



2009/10 Estimates Debate

Ministry of Forests and Range

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Issue: 60 Million Seedling Planting Target now 75M

- The government created the Forests For Tomorrow (FFT) program in 2005
- Through the FFT program, the Ministry reforests areas denuded by mountain pine beetle or wildfire
- FFT is projecting planting of 75 million trees from 2007 2008 to 2011 2012.
- To date, FFT has surveyed over 360,000 hectares and planted 29 million trees on 26 000 hectares
 - And an additional 11.7 million seedlings also funded by Forests for Tomorrow through FRPA section 108 claims
- This year FFT will plant an estimated 18.5 million trees on 17000 hectares and 14.5 M seedlings are projected to be planted in 2011

And an additional 5 million seedlings will be funded by FFT through FRPA s.108 claims from the 2009 wildfire season over the next two years

Date Prepared: September 14, 2009

Ministry Executive Sponsor:

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Phone: 250-387-1296

Alternate Contact for Issue:

Name: Lorne Bedford

Phone: 250-387-8901

Summary of All Forest Cover Polygons by Stocking Status and Species Groupings and Age where there had been Forest For Tomorrow Field Based Activities

Data Source: RESULTS as of September 29, 2009, Prepared by Mei-Ching Tsoi

Sum of Forest Cover Polygon Areas - where FC Species available

STOCKING STATUS CODE	1-Pine<60yrs	2-Pine>60yrs	3-NonPine	4-Unknown	Total
IMM	124,025	33,465	67,894	4,616	229,999
M	0	14	0	0	14
MAT	979	3,934	2,397	65	7,375
NC	23	22	7	0	52
NP	158	64	38	0	260
NSR	19,976	8,392	7,452	1,033	36,852
OR	274	54	545	0	874
R	0	0	19	0	19
RES	43	73	46	1	162
S	10	11	0	0	21
Total	145,488	46,029	78,396	5,714	275,627

Sum of Forest Cover Polygon Areas - no FC Species available - default to Prev Stand Label w

STOCKING STATUS CODE	1-Pine<60yrs	2-Pine>60yrs	3-NonPine	4-Unknown	Total
IMM	1	24	581	55	660
NSR	402	1,269	4,552	1,912	8,135
Total	403	1,293	5,133	1,966	8,795

Summary

STOCKING STATUS CODE	1-Pine<60yrs	2-Pine>60yrs	3-NonPine	4-Unknown	Total
IMM	124,025	33,489	68,475	4,670	230,659
M	0	14	0	0	14
MAT	979	3,934	2,397	65	7,375
NC	23	22	7	0	52
NP	158	64	38	0	260
NSR	20,377	9,661	12,004	2,945	44,987
OR	274	54	545	0	874
R	0	0	19	0	19
RES	43	73	46	1	162
S	10	11	0	0	21
Total	145,890	47,322	83,529	7,680	284,422

Summary

STOCKING STATUS CODE	1-Pine<60yrs	2-Pine>60yrs	3-NonPine	4-Unknown	Total
IMM	44%	12%	24%	2%	81%
M	0%	0%	0%	0%	0%
MAT	0%	1%	1%	0%	3%
NC	0%	0%	0%	0%	0%
NP	0%	0%	0%	0%	0%
NSR	7%	3%	4%	1%	16%
OR	0%	0%	0%	0%	0%
R	0%	0%	0%	0%	0%
RES	0%	0%	0%	0%	0%
S	0%	0%	0%	0%	0%
Total	51%	17%	29%	3%	100%

Summary of All Forest Cover Polygons by Stocking Status ar where there had been Forest For Tomorrow Field Based Act

Data Source: RESULTS as of January 25, 2010, Prepared by Mei-Ch
No Planting

Sum of Forest Cover Polygon Areas - where FC Species available

STOCKING_STAT US_CODE	1-Pine=<60	2-Pine>60	3-NonPine
IMM	93,692	41,042	66,974
M	0	14	
MAT	1,016	3,742	2,164
NC	11	21	13
NP	77	64	51
NSR	15,447	10,040	7,000
OR	221	27	623
R			19
RES	40	79	51
S	2	9	
Total	110,506	55,037	76,894

here pine leading

Sum of Forest Cover Polygon Areas - no FC Species available - def

STOCKING_STAT US_CODE	1-Pine=<60	2-Pine>60	3-NonPine
IMM	169	601	1,090
NSR	128	1,351	1,489
Total	297	1,951	2,580

Summary

STOCKING STATUS CODE	1-Pine<60yrs	2-Pine>60yrs	3-NonPine
IMM	93,862	41,642	68,064
M	0	14	0
MAT	979	3,934	2,397
NC	23	22	7
NP	158	64	38
NSR	15,575	11,390	8,489
OR	274	54	545
R	0	0	19
RES	43	73	46
S	10	11	0
Total	110,924	57,205	79,604

Summary

STOCKING STATUS CODE	1-Pine<60yrs	2-Pine>60yrs	3-NonPine
IMM	37%	16%	27%
M	0%	0%	0%
MAT	0%	2%	1%
NC	0%	0%	0%
NP	0%	0%	0%
NSR	6%	4%	3%
OR	0%	0%	0%
R	0%	0%	0%
RES	0%	0%	0%
S	0%	0%	0%
Total	44%	23%	31%

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4-Unknown	Total
4,481	206,189
	14
82	7,003
	45
	191
512	32,998
	871
	19
1	170
	11
5,076	247,512

fault to Prev Stand Label where pine leading

4-Unknown	Total
19	1,879
370	3,338
389	5,217

4-Unknown	Total
4,500	208,068
0	14
65	7,375
0	52
0	260
882	36,336
0	874
0	19
1	162
0	21
5,447	253,180

Summary of All Forest Cover Polygons by Stocking Sta where there had been Forest For Tomorrow Field Bas

Data Source: RESULTS as of January 25, 2010, Prepared by I
Planting

Sum of Forest Cover Polygon Areas - where FC Species ava

STOCKING_ST ATUS_CODE	1-Pine=<60	2-Pine>60	3-NonPine
IMM	18,862	5,751	9,227
M			6
MAT	92	370	27
NC			
NP	3		
NSR	1,351	598	884
OR			
R			
RES		3	
S			
Total	20,307	6,722	10,144

Sum of Forest Cover Polygon Areas - no FC Species availab

STOCKING_ST ATUS_CODE	1-Pine=<60	2-Pine>60	3-NonPine
IMM	90	100	67
NSR	30	178	332
Total	121	277	399

Summary

STOCKING STATUS CODE	1-Pine<60yrs	2-Pine>60yrs	3-NonPine
IMM	18,952	5,851	9,294
M	0	14	0
MAT	979	3,934	2,397
NC	23	22	7
NP	158	64	38
NSR	1,382	775	1,216
OR	274	54	545
R	0	0	19
RES	43	73	46
S	10	11	0
Total	21,821	10,798	13,561

4-Unknown	Total
2%	82%
0%	0%
0%	3%
0%	0%
0%	0%
0%	14%
0%	0%
0%	0%
0%	0%
0%	0%
2%	100%

Summary

STOCKING STATUS CODE	1-Pine<60yrs	2-Pine>60yrs	3-NonPine
IMM	40%	12%	19%
M	0%	0%	0%
MAT	2%	8%	5%
NC	0%	0%	0%
NP	0%	0%	0%
NSR	3%	2%	3%
OR	1%	0%	1%
R	0%	0%	0%
RES	0%	0%	0%
S	0%	0%	0%
Total	46%	23%	28%

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4-Unknown	Total
1,101	34,941
	6
	489
	0
	3
139	2,971
	0
	0
	3
	0
1,239	38,413

le - default to Prev Stand Label where pine leading

4-Unknown	Total
42	299
228	768
270	1,067

4-Unknown	Total
1,143	35,240
0	14
65	7,375
0	52
0	260
366	3,739
0	874
0	19
1	162
0	21
1,574	47,755

4-Unknown	Total
2%	74%
0%	0%
0%	15%
0%	0%
0%	1%
1%	8%
0%	2%
0%	0%
0%	0%
0%	0%
3%	100%



2010/11 Estimates Debate

Ministry of Forests and Range

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Issue: Not Satisfactorily Restocked (NSR) Area in BC

Facts and Figures:

- There is about 750 000ha of NSR which includes about 510 000ha of recently harvested areas that are managed by BCTS and other tenure holders as part of their ongoing basic silviculture obligation to reforest
- The remaining 240 000ha has resulted from historic logging or older catastrophic events and is termed "backlog"
- We are currently prioritising the backlog areas to determine if any treatments are warranted and its likely most of these areas have naturally restocked and therefore will not require planting
- As a result of the MPB epidemic and small scale salvage we estimate there may be up to an additional 700 000ha of NSR area right now
- The Ministry's - FFT program - is responding and is focusing efforts on large scale MPB impacted areas that are economically feasible to treat
- FFT has spent about \$160 million and has ground-surveyed 360 000ha impacted by MPB and wildfire, and planted over 40 million seedlings on more than 26 000ha
- As for the small scale salvage sites, we continue to monitor these areas, and the highest priority sites that are not regenerating naturally will be scheduled for planting as necessary

Date Prepared/Revised: March 10, 2010

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Alternate Contact for Issue:

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2011/12 Estimates Debate

Ministry of Forests, Lands and Natural Resource Operations

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Issue: Not Satisfactorily Restocked (NSR) Area in BC

Key Facts Regarding Issue:

- There is about 715 000 hectares of currently identified NSR which includes about 479 000 hectares of recently harvested areas that are managed by tenure holders and BCTS as part of their ongoing basic silviculture obligation to reforest.
- The remaining 246 000 hectares resulted from historic logging (pre-1987) or older catastrophic events and is referred to “backlog”
- We are currently prioritising the backlog areas to determine if treatments are warranted. We anticipate most of these areas have naturally restocked and will not require planting.
- As a result of the MPB epidemic, new wildfires and small scale salvage, we estimate there may be up to an additional 700 000 hectares of NSR area
- The reason this additional area is only a small portion of the 17.5 million hectares impacted by MPB is because much of the 17.5 million hectares is either outside of the harvesting land base, has only a small component of pine or is still considered potentially harvestable.

Advice and Recommended Response:

- The Ministry's Forests For Tomorrow (FFT) program is responding and is focussing efforts on large scale MPB impacted areas that are economically feasible to treat
- FFT has spent about \$200 million and has ground-surveyed 480 000 hectares impacted by MPB and wildfire, and planted over 57 million seedlings on more than 38 000 hectares
- As for the small scale salvage sites, we continue to monitor these areas, and the highest priority sites that are not regenerating naturally will be scheduled for planting as necessary

Date Prepared/Revised: April 21, 2011

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Alternate Contact for Issue:

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2011/12 Estimates Debate

Ministry of Forests, Lands and Natural Resource Operations

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Issue: Land Based Investment Strategy (LBIS) – 2011/12

Key Facts Regarding Issue:

- LBIS funding for 2011/12 is expected to be \$68 million.

Investment Category	\$Millions
Forests For Tomorrow	54.12
Tree improvement	3.50
Inventory	6.10
Fish passage	1.50
Fire management	0.09
Ecosystem restoration	0.75
Range	0.50
Recreation	0.75
LBIS monitoring and planning	0.69
Total	68.00

- In 2011/12, the LBIS will reforest areas impacted by the Mountain Pine Beetle and wildfire and improve timber supply in the province by:
 - planting about 14 million seedlings
 - reducing the provincial backlog NSR levels by 40 000 hectares
 - fertilizing 24 000 hectares and thinning 1 200 hectares
 - producing select seed to reforest, at least, 108 000 hectares
 - improving inventories in 21 forest management units under Ecosystem Based Management
 - controlling insects, disease, and invasive plants on about 57 000 hectares
 - improving fish passage by assessing fish access at 5 000 crossings to determine whether remediation is required to improve passage
 - restoring 4 000 hectares of vulnerable grassland and open-grown forests and about 14 500 hectares of range land damaged by wildfire and pests

Advice and Recommended Response:

- Building upon the strong foundations established last year, the 2011/12 Land Based Investment Strategy will continue to make efficient and effective investments benefiting the province's forest and range resources and the industries and communities that rely on them

2011/12 Estimates Debate

Ministry of Forests, Lands and Natural Resource Operations

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- Our Land Based Investment activities will result in an additional 6.8 million cubic metres of harvestable future volume, an additional 6.8 million tonnes of CO₂e sequestration.
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- In preparation for 2012/13, a broader range of potential land-based investments will be evaluated in an attempt to define the “best investments” for future funding allocations.

Date Prepared/Revised: April 21, 2011

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Alternate Contact for Issue:

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2011/12 Estimates Debate

Ministry of Forests, Lands and Natural Resource Operations

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Issue: Not Satisfactorily Restocked (NSR) Area in BC

Key Facts Regarding Issue:

- There are about 715,000 hectares of currently identified NSR which includes about 479,000 hectares of recently harvested areas that are managed by tenure holders and BCTS as part of their ongoing basic silviculture obligation to reforest.
- The remaining 246,000 hectares resulted from historic logging (pre-1987) or older catastrophic events and are referred to as “backlog”.
- We are currently prioritizing the backlog areas to determine if treatments are warranted. We anticipate most of these areas have naturally restocked and will not require planting.
- As a result of the MPB epidemic, new wildfires and small scale salvage, we estimate there may be up to an additional 700,000 hectares of NSR area.
- The reason this additional area is only a small portion of the 17.5 million hectares impacted by MPB is because much of the impacted area is either outside of the harvesting land base, has only a small component of pine, or is still considered potentially harvestable.

Advice and Recommended Response:

- FLNR’s Forests For Tomorrow (FFT) program is responding and is focussing efforts on large-scale MPB impacted areas that are economically feasible to treat.
- FFT has spent about \$200 million, ground-surveyed 480 000 hectares impacted by MPB and wildfire, and planted over 57 million seedlings on more than 38,000 hectares.
- As for the small scale salvage sites, we continue to monitor these areas, and the highest-priority sites that are not regenerating naturally will be scheduled for planting as necessary.

Date Prepared/Revised: April 21, 2011

Ministry Executive Sponsor:

Name: Jim Snetsinger

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Alternate Contact for Issue:

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2011/12 Estimates Debate

Ministry of Forests, Lands and Natural Resource Operations

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Issue: 60 Million Seedling Planting Target and Forests for Tomorrow

Key Facts Regarding Issue:

- The Forests for Tomorrow (FFT) program was created in 2005 to reforest areas damaged by wildfires or the Mountain Pine Beetle (MPB) that will not be harvested by conventional means or regenerate naturally
- In the 2008/09 Throne Speech, Government committed to plant 60 million trees over the next 4 years with the FFT program
- The Ministry is still committed to planting 60 million seedlings over 4 years starting in 2008/09
 - 40 million seedlings were planted since 2008/09,
 - 14 million seedlings will be planted in 2011, and
 - 14 million seedlings are planned for 2012
- Since inception FFT has:
 - invested nearly \$200 million in reforestation activities
 - planted over 54 million seedlings on more than 45 000 hectares
 - ground-surveyed 400 000 hectares impacted by wildfire and MPB
- In 2011/12, \$34.5 million of the \$54.12 million FFT budget is planned to be spent on reforestation as follows:
 - 17.85 million for stand establishment and treatment activities
 - 2.00 million for FRPA s108
 - 4.20 million in field surveys and overview planning
 - 5.00 million in sowing trees and cone collection
 - 1.50 Million in silviculture investments in TFL lands
 - 0.40 million in environmental and inventory updates in MPB areas
 - 2.00 million in Backlog Not Sufficiently Restocked initiatives
 - 1.55 million in Ministry staff and internal support

Advice and Recommended Response:

- FFT will exceed the 2008/09 Government commitment of planting over 60 million seedlings over 4 years

Date Prepared/Revised: April 21, 2011

Ministry Executive Sponsor:

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Alternate Contact for Issue:

Name: Allan Powelson

Phone: 250-812-5054

Not Satisfactorily Restocked (NSR) Area in BC

(May 2011)

Key Facts re: 715,000 NSR

- There are about 715, 000 hectares (ha) of currently identified NSR. This includes about 479,000 ha of recently harvested areas that are managed by tenure holders and BCTS. The remaining 236,000 are reforested at the discretion of the Ministry.
- The 236,000 ha is made up of 149,000 ha of “backlog” caused by disturbances (logging, wildfire etc) that occurred prior to 1987, the remaining 87,000 ha are from disturbances fire, pest etc that occurred after 1987.
- In 2008, the Ministry committed to eliminating 173,000 ha of backlog NSR by 2015. Since then the Ministry has reduced this amount to 149,000 ha. The Ministry will reduce it by a further 40,000 ha in 2011/12
- The 87,000 ha of post 1987 NSR includes recorded areas damaged by fire, pests etc. As surveys are completed on areas of wildfire and MPB this number will increase.
- The FFT program has surveyed over 400,000 hectares of MPB and wildfire. The NSR found in these surveys contribute to the post 1987 NSR. The FFT program has funded the planting of over 54 million seedlings on NSR areas.

Key Facts re: 2.1 million NSR

- From 1990 to 2001 the Ministry provided a complete summary of the status of Productive Forest Land. This summary included 2.1 million ha of Low Site, and low priority sites.
- The 2.1 million ha is not included in the Timber Harvesting Land base and does not contribute to the Annual Allowable cut. Most of the openings were not created through logging.
- The 2.1 million includes approximately 300,000 ha of low site, 930,000 ha of Non Commercial Brush, (areas stocked with mountain alder, willows etc). As well as Non productive brush areas, alder on talus slopes etc.
- These areas are a very low priority for reforestation. They are scattered, often remote, and very costly to treat. It is estimated that perhaps 100,000 ha could provide an opportunity for treatment.

Key Facts on MPB For Mature Pine (Based on Albert's Note)

- 17.5 million ha have experienced some level of MPB- Mortality as of 2010.
- Of this 9.9 million is in the timber harvesting land base and 5.1 million ha contains more than 50% pine and could become un-harvestable.
- Licensees are focusing their harvesting on this 5.1 million ha.
- We hope to harvest and regenerate between 2.0 and 2.9 million ha of the 5.1 million. Leaving 2.2 to 3.1 million ha.
- About 70-80% of these stands have advanced regeneration in quantities that can regenerate these sites successfully although growth of these stands may be slower than if they had been regenerated by planting.
- Assuming 25% of these stands have insufficient advanced regeneration then 525,000 to 775,000 or approx 650,000 ha would benefit from treatment.
- These stands will be costly to treat as it is difficult to under plant (hazard from falling trees and rodent damage to seedlings). Rehabilitation is costly, not feasible on sensitive sites and destroys fibre for other uses.

Key Facts on MPB immature

- Estimates place the area of immature pine (less than 60 years old) effected by MPB as high as 500,000 ha.
- The level of mortality in young pine stands is highly variable and ranges from 5% to 65%.
- Where the MPB outbreak is still active in mature stands, young pine damage continues to occur.
- The FFT program has focused surveys on the sites that are most highly affected. Approximately 143,600ha (RESULTS) of these stands have been surveyed to determine if a rehabilitation opportunity exists
- Of this surveyed area, about 34,300ha have been identified as having planting opportunities.

Key Facts on Fire

- 1,417,000 ha were impacted by fir since 98/99. This figure is for total area.. Fire does not burn uniformly through areas. It leaves some areas restocked and others NSR.
- Where feasible, areas are harvested and reforested by licensees.
- There has been a drastic increase in fire in 2003,2004,2006,2009,2010
- The govt pays for reforesting areas which have an outstanding free growing obligation under section 108 of the Act..

- The govt will fund planting of approx 4 million trees from the 2009 fires and between 12 and 17 million trees from the 2010 fires. The trees will be planted in 2012 and 2013
- FFT was initiated in 2005 with focus on fires and MPB
- The first focus for FFT was on the 2003/04 wildfires
- Surveying and planting has been completed on the 2003/2004 fires.
- As this area was rehabilitated focus shifted to MPB in recent years
- With the wildfires of 2010 the focus of FFT will once again shift to rehabilitating these areas.
- With the focus on both MPB and wildfire, over 400,000 ha have been surveyed and over 54,000 million trees planted.

Key facts on Small scale Harvest

- Approximately 200,000 ha covered by this category
- Many of these areas are small and will be stocked through natural regeneration
- For many of these areas it is more appropriate to reforest once larger cutblock is harvested over the small areas.

- In 2011/12 FFT will spend \$34.5 M on restoring the current MPB/Fire and backlog NSR.
By (estimated)

Activity	Out put	expenditure
surveying and reviewing NSR	250,000 ha	\$6.0 M
Planning, Prescriptions and Layout	18,000 ha	\$4.7 M
Planting 2011	12,000 ha with 14 M seedlings	\$9.0 M
Seedlings for 2011	14 M seedlings	\$3.0 M
Site preparation	6,000 ha for planting another 14 M seedling in 2012	\$2.9 M
Brushing	at least 1,500 ha	\$1.8 M
Seed purchase		\$1.0 M
Sowing for planting in 2013	18 M seedlings	\$1.8 M
Access reconstruction		\$0.3 M
Admin		\$1.6 M
Environmental support (watershed planning)		\$0.4 M
FRPA s 108		\$2.0 M
Total		\$34.5 M

Key Facts: Post Free Growing Mortality

Post Free Growing Mortality

- Forest Range Evaluation Program (FREP) is monitoring post-free growing stand conditions across the Province
- Results from 5 TSAs across the province have been analyzed
- Average **Total Density**:
 - At time of **Free Growing declaration** (average stand age 15 years): **4036 stems/ha**
 - At time of **Post-Free Growing survey**(average stand age 27 years): **3190 stems/ha**
- Average **Free Growing Density**:
 - At time of Free Growing declaration (average stand age 15 years): **909 stems/ha**
 - At time of Post-Free Growing survey(average stand age 27 years): **846 stems/ha**
- 20% of sampled stands had a change in leading species in the stand (Inventory Label)
- **While there has been some mortality and reduction in stocking levels post free-growing, these stands are expected to provide a viable harvest opportunity in the future.**
- The Ministry is making a greater commitment to species diversity (see below)
- Level of Monitoring will be increased to identify where we have issues
 - \$160 000 Stand Development Monitoring
 - \$120 000 Change Monitoring
- Greater focus on hazard rating to minimize risks of mortality
 - Hard Pine Stem Rusts \$110 000
 - Fire \$85 000
 - *Septoria* (Aspen) 66 000

Species Diversity will decrease post free growing issues in the future

- Chief Forester Guidance on Tree Species Composition released Sept. 24th, 2009
- Chief Forester amended his standards for seed use to permit use of Western Larch outside of its natural range but deemed suitable considering present and future climate
- Developing resistant White Pine and Sitka to provide opportunity for more diversity
- Reviewing 20+ year old species trials and continuing Landscape Level species diversity project to provide better direction
- Annual Monitoring using RESULTS on planting mixes and species diversity of managed stands, with a Special Focus on the Interior Cedar Hemlock Subzone.

Key Facts: Species Diversity

Species Diversity

- Chief Forester Guidance on Tree Species Composition released Sept. 24th, 2009
- Chief Forester amended his standards for seed use to permit use of Western Larch outside of its natural range but deemed suitable considering present and future climate
- Developing resistant White Pine and Sitka to provide opportunity for more diversity
- Reviewing 20+ year old species trials and continuing Landscape Level species diversity project to provide better direction
- Annual Monitoring using RESULTS on planting mixes and species diversity of managed stands, with a Special Focus on the Interior Cedar Hemlock Subzone.

2012/13 Estimates Debate

Ministry of Forests, Lands and Natural Resource Operations

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Issue: Not Satisfactorily Restocked (NSR) Area: Overview

Key Facts Regarding Issue:

- The ministry defines not satisfactorily restocked (NSR) as an area not occupied by a sufficient number of well-spaced trees of desirable species. NSR areas reported by the ministry are identified based on field surveys and tracking for areas within the timber harvesting land base.
- By law, licensees are required to reforest the areas they harvest. The province is responsible for reforesting Crown land not under licence that has been impacted by wildfire, disease or insect infestations.
- As of January 2012 there is about 733 677 ha of NSR in the timber harvesting land base (THLB) which includes about 511 492 ha of recently harvested areas that are managed by BCTS and other tenure holders as part of their ongoing basic silviculture obligation to reforest.
- Areas harvested prior to 1987 and not yet sufficiently stocked are classified as 'backlog' NSR. The remaining 221 854 ha consists of 136 935 ha of 'backlog' NSR and 85 250 ha of more recent fire and pest impacts that have been surveyed.

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- In addition to identified NSR land, there are areas of projected NSR. This includes pine beetle-attacked areas that have not yet been salvage harvested or surveyed. The ministry currently projects there will be between 525 000 and 775 000 additional hectares of NSR in the THLB in need of regeneration treatments due to beetle infestation. The economically viable area to treat will be determined from FFT surveys.

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- The ministry's FFT program is responding to identified and projected NSR and is focusing efforts on large scale MPB and wildfire impacted areas that are economically feasible to treat. Through FFT since 2004/05, 1.1 million ha have been surveyed and 51 000 ha have been planted.
- Others have estimated vastly different NSR areas due to use of different assumptions (e.g. reporting on areas outside of THLB, assuming less natural recovery of MPB impacted areas).

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Date Prepared/Revised: January 14, 2012

Ministry Executive Sponsor:

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Alternate Contact for Issue:

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Phone: 250-387-3223

Issue: Land Based Investment Strategy – 2012/13

Key Facts Regarding Issue:

- Land Based Investment Strategy funding for 2012/13 is \$78.6 million.

