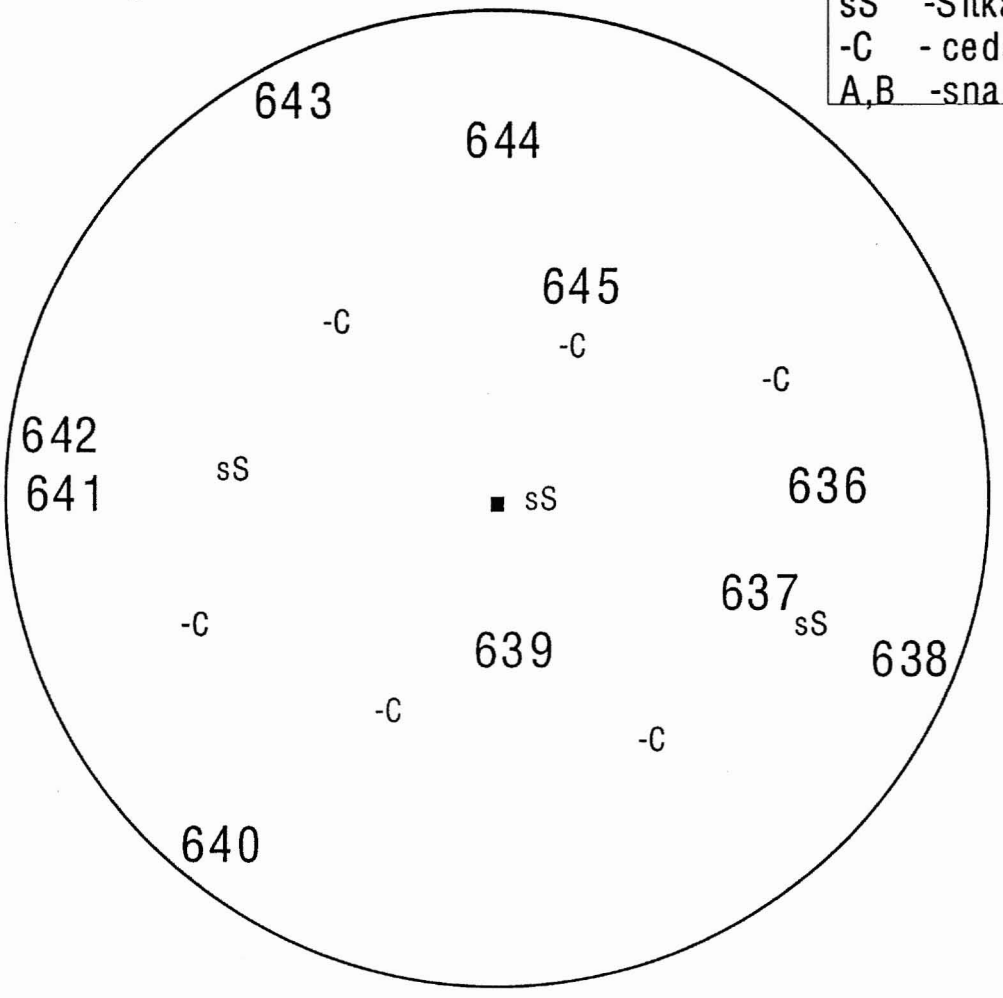
Original tree no.	New tree no.	Species	DBH	Status
1	633	wH	43	healthy, scar
2	634	wH	18	sweep, felled
3	635	wH	24	sweep, logged
xx		wH		majority under slash

Gregory Creek - Demonstration Trail B

Plot 2 (R.P. - 188)

Canadian Forest Service
FOREST INSECT & DISEASE SURVEY

LEGEND
999 - tagged tree #
xx - natural regen.
oo - regen. destroyed
sS -Sitka spruce seedling
-C - cedar seedling
A,B -snags



Original tree no.	New tree no.	Species	DBH	Status
1	636	wH	27	lean
2	637	wH	29	lean, logged
3	638	wH	25	logged
4	639	wH	35	
5	640	wH	34	logged
6	641	wH	12	
7	642	wH	12	healthy, dead standing
8	643	wH	32	logged
9	644	wH	41	logged
10	645	wH	28	

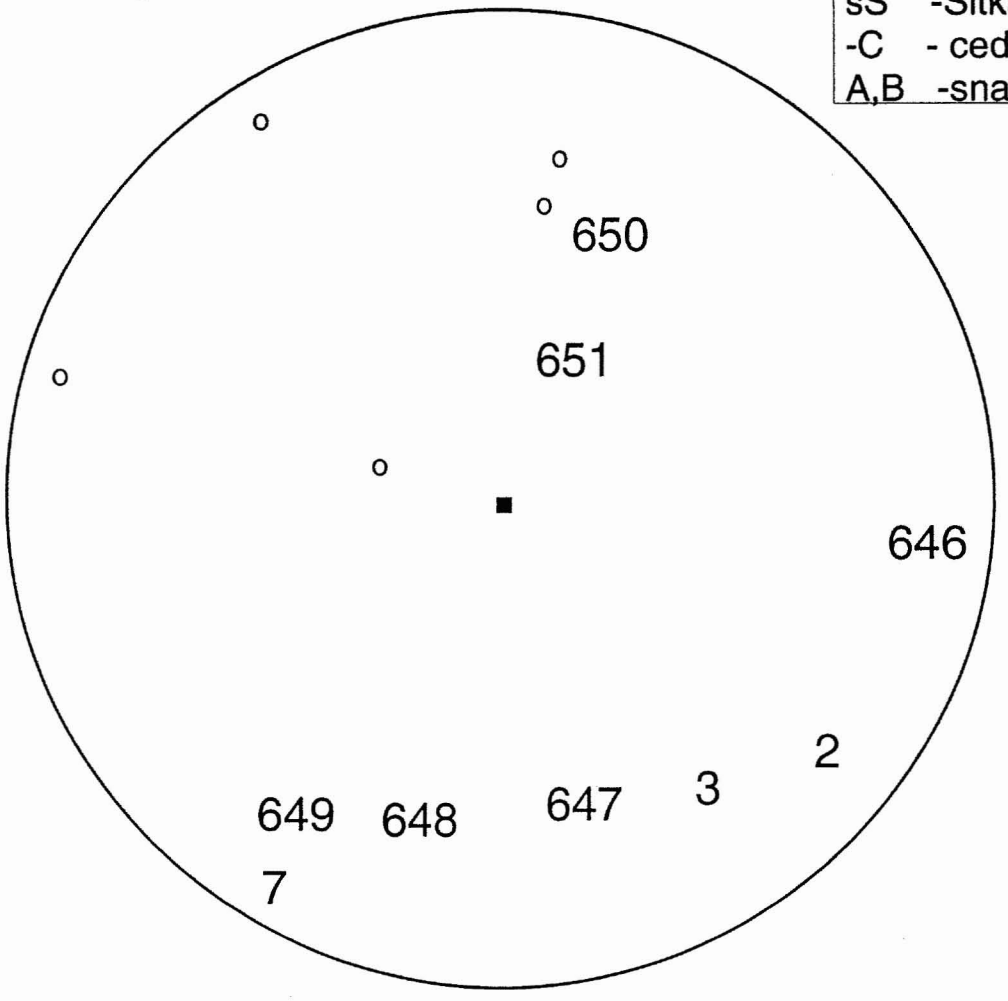
Gregory Creek - Demonstration Trail B

Plot 3 (trail)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND
999 - tagged tree #
xx - natural regen.
oo - regen. destroyed
sS -Sitka spruce seedling
-C - cedar seedling
A,B -snags



Original tree no.	New tree no.	Species	DBH	Status
1	646	wrC	96	fork, logged
2		wH	12	mistletoe (1), felled, not found
3		wH	9	felled, not found
4	647	wH	9	felled
5	648	wrC	143	dead top, logged
6	649	wH	7	sweep, felled
7		wH	11	felled, not found
8	650	wH	95	mistletoe suspect, logged
9	651	wH	11	mistletoe (1), felled
xx		wH		destroyed, under slash