Investment Category	2012/13 (\$ million)
FFT Current Reforestation	34.45
FFT Timber Supply Mitigation	11.85
Tree improvement	4.00
Forest health	8.50
Inventory	9.00
VRI, Site Productivity	7.50
Ecosystem Based Management	1.25
Visual Quality	0.25
Fish passage	2.50
Fire management	0.05
Ecosystem restoration	1.00
Range	1.00
Invasive plant control	1.70
Recreation	1.25
Water	0.65
Wildlife	2.65
Total	78.6

- In 2012/13, the Land Based Investment Strategy will reforest areas impacted by the Mountain Pine Beetle and wildfire, and improve timber supply in several areas of the province by:
 - planting about 14.5 million seedlings,
 - reducing the provincial backlog NSR levels by 80,000 hectares,
 - fertilizing 28,000 hectares,
 - thinning 3,000 hectares, and
 - producing select seed to reforest, at least 123,000 hectares.
- It will also benefit British Columbia's forest resources with:
 - improved inventories in at least 21 forest management units substantially impacted by mountain pine beetle and wildfire, and areas under ecosystem-based management;
 - protecting BC's forests by controlling and monitoring insects, disease, and invasive plants on more than 100,000 hectares;
 - improving fish passage through remediation of at least 10 crossings and by assessing fish access on 3,000 crossings;
 - Restoring 4,000 hectares of vulnerable grassland and open-grown forests; and

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- Restoring about 14,500 hectares of range land damaged by wildfire and pest infestations.
- Land Based Investment Strategy activities in 2012/13 are estimated to result in:
 - s.13
 - s.13
 - s.13
 - s.13
- s.13

Advice and Recommended Response:

- Building upon the strong foundations established last year, the 2012/13 Land Based Investment Strategy will continue to make efficient and effective investments.
- These investments will benefit our forest and range resources and the industries and communities that rely on them.
- We have allocated more funding to inventories, increased the area to be fertilized and spaced, and are also doubling our NSR assessments.

Date Prepared/Revised: March 8, 2012

Ministry Executive Sponsor:

Susanna Laaksonen-Craig

Phone: 250 356-0972

Alternate Contact for Issue:

Allan Powelson

Phone: 250-812-5054

Issue: Not Satisfactorily Restocked (NSR) Area in BC

Key Facts Regarding Issue:

- There are about 734,000 hectares of currently identified NSR area in British Columbia.
- This includes about 512,000 hectares of recently harvested areas that are managed by tenure holders and BC Timber Sales as part of their ongoing basic silviculture obligation to reforest.
- The remaining 246,000 hectares is composed of:
 - 136,000 hectares associated with pre-1987 or older historic logging and catastrophic events. This is referred to as “backlog”, and
 - 86,000 hectares is a result of fire and pest events post-1987.
- The backlog areas are being prioritized to determine if treatments are warranted. We anticipate most of these areas have naturally restocked and will not require planting.
- As a result of the pine beetle epidemic, new wildfires and small scale salvage, s.13
s.13 However, this needs to be surveyed before it can be confirmed as NSR.

Advice and Recommended Response:

- The ministry is taking the following actions:
 - Forests for Tomorrow is focusing efforts on large-scale MPB impacted areas that are economically feasible to treat.
 - We are surveying more areas and planting more trees.
- Forests for Tomorrow has spent about \$236 million, ground-surveyed 1.1 million hectares impacted by MPB and wildfire, and planted over 60 million seedlings on more than 51,000 hectares.
- This coming year, s.13
s.13
- We continue to monitor small-scale salvage site. The highest-priority sites not regenerating naturally will be scheduled for planting as necessary.

Date Prepared/Revised: February 24, 2012

Ministry Executive Sponsor:

Susanna Laaksonen-Craig

Phone: 250 356-0972

Alternate Contact for Issue:

Lorne Bedford

Phone: 250-387-8906

Issue: NSR, Impacted Areas, and Forests for Tomorrow

Key Facts Regarding Issue:

- There has been confusion and debate about the not satisfactorily restocked (NSR) areas in BC. The confusion centres around how NSR is defined and where on the land base it is tracked.
- The ministry defines NSR as an area not occupied by a sufficient number of well-spaced trees of desirable species. Stocking standards are set by the ministry. NSR areas reported by the ministry are identified based on field surveys and tracking for areas within the timber harvesting land base (THLB).
- In addition, there are areas likely to have NSR within the THLB due to impacts from insect infestations (e.g. the mountain pine beetle), wildfires and harvesting that have not yet been surveyed or tracked.
- There are also not stocked areas outside of the timber harvesting land base that the ministry tracked until 2000/01. FLNR no longer reports this area in order to focus survey work in areas that can be cost-effectively treated (i.e. where there is a reasonable return on investment – ROI).
- Forests for Tomorrow (FFT) invests in both field surveys (to improve estimates of NSR) and reforestation treatments (to reduce the NSR area).
- The table below summarizes what we currently know about identified NSR, impacted areas in the timber harvesting land base (THLB) that may have NSR area, other non-stocked areas, and FFT accomplishments.

NSR ha in THLB		
1	Forest industry and BCTS legal obligation	511 492
2	Government (non-obligation) – ‘backlog NSR’ prior to 1987	136 935
3	Government (non-obligation) – current NSR (surveyed MPB and wildfire impacted areas that are confirmed as NSR)	85 250
4	Total	733 677

Source: RESULTS (2011 Summary of Backlog and Current NSR Forest Land in BC)

Non-Commercial (outside THLB) Not Stocked Area		
5	2000/01 reported not stocked non-commercial areas, either covered with commercial tree species, or at least 60% covered with brush that is higher than one metre	2 120 000

Source: 2000/01 Annual Report Table 4

Wildfire Impacted Area (ha)		
6	Total Wildfire Burned Area (2003 to 2010)	1 137 000
7	THLB area impacted to some extent	370 000
8	Economically viable area to treat	FFT surveys

Source: data provided by K. Osbourne

Mountain Pine Beetle (MPB) Impacted Area (ha)		
9	Total MPB Impacted Area	17 500 000

10	THLB area impacted to some extent	9 900 000
11	THLB area with >50% pine	5 100 000
12	Current and projected harvest (including FFT treatments) with reforestation obligation	2 000 000 to 2 900 000
13	Area not projected to be harvested (non-obligation)	2 200 000 to 3 100 000
14	Naturally recovery not expected (either insufficient stocking or secondary structure)	525 000 to 775 000
15	Economically viable area to treat	FFT surveys

Source: BCMPB v8 and Chief Forester Sept/Oct 2011 article "NSR Area in BC" in BC Forest Professional Magazine

Forest for Tomorrow (FFT) Accomplishments: 2004/05 to 2011/12		
16	Area surveyed* (ha)	1 128 000
17	Area planted (ha)	51 050
18	Seedlings planted	60.1 million

Source: Al Powleson from RESULTS *includes projected 200 000 ha surveys for 2011/12

Date Prepared/Revised: January 14, 2012

Ministry Executive Sponsor:

Name: Jim Snetsinger

Phone: 250-387-1296

Alternate Contact for Issue:

Name: Kelly Osbourne

Phone: 250-387-3223

Survey response to NSR

- In 2011/12 FFT will be surveying about:
 - 150,000 ha of current and past insect, disease, and wildfire impacted forests
 - 100,000 ha for potential to improve growth rates through thinning and fertilization to off-set impacts of current and past catastrophic events
 - 80,000 ha of pre-1987 backlog NST will be reviewed for current status
 - 75,000 ha of plantations burnt in the 2010 wildfires in conjunction with the major licensees
- The initial phase of establishing seedlings on the 2003/04 fires has been completed and we are now moving onto the next phase which is plantation maintenance. This is to ensure that the initial investments survive and grow un-impeded by competition.
- This phase mostly consists of surveys such as regeneration and brushing
- The brushing surveys typically result in a small fraction of previously treated areas requiring treatment to ensure seedling survival and adequate growth rates.
- This phase for the 2003/04 fires will be extended until the stands are free growing which will last to about 2018 and over this time period will shift to mainly just surveys.
- Reforestation of following years major burns are following a same pattern as we are just in the initial phases of the 2009 and 2010 fires of determining what needs to be treated and developing rehabilitation prescriptions where feasible and practical.
- Past work on disease infestations such as the Dothistroma outbreak in the NW is also entering the second phase of monitoring and survey past planting and rehab growth and seedling performance.
- Through our Forest health overview surveys and the collaborative work between the wildfire management branch and resource practices branch we are assessing the degree of impact of current and past insect, diseases, and wildfires to ensure that all feasible and practical opportunities for rehabilitation are undertaken.



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Issue: MPB Impacted Area 14.5 M and Treatments

- Of the 60 million ha of forested land, 14.5 million ha have experienced some level of MPB-mortality.
- About 4.6 million ha are inoperable, leaving about 9.9 million ha of timber harvesting land base (THLB).
- Of the 9.9 million ha of THLB, 5.5 million are stands with > 50% pine with 3.5 million ha in >70%.
 - Pine stands considered to be the highest risk are those with the highest percentage of pine. Stands with less pine will help offset impacts in the mid-term.
 - Therefore, MFR is focussing (harvesting and rehabilitation) efforts into stands > 70% pine.
 - Based on this approach, by 2020 we will have harvested about 1.5 million hectares between 1999 and 2020.
- Also, we will treat about 300,000 ha of stands through Forest For Tomorrow at current funding levels.
 - Many areas will not require treatment as they have other species or sufficient understory and will rehabilitate naturally.
 - Potential rehabilitation sites are classified as NSR or stocked with new regeneration or residual trees through ground surveys funded by FFT.
 - All ground surveys funded by FFT are put into RESULTS which updates the forest inventory on MPB affected stands.

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- Both harvesting and rehabilitation are targeting more productive sites which further increases benefits of these treatments.
- Based on the surveys, the severity of the MPB infestation on the 14.5 million hectares is broken down as follows: ALBERT TO UPDATE ?

MPB Attack	Level of Severity
Trace	27%
Light (<1%)	36%
Mod (11-30%)	23%
Severe (31-50%)	9%
Very Severe (>50%)	5%
Total	100%

- ALBERT INVENTORY QUESTION How is the ministry tracking and kept its forest inventory up to date to reflect the MPB impacts?

ALBERT ?? MFR completes forest health surveys every year. In 2008, about 76% of province was inventoried for forest health. The breakdown of survey types is:

- 72 million hectares were surveyed by fixed-wing.
- Of the above area, 3.75 million hectares had more detailed surveys by helicopter to narrow down the areas with more critical forest health issues.
- From this area, over 200,000 hectares were surveyed in the field.

Date Prepared: February 12, 2010

Ministry Executive Sponsor:

Name: Jim Snetsinger
Phone: 250-387-1296

Alternate Contact for Issue:

Name: Lorne Bedford
Phone: 250-387-8901

Definition of NSR

Key Facts Regarding NSR:

- Means not satisfactorily restocked
- This is a forest management term identifying the degree of satisfaction that forest managers have with the state of reforestation on an area
- In BC it has usually been related to the achieving a minimum number of well spaced trees occupying an area – that meets management objectives. To meet management objectives trees need to be healthy, ecologically appropriate and economically valuable
- If there are fewer trees than the minimum number desired on the area...then the area is called NSR.
- The ministry has been using the term NSR for over 60 years
- What constitutes NSR has changed over the years and is dependent on the age of stands when they are surveyed.
- Younger stands are expected to have more trees than older stands.
- We expect more trees at ages 8-15 than at later stages (ie 20-50). We know through self thinning stands start off with more trees and end up with fewer over time.
- Therefore we have standards which recognize this. ---- i.e. need fewer sph on older stands

What is backlog NSR:

- The Ministry uses the term Backlog NSR to refer to those areas that were denuded prior to October 1987. These areas were created through wildfire, pests or harvesting.
- These areas have been previously identified as potentially needing more surveys or reforestation to bring them to a stocking level satisfactory to forest managers.

N. Macdonald: This morning is going to be, as I was speaking with the minister, a bit more of a case where we're going to jump from topic to topic. I will be starting with some questions coming out of yesterday's debate, and then we'll be moving to the independent member for Delta South, followed by one of my colleagues from Stikine. I should know these.

[1010]

That will likely take the better part of the morning. Following that, we'll go to Cowichan Valley to continue with the raw log debate.

I just want to come back to one of the things that we talked about yesterday. It was when the minister was explaining NSR. He gave me an explanation, and I was just trying to go back and look at what I had heard in the western Canada silviculture association. The question will deal with that.

Basically, with not sufficiently restocked forest lands, I think the minister was explaining how the 715,000 hectares breaks out into current NSR and other types of NSR. Last February, as I was saying, I attended the Western Silviculture Contractors Association annual conference, at which the previous Minister of Forests and Lands at the time said that the area of NSR lands suitable and economic for replanting might be as high as 1.5 million hectares.

Later on one of the ministry staff confirmed that a further 400,000 hectares of NSR were not accounted for in the 715,000 hectares that we talked about yesterday. He also estimated that 300,000 hectares of NSR attributable to small-scale salvage, logging for which licensees and industry have no responsibility to reforest, are also unaccounted for in the 715,000 hectares.

So the total estimate is an additional 700,000 hectares of NSR unaccounted for in the 715,000 hectares. That figure was also noted on the ministry's website under "Key silviculture statistics." This estimate of an additional 700,000 hectares in NSR that the ministry deems economic and feasible to replant makes the total area of NSR around 1.4 million hectares, not the 715,000 hectares.

So my questions to the minister are: can he confirm the additional amount of NSR? And given that not sufficiently restocked is a key indicator of sustainable forest management, does the minister agree that it is totally unacceptable that his ministry does not know the true, actual extent of NSR in the province?

[1015]

Hon. S. Thomson: So just working through the numbers here for the member opposite to make sure.... Yesterday we did talk about the 715,000 hectares, and I think we clarified that the amount of current NSR that rotates in terms of the responsibility of licence holders. We worked through that.

The number that the member opposite is talking about in terms of the additional potential NSR land I think it's important to recognize that that is potential. This is the area, you know, that's primarily related to mountain pine beetle impacts. So those are estimates of what may be potentially NSR land after all of the logging is completed.

There are approximately 525,000 to 775,000 hectares. But I think the important point is that this land is still being logged in many cases. So the ability to go in and determine what may or may not be NSR land won't be there until after all of that process is completed that we've seen the full impact, that it has been logged.

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We're continuing to work on bioenergy initiatives that take waste out of those areas. So it is simply an estimate of potential, but the work is underway. We'll continue to survey those areas

when we can do that appropriately, at the right time. Then if the area is determined to be NSR, it would be put into the inventory or into the process for reforestation. But much of that land, particularly land that is less than 50 percent pine, may not require it. So I think that number that you're talking about, to the member opposite, is currently an estimate at this time.

Work continues. We talked about the resources within our program that are focused on doing the survey work. At some point that work will be done and completed and, potentially, added to the numbers around the NSR land. We're also continuing, as he mentioned, on the small-scale salvage operations. We are continuing to survey and assess those as well. So those numbers that you're referring to are simply estimates at this point.

N. Macdonald: So the minister would agree with his predecessor, then, that it could be as high as 1.4 million hectares to 1.5 million hectares that are NSR that that's possible?

Hon. S. Thomson: You talked about 400,000 and 300,000. As I pointed out, simply estimates. If you add that to the 715,000, then you come to the number of the 1.5 that we're referring to. But remember that yesterday we talked about the fact that of that 715,000, a significant amount 480,000 is under licensees. We talked about the other components of that. So to jump to the point where you say that it goes from here to there, you have to recognize from our beginning conversation around the explanation of what makes up the 715,000 hectares.

N. Macdonald: For laymen, these are complex issues, and trying to get them right is always a little difficult, but I think that even if we take out the 400,000 hectares, we are talking potentially about a vast area of NSR. So just to wrap up with this part of the estimates, I'll just basically repeat the assertions, the conclusions, that the co-critic and I have reached on this set of estimates. I'll give the minister a chance to respond to that, and then we'll turn it over to the independent member for Delta South for some questions.

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A backgrounder on NSR

in the context of recent letters to the editor

by Marvin Eng; Manager, Special Investigations
June 30, 2010

Context

On April 28, 2010 the Vancouver Sun published a opinion editorial by Arnold Bercov, George Heyman and Ben Parfitt accusing the province of being an “environmental laggard” because a “major reforestation crisis is underway.” They outline in some detail their concerns about funding for reforestation and conclude with the “wake-up call” that the extent “reforestation crisis” is, by MFR’s own admission, 700 000 hectares larger than previously reported.¹

On April 30 the Minister of Forests and Range, Pat Bell, posted a response in which he explained some of the history of reforestation efforts in the province and stated that the amount of NSR (not satisfactorily restocked) land that the taxpayers are “on the hook for” is 240 000 hectares and that the “missing” 700 000 hectares was “potential for addition NSR lands to be identified through plans to survey” small scale salvage and beetle killed forests.

On June 10 the Victoria Times Colonist published an opinion editorial by Anthony Britneff stated that, by MFR’s own admission “the area of forestland that had been ‘not satisfactorily restocked’ stood at [2 762 000] hectares” in 2001. He claimed that a conservative estimate of losses due to fires and mountain pine beetles since that time would add an additional 6 000 000 hectares bringing the total NSR land area to 9 000 000 hectares.

On June 12 Minister Bell responded rather tersely in a letter to the editor of the Victoria Times Colonist that “the ministry estimates the current size of ‘not sufficiently restocked’ (NSR) land to be 240,000 hectares -- not [9 000 000] hectares.”

The question remains: how is it that Britneff (a 39 year veteran of the forest service) and Bell (the Minister of Forests and Range) are nearly two orders of magnitude apart on their estimates of NSR? The obvious answer is that they are talking about two different things. Clearly this difference is not about the difference between the words “satisfactorily” (used by Britneff) and “sufficiently” (used by Bell). Bell, in his response to Bercov et al., used the correct current terminology of “not satisfactorily restocked” when providing the estimate of 240 000 hectares.

The appended copies of the letters contain a substantial discussion about:

- surveying the need for reforestation and
- the funding of, and legal requirements for, reforestation.

Therein lies much of the reason for the differences.

¹ Copies of all letters are appended to this document.

NSR Background and History

Not satisfactorily restocked (NSR) is defined as “an area not covered by a sufficient number of well-spaced trees of desirable species.”² Setting aside the need for definitions of the words “sufficient”, “well-spaced” and “desirable” (effectively the definition of a stocking standard³) it is important to note that the definition:

- implies that the state of being NSR is something requiring remedy (i.e. it is not satisfactory); and
- does not contain any restrictions on why the area is NSR (harvesting or natural disturbances).

The arcane nature of any discussion of NSR does not result from the definition of the term, but rather, it is primarily a result of the long and varied history of funding sources and legal obligations for reforestation.

In 1930 the province built a tree nursery at Green Timbers. This marked the beginning of the provincially funded reforestation program. Provincial funding continued in a variety of forms and was augmented by federal funding in the late 1970's in the form of the Subsidiary Agreement for Intensive Forest Management. Despite this funding reforestation efforts proceeded slowly and, by the mid 1980's, there was at least the perception of a “crisis in reforestation” because of the amount of NSR land resulting from harvesting.

In 1985 the “crisis” was addressed by substantially increasing funding for reforestation (and other silviculture activities) with the signing of the first Canada - British Columbia Forest Resource Development Agreement (FRDA). The information from the 1984 *Forest and Range Resource Analysis* (current to 1982) was used to estimate the area of NSR land that would be eligible for reforestation funding under FRDA. That estimate was 738 000 hectares on good and medium growing sites (poor and low sites were not eligible). These areas became known as the **pre-82 backlog**.

In 1987 the government amended the *Forest Act* to create legal obligations to reforest areas denuded by harvesting, fire, insects and diseases. The forest industry was explicitly responsible for reforesting the areas it harvests (and the Small Business Forest Enterprise Program [SBFEP], now BC Timber Sales (BCTS), was included in this requirement in 1988). The crown was responsible for reforesting areas subject to natural disturbances. The areas involved became known as **post-87 current reforestation** for the Ministry and industry (post-88 for BCTS). This resulted in 5 years of “orphaned” NSR known as **1982 to 87 backlog** (between the pre-82 backlog and the post-87 current reforestation). There was no legal obligation to reforest these areas and any responsibility for reforestation remained with the crown.

In the 1988/89 annual report the Ministry of Forests provided a summary of the amounts of NSR in different categories that represented “the beginning status for a 'net change' analysis to be presented in the 1989-90 annual report.” For the first time in an annual report they estimated the total amount of productive forest crown land that was “not-satisfactorily-stocked” 3 779 000 hectares. Their summary showed 550 000 hectares remained of the original 738 000 hectares eligible for FRDA funding (pre-82 backlog). The ministry was responsible for nearly 1 000 000 hectares of 1982 to 87 backlog. Approximately 120 000 hectares was the obligation of industry and the SBFEP. The remaining 2 100 000 hectares consisted of 325 000 hectares of “low site” areas denuded before 1982 (that were not eligible for FRDA funding) and nearly 1 800 000 hectares simply labelled as “low priority”.

Not Responsive

³ “The range of healthy, well-spaced, acceptable trees required to establish a free-growing stand. . .”

These figures along with the wording used in the annual report are shown in Table 1. Note that, although the ministry (82-87 backlog) category was presented and discussed as an “obligation” there was no legal obligation for the ministry to reforest these areas. Their obligation, under the *Silviculture Regulation of the Forest Act* only extended to areas denuded by natural disturbances after 1987. Also note that, by categorizing the “Pre-82 Low Site” and “Low Priority” areas as “Unmanaged Land”, the ministry effectively absolved themselves from the responsibility to reforest these areas.

Table 1. Summary of not-satisfactorily-restocked land
as presented in the MFR annual report for 1988/89

Land Category		Area
Managed Forest Land Obligation Category		
FRDA	(pre-82 backlog)	553,145
Ministry	(82-87 backlog)	990,347
SBFEP	(post 88)	28,015
Major Licensees	(post 87)	95,221
Subtotal		1,666,728
Unmanaged Land		
	Pre-82 Low Site	305,423
	Low priority	1,806,849
Subtotal		2,112,272
Total		3,779,000

Beginning in 1990, and continuing to this day, the ministry provided annual estimates of changes in not-satisfactorily-restocked (NSR) crown land in a table that only showed the areas in the “Managed Forest Land Obligation Categories” in Table 1 (in 1992 a “Ministry post-87 column was added showing the areas for which the ministry had a legal obligation for reforestation). The estimated changes were based on information provided through legal reporting requirements about harvesting and silviculture activities.

From 1990 to 2001 the ministry also provided a complete summary of the status of “Productive Forest Land” including a “Not Stocked” category. “Not Stocked” land included NSR areas in all of the “Managed Forest Land Obligation Categories” (discussed above) plus “non-commercial areas, either covered with commercial tree species, or at least 60 per cent covered with brush that is higher than one metre”. This presumably was the definition of the “low priority” areas, shown in Table 1. This summary of forest land status was based on information contained in forest cover mapping. That mapping was updated with new harvesting and natural disturbances on a two year cycle.

By 1995 FRDA had run its course. Much of the funding shortfall for reforestation was supposed to be picked up by the Backlog Reforestation program of Forest Renewal B.C (FRBC) which began in 1994. In 1995 regulation of reforestation came under the purview of the *Forest Practices Code of British Columbia Act (FPC)*. The FPC re-defined backlog NSR area as “area from which the timber was harvested, damaged or destroyed before October 1, 1987.” This simplification made all “pre-87” areas eligible for funding under FRBC. Nonetheless, the ministry continued to report both pre-1982 and 1982-87 backlog NSR statistics for Crown land. The FPC maintained the legal obligation for the crown to reforest areas damaged by fires, insects and diseases unless the District Manager considered the area to be too small or too inaccessible.

In 2002 the legal obligation for the crown to reforest areas denuded by natural disturbances was removed from the FPC. Also in that year, the Vegetation Resources Inventory (VRI) replaced the “traditional” forest cover mapping. The VRI was intended to be “value neutral” inventory with no “cultural attributes” such as NSR, non-productive, non-commercial brush, etc. This made it impossible to report on the amount of “Not Stocked Productive Forest Land”.

The *Forest and Range Practices Act* maintained the status quo at 2002 with respect to legal obligations for reforestation:

- licensees and BCTS are legally obligated to reforest areas that they harvest (after 1987 and 1988 respectively).
- there is no legal obligation for the crown, or anyone else, to reforest areas harvested before 1987 or any areas affected by natural disturbances.

With the advent of “Ministry Service Plans” in 2003 NSR became part of a “Key Outcome Indicator”. After some initial “growing pains” with this type of reporting the ministry settled on the indicator of “Ratio of area reforested to area harvested or lost to fire and pest (unsalvageable losses)” with the goal that the ratio should be greater than 1.0; i.e. more area should be reforested than “lost”. The results were:

2004/05	1.01
2005/06	0.94
2006/07	0.90
2007/08	0.83
2008/09	0.78

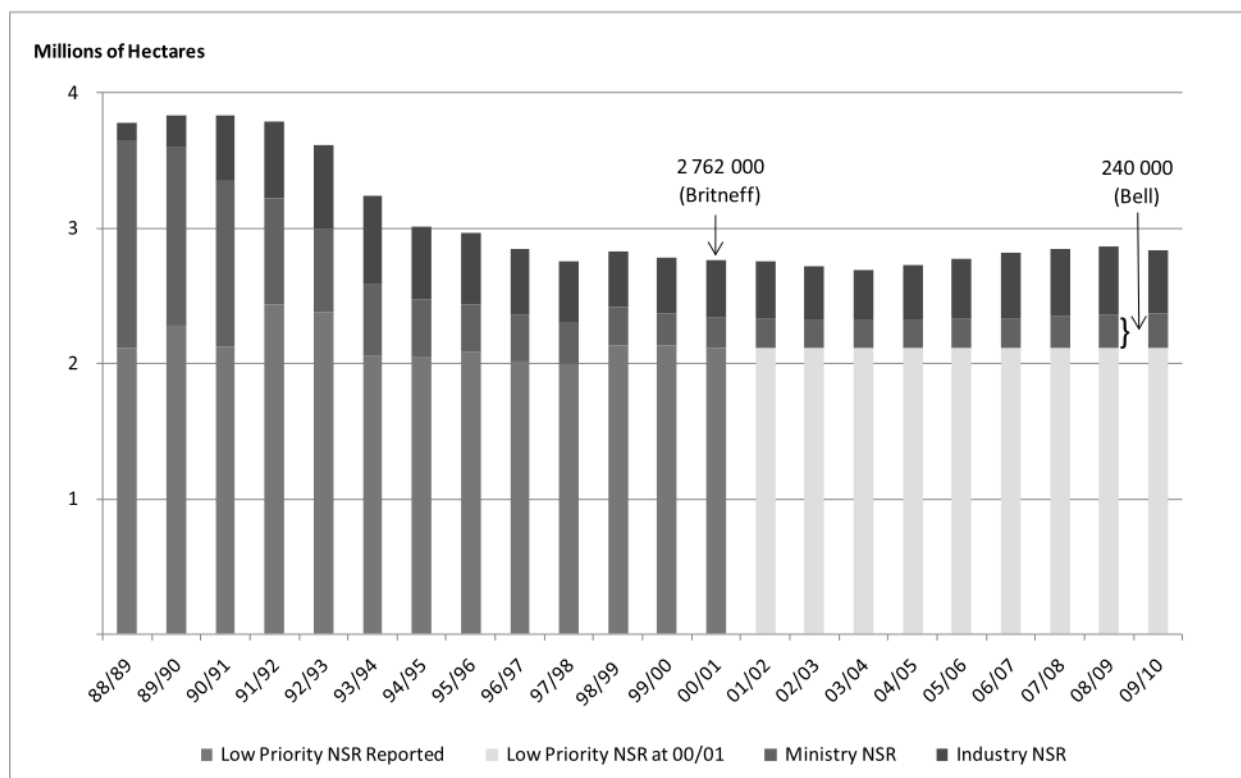
Note that, while the indicator continues to deteriorate, the ratios are still much higher than one might expect given the extent of the current MPB outbreak. The reason for this is that the area lost to pests only includes that area that has been formally surveyed for the purpose of reforestation (under the auspices of the Forests for Tomorrow program); it does not include any estimate of the total area affected.

The performance indicator is not part of the current (2010/11 – 2012/13) service plan.

Trend in NSR Over Time

The following figure uses data from MFR annual reports. It shows the trend in the amounts of NSR in three categories “relevant” to the current situation and the context of this discussion:

- **Low Priority NSR** is the areas that were not satisfactorily restocked but considered to be unmanaged. This category was not estimated by the ministry after 2001 so that amount is used in the figure in subsequent years.
- **Industry NSR** is “current NSR” resulting from harvesting. It is the sum of post-87 Major licensee and post-88 BCTS NSR.
- **Ministry NSR** is the backlog NSR from harvesting (pre-87) and the NSR from natural disturbances but only those disturbances that have been reported to the ministries silviculture tracking database. It is the sum of the pre-82 backlog, 1982 to 87 backlog and post-87 ministry NSR.



The “Low Priority” category showed minor changes during the time it was reported due mainly to re-categorisation of areas into and out of the category rather than any actual changes in the stocking status. The industry NSR rapidly levelled off at relatively stable level of approximately 500 000 hectares. This area is almost entirely truly “current” NSR; i.e. areas that have been recently harvested and are in the process of being regenerated either naturally or through planting. The ministry NSR category decreased dramatically during the last 6 years of the FRDA program but has showed only minor changes since.

Britneff cites the total area in 2000/01 as his starting point. Bell uses the Ministry NSR amount at 2008/09 in responses. The ministry provided a graph showing only the Ministry NSR and Industry NSR categories with an additional 700 000 hectares on top of the 2008/09 bars to indicate the amount they expected to be added from surveys of mountain pine beetle damage and small scale salvage that had no obligation to reforest. It was this amount that Bergov et al. used.

The Current Situation

The Silviculture Section of the Forest Practices Branch at MFR continues to report on “Changes in Not Satisfactorily Restocked (NSR) Crown Land” using the same process and format in use since 1988 (with only minor revisions). The 2008/09 version of this table is provided opposite as an example. It is from this table that the Minister drew his figure of “240 000 hectares of NSR” that is the sum of Total NSR as of 2009-04-31 for the first three columns (the “Ministry” columns equal 241 583 hectares).

The utility of this table, in its current format, is somewhat doubtful. There is no useful distinction to be made among the first three columns. There is no legal obligation to reforest these areas and the funding sources that created the original distinction have long since expired. When Minister Bell responded to Bergov et al. with the statements that “taxpayers maintained responsibility for areas hit by forests fires and insect infestations” he neglected the context provided above that there was a period of 14 years (from 1987 to 2001) when this was a legal obligation rather than just a responsibility. More importantly, the 240 000 hectares that the Bell says the “taxpayers [are] on the hook for” is entirely an artefact of the arcane nature of silviculture reporting rather than a representation of the stocking status of BC’s forests.

We can expect the numbers in the “Post 87 Ministry” column to change substantially over the next few years as the ministry does more silviculture surveys. They are considering relaxing the stocking requirements for older harvested stands so some of those areas will be deleted from the NSR totals. There will be very substantial additions as the Forests For Tomorrow program surveys areas that were harvested under the small scale salvage program without an obligation to reforest, and areas that have been affected by mountain pine beetles. The ministry anticipates those NSR areas will be on the order of 300 000 and 400 000 hectares respectively (Ralph Winter, pers. comm. 10/06/30).

It is unlikely that there will be a complete accounting of the stocking status of BC forests in the near future. It may be relatively simple to identify, in the VRI, the 2 000 000 hectares of “low priority” NSR that was “lost” in 2001 when the ministry stopped reporting on the status of the forest landbase in total. It is likely that much of that area would still be considered NSR but a portion of it, particularly in the northeast, was covered with aspen stands that were considered non-commercial brush at the time of inventory and are now a preferred species. A far more difficult task would be a useful survey NSR caused by damage from fire, insect and disease in the past 5 to 7+ years. Britneff thinks he is conservative in estimating this area at 6 000 000 hectares. The minister has been advised that the estimate is closer to 400 000 hectares.

The truth may be out there but it is likely somewhere in between.



Changes in the Not Satisfactorily Restocked (NSR) Crown Land

**From: 2008-04-01
To: 2009-03-31**

Page: Page 1 of 1
Date Printed: 2009 04 09
User Id: IDIR\RWINTER
Database: DBP01
Report Id: RESULTSR004
File:

Org Unit: All
TSO: All
Management Unit: All
Client:

Licence: **Land Status Date (From):** 2008 04 01 **Land Status Date (To):** 2009 03 31

RESPONSIBILITY	BACKLOG (2)		CURRENT REFORESTATION (3)			Totals
	MINISTRY	MINISTRY	MINISTRY	BCTS (9)	MAJOR LICENSEES	
YEAR OF DENUDATION	PRE 82	1982 87	POST 87 (OCT 1/87)	POST 88 (JAN 1/88)	POST 87 (OCT 1/87)	
	hectares					
TOTAL NSR AS OF 2008-04-01	114,099.60	58,476.10	59,702.90	69,259.80	424,349.80	725,888.20
Additions in NSR due to:						
Harvesting (4)	499.90	398.90	4,230.40	30,037.10	148,088.20	183,254.50
Fire (5)	68.70	50.40	6,682.40	0.90	0.00	6,802.40
Pests (5)	700.00	11.30	1,121.50	0.00	0.00	1,832.80
Other Disturbances (6)	9.90	0.00	1,065.70	10.10	3,636.10	4,721.80
Plantation Failure	890.70	549.70	652.70	600.40	589.20	3,282.70
Natural regeneration failure	7,921.50	236.00	1,300.90	67.30	60.60	9,586.30
TOTAL ADDITIONS TO NSR	10,090.70	1,246.30	15,053.60	30,715.80	152,374.10	209,480.50
Reductions in NSR due to:						
Planting (7)	2,347.30	1,190.60	5,024.20	27,316.50	119,324.70	155,203.30
Natural regeneration	1,704.80	190.30	2,316.90	1,898.20	16,397.50	22,507.70
Reclassification of NSR to NP (8)	2,257.20	174.60	1,034.00	516.30	2,783.50	6,765.60
TOTAL REDUCTIONS TO NSR	6,309.30	1,555.50	8,375.10	29,731.00	138,505.70	184,476.60
DIFFERENCE (10)	43.60	-8.70	-248.10	-34.50	-213.40	-461.10
TOTAL NSR AS OF 2009-03-31	117,924.60	58,158.20	66,133.30	70,210.10	438,004.80	750,431.00
NET CHANGE IN NSR	3,825.00	-317.90	6,430.40	950.30	13,655.00	24,542.80

(1) Includes accomplishments under all funding sources.

Ministry annual reporting is based on data in ministry information systems as of 2009-04-09.

Where data entry is incomplete or delayed, numbers reported may under estimate actual accomplishments.

(2) Backlog obligation categories are based on the responsibility for reforestation to a free growing stage.

Ministry, Pre-82: A large portion of good and medium sites in this obligation category was treated under FRDA I (1985-90).

Ministry, 1982-87, All Sites: Includes areas under the Small Business Enterprise Program (cut prior to January 1, 1988), and areas of Major Licensees (cut prior to October 1, 1987). Together with the Ministry Pre-82 areas, these areas are considered "outstanding obligations" for treatment under the Backlog Reforestation program, funded by Forest Renewal B.C. as of August 1996.

(3) Current obligation categories are based on the responsibility for reforestation to a free growing stage, by law, within an acceptable period of time.

Ministry, Post-87, All Sites: The Ministry remains responsible for basic silviculture on all areas denuded by fire or pests.

BCTS, Post-88, All Sites: Basic silviculture on all areas denuded by SBFEP after January 1, 1988 is funded by the SBFEP account, and implemented by the Ministry of Forests.

Major Licensees, Post-87, All Sites: Basic silviculture on areas denuded by major licensees after October 1, 1987 is funded by major licensees.

Licensees have approximately six to seven years to reach the basic silviculture requirement through natural regeneration, or about three to four years through planting, as specified in the silviculture prescription or site plans.

(4) NSR resulting from logging is the net area to be reforested after harvest (excluding roads, landing and other non-productive areas).

(5) Openings caused by fire or pests refer to incidence in mature timber or in areas already classified as free growing.

Fire and pest incidence prior to free growing is considered plantation or natural regeneration failure.

(6) "Other Disturbances" includes all disturbances that are not caused by Harvesting, Fire, or Pest, and also include any opening for which there are no disturbances.

(7) Area planted does not equal the statistics reported to the Service Plan tables: Total Silviculture Accomplishments on Crown Land by All Sources and Area Planted by Responsibility due to replants and fill plants that do not affect NSR status.

(8) NP is non-productive land. Reclassification to NP is due to roads, landing, swamps, rock outcrops, etc.

(9) Small Business Forest Enterprise Program (SBFEP) was changed to BC Timber Sales (BCTS) as of April 1, 2003

(10) Differences are used to compensate for records that have missing or incomplete disturbance information that have records not reflected in the reported NSR statistics.

Letters to the Editor

B.C.'s reforestation crisis shows province an environmental laggard

Arnold Bercov, George Heyman and Ben Parfitt

Special to the Vancouver Sun April 28, 2010

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OPINION-EDITORIAL B.C. CONTINUES TO LEAD IN REFORESTATION

By Pat Bell; Minister of Forests and Range

April 30, 2010

As Minister of Forests and Range, I take every opportunity to highlight the effects of climate change on B.C.'s vast forests. Two of the more obvious impacts include the growing severity of wildfires and the unprecedented mountain pine beetle infestation. More than ever, we need to work across political lines to clearly identify the challenges and develop practical solutions.

That is why it is so disappointing to see the Sierra Club and the Pulp, Paper and Woodworkers of Canada, prompted by weak and misleading research from the Canadian Centre for Policy Alternatives, concocting a "major reforestation crisis" where none exists. What is worse, their only solution is to reach deeper into the public purse.

The April 28th opinion piece by Arnold Bercov, George Heyman, and Ben Parfitt argues there is a "crisis" because twenty years ago taxpayers contributed six times as much funding and planted 31 times more seedlings. Let's take a closer look at the facts.

As they correctly point out, prior to 1986 taxpayers paid for virtually all tree-planting. And previous years of neglect left vast swaths of land with too few trees -- areas referred to as Not Satisfactorily Restocked or "NSR" lands. Starting in 1986, however, the obligation to regenerate harvested areas moved to industry while taxpayers maintained responsibility for areas hit by forests fires and insect infestations. It is also true that taxpayers spent a considerable amount of money to correct the historical backlog.

However, the authors chose not to disclose the size of the backlog. Looking at the same Ministry of Forests and Range presentation they held up as a "wake up call", it clearly shows, at its height in 1987/88, taxpayers were on the hook for over 1.6 million hectares of NSR land. Today, the area is 240,000 hectares -- about one-eighth of that size. It also points out, prior to 1987, half of all seedlings planted failed to survive. Today, thanks to advancements in silviculture practices, 93 per cent of seedlings survive.

British Columbians are spending one-sixth of what they used to because the problem is only one-eighth the size and they need to plant fewer trees because more of them survive -- and Bercov, Heyman and Parfitt want you to believe this makes B.C. an "environmental laggard"? As representatives of organizations that claim to care about climate change, this is inexcusable.

Next is their claim that 700,000 hectares "suddenly appeared" as new land in need of reforestation. The Ministry of Forests and Range readily admits that poorly chosen words on the chart conveyed the wrong message. What they meant by "missing" (from the estimates) was the potential for additional NSR lands to be identified through plans to survey 300,000 hectares of forest harvested by small scale salvagers and another 400,000 hectares of pine beetle impacted forests. We do not yet know if those 700,000 hectares are additional NSR but we intend to survey them and find out. This is not a "disparity," this is good planning and stewardship.

None of the above is meant to downplay the impact of climate change on B.C.'s forests. Following the wildfires of 2003 and 2004, and the largest mountain pine beetle infestation in B.C.'s recorded history, government introduced the Forests for Tomorrow program in spring 2005. Since then, \$161 million has

been spent on surveying 360,000 hectares of forest land and planting more than 40 million seedlings. Funding to support Forests for Tomorrow will continue at about \$42 million each year.

But public funding is only part of the solution. One of my key priorities is to make British Columbia a world leader in growing trees. And through our silviculture discussion paper, we are exploring ways to increase private investment into intensive silviculture and establish a carbon offset credit program that could be used to restore beetle-killed forests. Expanding the production of bioenergy is also a major opportunity. The more beetle-killed stands that we can turn into green power, the more area that industry will be responsible to reforest.

The impacts of climate change on our forests are real and we need to deal with them. It is unfortunate that some groups prefer to manufacture crises and foster division instead of directing their time and effort towards meaningful solutions.

Neglect in the woods: No way to manage a forest: A decade of cuts has left a priceless resource facing a homemade crisis

Anthony Britneff

Special to Times Colonist June 10, 2010

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B.C. Ministry of Forests Replanting trees still the law

Pat Bell,

Times Colonist June 12, 2010

Copyright

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Silviculture – why we do it and opportunities for the future

➤ **Ralph Winter**
➤ **Forest Practices Branch**
BC Forest Service

July 14, 2010

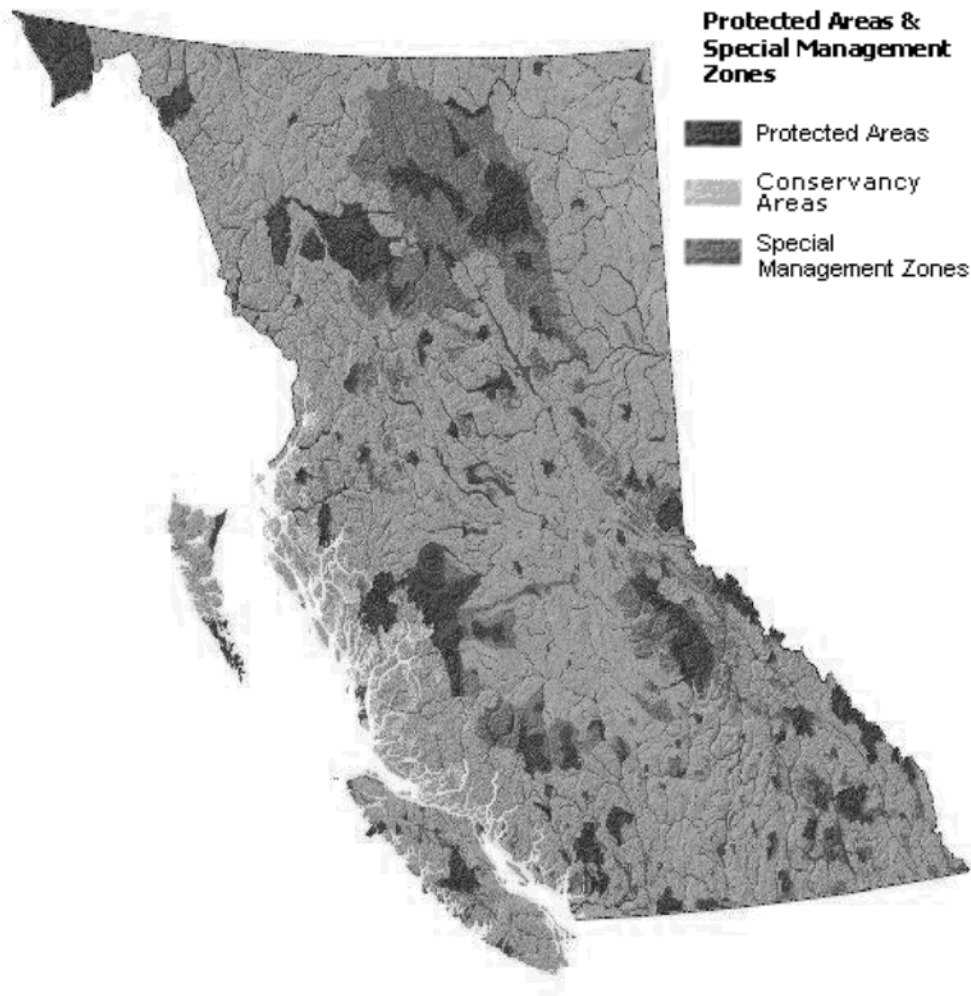


Objectives



- To discuss what silviculture can do for the future
- To share some key opportunities in silviculture with you
- Discuss Silviculture strategies
- Discuss some costs and benefits
- Discuss some key challenges

British Columbia's forests



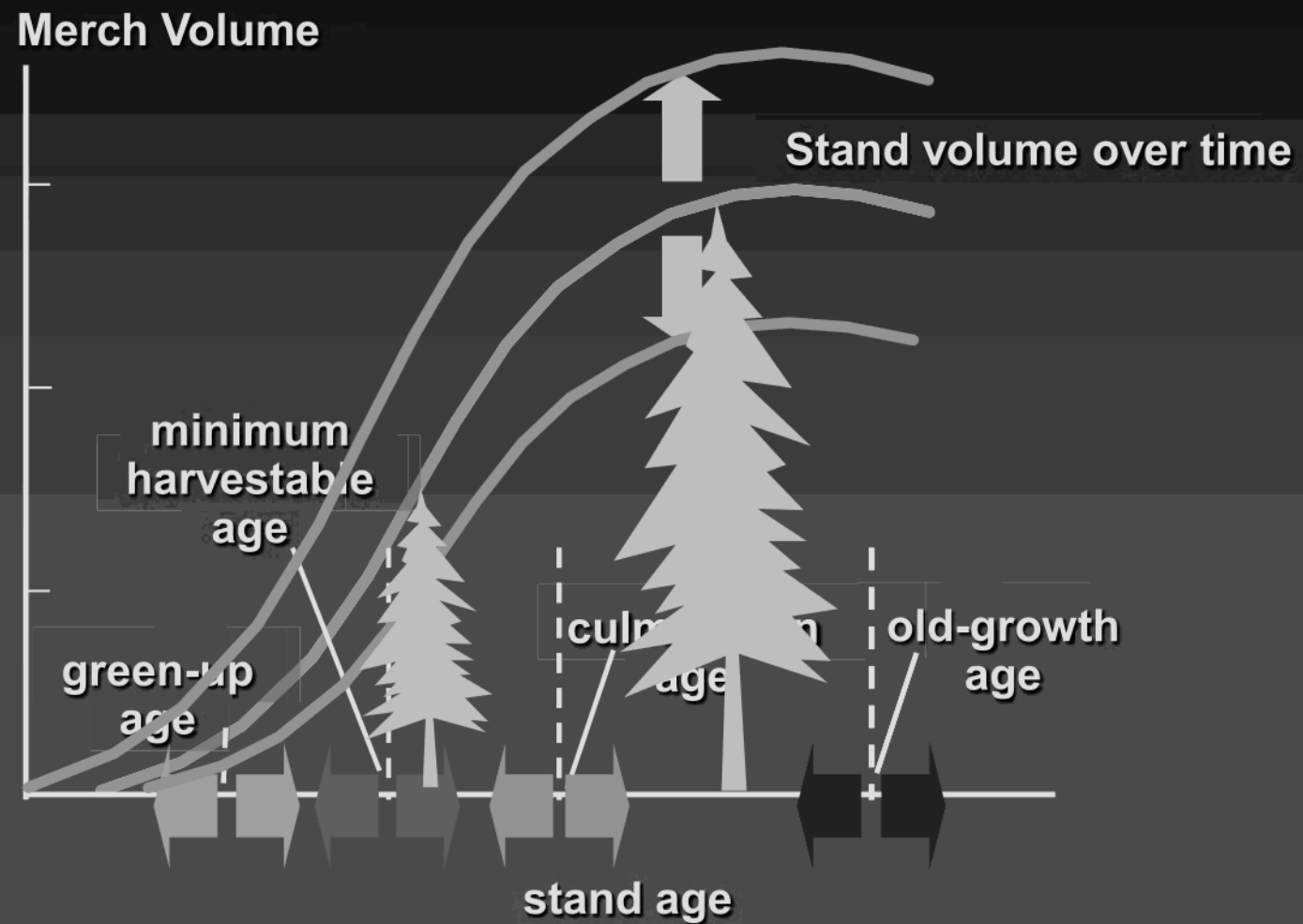
- 55 million hectares of forest – most publicly owned...this is a unique feature & challenge
- 13.8% of land base protected
- 14% in special management zones
- 22 million ha in the THLB.
- Log 0.8% or 180,000 ha/yr of the THLB
- 12-15% of each cutblock has WTR or patches within them
- 300,000 hectares/year reforestation and tending on harvested or denuded areas.

Silviculture



- Silviculture is the art and science of growing trees and forests for desired objectives
- Typically activities includes
 - Site preparation
 - Planting
 - Vegetation management
 - Spacing
 - fertilization

Silviculture affects conditions produced at the stand level



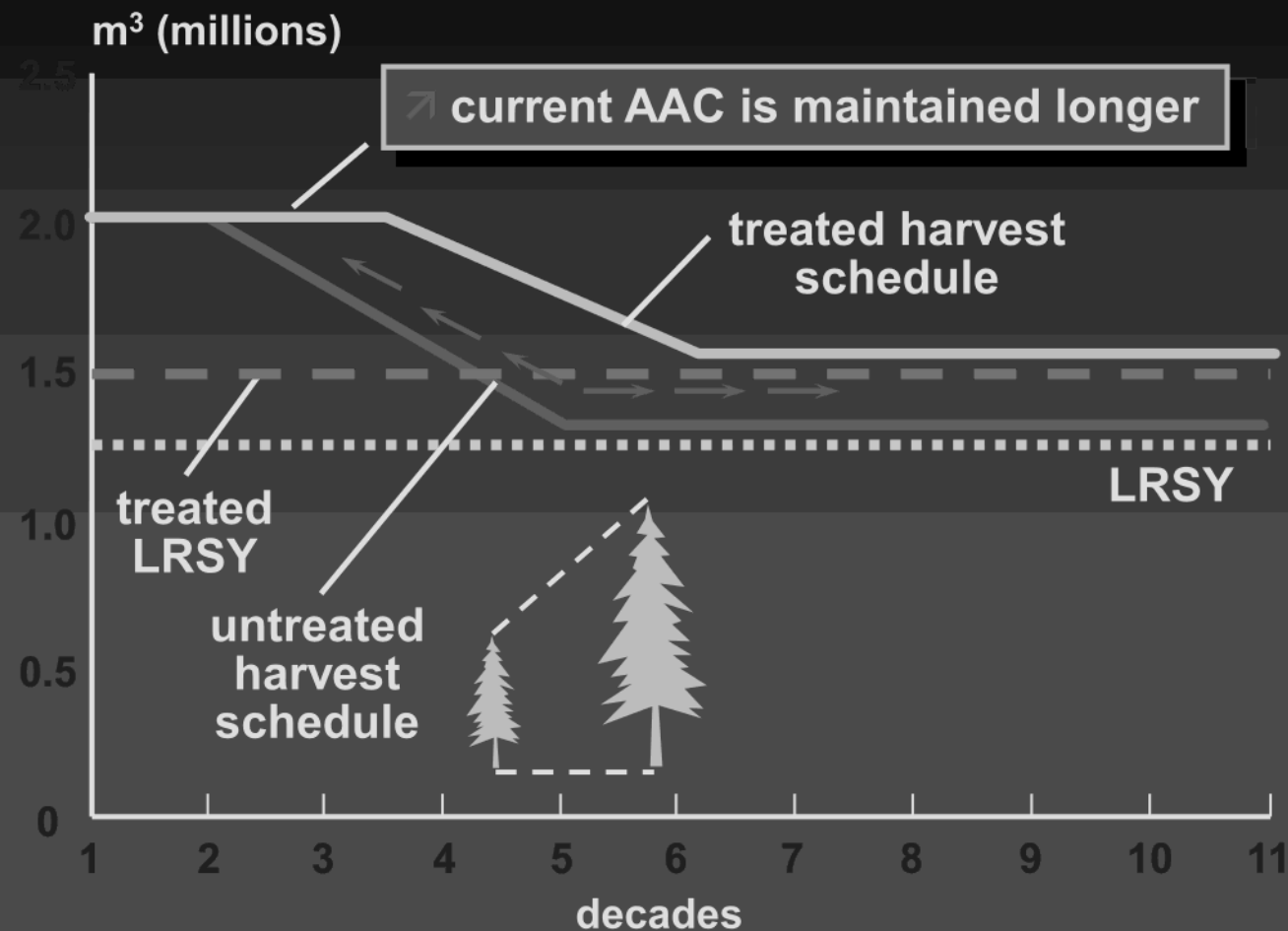
Silviculture is used to manage stands for both timber and non timber objectives (ie Fraser TSA)



- To have a viable timber supply, we need to manage non timber values appropriately, either through integrated management or through zoning approaches
- Coordinated SFM planning is a key to understand how all values are flowed out over time, over the entire forested areas...and how the total growing stock changes



Harvesting and Silviculture affects conditions produced at the forest level

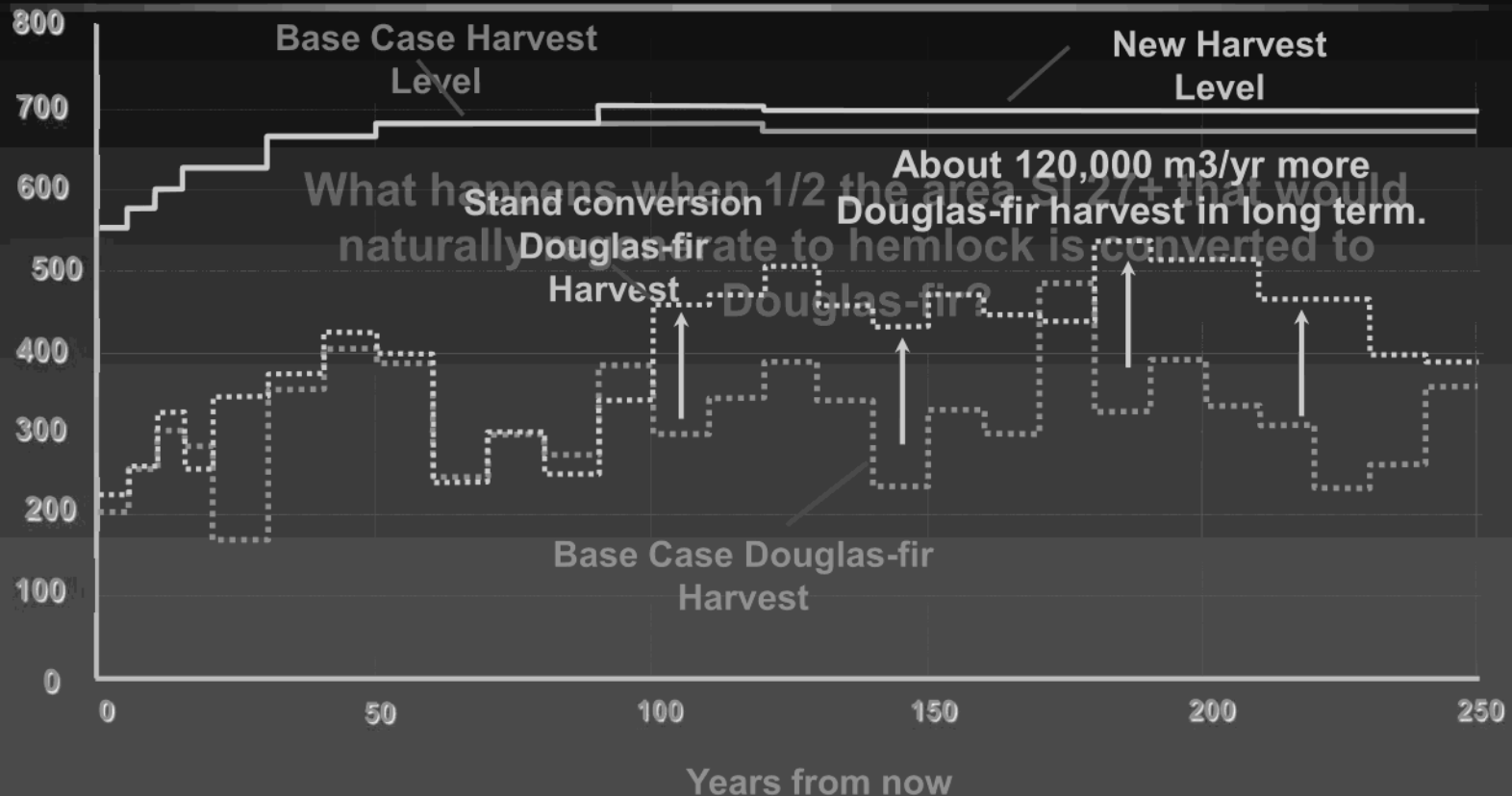




Choice of species affects the volume and value of the future crop!