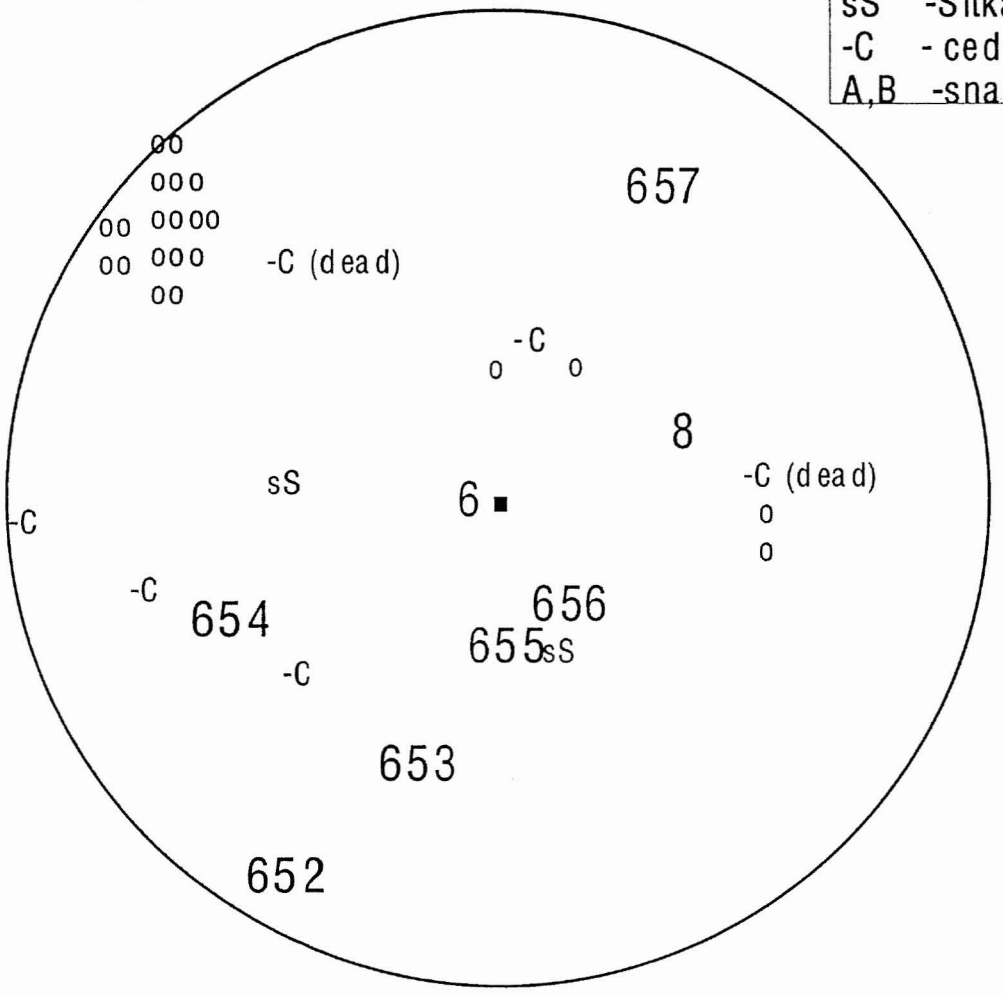
Gregory Creek - Demonstration Trail B

Plot 4 (R.P. -113)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND
999 - tagged tree #
xx - natural regen.
oo - regen. destroyed
sS -Sitka spruce seedling
-C - cedar seedling
A,B -snags



Original tree no.	New tree no.	Species	DBH	Status
1	652	wH	48	mistletoe (3)
2	653	wH	14	mistletoe (1)
3	654	wH	11	lean, mistletoe (2)
4	655	wH	13	mistletoe (2), felled
5	656	wH	15	mistletoe (2), felled
6		wH	11	mistl. (1), felled, not fnd
7	657	wrC	70	brk. top, logged
8		wH	6	mistl. (1), felled, not fnd
xx		wH		destroyed, heavy slash

Gregory Creek - Demonstration Trail B

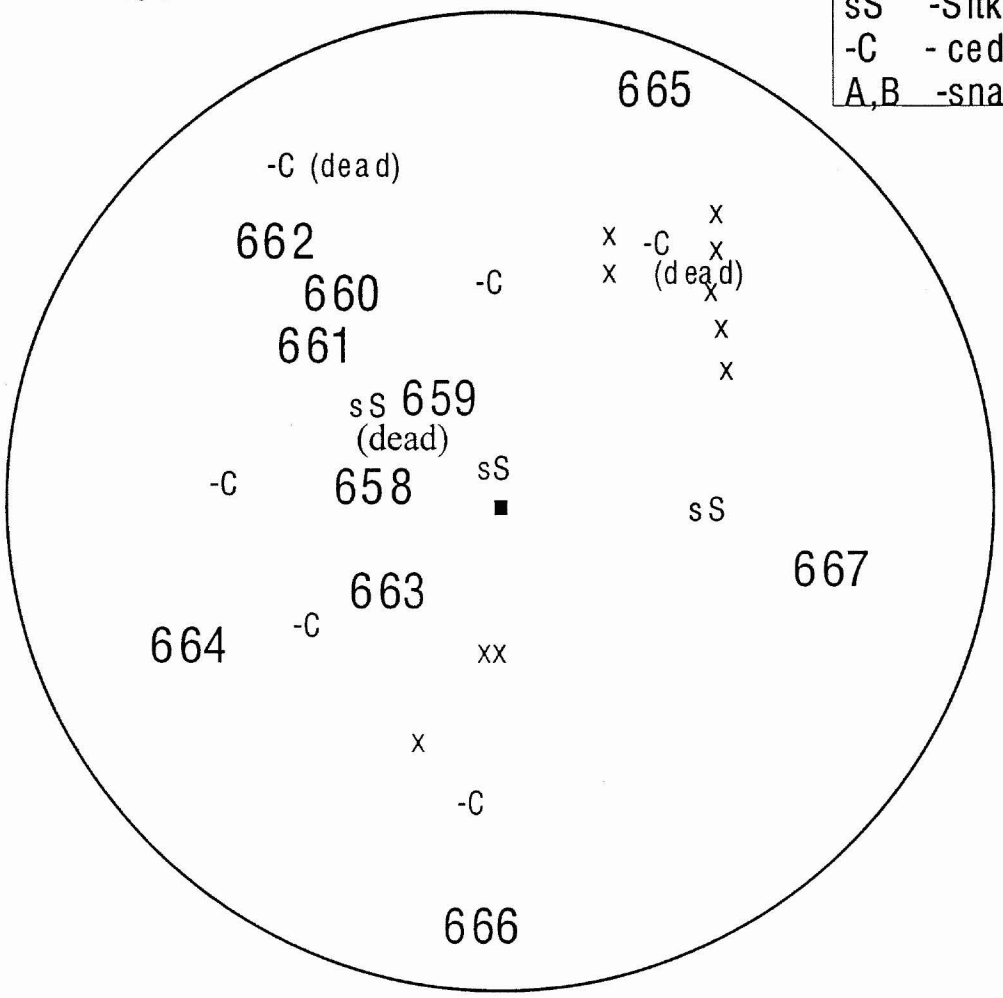
Plot 5 (R.P. - 104)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND

999 - tagged tree #
xx - natural regen.
oo - regen. destroyed
sS -Sitka spruce seedling
-C - cedar seedling
A,B -snags



Original tree no.	New tree no.	Species	DBH	Status
1	658	wH	8	mistletoe (1)
2	659	wH	20	mistletoe (3)
3	660	wH	45	mistletoe (3)
4	661	wH	42	mistletoe (3)
5	662	wH	54	mistletoe (3), rec.-dead
6	663	wH	77	mistletoe (2)
7	664	wH	15	healthy, scar
8	665	wH	26	mistletoe (1)
9	666	wH	120	mistletoe (3), sapsuck.
10	667	wH	16	mistletoe (1)
xx		wH		

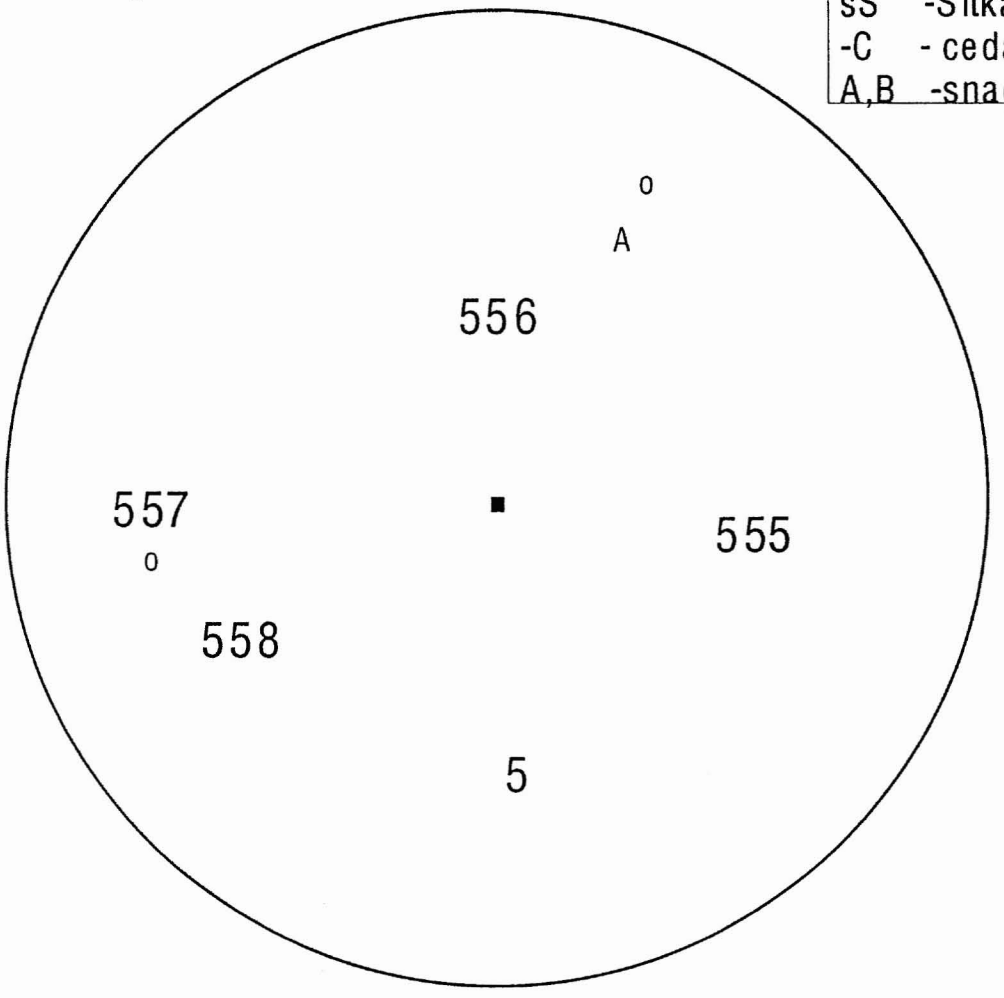
Gregory Creek - Demonstration Trail A

Plot 6 (trail)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND
999 - tagged tree #
xx - natural regen.
oo - regen. destroyed
sS -Sitka spruce seedling
-C - cedar seedling
A,B -snags