Douglas-fir is about 40% more valuable than hemlock!

Harvest Level (000's m³/yr)



39 Blk 1 Type II Silviculture Analysis

Every management unit is different

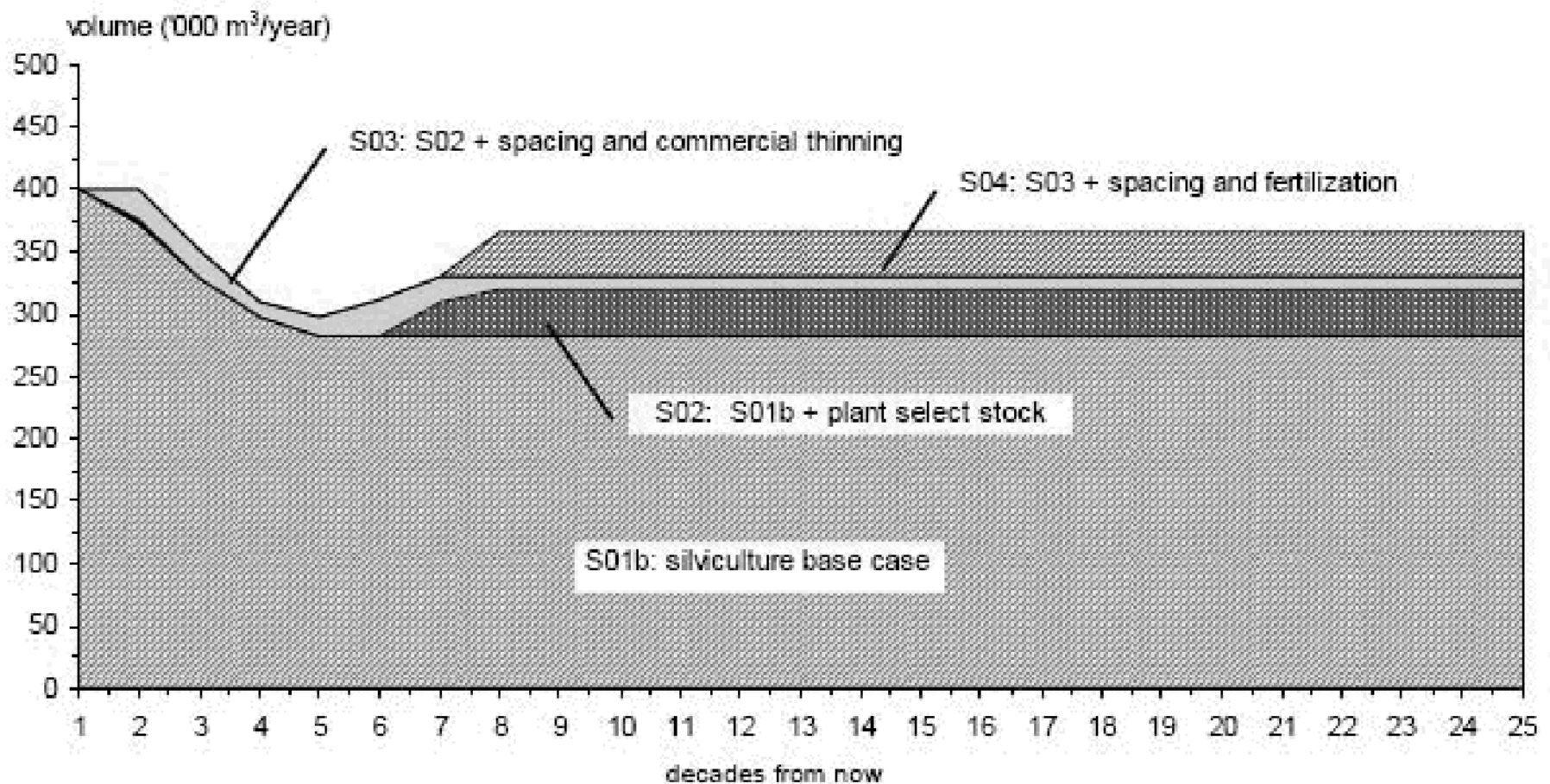


- There are 71 TSAs and TFLs in the province. Each management unit has unique
 - Management objectives and assumptions
 - Forest inventory conditions
 - Types of silviculture and growth and yield that are applicable to the area
- Therefore there is no one unique solution for the whole province to solve mgmt unit issues and carbon sequestration goals
- In the past 10 years BC has done extensive silviculture strategy analysis to identify strategic silviculture investment opportunities
- As conditions (MPB), objectives (carbon production) and emphasis (timber or habitat production) these strategies are enhanced

Arrowsmith TSA

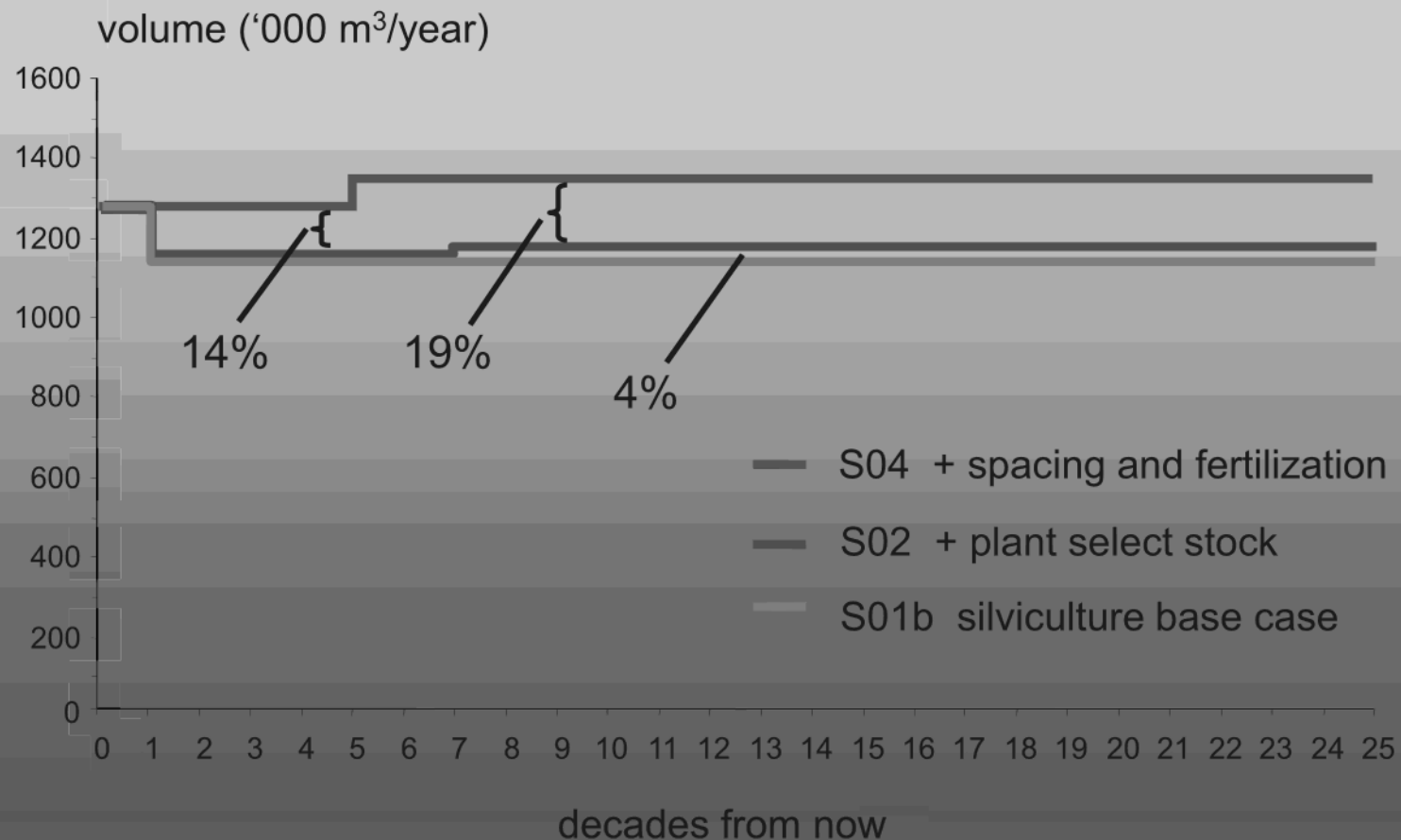


Figure S-1. Impact of planting select stock, commercial thinning, spacing and fertilization on the forecast harvest



Fraser TSA

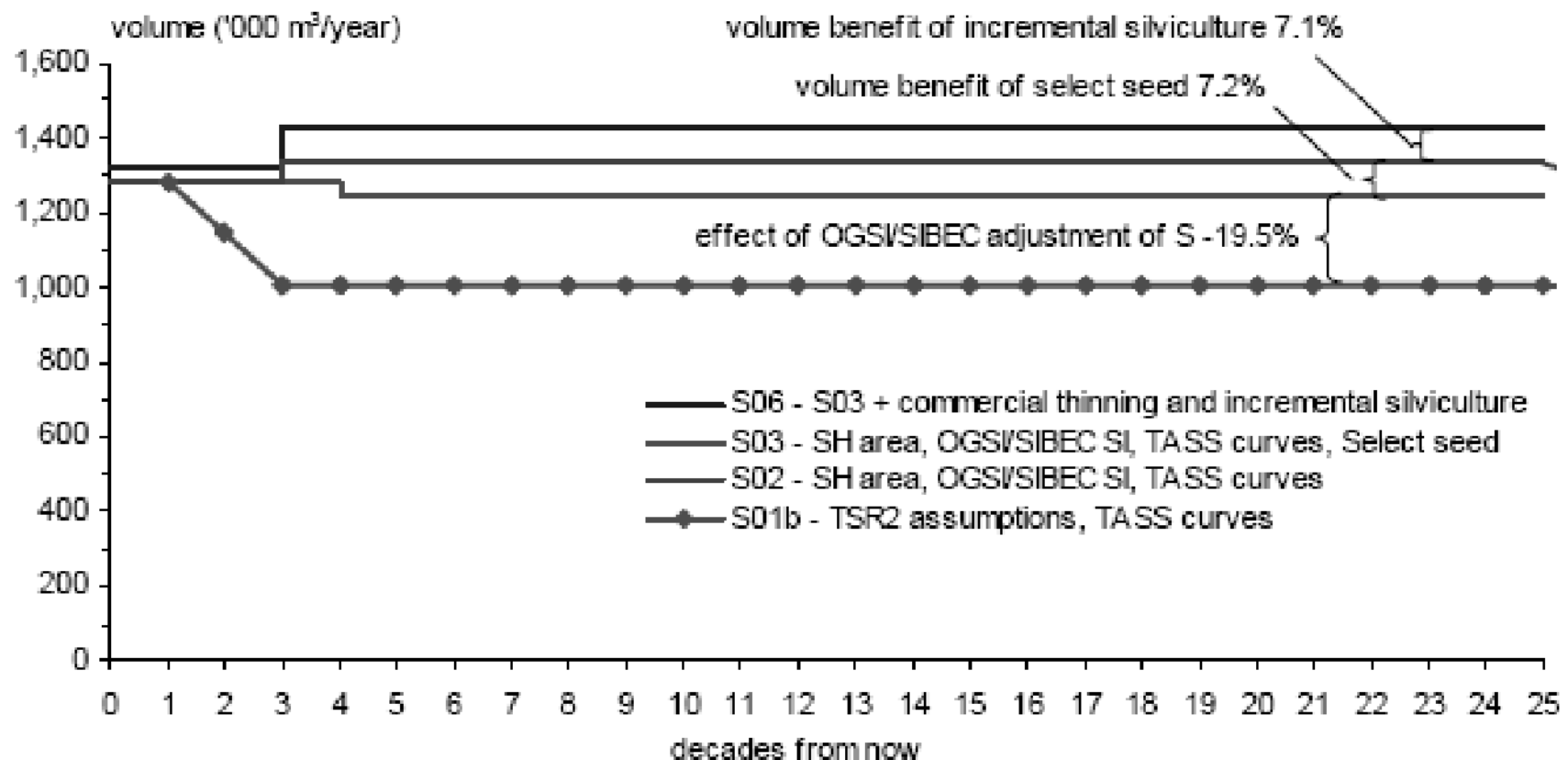
Objective: Maximize volume production



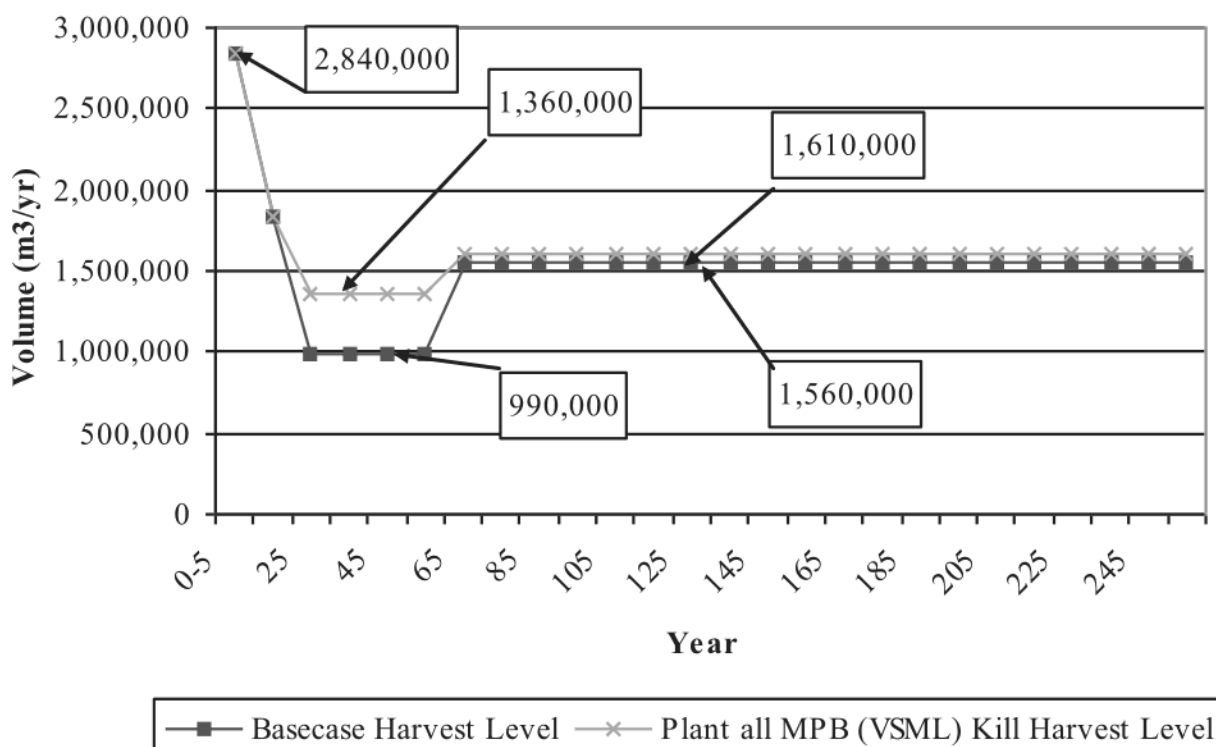
Strathcona TSA – need timely, focussed and integrated programs to achieve maximum carbon sequestration



Figure E-1. Impact of management assumptions on forecast harvest.

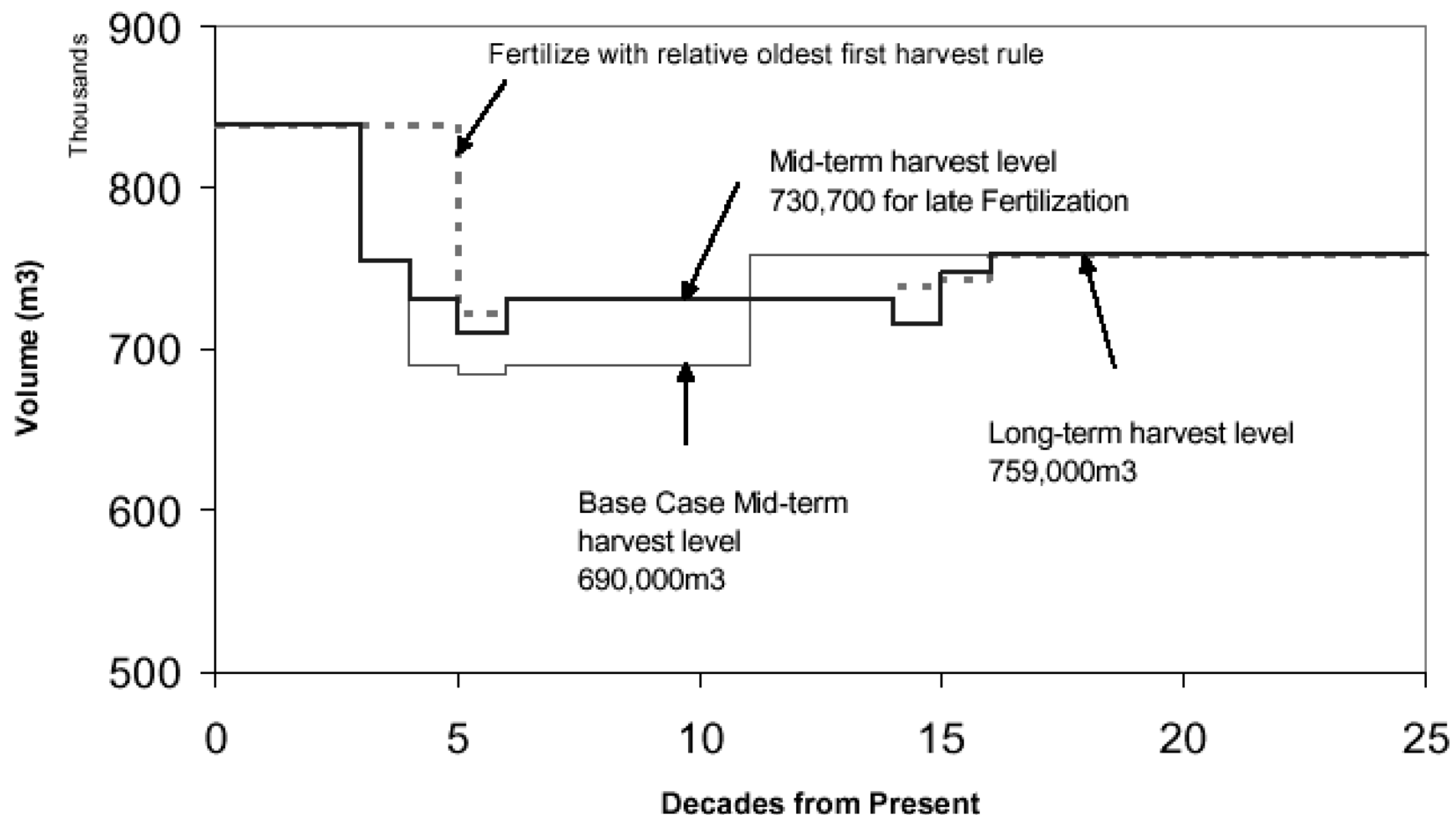


Plant all unharvested MPB in the Merritt TSA



**Plant
122,000 ha
Mid term
increase:
370,000
m³/year**

Allowable cut effect - sustain harvest levels longer and 5.9 % increase in the midterm



Cranbrook TSA

Silviculture



➤ In BC we have some of the most productive and high value forest lands in Canada

In the past, these stands have typically generated \$10,000/ha in revenue for government compared to about \$300/ha in eastern Canada

This provides opportunity/rationale for reinvesting some of the revenue back into silviculture.



Silviculture is a keystone tool used to maintain the inherited estate for current and future generations



- estimated standing tree value of the estate is \$1/4 trillion
- It generates up to \$16-19 billion/year in exports
- It generates up to \$1.6-1.9 billion/year in stumpage, rents and fees
- Industry and BCTS spend ~ \$200 million/yr in basic maintenance (silv)
- This year \$60 million in incremental enhancements

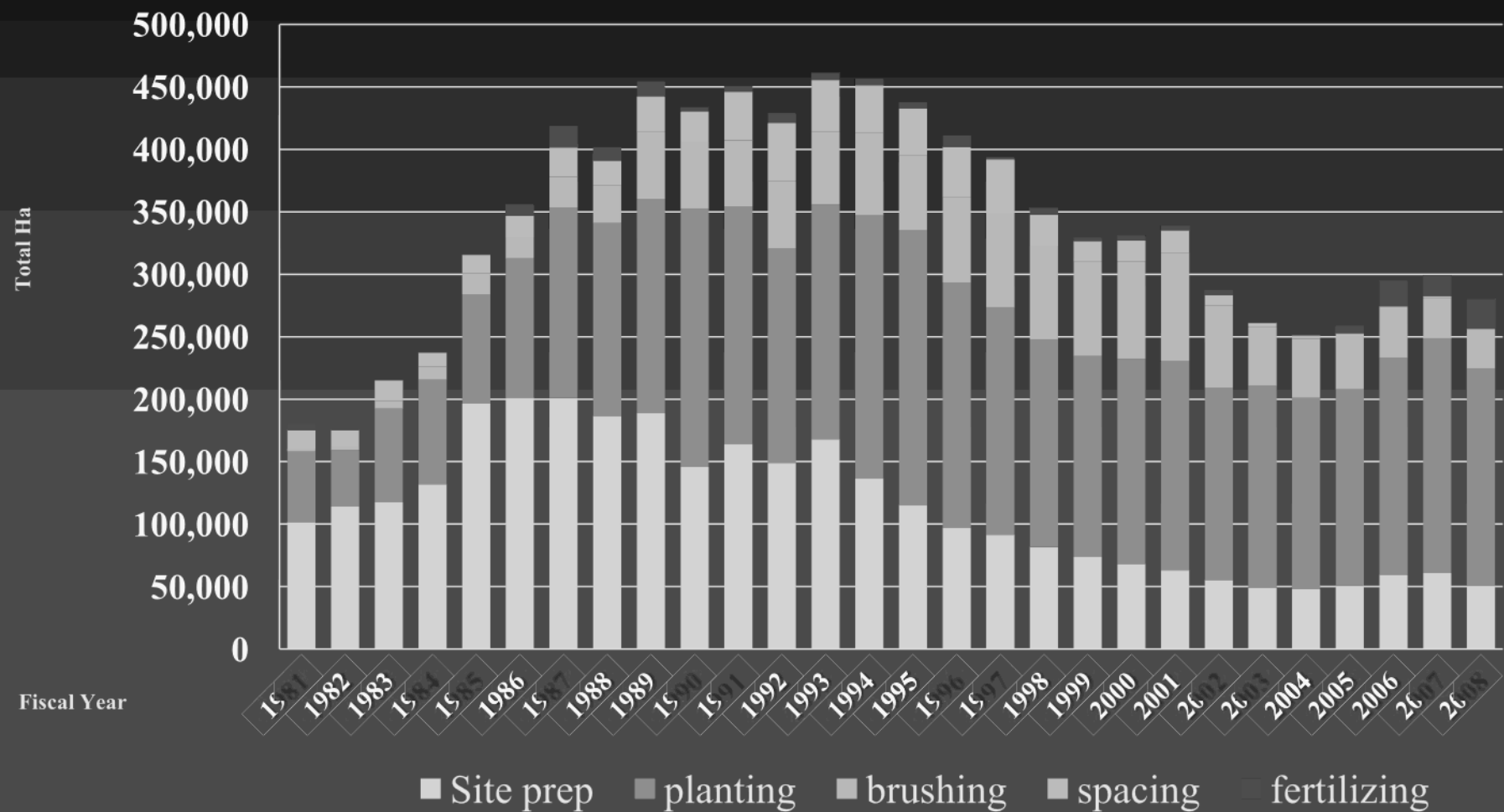
Private sector investments on crown land



- Ephemeral tenants with ephemeral tenancy provisions and rights will not spend their own money on long term improvements on an apartment they do not own.
- 95% of BC is crown land, with:
 - many existing licence encumbrances'
 - outstanding first nations rights and titles
 - Unclear or not timely compensation policies
 - An appraisal system which captures incremental values for the crown
 - Constantly changing policy environment
 - Varying perspectives on intergenerational equity and long term discount rates

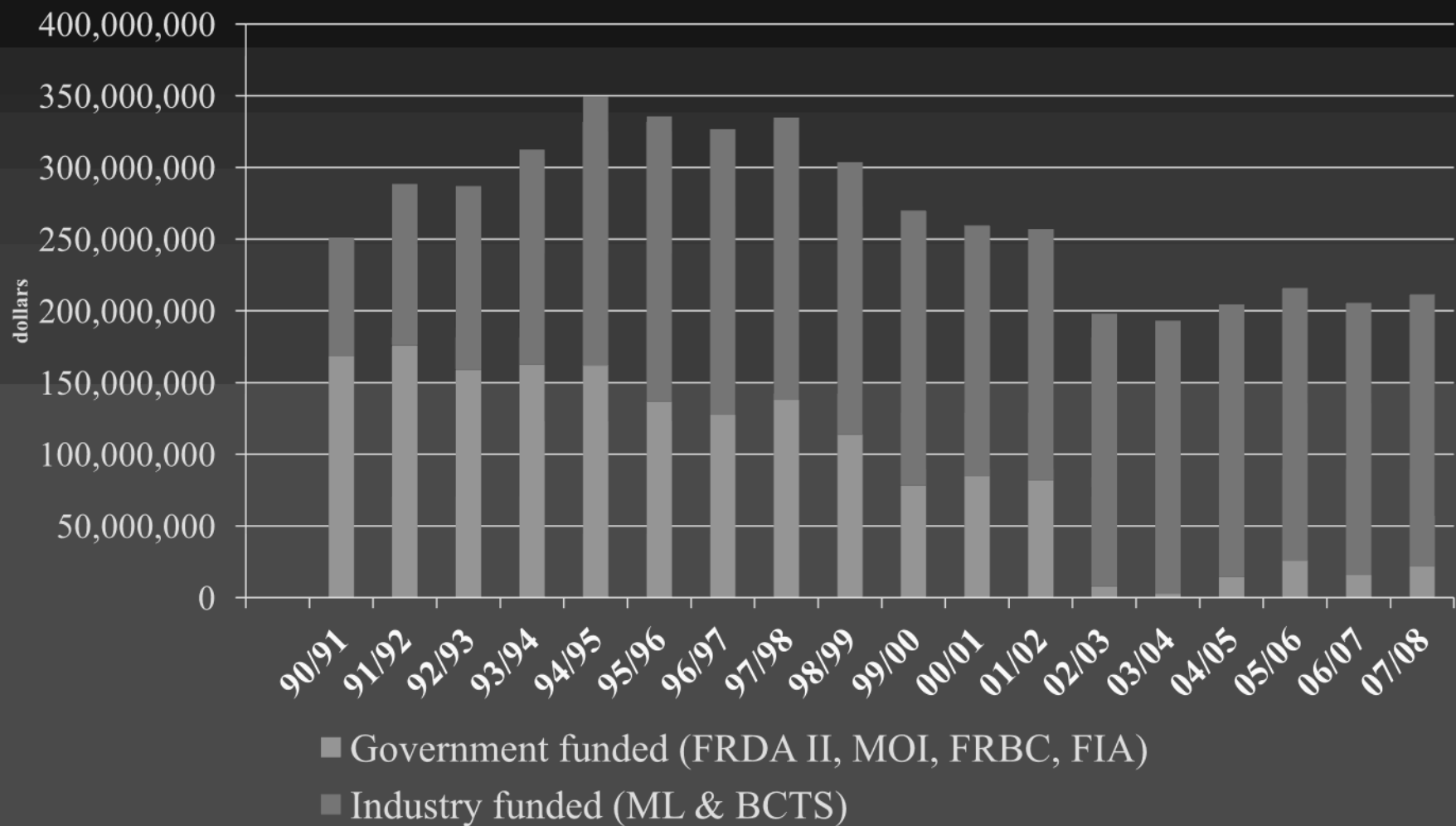


Cumulative Silviculture Activities





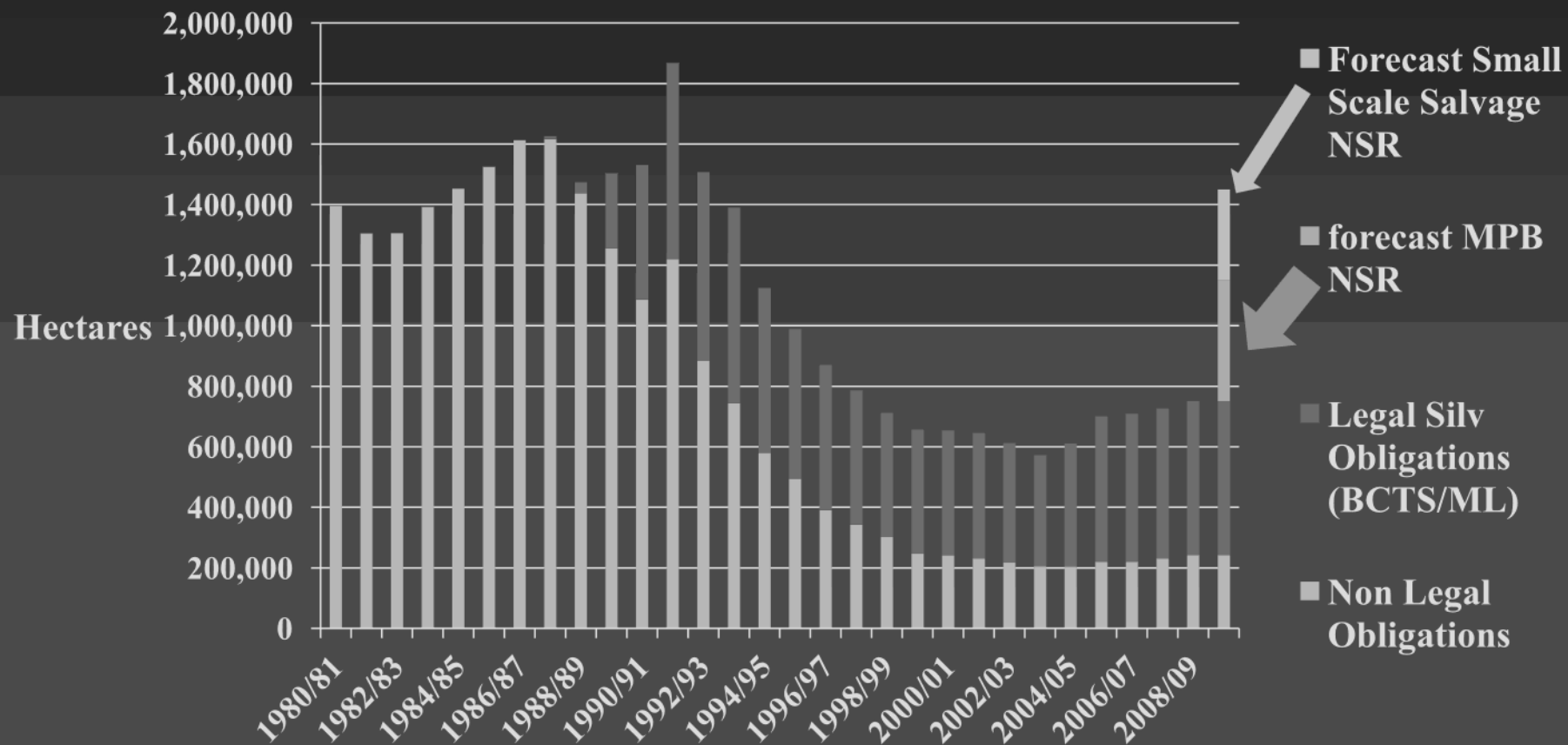
Estimated Silviculture expenditures



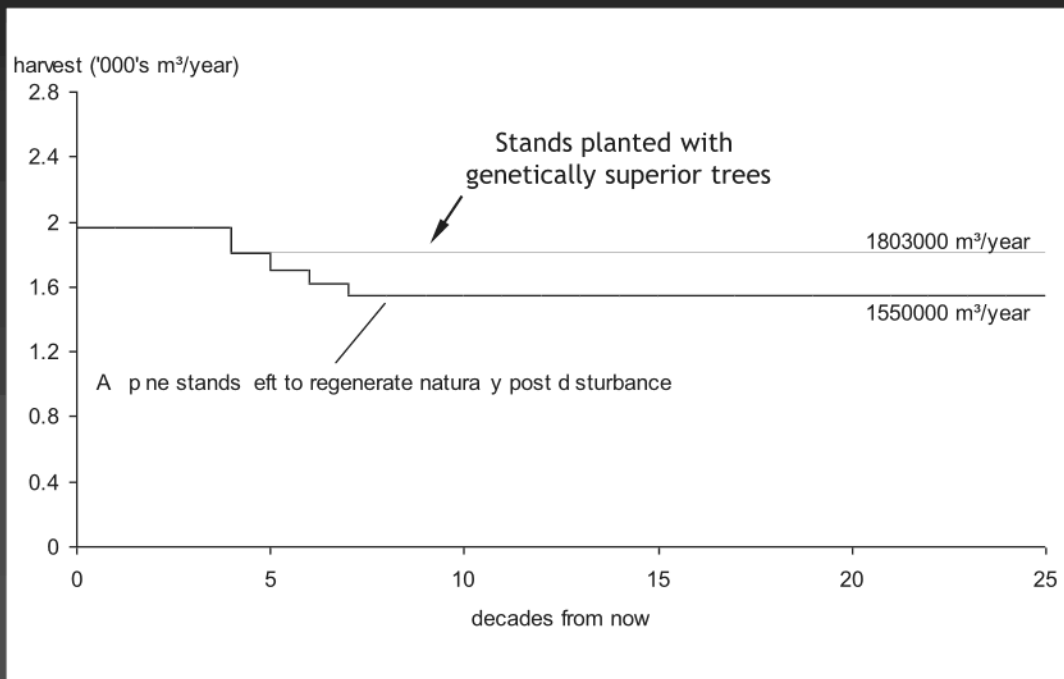
**Total NSR is estimated at 750,000 in RESULTS plus
300,000 of SSS and 400,000 of MPB NSR**



**Total NSR on Crown Land and
forecast MPB and SSS NSR**



Silviculture can be used to Improve timber supply by planting backlog NSR and MPB areas



- Genetically superior trees can provide a gain for both biodiversity and timber.
- Monoculture stands can be reduced.
- Regeneration delay can be shortened.
- Higher volume yields at rotation can be grown.

Opportunities going forward



The strategic rehabilitation of MPB and backlog NSR areas provides an opportunity to

- Achieve increased growth rates from 2m³/ha/year to 4m³/ha/year
- Achieve 100% increases in carbon sequestration in 40 and 100 years over no treatment
- Manage species diversity ie strategic introduction of species like larch, birch and other high wood/carbon density tree species

Strategic application of spacing, fertilizing and commercial thinning has multiple benefits



- Manage species diversity and increase the production of high value stands.
- Great opportunities for NTFP (salal, sword fern) and community recreation – Mt Benson
- Higher proportion of sawlog vs pulp grades of wood
- Higher potential for long term offsite storage in solid products

Modelled effects on technical rotation length

Fertilization @ 13, 18, 23, and 28 years



➤ Time to attain minimum operability ($150 \text{ m}^3/\text{ha}$)

➤ Unthinned/unfertilized – 44 years

Thinned (1600 sph) – 40 years

➤ Thinned + fertilized – 33 years

➤ Merchantable harvest volume of 38-year-old stand (25 years in future)

➤ Unthinned/unfertilized – $94 \text{ m}^3/\text{ha}$

➤ Thinned (1600 sph) – $130 \text{ m}^3/\text{ha}$ (+38%)

➤ Thinned + fertilized – $195 \text{ m}^3/\text{ha}$ (+107%)



Selective Spacing and pruning provides opportunities for



- Fire proofing, reducing fire hazard/protecting local communities.
- Reducing future fire hazards and CO₂e emissions
- Habitat for specific wildlife
- Creation of stands that are 60% higher in value through production of clear wood which has 4-10 times the value of commodity products and grades.

Spacing and fertilization can produce larger diameter logs

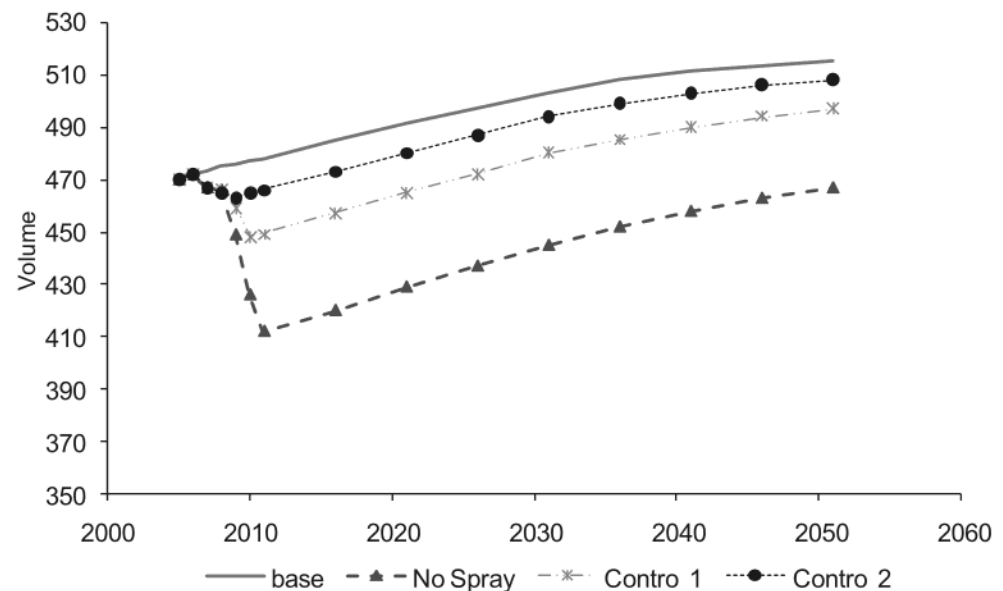


- Sequestration of carbon in large diameter logs which can be sawn into large diameter timbers and boards to be sequestered offsite for 70-100 years
- Pulp logs produce products that have only 1-6 year off site storage

Treatment of specific Forest Health agents like Spruce Budworm provides cost effective protection of mid term timber supply and maintained carbon sequestration



➤ Save 20-50 m³/ha for a cost of \$25/ha



Estimated annual opportunities for treatment



Additional Proposed Delivery		Ha treated per year	Current funding per year \$\$	Volume at rotation m3 (80 years)	Tonnes CO2* equivalencies (80 years)		Additional Ha treated per year	Additional funding per year \$\$	Additional volume at rotation (80 years)	Additional tonnes CO2* equivalencies (80 years)		Potential Ha treated per year	Potential funding per year \$\$	Potential volume at rotation (80 years)	Potential tonnes CO2* equivalencies (80 years)
Carbon Sequestration Carbon Gains realized starting 2012 for Fertilization and 2020 for other treatments	Current Program	36 600	\$50 878 000	5 182 440	3 800 801	Feasible	31 979	\$38 985 500	2 719 928	1 996 427	Cumulative Program	68,579	89,095,000	7,902,368	5,800,338
Enhancement and Climate Change Adaptation		1 000	\$5 125 000	93 600	567 974		5 500	\$11 106 000	139 200	127 612		6,500	12,259,600	208,800	191,417
Improving Forest Health (carbon gains not calculated)		NA	\$ -	-	-		NA	\$5 500 000		-		NA	\$5,500,000		-
Implementation		NA	\$ 5 102 480		-		NA	\$9 090 334		-		NA	\$14,192,814		-
Total incremental \$\$		37 600	\$61 105 480	5 276 040	4 368 776		37 479	\$64 681 834	2 859 128	2 124 039		75,079	\$121,047,414	8,111,168	5,991,756

* CO2 Equivalencies in Solid Wood that is Merchantable (possible gains could be higher if total biomass expansion factor) Preliminary Estimates suggest that a similar amount of CO2 will be sequestered in non merchantable branches roots soil components etc

Estimated costs



- It costs about \$7-\$21/tonne for silviculture treatments
- If treatments are to go ahead to help in carbon sequestration, the costs must be recognized and paid up front
- If a balanced program of incremental silviculture is deployed, it is estimated that for every \$100 million spent an additional 5 million m³ is produced and 4.6 million tonnes CO₂e

Opportunities

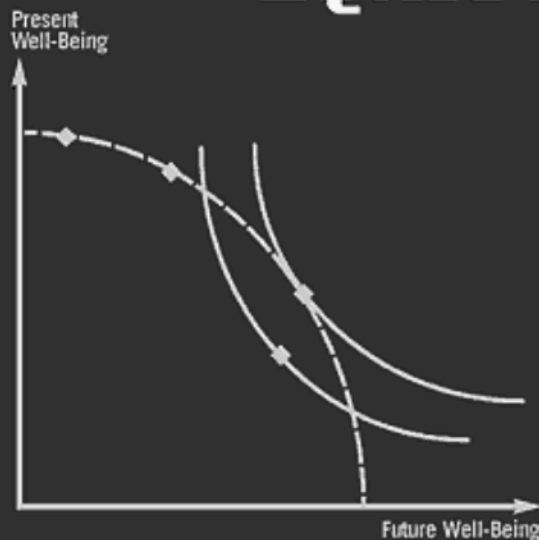


- Reforestation of 900,000 ha of MPB, SSS and backlog NSR – could produce an extra 65 million tonnes of CO₂e sequestration in 40 years and 162 million tonnes in 100 years.
- Fertilization of 100,000 hectares a year for the next 10 years could produce 20 million tonnes of CO₂e sequestration in 20 years
- Spacing and pruning would provide significant opportunities for producing operable sized timber 5-30 yrs sooner that could be stored offsite for 70-100 years
- Intensive management of a smaller landbase could provide options for non timber objectives or conservation of other areas

Key learning's from the strategies



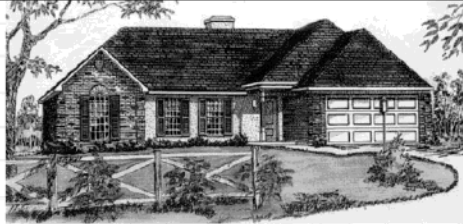
DISCOUNTING AND INTERGENERATIONAL EQUITY



PAUL R. PORTNEY • JOHN P. WEYANT, EDITORS

- Differences in opinion on silviculture are often due to
 - Lack of clearly defined objectives
 - What are the carbon sequestration goals
 - lack of definition of what values are to be sustained over time
 - assumptions on how much to discount the future (2, 4, 6 or 8%)
 - perspectives on intergenerational equity

Key learning's from the strategies



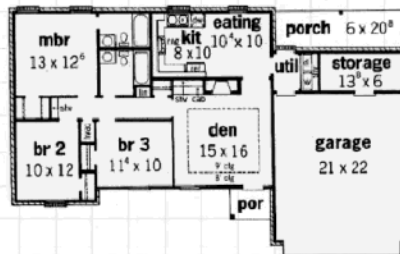
Plan : 1105

Width: 60'-10" Depth: 34'-10"
Ceiling Heights: 8' Main
Main Roof Pitch: 8 in 12

Features:

3 Bedrooms, 2 Baths
Raised Ceiling in Den
Covered Front & Rear Porch
Fireplace & Built-ins in Den
Open Kitchen/Eating Area
Elegant Brick & Stucco Exterior
Large Storage Area
Living Area: 1121 sq. ft.
Total Area: 1736 sq. ft.

Price Code A



- While some would like simple rules of what the right forest is...
 - *there is no one solution*
 - the right silviculture regime depends on the forest, the inventory, and the mgmt objectives and assumptions
 - Carbon mgmt objectives
- Sufficient and consistent funding programs are needed to deliver on the strategy
- You need consistent committed actions guided by the strategy if you are going to achieve the desired forest objectives including carbon sequestration

Some key challenges for the future



- Growth & Yield Modelling Issues
- Carbon Modelling Issues Related to Growth & Yield
- Monitoring and Reporting Issues
- Policy Issues Related to Silviculture
- Private Investment Issues

POLICY ISSUES RELATED TO SILVICULTURE



- Identify silvicultural practices which are not considered “business as usual” and meet additionality criteria – ie MPB rehabilitation
- Develop a rationale for reducing the current 100 year expectation of forestry GHG sequestration to match expected managed stand rotations – ie 25, 50, 70 years?
- Account for changes in end product lifecycles when quantifying the carbon sequestered – ie large diameter timbers
- Quantify the risks associated with each silvicultural practice

PRIVATE INVESTMENT CHALLENGES/ISSUES



- **Established property or ownership rights – this is a significant issue**
- Access to qualified professionals certified in GHG quantification, validation and verification
- Approved standard operating procedures
- A framework for payments for carbon sequestered that is equitable with project establishment costs – need to pay for upfront costs somehow
- Consistent access to government data
- Identify opportunities and establish procedures for co-operative data collection and model development with government agencies and universities

Conclusion



- There are significant incremental opportunities to invest in silviculture in BC to sequester carbon, reforest MPB areas, carry out incremental treatments on existing stands
- There are potential significant positive impacts to carbon sequestration, future timber supply, communities and revenue if treatments are done strategically now.
- If silviculture is to be paid through carbon credits, there needs to be some major changes made to current protocols.
- Silviculture will not go ahead on any significant basis unless the major significant issues are addressed
- There are important technical challenges that need to be better managed through knowledgeable teams working closely together



Thank you for the opportunity **to speak to you**

**Special thanks to the following for material
used in the presentation**

- **Doug Williams and Cortex Consultants**
- **Rob Brockley – Research Branch**
- **Al Powellson – Forest Practices Branch**
- **Frank Barber**
- **Mei Ching Tsoi**
- **Jennifer Burleigh**
- **Mel Scott and Martin Watts**

GROWTH & YIELD MODELLING ISSUES

Summary



- Uncertainty with managed stand yield predictions between different models (ie TASS and TIPSy)
- Mixed species stand yield projections that account for the dynamics of mixed species stands are required
- Height-age models that incorporate climate indices and site specific variables that can account for changes in growth patterns over time due to climate change are required
- Individual tree volume equations and/or taper functions that can account for the changes in stem taper observed in trees due to changes in stand density are required

GROWTH & YIELD MODELLING ISSUES

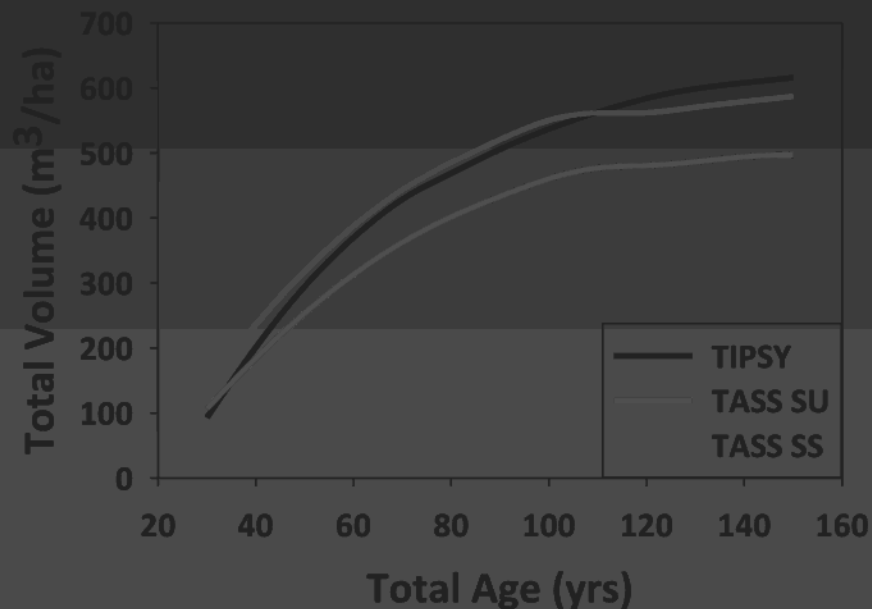
Uncertainty with Managed Stand Yield Projections



GROWTH & YIELD MODELLING ISSUES

Uncertainty with Managed Stand Yield Projections

Lodgepole Pine



- Which model you use and how you use it can have almost more impact on forecast growth and yield and sequestration than actual treatment effects
- There can be substantial differences between projections made with
 - TIPSy
 - TASS II in selection suppressed mode (TASS SS),
 - TASS II in selection upgrade mode (TASS SU), which conditions top height growth to follow the site index curve.

GROWTH & YIELD MODELLING ISSUES

Mixed Species Stand Yield Projections



➤ Most key growth and yield models in production do not have the capability to model stand dynamics for mixed species stands.

➤ The ability to model mixed species dynamics is essential for:

- Modelling mixed species stands – which cover 90% of BC
- Supporting the current trend of partial harvesting – 10% of BC
- Assessing silvicultural practices, such as veg control

GROWTH & YIELD MODELLING ISSUES

Height-Age Equations



- All growth models approved for use in the BC TSR process are driven by site height growth
- In order to account for climate change, site height growth / site index equations could incorporate climate indices, such as mean annual rainfall or mean maximum daily temperature, and/or site specific variables, such as topography or soil nutrients.
- Research Branch is currently developing height growth equations for lodgepole pine that incorporate climate indices. Results are expected to be published in the near future.