Original tree no.	New tree no.	Species	DBH	Status
1	555	wH	96	mistletoe (1),windt.
2	556	wH	15	mistletoe (1), windt.
3	557	wH	49	mistletoe (1), windt.
4	558	wH	48	mistletoe (1), windt.
5		wH	17	buried under slash
A				snag, knocked down
xx		wH		under slash, not found

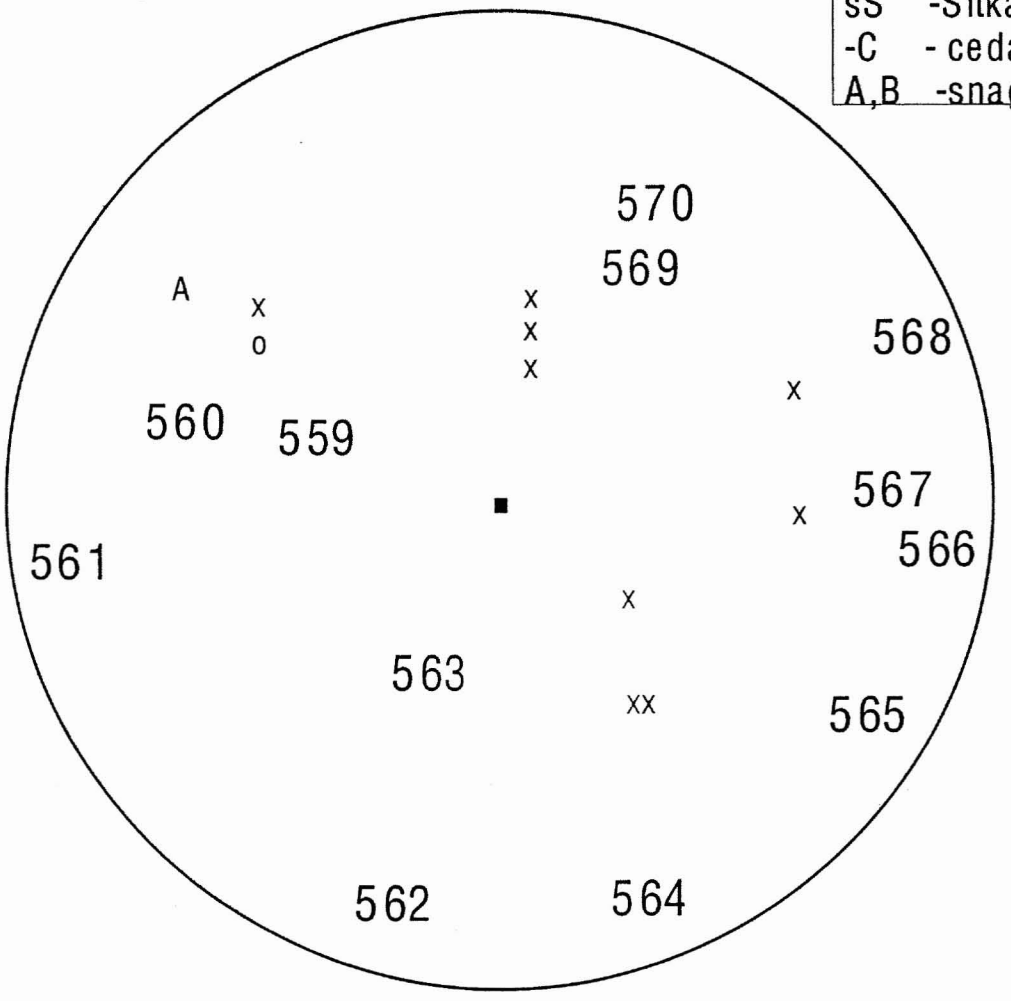
Gregory Creek - Demonstration Trail A

Plot 7 (trail - 0+314)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND
999 - tagged tree #
xx - natural regen.
oo - regen. destroyed
sS -Sitka spruce seedling
-C - cedar seedling
A,B -snags



Original tree no.	Neew tree no.	Species	DBH	Status
1	559	wH	27	mistletoe (3)
2	560	wH	16	mistletoe (1)
3	561	wH	14	mistletoe (1)
4	563	wH	12	healthy
5	562	wH	16	healthy
6	564	wH	11	healthy
7	565	wH	11	healthy
8	566	wH	12	mistletoe (1), fork
9	567	wH	23	mistletoe (2)
10	568	wH	13	mistletoe (1)
11	569	wH	14	mistletoe (2)
12	570	wH	20	mistletoe (2)
xxx		wH		

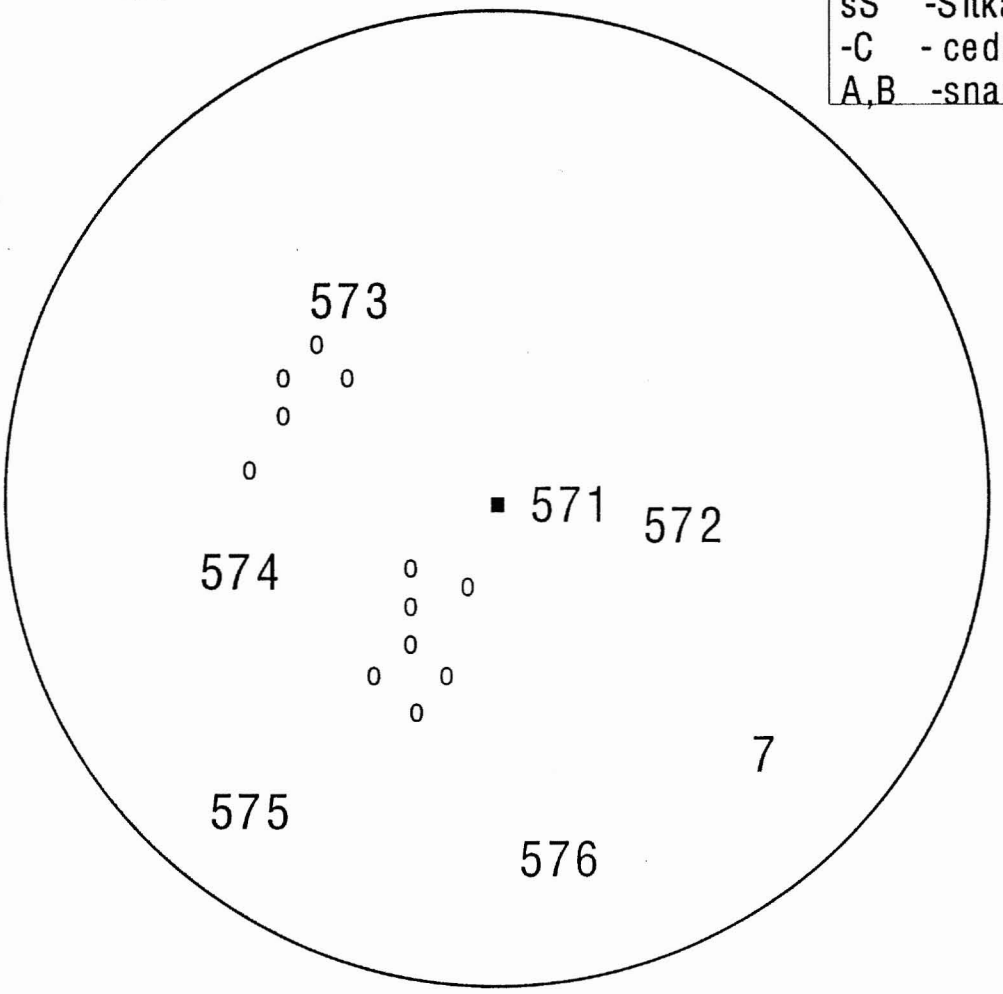
Gregory Creek - Demonstration Trail A

Plot 8 (R.P. - 74)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND
999 - tagged tree #
xx - natural regen.
oo - regen. destroyed
sS -Sitka spruce seedling
-C - cedar seedling
A,B -snags



Original tree no.	New tree no.	Species	DBH	Status
1	571	wH	41	lean, logged
2	572	wH	120	dead top, logged
3	573	wH	20	logged
4	574	wH	37	lean, logged
5	575	wH	38	logged
6	576	wH	31	fork, logged
7		wH	14	crook, felled
xx		wH		destroyed, heavy slash

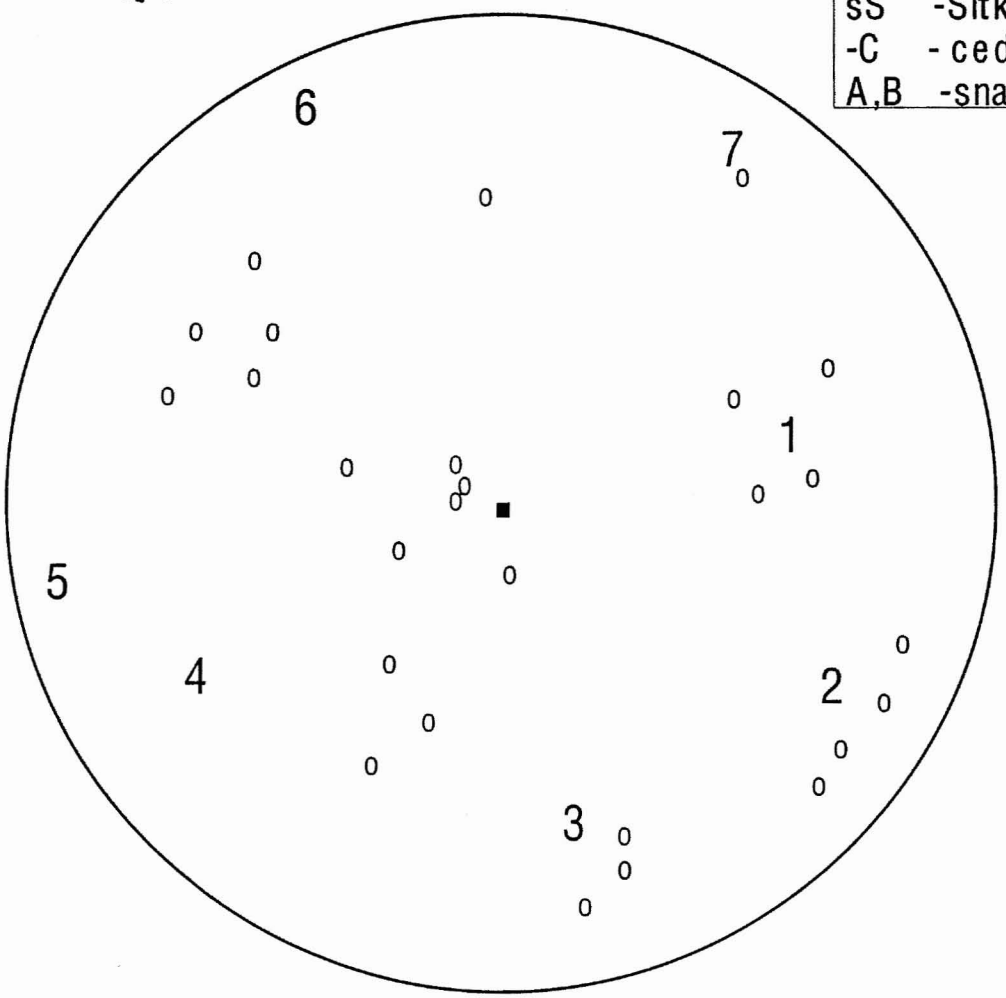
Gregory Creek - Demonstration Trail A

Plot 9 (R.P. - 37; plot not found)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND
999 - tagged tree #
xx - natural regen.
oo - regen. destroyed
sS -Sitka spruce seedling
-C - cedar seedling
A,B -snags



Original tree no.	New tree no.	Species	DBH	Status
1	plot not found	wH	10	crook, felled
2	plot not found	wH	17	crook, felled
3	plot not found	wH	23	sweep, logged
4	plot not found	wH	42	logged
5	plot not found	wH	24	crook, logged
6	plot not found	wH	59	lean, logged
7	plot not found	wH	43	logged
xx		wH		destroyed, under slash

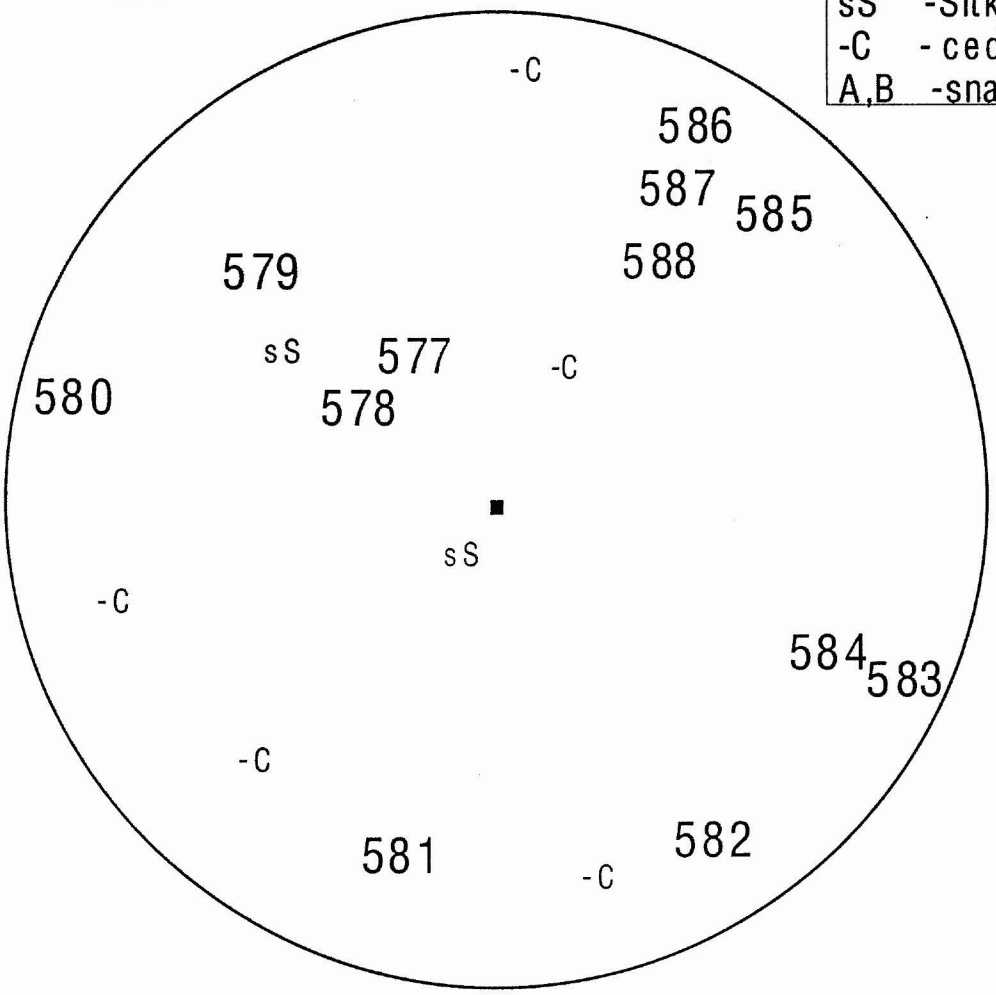
Gregory Creek - Demonstration Trail A

Plot 10 (R.P. - 48)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND	
999	- tagged tree #
xx	- natural regen.
oo	- regen. destroyed
sS	-Sitka spruce seedling
-C	- cedar seedling
A,B	-snags



Original tree no.	New tree no.	Species	DBH	Status
1	577	wH	60	logged
2	578	wH	17	crook, felled
3	579	wrC	9	felled
4	580	wH	13	felled
5	581	wH	13	lean,felled
6	582	wH	34	logged
7	583	wH	17	lean/sweep, felled
8	584	wH	62	lean, logged
9	585	wH	30	logged
10	586	wH	13	crook, felled
11	587	wH	14	felled
12	588	wH	12	felled