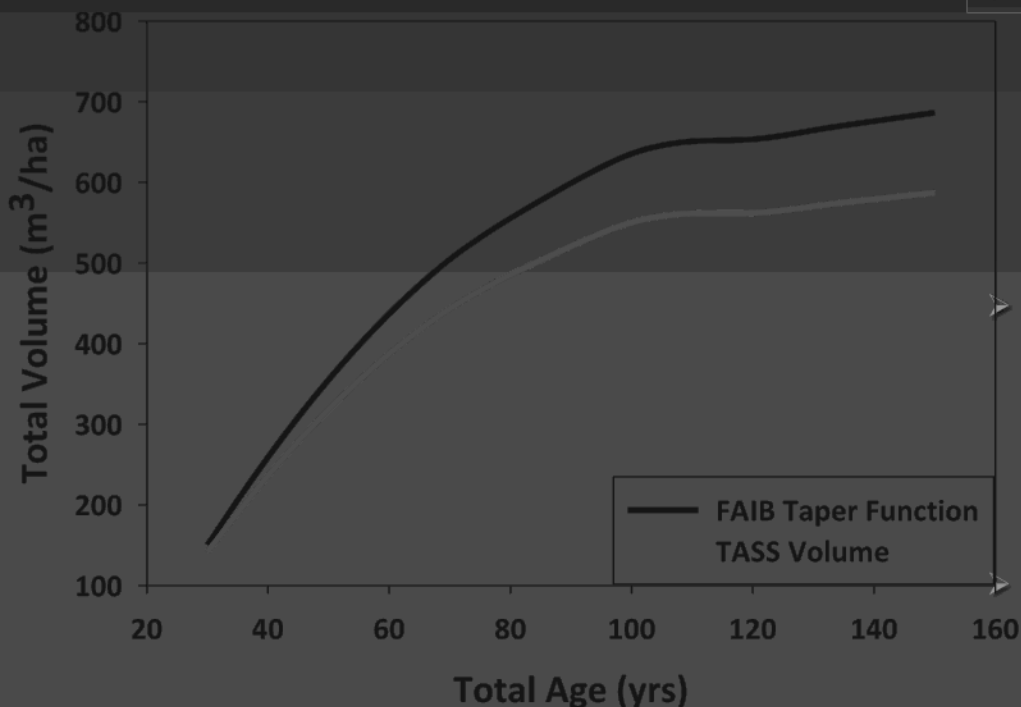


GROWTH & YIELD MODELLING ISSUES

Individual Tree Volume Equation / Taper Function



Lodgepole Pine (1600 sph)



- The FAIB taper function, used to calculate tree volume from DBH and height, was derived primarily from natural stand data.
- TASS tree volumes are not based on an equation, but are the result of annual layers of wood added to the bole, as determined by the foliage. Foliage accumulation is determined by competition, site quality and cultural practices (thinning, pruning, fertilization).
- As such, TASS tree volumes are highly influenced by stand density. At managed stand densities, TASS will produce a bole with more taper than is predicted with the FAIB taper function and consequently, less volume and biomass.
- As a result, compilation of individual tree output data from TASS with the FAIB taper function yields different results from the TASS volume compilation.

CARBON MODELLING ISSUES RELATED TO GROWTH & YIELD

Desirable Characteristics of a Carbon Budget Model



- Stable and consistent biomass estimates
- Compatibility with models (and data) that are linked together for a carbon sequestration analysis
- Compliment growth & yield models and not unjustifiably modify their projections
- Quantification and transparency of model uncertainty
- Need Inventory specialists, growth and yield specialists and forest level modeling specialists to work closer together in order to avoid the chronic mistakes made in the past
- (ie misapplication of Site index curves to inappropriate stands and ages etc)

CARBON MODELLING ISSUES RELATED TO GROWTH & YIELD

Problems Identified with Carbon Budget Modelling



- Changes in the individual tree biomass equations and base data used to compile data to fit the stand level volume-to-biomass conversion equations between model versions. Need to have good communication and sharing of info with users.
- Different stand level volume-to-biomass equations between ecozones for the same species.
- TASS yield projections do not differentiate between ecozones.
- Height-DBH based individual tree biomass equations that do not account for the difference in tree taper, due to stand density, that is observed in plantations and predicted by TASS.
- Loss factors applied to stand level volume-to-biomass equations that is inconsistent with the method used for BC growth models.

CARBON MODELLING ISSUES RELATED TO GROWTH & YIELD

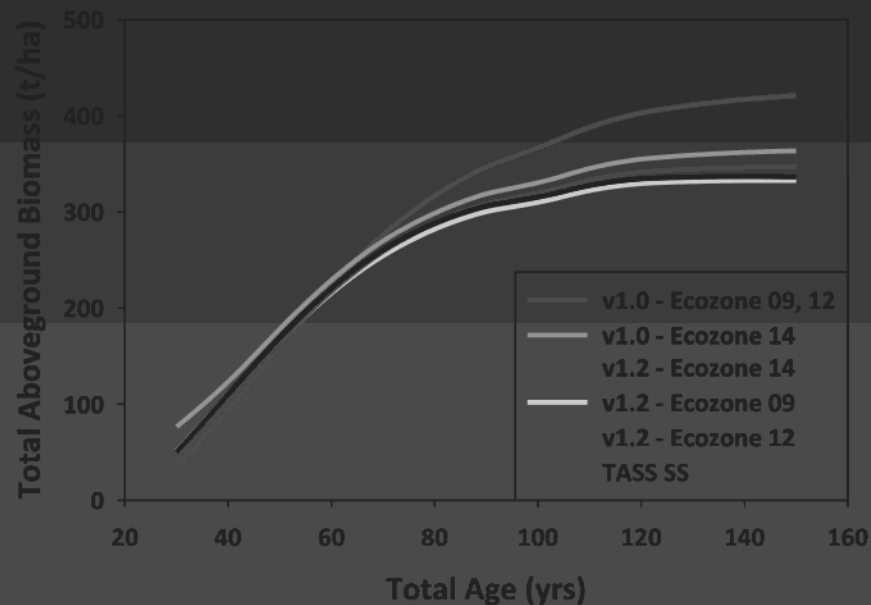
Consequences of the Problems Identified with Carbon Budget Modelling



CARBON MODELLING ISSUES RELATED TO GROWTH & YIELD

Individual Tree Biomass Equations

Effect of Changes and Differences Using the Same Sw Yield Table



- Biomass estimates are not stable or consistent
- Stand level volume-to-biomass conversion equations are not compatible with BC growth models
- There needs to be more quantification and transparency with model uncertainty

MONITORING AND REPORTING CHALLENGES/ISSUES



- Standard interpretation and methodology for forestry greenhouse gas (GHG) projects
- Identify sources, sinks and reservoirs, by project type, to be:
 - Measured, such as tree DBH and height
 - Estimated from measured data, such as tree volume, foliage
 - Estimated from external data/studies, such as soil carbon
- Approved standard operating procedures, by project type, for:
 - Identifying and quantifying the baseline scenario
 - Verification of models and carbon quantification
 - Monitoring carbon sequestered above the baseline scenario
- ***Procedures to reconcile modeled and measured results***



Setting the Context for Silviculture in BC

- **Al Powelson,**
Forest Practices and Investment Branch
Ministry of Forests, Mines, and Lands
- **BC Forest Service**

November 18, 2010

BC's silviculture vision



➤ *British Columbia's silviculture policies encourage investments that maximize productivity, value, and support forest resiliency.*

Silviculture



Basic Silviculture:

Harvesting methods and silviculture operations including seed collecting, site preparation, artificial and natural regeneration, brushing, density control, and any other operations that are for the purpose of establishing a free-growing crop of trees of a commercially valuable species as required under legislation

Incremental Silviculture:

The treatments carried out to maintain or increase the yield and value of forest stands; includes activities such as commercial thinning, juvenile spacing, pruning, and fertilization that are not part of the basic silviculture obligations

Rehabilitation Silviculture:

Aims to accelerate the establishment of a free-growing stand of commercially valuable tree species on areas affected by natural disturbances, such as wildfire, disease, or insects, as well as areas harvested prior to 1987 that have not successfully reforested.

Basic Silviculture in BC



Must result in the harvested area being stocked with ecologically suitable species that address immediate and long-term forest health issues on the area, to a density or to a basal area that, in either case,

(i) is consistent with maintaining or enhancing an economically valuable supply of commercial timber from British Columbia's forests, and

(ii) is consistent with the timber supply analysis and forest management assumptions that apply to the area covered by the plan on the date that the plan is submitted for approval,

Reference_Guide.xls [Read-Only] [Compatibility Mode] - Microsoft Excel

Home Insert Page Layout Formulas Data Review View Get Started

Cut Copy Paste Format Painter Clipboard

Arial 9 A A Wrap Text

General \$ % +.0 -0.0 Conditional Formatting as Table

Normal Bad Good Neutral Calculation Check Cell Explanatory... Input

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BWBSdk1_PR BWBSdk1

A B F G H I J K L M N O P Q R S T U V W X Y

1 Shw PIS/T Show P/A See the 'Instructions' worksheet (click on tab at bottom of screen)

2 Print PIS/T Print P/A for tips on using features in this workbook.

3

4 BGC

5 Classification

6 Zone/SZ Series

7

8 BWBSdk1 01 PI Sw³² PI Sw³² BI BI Sb Sb At³ Ep³ 1200 700 600 7 12 15 PI 1.60

9

10 02* PI PI Sw Sb BI⁵⁰ Sb Sw At³ 1000 500 400 7 12 15 PI 1.20

11 Others 0.60

12 03 PI PI Sw²⁸ Sw²⁸ At³ 1200 700 600 7 12 15 PI 1.60

13 Others 0.80

14 04 PI PI Sb⁵⁰ Sw³² Sb⁵⁰ Sw³² At³ 1200 700 600 7 12 15 PI 1.60

15 Others 0.80

16 05 PI Sw PI Sw BI BI Sb Sb At³ Ep³ 1200 700 600 7 12 15 PI 1.60

17 Others 0.80

18 06 PI Sw³² PI Sw³² BI BI Sb Sb Acb³ At³ Ep³ 1200 700 600 7 12 15 PI 1.60

19 Others 0.80

20 07 PI¹ Sb¹ Sw^{1,32} PI¹ Sb¹ Sw^{1,32} BI⁵⁰ BI⁵⁰ At³ 1200 700 600 7 12 15 PI 1.60

21 Others 0.80

22 08 Sw^{1,32} Sw^{1,32} PI¹ PI¹ BI⁵⁰ Sb BI⁵⁰ Sb Acb³ At³ Ep³ 1000 500 400 4 9 15 PI 1.20

23 Others 0.60

24 09* Sb¹ Sw^{1,32} Sb¹ Sw^{1,32} PI¹ PI¹ 400 200 200 4 9 15 PI 1.20

25 Others 0.60

26 10* Sb¹ Sw^{1,32} Sb¹ Sw^{1,32} PI¹ PI¹ 400 200 200 4 9 15 PI 1.20

27 Others 0.60

28 11* Sb¹ Sw¹ Sb¹ Sw¹ PI¹ PI¹ Acb³ At³ 400 200 200 4 9 15 PI 1.20

29 Others 0.60

30 31 non-forested non-forested

31 32 non-forested non-forested

32 81 non-forested non-forested

33

34 BWBSdk2 01 PI Sw³² PI Sw³² Sb Sb At³ Ep³ 1200 700 600 7 12 15 PI 1.60

35 Others 0.80

36 02* PI PI Sb Sw Sb Sw At³ 1000 500 400 7 12 15 PI 1.20

37 Others 0.60

38 03 PI PI Sb⁵⁰ Sw³² Sb⁵⁰ Sw³² At³ 1200 700 600 7 12 15 PI 1.60

39 Others 0.80

40 04 PI Sb Sw PI Sb Sw Lt Lt At³ 1000 500 400 4 9 15 PI 1.20

41 Others 0.60

42 05 PI Sw³² PI Sw³² At³ Ep³ 1200 700 600 7 12 15 PI 1.60

43 Others 0.80

44 06 Sw^{1,32} Sw^{1,32} Lt¹ PI¹ Sb PI¹ Lt¹ Sb Acb³ At³ Ep³ 1000 500 400 4 9 15 PI 1.60

Kamloops Nelson Pr George Pr Rupert Vancouver Sgl Tree Self Habitat Regimes Footnotes

Ready

start Inbox - Microsoft Out... Forest Practices Bran... Microsoft Excel - Ref... G:\Work\Ppresentations Microsoft PowerPoint ... 8:52 AM

Incremental and rehabilitation silviculture



Both of these types of silviculture in BC are currently focused on mitigating the impacts of catastrophic disturbance in BC

- incremental activities are mainly being focused on those forest management units experiencing constrained timber supply
- rehabilitation silviculture activities are being focused on those forest management units that have had their long-term timber supplies significantly impacted by catastrophic disturbance.

Silviculture is a keystone tool used to maintain the inherited estate for current and future generations



- estimated standing tree value of the estate is \$1/4 trillion
- It generates up to \$16-19 billion/year in exports
- It generates up to \$1.6-1.9 billion/year in stumpage, rents and fees
- Industry and Bcts spend ~ \$200 million/yr in basic maintenance (silv) - 1% of export values
- \$30 million in incremental enhancements

How many silviculture funding sources



Assigned Funding Source Code to Fund Category to generalize for graph

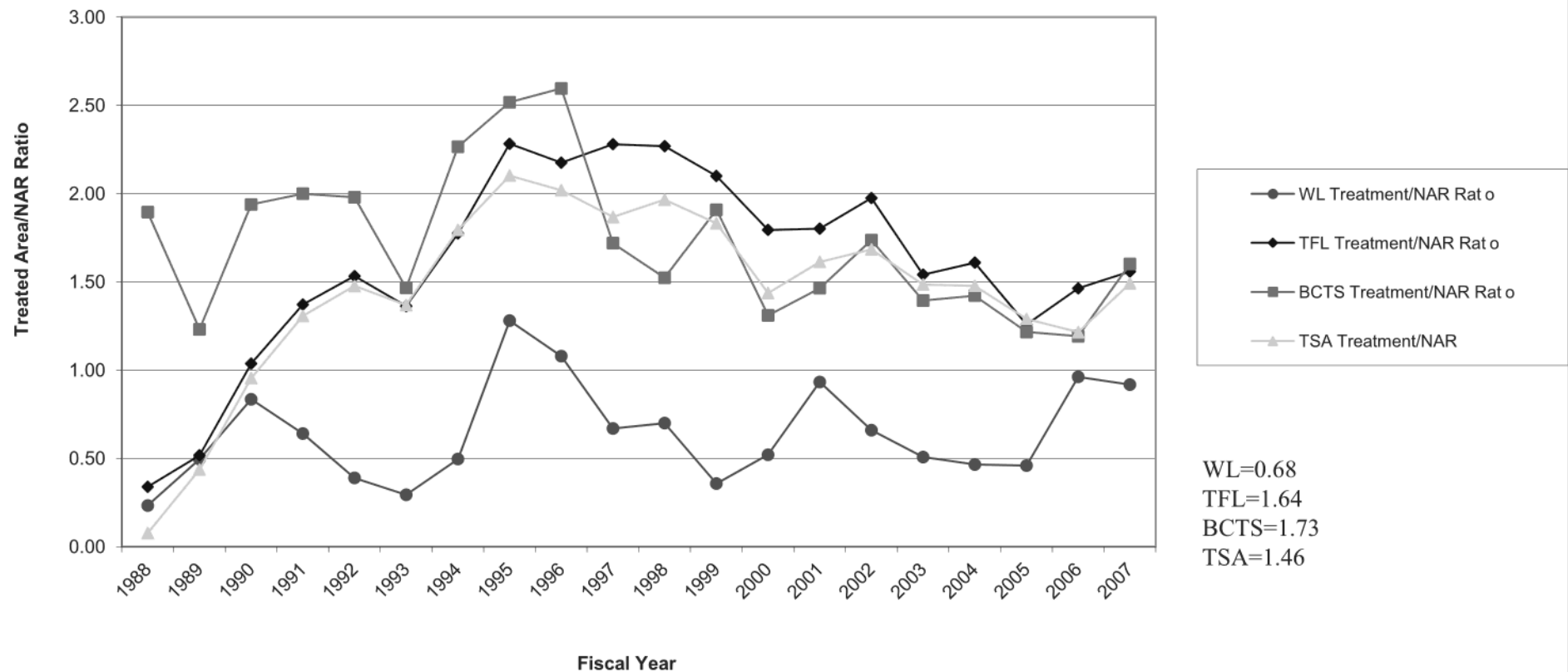
SILV_FUND_SRC_CODE	DESCRIPTION	Fund Category	EFFECTIVE DATE	EXPIRY DATE
CL	Catastrophic Losses	Non-legal	1905-01-01	2007-09-30
FID	Forest Investment Account - FRPA 108	Non-legal	2003-04-01	2006-09-14
	Forest Investment Account - Non-legal	Non-legal	1905-01-01	2007-09-30
	Forest Investment Account - Non-legal	Non-legal	1905-01-01	2007-09-30
FMC	COMFOR	Non-legal	1905-01-01	2007-09-30
FME	Forest Worker Development Program (non-MOF funded)	Non-legal	1905-01-01	2007-09-30
FMY	Youth Fund	Non-legal	1905-01-01	2007-09-30
FR	FRDA I & II	Non-legal	1905-01-01	2007-09-30
FBP	FRPA - Application For Relief	Non-legal	2005-09-01	9999-12-31
FTL	Forests for Tomorrow - Li Admin	Non-legal	2005-04-01	9999-12-31
FTM	Forests for Tomorrow - MOF Admin	Non-legal	2005-04-01	9999-12-31
GA	Other Agencies or Voluntary Work	Non-legal	1905-01-01	9999-12-31
GAC	Corrections	Non-legal	1905-01-01	9999-12-31
GFS	Forest Guard Management Fund	Legal-PSMF	1905-01-01	9999-12-31
GJF	Job Creation, Federal	Non-legal	1905-01-01	9999-12-31
GJI	Job Creation, Infra	Non-legal	1905-01-01	9999-12-31
GJM	Job Creation, MOF	Non-legal	1905-01-01	9999-12-31
IA	Industrial Appraisal	Legal-Licensee	1905-01-01	9999-12-31
IR	Industrial Inr., Required	Legal-Licensee	1905-01-01	9999-12-31
IV	Industrial Inr., Voluntary	Non-legal	1905-01-01	9999-12-31
IO	Industry Outstanding	Non-legal	1905-01-01	2006-06-26
IR	Industry Royalties	Non-legal	1905-01-01	9999-12-31
LFP	Licenses Funded Program	Legal-Licensee	1905-01-01	9999-12-31
M	Ministry	Non-legal	1905-01-01	2003-03-31
O	Operational	Non-legal	1905-01-01	9999-12-31
RBC	Forest Renewal B.C.	Non-legal	1905-01-01	2007-09-30
RBL	Forest Renewal B.C. - license administered	Non-legal	1997-08-13	2003-03-31
RBM	Forest Renewal B.C. - ministry administered	Non-legal	1997-08-13	2003-03-31
S	Section 88	Non-legal	1905-01-01	2007-09-30
SBF	BC Timber Sales	Legal-BCTS	1905-01-01	2003-03-31
SMF	South Moresby Forest Replacement Account	Non-legal	1905-01-01	9999-12-31
TSC	Tree Seed Centre	Non-legal	2005-09-13	9999-12-31
UCV	Provincial Contingency Vote (Special Use Only)	Non-legal	2007-08-01	9999-12-31
VFH	Forest Health	Non-legal	1905-01-01	2003-03-31
VFP	Current Reforestation	Non-legal	1905-01-01	2003-03-31
VG	Ministry Outstanding	Non-legal	1905-01-01	2003-03-31
VI	Provincial Incremental	Non-legal	1905-01-01	2007-09-30
VOB	Ministry Vote, SBEP	Non-legal	1905-01-01	2007-09-30
VDI	Industry Outstanding	Non-legal	1905-01-01	2003-03-31
VRT	Aforestation	Non-legal	1905-01-01	2007-09-30
XOX	No Funding Source	Non-legal	1905-01-01	9999-12-31

- There have been 44 different funding sources used to date
- Only one has lasted 23 years and delivered \$190 million per year in silv funding

Does Tenure currently effect basic silviculture performance



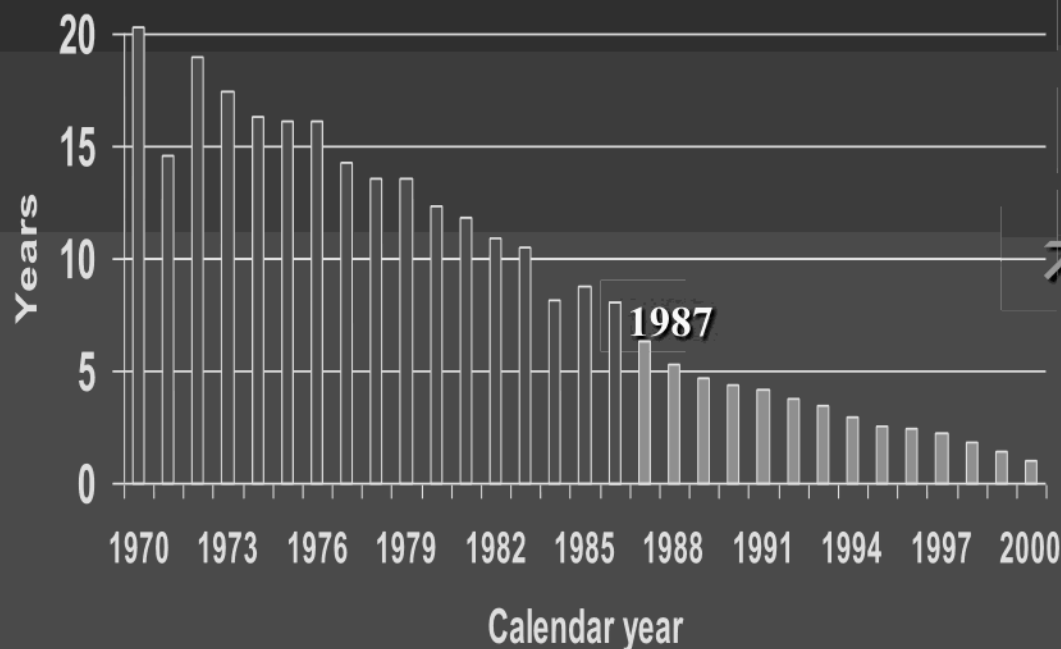
Silviculture Treatment to Net Area to be Reforested Ratio
For Basic Silviculture Activities



A good foundation to start from



Average Delay in reforesting areas after harvesting



- In the last few years 82% of harvested areas are planted within 1.7 years
- 22 different tree species planted

Basic silviculture - a great industry success story



	Before 87	After 1987
% area planted	50%	73%
% survival	50%	93%
average RD	8-20 yrs	1-5 yrs
time to 3 metres	15-20 yrs	10-15 yrs
timeliness of treatments	P	H

Planting Densities

Based on taking sum of planted trees/planted area



Data source: RESULTS as of December 11, 2008,

PL Yr	BCTS	GOV	IND
1995	1,383	1,204	1,204
1996	1,367	1,089	1,217
1997	1,380	1,043	1,327
1998	1,306	1,136	1,325
1999	1,408	1,173	1,367
2000	1,359	1,104	1,314
2001	1,347	1,198	1,343
2002	1,377	1,259	1,314
2003	1,400	1,237	1,267
2004	1,410	1,170	1,278
2005	1,402	1,379	1,292
2006	1,397	1,376	1,296
2007	1,459	1,257	1,304
2008	1,399	1,192	1,230
average	1,385	1,201	1,291

free growing stand densities as reported since January 2006

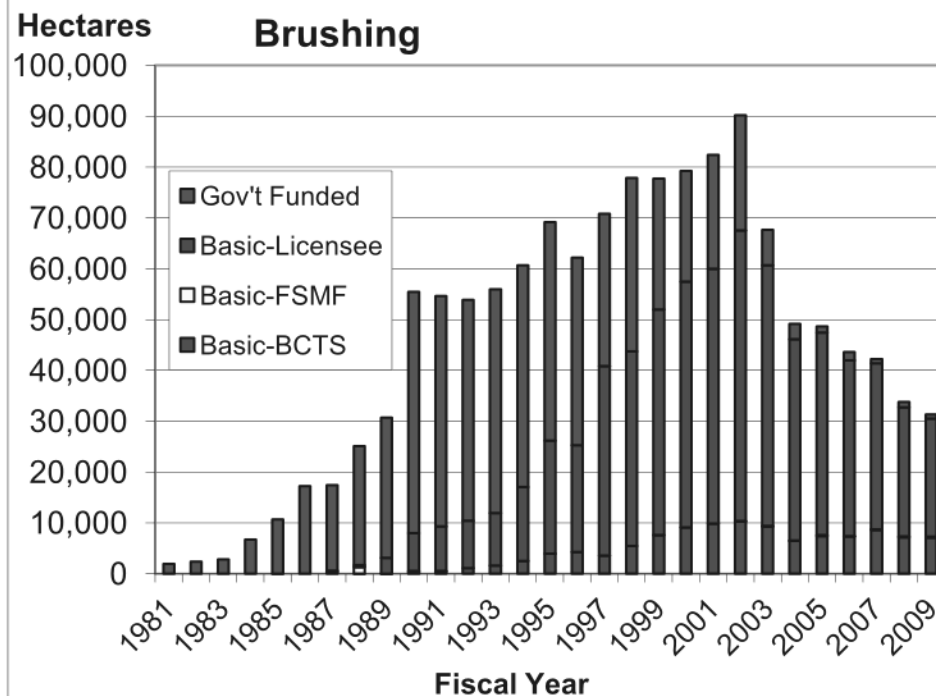
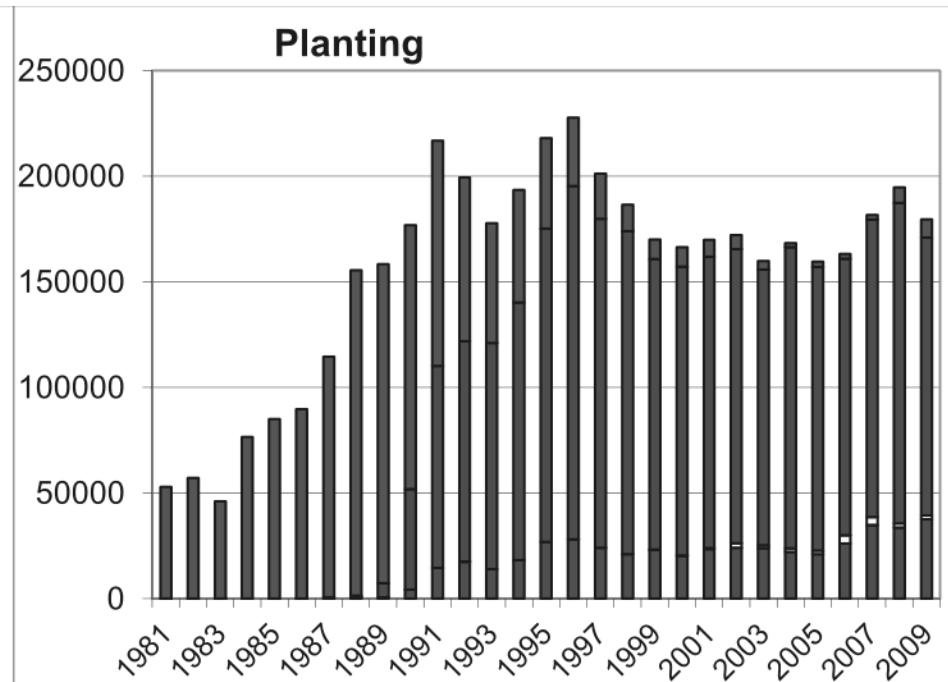
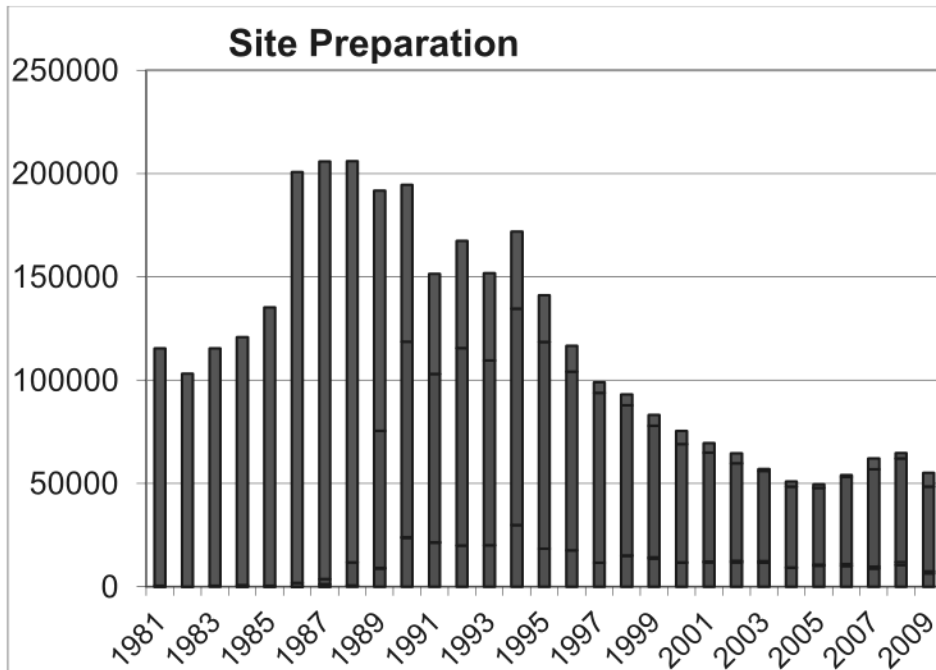