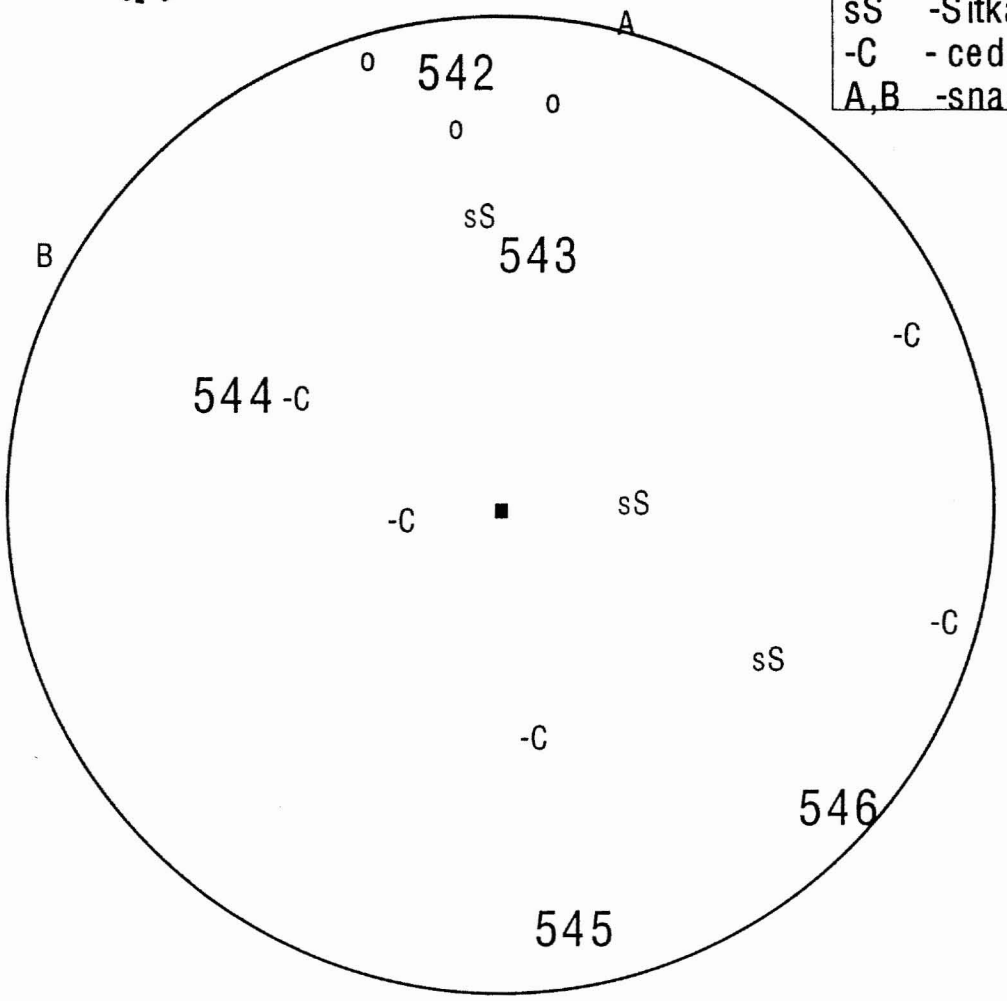
Hangover Creek - Demonstration trail

Plot 11 (R.P. - 213)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND	
999	- tagged tree #
xx	- natural regen.
oo	- regen. destroyed
sS	-Sitka spruce seedling
-C	- cedar seedling
A,B	-snags



Original tree no.	New tree no.	Species	DBH	Status
1	542	wH	61	
2	543	wH	14	felled
3	544	wH	27	logged
4	545	wH	69	healthy, dead(beetle?)
5	546	sS	130	f. pini, fork
A,B				snags felled
xx		wH		most destroyed, slash

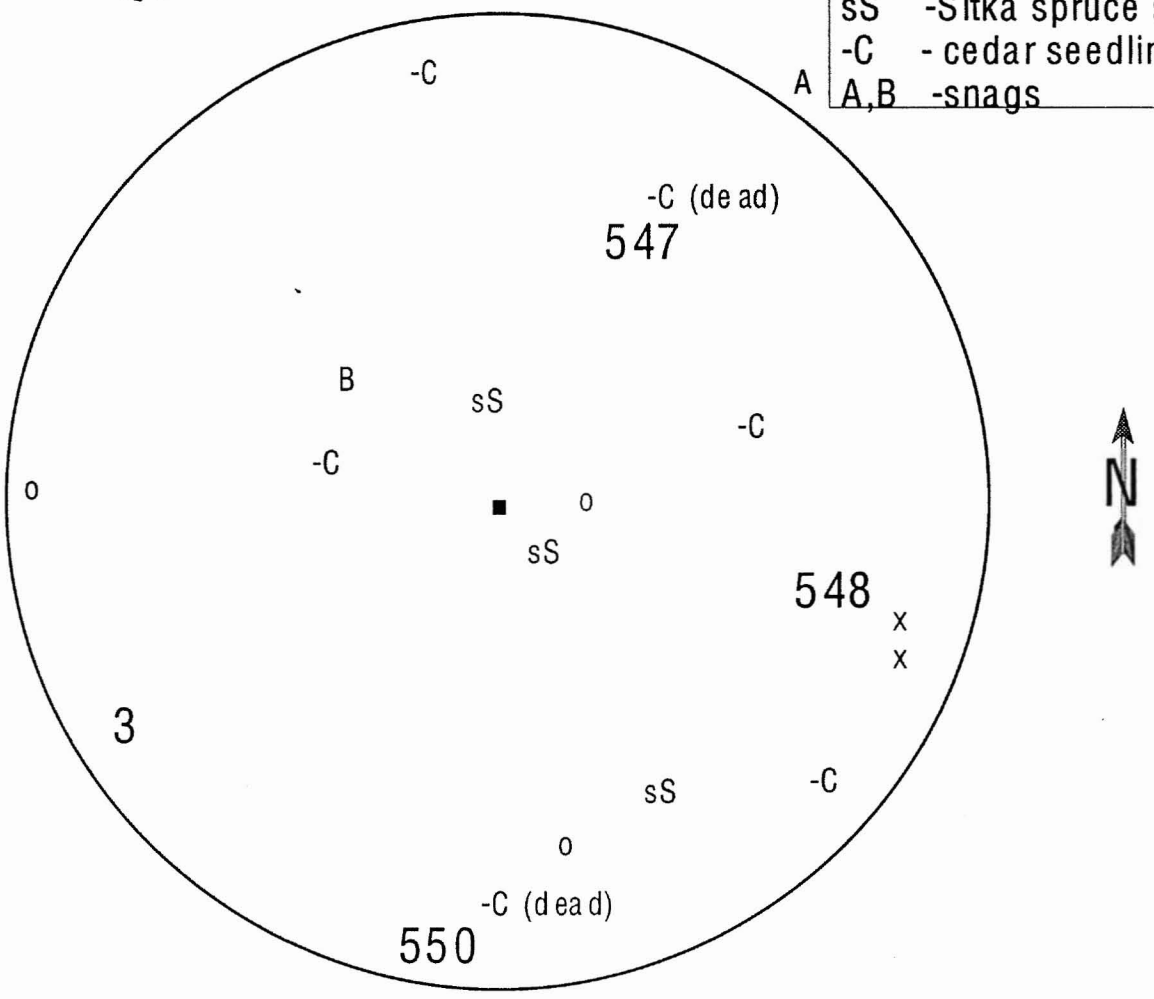
Hangover Creek - Demonstration trail

Plot 12 (R.P. - 230)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND	
999	- tagged tree #
xx	- natural regen.
oo	- regen. destroyed
sS	-Sitka spruce seedling
-C	- cedar seedling
A,B	-snags



Original tree no.	New tree no.	Species	DBH	Status
1	547	wH	56	
2	548	wH	49	sapsucker
3		wH	13	crook, felled, not found
4	550	wH	70	sapsucker, conks
A,B				felled
xx		wH		about half lost, slash

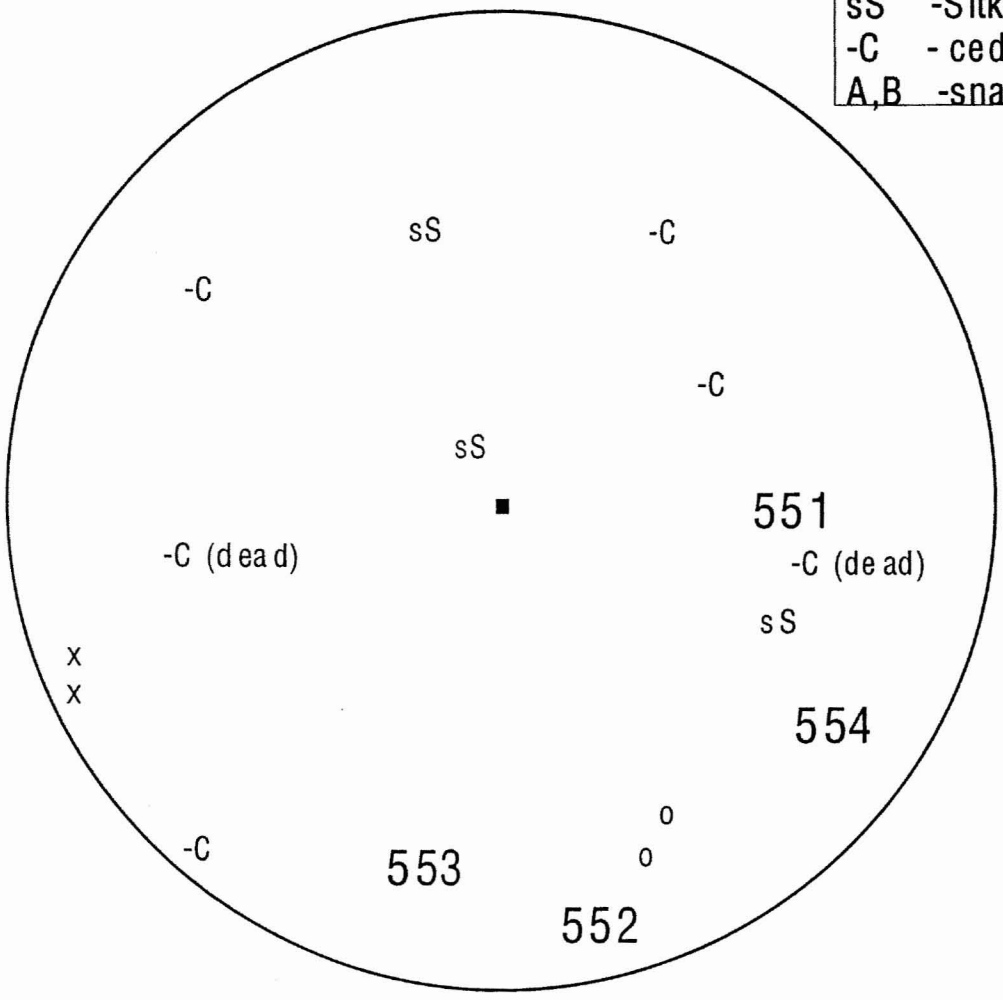
Hangover Creek - Demonstration trail

Plot 13 (R.P. - 249)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND	
999	- tagged tree #
xx	- natural regen.
oo	- regen. destroyed
sS	-Sitka spruce seedling
-C	- cedar seedling
A,B	-snags



Original tree no.	New tree no.	Species	DBH	Status
1	551	wH	46	
2	552	wH	37	
3	553	wH	23	brk. top
4	554	wH	34	snag, f. pinicola, felled
xx		wH		about half lost, slash

Hangover Creek - Demonstration trail

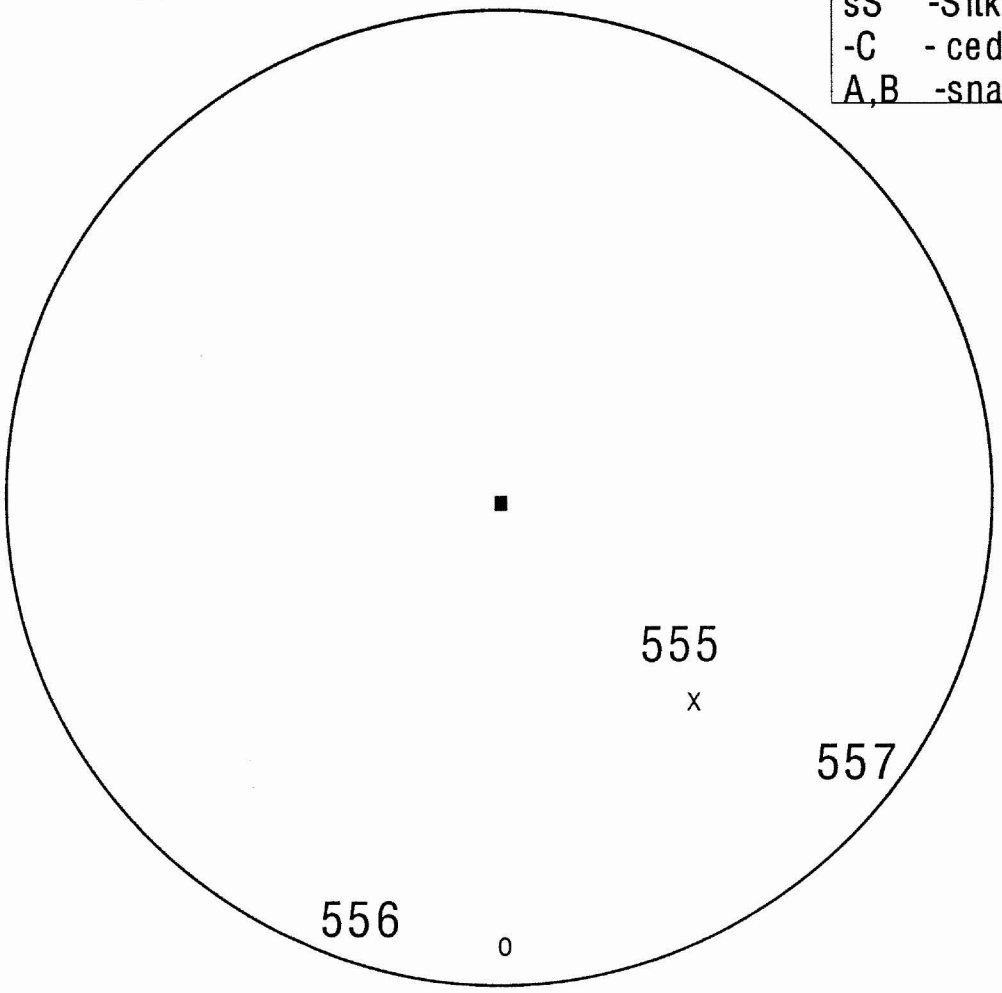
Plot 14 (trail - 1529)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND

999 - tagged tree #
xx - natural regen.
oo - regen. destroyed
sS -Sitka spruce seedling
-C - cedar seedling
A,B -snags



Original tree no.	New tree no.	Species	DBH	Status
1	555	wH	19	
2	556	sS	87	dead branches
3	557	wH	39	
xx		wH		1 of 2 missing

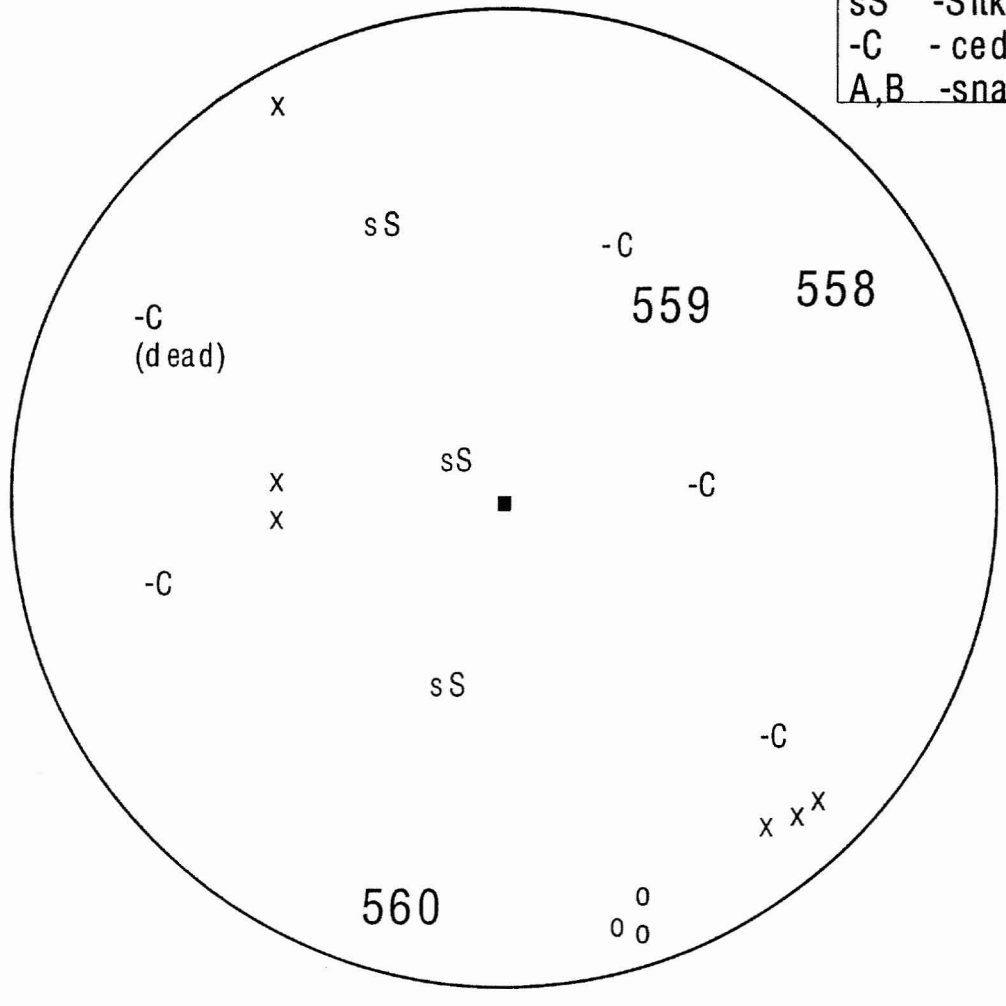
Hangover Creek - Demonstration trail

Plot 15 (R.P. - 181)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND	
999	- tagged tree #
xx	- natural regen.
oo	- regen. destroyed
sS	-Sitka spruce seedling
-C	- cedar seedling
A,B	-snags



Original tree no.	New tree no.	Species	DBH	Status
1	558	wH	16	crook
2	559	wH	21	fork/sweep
3	560	wH	35	healthy, sapsucker
xx		wH		some under slash