- on average at the free growing declaration
- the coast is achieving 86% of target free growing target number of well spaced trees per hectare
- the northern interior is achieving 86%
- the southern interior is achieving 82%
- *and BC is achieving 84% of target free growing target number of well spaced trees per hectare*
 - *Sites have on average*
 - *1005 free growing well-spaced trees per hectare and*
 - *1101 total well spaced trees per ha and*
 - *5414 TOTAL trees per hectare*

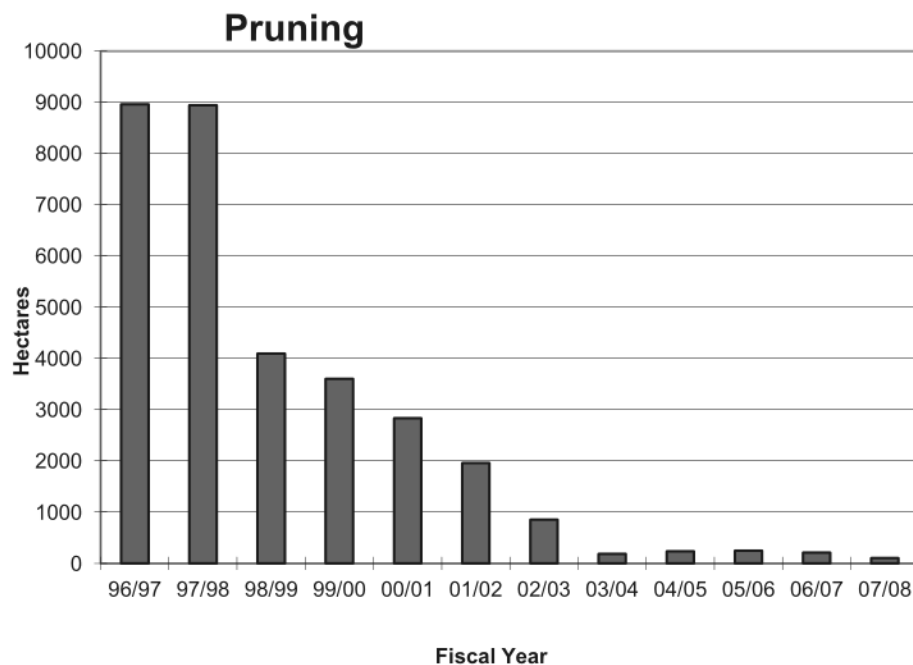
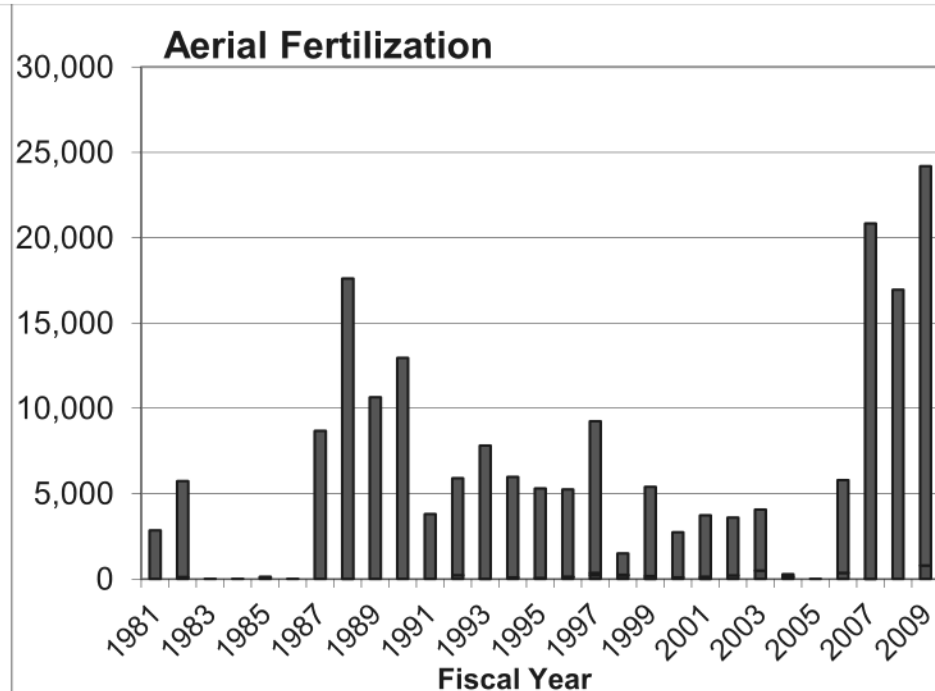
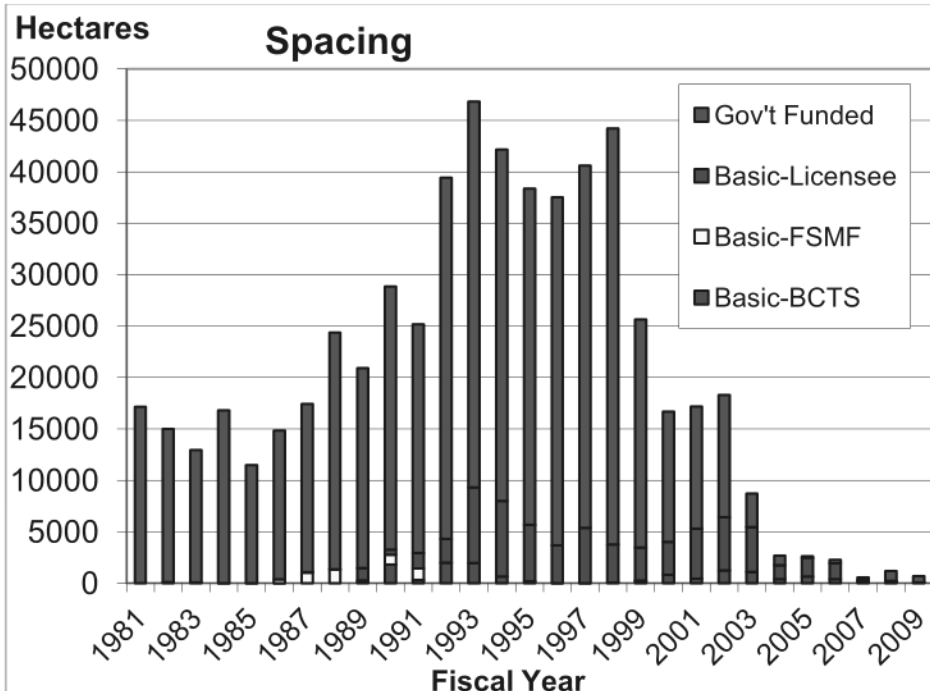
Silviculture Activity



How much area has been treated over the past 30 years?



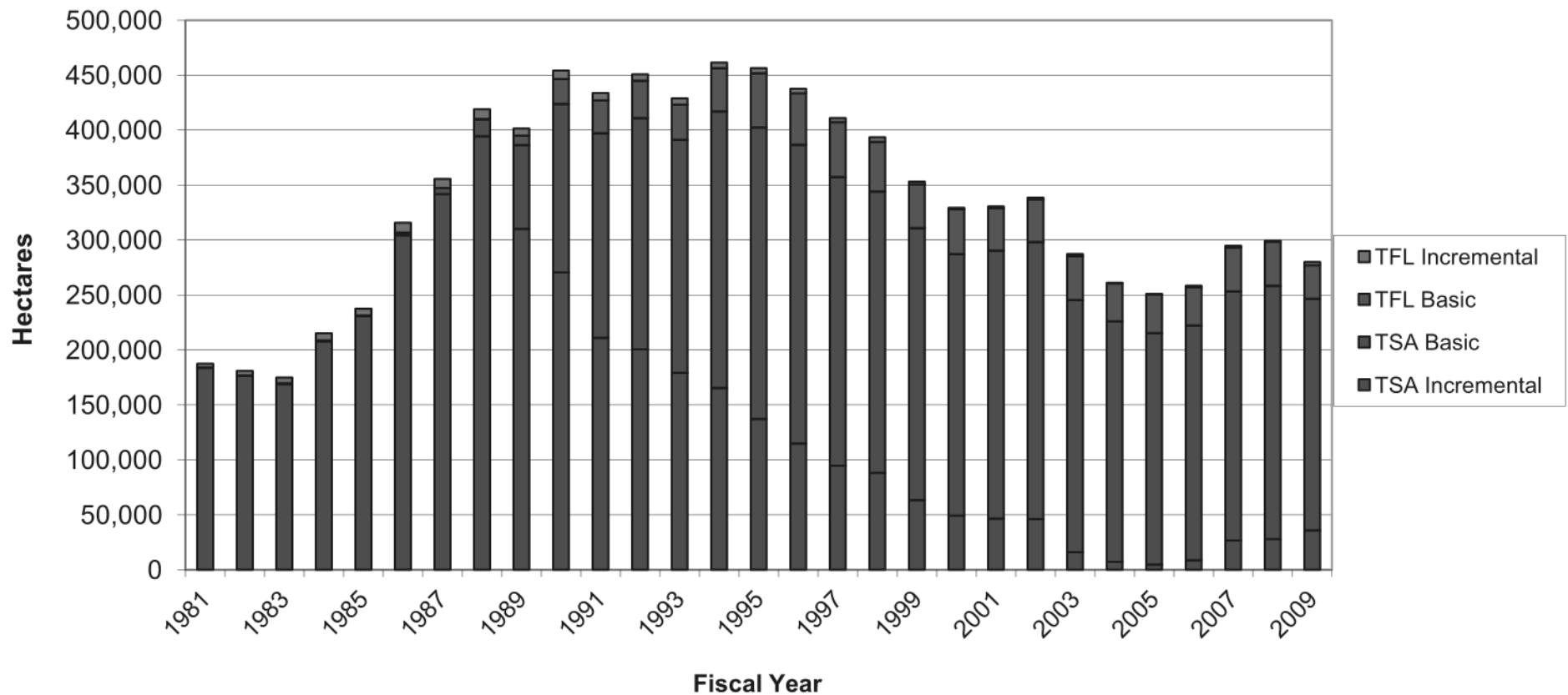
Basic Silviculture on
Crown Land by Funding
Categories
from 1980/81 to
2008/09



Incremental Silviculture
on Crown Land by
Funding Categories
from 1980/81 to 2008/09



Site Preparation, Planting, Brushing, Fertilization and Spacing on Crown Land by Funding Categories & Management Unit Type from 1980/81 to 2008/09



How do silviculture cost estimates for appraisals relate to site productivity

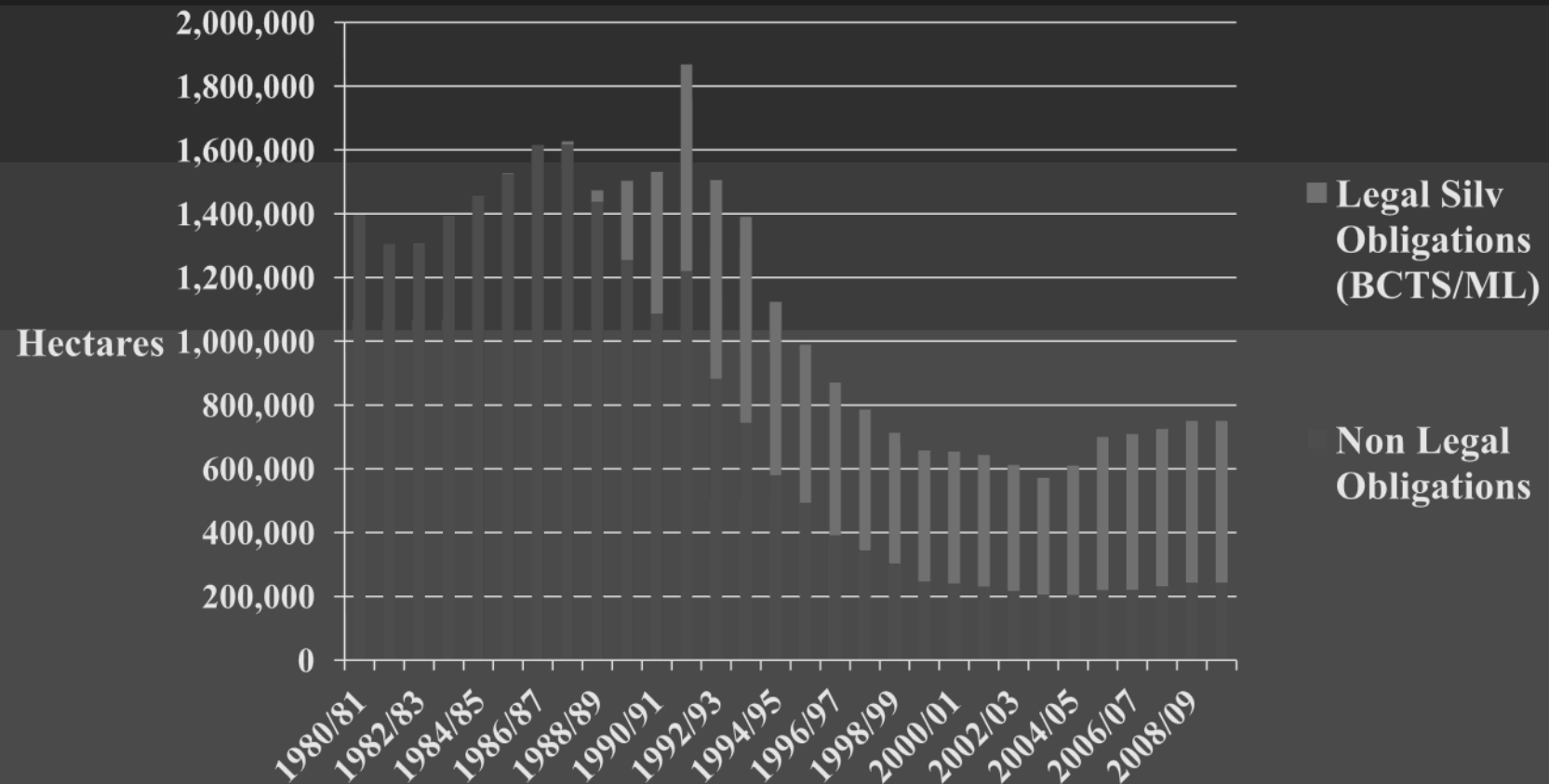


Cost Range	SITE INDEX							Grand Total	
	a 0-12	b 13-17	c 18-23	d 24-28	e 29-33	f 34-38	g >38		
	0.00%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	
a 0-500	4.51%	14.43%	18.19%	1.33%	0.02%	0.00%	0.00%	38.48%	55.79%
b 501-900	1.35%	6.28%	8.73%	0.91%	0.03%	0.00%	0.00%	17.31%	
c 901-1300	0.75%	4.20%	6.51%	0.59%	0.02%	0.00%	0.00%	12.07%	26.88%
d 1301-1700	0.49%	2.81%	4.41%	0.62%	0.05%	0.00%	0.00%	8.39%	
e 1701-2100	0.33%	2.20%	3.36%	0.49%	0.03%	0.00%	0.00%	6.41%	17.32%
f 2101-2500	0.30%	1.31%	2.34%	0.25%	0.01%	0.00%	0.00%	4.21%	
g 2501-2900	0.14%	0.89%	1.36%	0.22%	0.01%	0.00%	0.00%	2.63%	
h >2900	0.69%	3.62%	5.36%	0.80%	0.02%	0.00%	0.00%	10.48%	
Grand Total	8.57%	35.75%	50.27%	5.21%	0.18%	0.01%	0.01%	100.00%	
site class	low	poor to med	med	good	good	good	good		
percent area in class	44%		50.27%	5%					

Total NSR

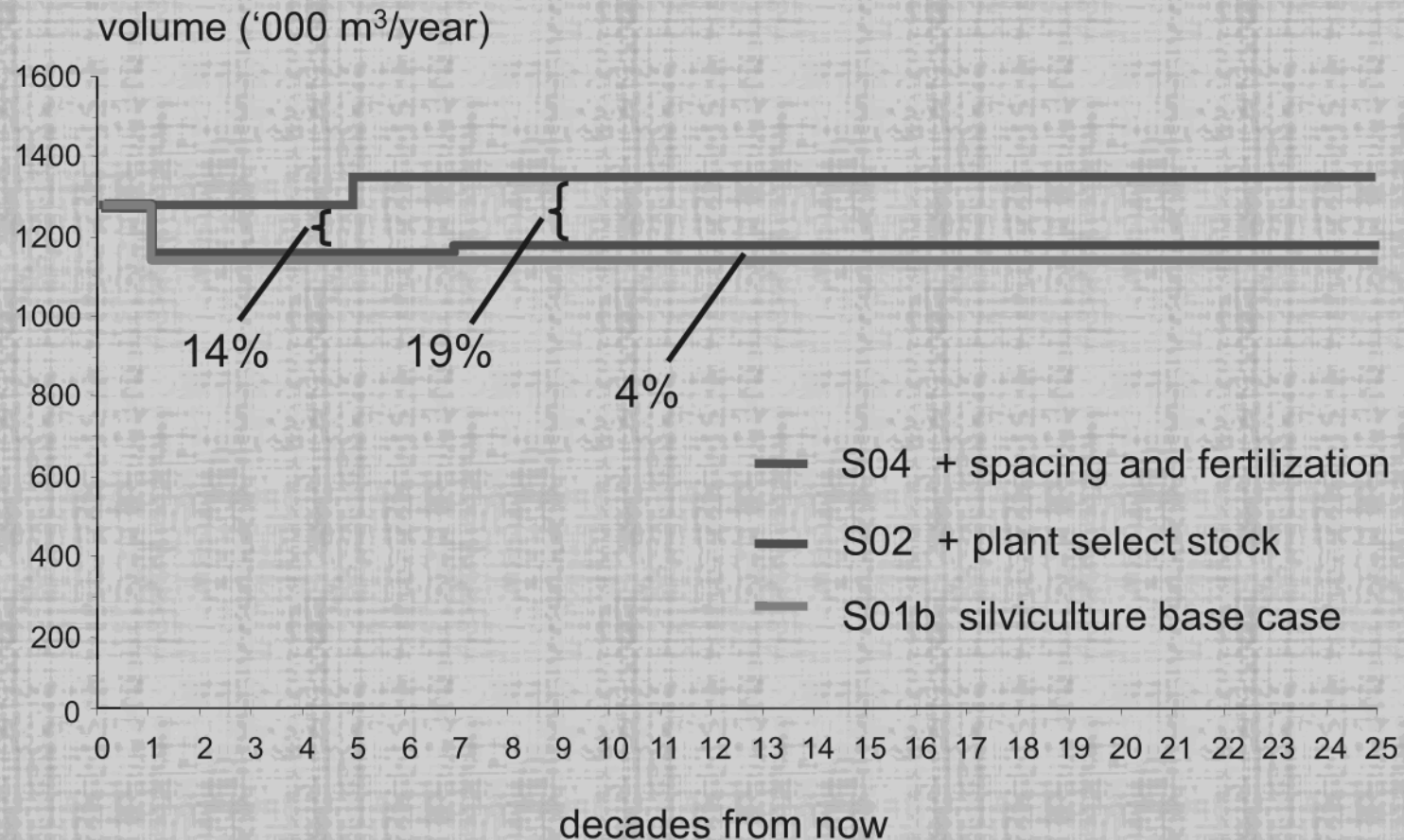


Total NSR on Crown Land



Impact of Silviculture

Objective: Maximize volume production



Estimated annual opportunities for treatment



Additional Proposed Delivery		Ha treated per year	Current funding per year \$\$	Volume at rotation m3 (80 years)	Tonnes CO2* equivalencies (80 years)		Additional Ha treated per year	Additional funding per year \$\$	Additional volume at rotation (80 years)	Additional tonnes CO2* equivalencies (80 years)		Potential Ha treated per year	Potential funding per year \$\$	Potential volume at rotation (80 years)	Potential tonnes CO2* equivalencies (80 years)
Carbon Sequestration Carbon Gains realized starting 2012 for Fertilization and 2020 for other treatments	Current Program	36 600	\$50 878 000	5 182 440	3 800 801	Feasible	31 979	\$38 985 500	2 719 928	1 996 427	Cumulative Program	68,579	89,095,000	7,902,368	5,800,338
Enhancement and Climate Change Adaptation		1 000	\$5 125 000	93 600	567 974		5 500	\$11 106 000	139 200	127 612		6,500	12,259,600	208,800	191,417
Improving Forest Health (carbon gains not calculated)		NA	\$ -	-	-		NA	\$5 500 000		-		NA	\$5,500,000		-
Implementation		NA	\$ 5 102 480		-		NA	\$9 090 334		-		NA	\$14,192,814		-
Total incremental \$\$		37 600	\$61 105 480	5 276 040	4 368 776		37 479	\$64 681 834	2 859 128	2 124 039		75,079	\$121,047,414	8,111,168	5,991,756

* CO2 Equivalencies in Solid Wood that is Merchantable (possible gains could be higher if total biomass expansion factor) Preliminary Estimates suggest that a similar amount of CO2 will be sequestered in non merchantable branches roots soil components etc

Thanks to



- Mei Ching Tsoi for graphs
- Al Powelson and Ralph Winter for stats
- Kelly Osbourne for financial estimates



Changes in the Not Satisfactorily Restocked (NSR) Crown Land

**From: 2010-04-01
To: 2011-03-31**

Page: Page 1 of 1
Date Printed: 2011 02 15
User Id: IDIR\TERRCHOW
Database: DBP01
Report Id: RESULTSR004
File:

Org Unit: All
TSO: All
Management Unit: All
Client:

Licence:	Land Status Date (From): 2010 04 01				Land Status Date (To): 2011 03 31	
	BACKLOG (2)		CURRENT REFORESTATION (3)			
RESPONSIBILITY	MINISTRY	MINISTRY	MINISTRY	BCTS (9)	MAJOR LICENSEES	Totals
YEAR OF DENUDATION	PRE 82	1982 87	POST 87 (OCT 1/87)	POST 88 (JAN 1/88)	POST 87 (OCT 1/87)	
	hectares					
TOTAL NSR AS OF 2010-04-01	118,781.70	58,457.70	75,855.10	75,879.20	395,690.90	724,664.60
Additions in NSR due to:						
Harvesting (4)	93.90	7.00	4,221.90	22,733.50	79,604.00	106,660.30
Fire (5)	94.40	2.80	3,368.20	30.00	159.10	3,654.50
Pests (5)	0.00	0.00	2,070.30	235.90	17.90	2,324.10
Other Disturbances (6)	0.00	0.00	135.30	38.00	1,779.90	1,953.20
Plantation Failure	160.00	356.60	298.20	1,374.00	4,448.10	6,636.90
Natural regeneration failure	213.50	4.80	140.60	201.40	324.90	885.20
TOTAL ADDITIONS TO NSR	561.80	371.20	10,234.50	24,612.80	86,333.90	122,114.20
Reductions in NSR due to:						
Planting (7)	6,740.00	2,101.60	5,741.10	25,240.20	77,385.10	117,208.00
Natural regeneration	3,669.60	1,038.40	1,087.70	1,971.00	11,430.80	19,197.50
Reclassification of NSR to NP (8)	2,050.90	345.10	551.70	204.60	1,416.40	4,568.70
TOTAL REDUCTIONS TO NSR	12,460.50	3,485.10	7,380.50	27,415.80	90,232.30	140,974.20
DIFFERENCE (10)	-386.10	6.80	-34.20	6.70	19.40	-387.40
TOTAL NSR AS OF 2011-03-31	106,496.90	55,350.60	78,674.90	73,082.90	391,811.90	705,417.20
NET CHANGE IN NSR	-12,284.80	-3,107.10	2,819.80	-2,796.30	-3,879.00	-19,247.40

(1) Includes accomplishments under all funding sources.