Hangover Creek - Demonstration trail

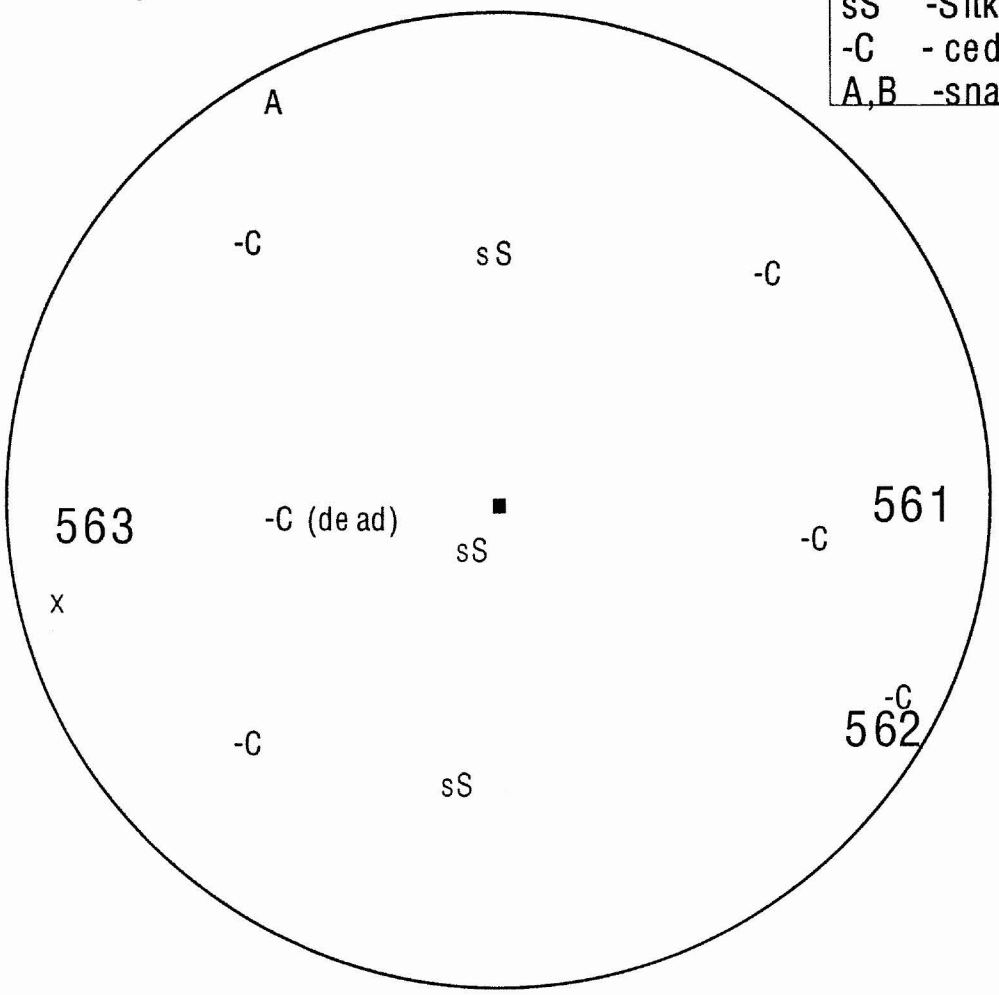
Plot 16 (R.P. - 134)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND

999 - tagged tree #
xx - natural regen.
oo - regen. destroyed
sS -Sitka spruce seedling
-C - cedar seedling
A,B -snags



Original tree no.	New tree no.	Species	DBH	Status
1	561	wH	59	crook/scar, logged
2	562	wH	65	sweep, logged
3	563	wH	34	brk. top, logged
xx		wH		

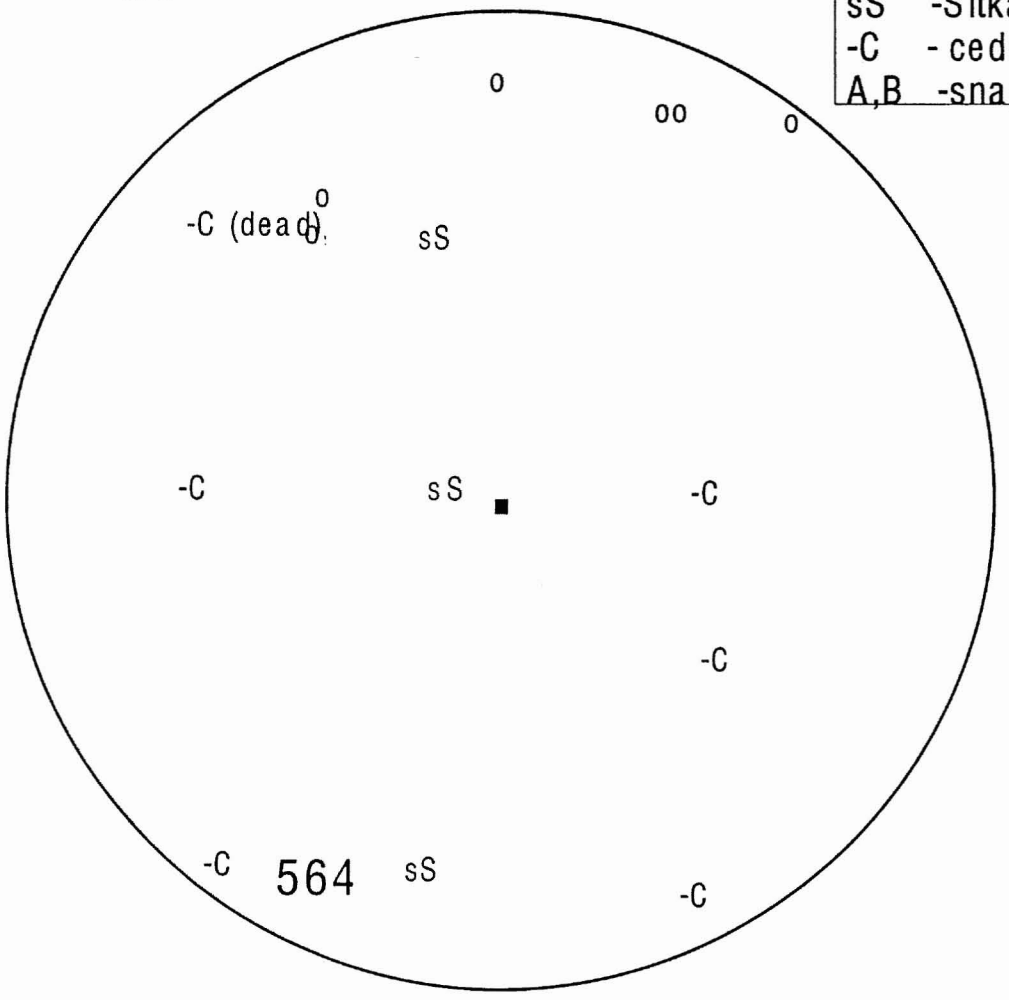
Hangover Creek - Demonstration trail

Plot 17 (R.P. - 132; already logged at establishment)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND	
999	- tagged tree #
xx	- natural regen.
oo	- regen. destroyed
sS	-Sitka spruce seedling
-C	- cedar seedling
A,B	-snags



Original tree no.	New tree no.	Species	DBH	Status
1	564	wH	17	stump, heavy slash
xx		wH		destroyed

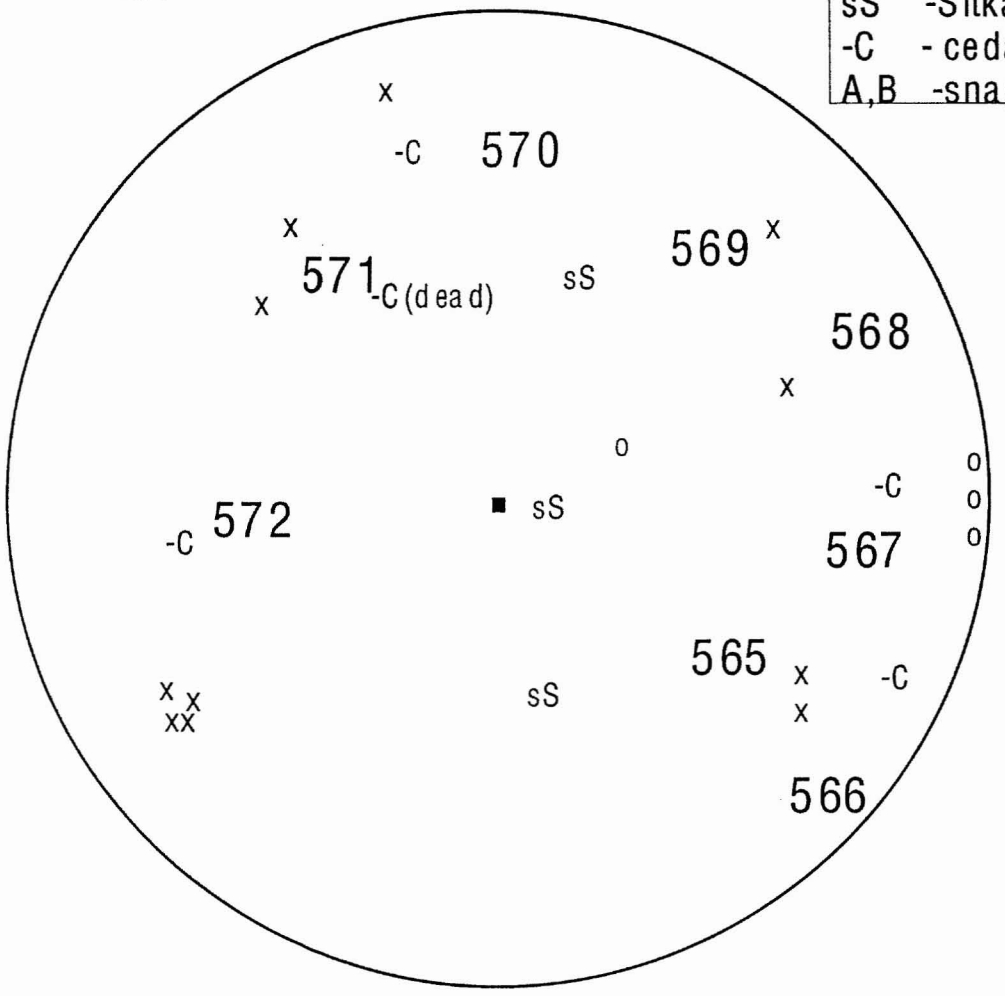
Hangover Creek - Demonstration trail

Plot 18 (R.P. - 85)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND
999 - tagged tree #
xx - natural regen.
oo - regen. destroyed
sS -Sitka spruce seedling
-C - cedar seedling
A,B -snags



Original tree no.	New tree no.	Species	DBH	Status
1	565	sS	73	logged
2	566	wH	23	crook, logged
3	567	wH	33	logged
4	568	sS	63	logged
5	569	wH	47	brk. top, logged
6	570	sS	84	
7	571	sS	85	
8	572	wH	58	sweep, sapsucker
xx		wH		about half lost, slash

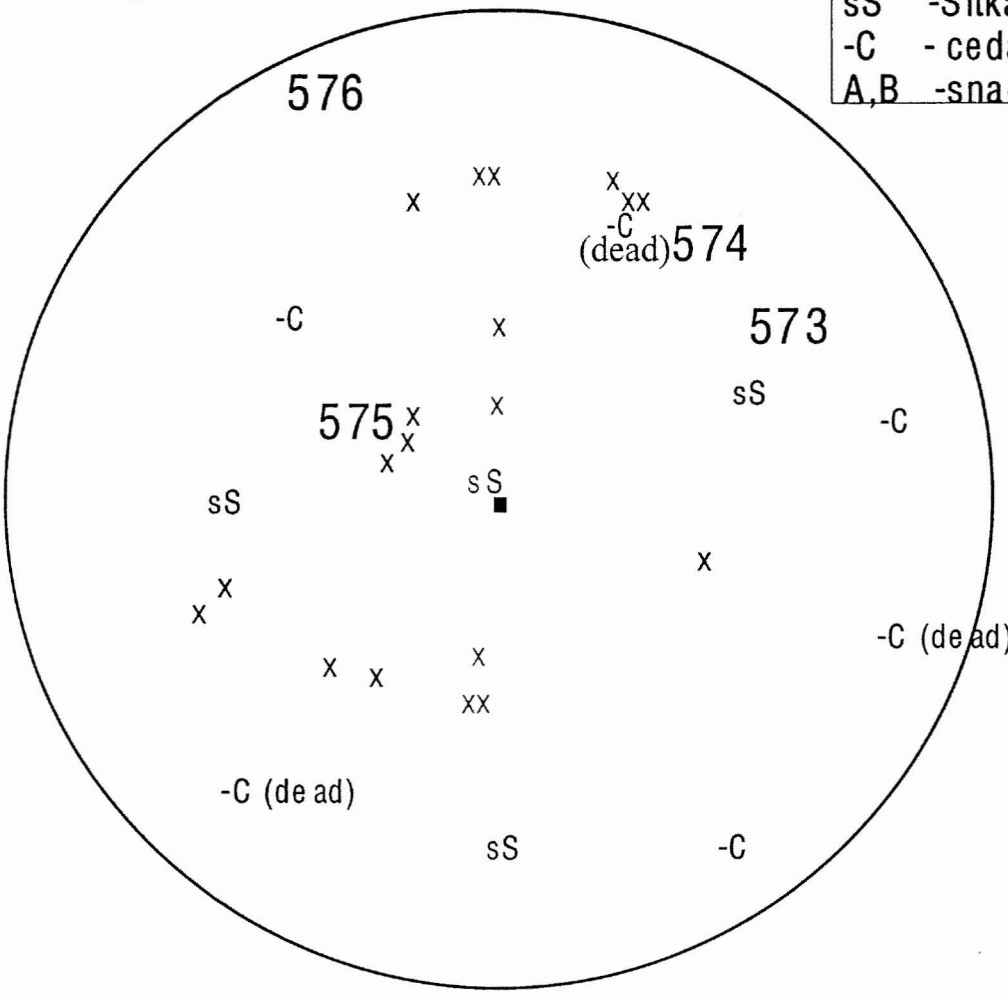
Hangover Creek - Demonstration trail

Plot 19 - (R.P. - 89)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND
999 - tagged tree #
xx - natural regen.
oo - regen. destroyed
sS -Sitka spruce seedling
-C - cedar seedling
A,B -snags



Original tree no.	New tree no.	Species	DBH	Status
1	573	wH	43	dead top, logged
2	574	wH	38	brk. top, logged
3	575	wH	77	logged
4	576	wH	42	frost crack,logged
xx		wH		most intact, drought stressed

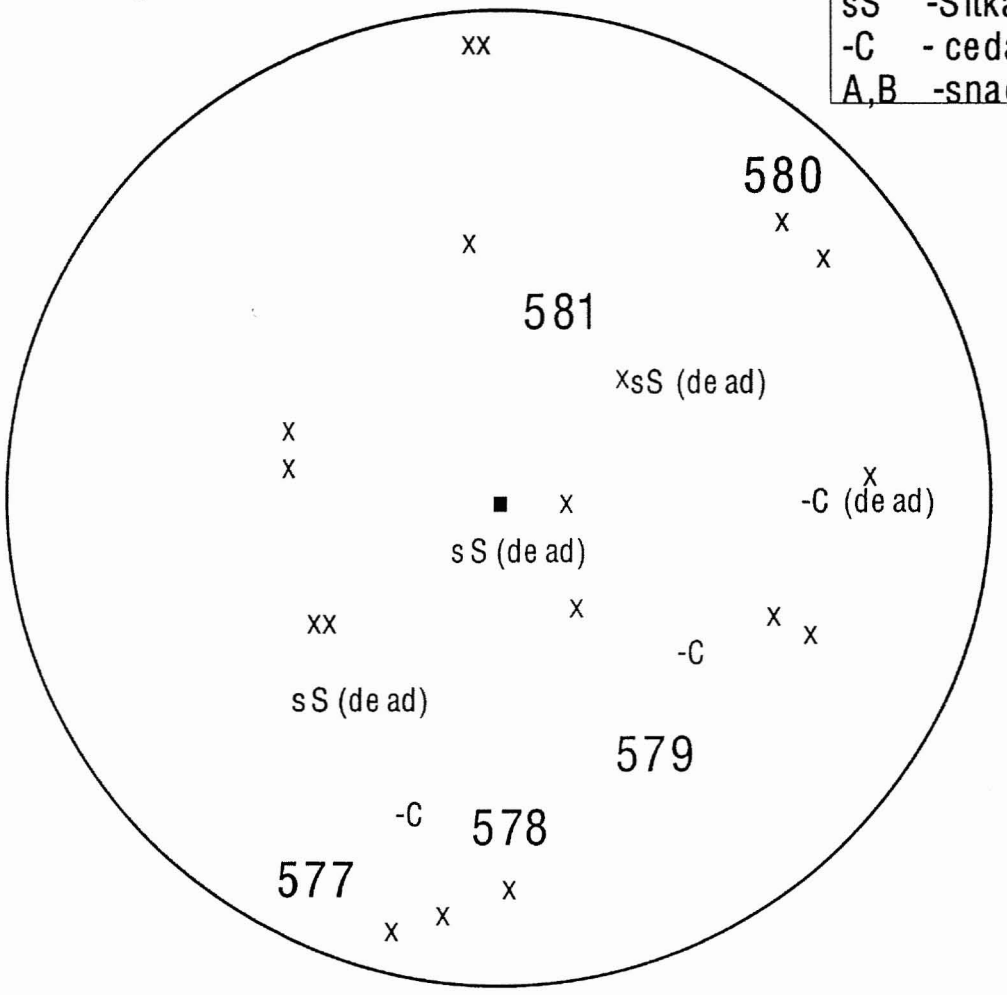
Hangover Creek - Demonstration trail

Plot 20 (R.P. - 35)

Canadian Forest Service

FOREST INSECT & DISEASE SURVEY

LEGEND	
999	- tagged tree #
xx	- natural regen.
oo	- regen. destroyed
sS	-Sitka spruce seedling
-C	- cedar seedling
A,B	-snags



Original tree no.	New tree no.	Species	DBH	Status
1	577	wH	45	crook
2	578	wH	43	
3	579	wH	50	
4	580	sS	75	
5	581	wH	11	
xx		wH		