Ministry annual reporting is based on data in ministry information systems as of 2011-02-15.

Where data entry is incomplete or delayed, numbers reported may under estimate actual accomplishments.

(2) Backlog obligation categories are based on the responsibility for reforestation to a free growing stage.

Ministry, Pre-82: A large portion of good and medium sites in this obligation category was treated under FRDA I (1985-90).

Ministry, 1982-87, All Sites: Includes areas under the Small Business Enterprise Program (cut prior to January 1, 1988), and areas of Major Licensees (cut prior to October 1, 1987). Together with the Ministry Pre-82 areas, these areas are considered "outstanding obligations" for treatment under the Backlog Reforestation program, funded by Forest Renewal B.C. as of August 1996.

(3) Current obligation categories are based on the responsibility for reforestation to a free growing stage, by law, within an acceptable period of time.

Ministry, Post-87, All Sites: The Ministry remains responsible for basic silviculture on all areas denuded by fire or pests.

BCTS, Post-88, All Sites: Basic silviculture on all areas denuded by SBFEP after January 1, 1988 is funded by the SBFEP account, and implemented by the Ministry of Forests.

Major Licensees, Post-87, All Sites: Basic silviculture on areas denuded by major licensees after October 1, 1987 is funded by major licensees.

Licensees have approximately six to seven years to reach the basic silviculture requirement through natural regeneration, or about three to four years through planting, as specified in the silviculture prescription or site plans.

(4) NSR resulting from logging is the net area to be reforested after harvest (excluding roads, landing and other non-productive areas).

(5) Openings caused by fire or pests refer to incidence in mature timber or in areas already classified as free growing.

Fire and pest incidence prior to free growing is considered plantation or natural regeneration failure.

(6) "Other Disturbances" includes all disturbances that are not caused by Harvesting, Fire, or Pest, and also include any opening for which there are no disturbances.

(7) Area planted does not equal the statistics reported to the Service Plan tables: Total Silviculture Accomplishments on Crown Land by All Sources and Area Planted by Responsibility due to replants and fill plants that do not affect NSR status.

(8) NP is non-productive land. Reclassification to NP is due to roads, landing, swamps, rock outcrops, etc.

(9) Small Business Forest Enterprise Program (SBFEP) was changed to BC Timber Sales (BCTS) as of April 1, 2003

(10) Differences are used to compensate for records that have missing or incomplete disturbance information that have records not reflected in the reported NSR statistics.

LETTER

May 30, 2011

The Editor
BC Forest Professional

NSR challenge for British Columbia

As B.C.'s Chief Forester, the issues of reforestation and NSR in BC are of great importance to me. From my perspective, the May June article regarding not satisfactorily restocked (NSR) forests over estimates the NSR situation in British Columbia.

There is currently about 715,000 ha of NSR in the RESULTS data base of which about 240,000 ha is not associated with a forest licensee or BCTS legal obligation to reforest. We estimate that there is the potential for an additional 650,000 ha of NSR arising from Mountain Pine Beetle and 200,000 from other sources such as wildfire for a potential total NSR area (that is not associated with a legal obligation), that is closer to about 1.1 million ha.

I do not believe that the assumptions underpinning the May June article adequately incorporate factors such as:

- The net down for areas outside the Timber Harvesting Land Base.
- The amount of area that will regenerate naturally and/or have sufficient residual stocking levels.
- The amount of area that will be harvested and carry legal obligations.

Regarding the last point it, is too early to say definitively how much mountain pine beetle impacted area will ultimately require government reforestation funding because harvesting and regeneration of dead pine stands will continue for the next few years. Industry and government are focusing harvesting on beetle attacked and burned stands where we can capture current timber value and reforest in a timely manner. It is also clear that additional harvesting and regeneration will result from bio energy and other new uses for beetle killed wood. Past experience has taught us that what may seem uneconomical today can become a much more valuable resource tomorrow.

Reducing the impacts of wildfires and pest infestations is also a key priority of the 'Forests For Tomorrow' (FFT) program under the Land Based Investment Strategy. In areas where it is clear that harvesting will not be an option, FFT is using innovative and cost effective techniques to survey and reforest productive sites (e.g. 45,000 ha of reforestation through 2010.)

In addition, given the significant area burned by wildfires in 2009 and 2010, the FFT program will be assessing the damage, and identifying the best opportunities, to re establish sufficient stocking.

It will take a collective effort on the part of forest professionals to address stewardship issues such as reforestation and addressing NSR. In an upcoming issue of the 'BC Forest Professional' I

will be providing more detailed information related to the determination of Ministry NSR estimates and how we are responding to the NSR challenge.

Jim Snetsinger

Chief Forester

Ministry of Forests, Lands, and Natural Resource Operations

Summary of Silviculture Obligation Area

Net Area to be Reforested, FG Declared Areas, Immature Not Free Growing and NSR Areas

Immature Not FG inferred by Total NAR - SU Declared FG NAR - FC NSR

Data source: RESULTS as of July 7, 2011, Prepared by Mei-Chiing Tsoi

Disturb Yr	Total NAR	SU Declared FG NAR	IMM not FG	FC NSR
1987	50,111	46,405	3,348	357
1988	205,484	193,085	11,138	1,261
1989	187,468	172,634	13,920	915
1990	179,274	165,978	12,263	1,032
1991	167,830	152,803	13,949	1,079
1992	180,195	161,089	17,758	1,348
1993	166,191	147,206	17,739	1,246
1994	153,648	132,697	19,252	1,699
1995	155,079	126,475	26,344	2,260
1996	166,241	120,638	41,374	4,229
1997	159,281	95,964	59,847	3,471
1998	155,176	72,041	77,710	5,425
1999	181,331	57,730	115,598	8,004
2000	183,909	42,814	129,891	11,203
2001	171,369	21,001	136,787	13,581
2002	185,448	11,627	159,984	13,837
2003	182,032	7,029	161,895	13,108
2004	212,004	4,579	185,915	21,510
2005	208,949	2,126	177,592	29,230
2006	200,643	1,385	158,503	40,755
2007	188,698	874	123,928	63,897
2008	154,958	336	84,558	70,065
2009	122,364		30,566	91,798
2010	133,995		16,913	117,082
2011	27,381		5,152	22,229
Total	#####	#####	#####	540,622

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Net Area to be Reforested, FG Declared Areas, Immature Not Free Growing and NSR Areas

Immature Not FG inferred by Total NAR - SU Declared FG NAR - FC NSR

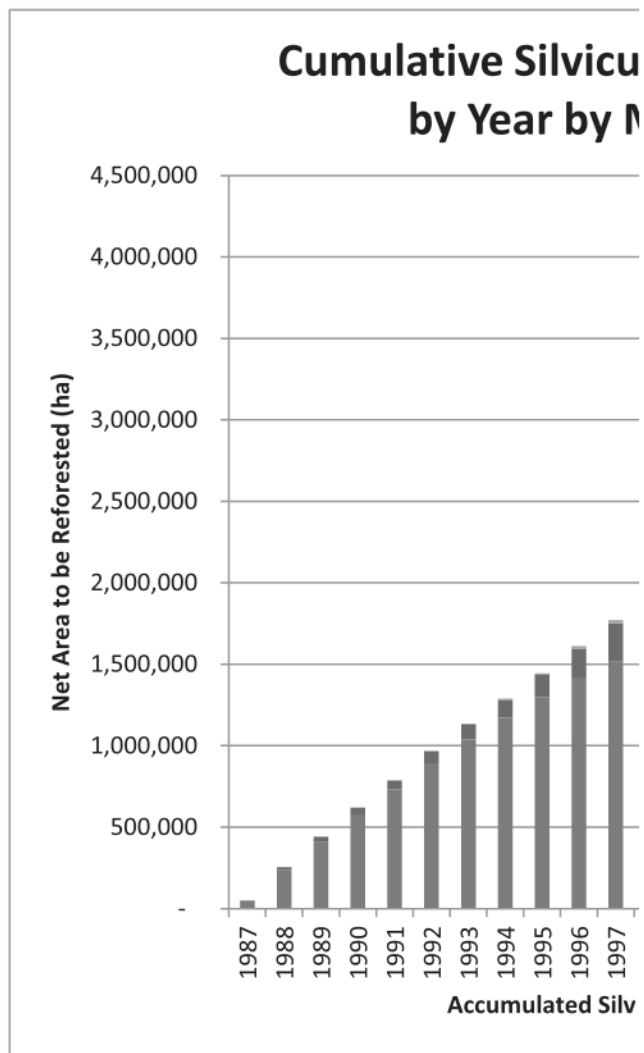
Cummulated Total

Data source: RESULTS as of July 7, 2011, Prepared by Mei-Chiing Tsoi

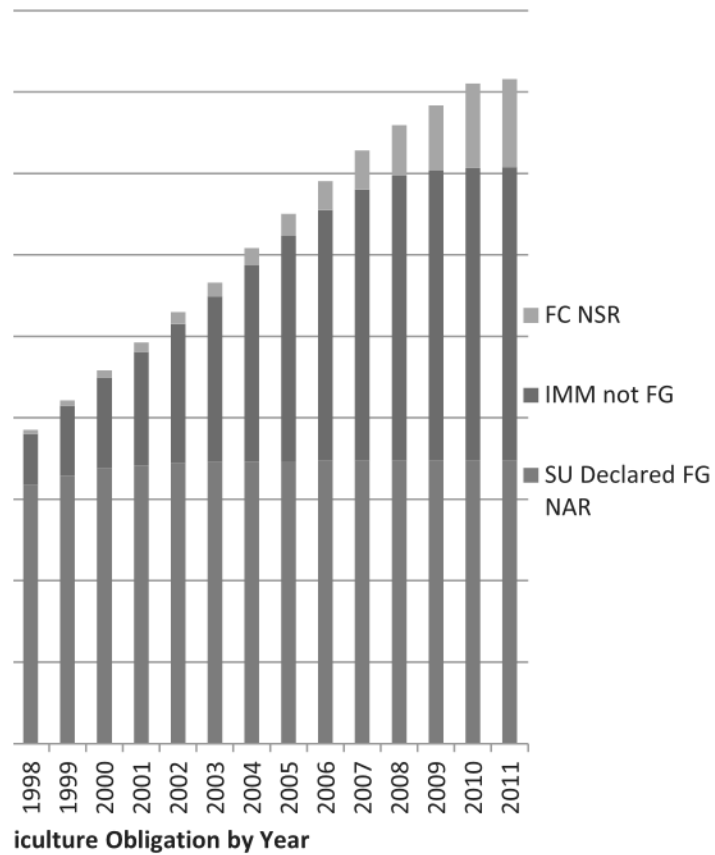
Disturb Yr	Total NAR	SU Declared FG NAR	IMM not FG	FC NSR
1987	50,111	46,405	3,348	357
1988	255,595	239,490	14,487	1,618
1989	443,063	412,124	28,407	2,533
1990	622,337	578,102	40,670	3,565
1991	790,167	730,905	54,619	4,644
1992	970,362	891,994	72,377	5,991
1993	1,136,553	1,039,200	90,115	7,238
1994	1,290,200	1,171,896	109,367	8,937
1995	1,445,280	1,298,371	135,711	11,197
1996	1,611,521	1,419,009	177,085	15,426
1997	1,770,802	1,514,973	236,932	18,897
1998	1,925,977	1,587,014	314,642	24,321
1999	2,107,309	1,644,743	430,240	32,326
2000	2,291,218	1,687,557	560,131	43,529
2001	2,462,586	1,708,558	696,918	57,110
2002	2,648,034	1,720,185	856,902	70,947
2003	2,830,066	1,727,214	1,018,797	84,056
2004	3,042,070	1,731,792	1,204,712	105,566
2005	3,251,018	1,733,919	1,382,304	134,796
2006	3,451,662	1,735,303	1,540,807	175,551
2007	3,640,360	1,736,177	1,664,735	239,448
2008	3,795,318	1,736,513	1,749,293	309,513
2009	3,917,683	1,736,513	1,779,859	401,311
2010	4,051,677	1,736,513	1,796,772	518,393
2011	4,079,059	1,736,513	1,801,924	540,622

Disturb Yr
1987
1988
1989
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2006
2007
2008
2009
2010
2011

SU Declared FG NAR	IMM not FG	FC NSR
46,405	3,348	357
239,490	14,487	1,618
412,124	28,407	2,533
578,102	40,670	3,565
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1,298,371	135,711	11,197
1,419,009	177,085	15,426
1,514,973	236,932	18,897
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1,708,558	696,918	57,110
1,720,185	856,902	70,947
1,727,214	1,018,797	84,056
1,731,792	1,204,712	105,566
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1,736,513	1,796,772	518,393
1,736,513	1,801,924	540,622



Milestone Status





Ministry of Forests, Lands
and Natural Resource Operations

Backlog NSR Project Review and RESULTS Issues

**Land Based Investment Strategy (LBIS):
Current Reforestation and Timber Supply Mitigation Meeting**

*September 28, 2011
Richmond, BC*

**Matt LeRoy
Dave Weaver
Paul Rehsler**
Resource Practices Branch



Backlog Management Policy

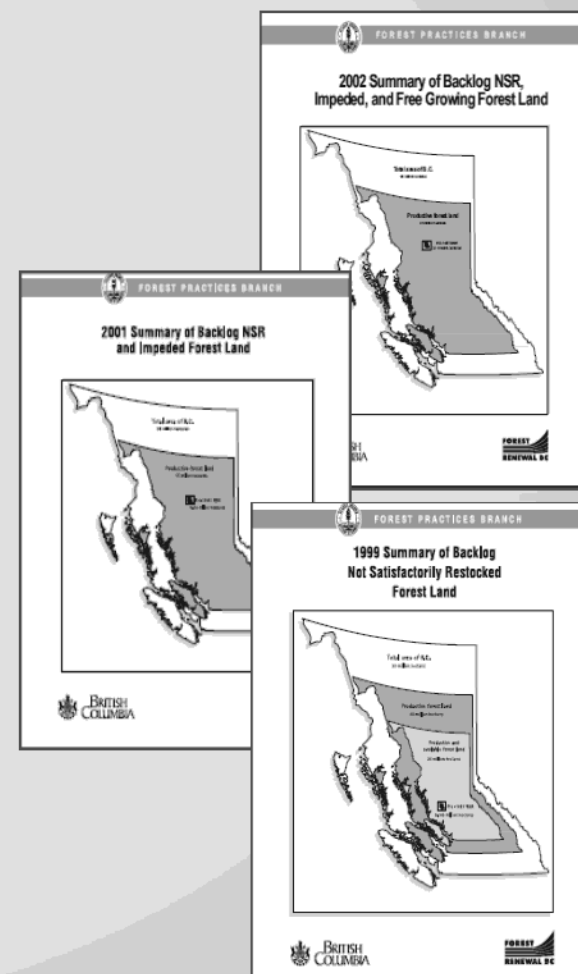
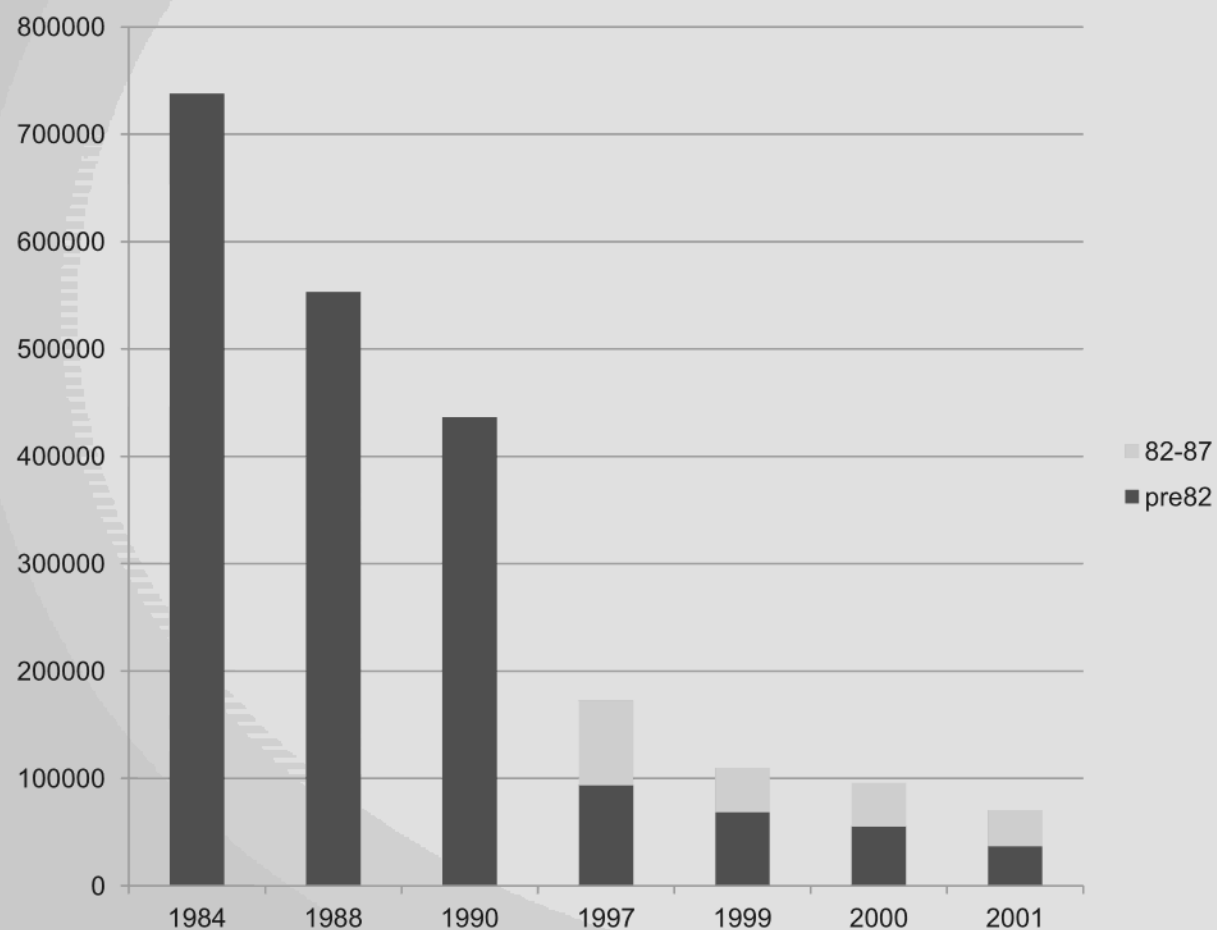
"backlog area" means an area a) from which the timber was harvested, damaged, or destroyed before October 1, 1987; and, b) that in the District Manager's opinion, is insufficiently stocked with healthy, well-spaced trees of a commercially acceptable species

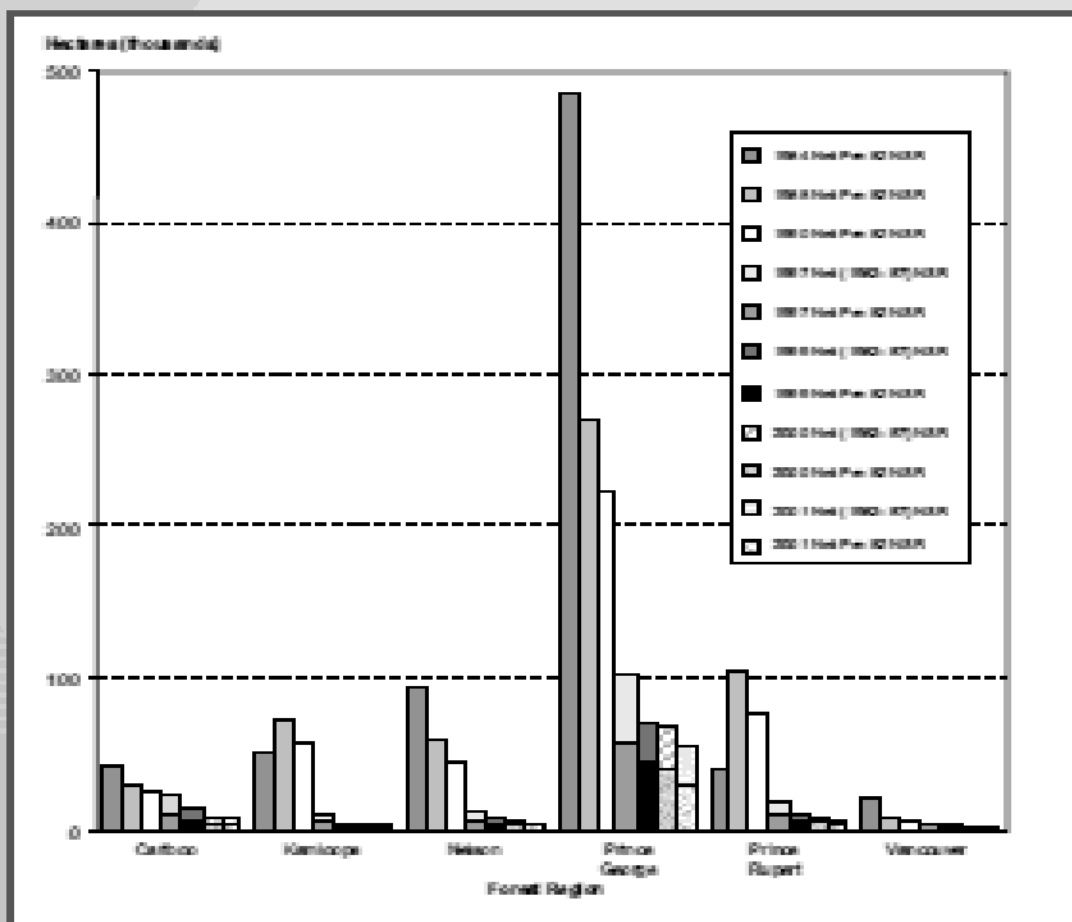
Not satisfactorily restocked (NSR)" means productive forest land that has been denuded and has not been regenerated to the desired stocking standards for the opening



Ministry of Forests, Lands
and Natural Resource Operations

Previous NSR Reports





**By Region, backlog NSR
would be eliminated by:**

- 2007 in PR, PR
- 2005/06 in Car, Kam, Nel
- 2003/04 in Van

- Where do these backlog NSR numbers come from?
 - RESULTS via the Corporate Reporting System

• Home

Corporate Reporting System

MY BOOKMARKS

» [Planting by Species](#) [delete](#)

Search Reports:

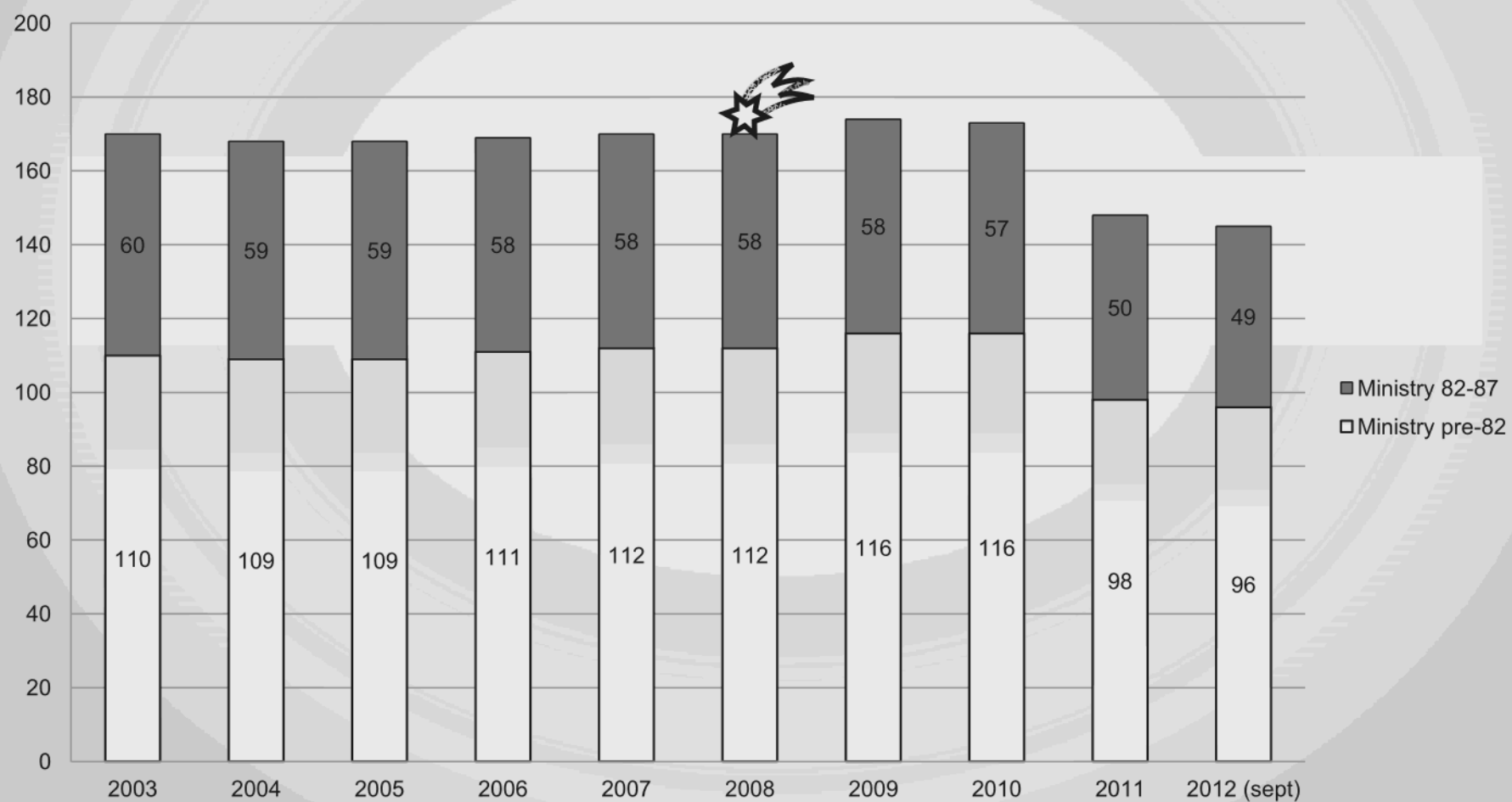
[Search](#)

Main Menu : [Silviculture](#) : [RESULTS - Reporting Silviculture and Land Status](#) : Key Performance Indicators

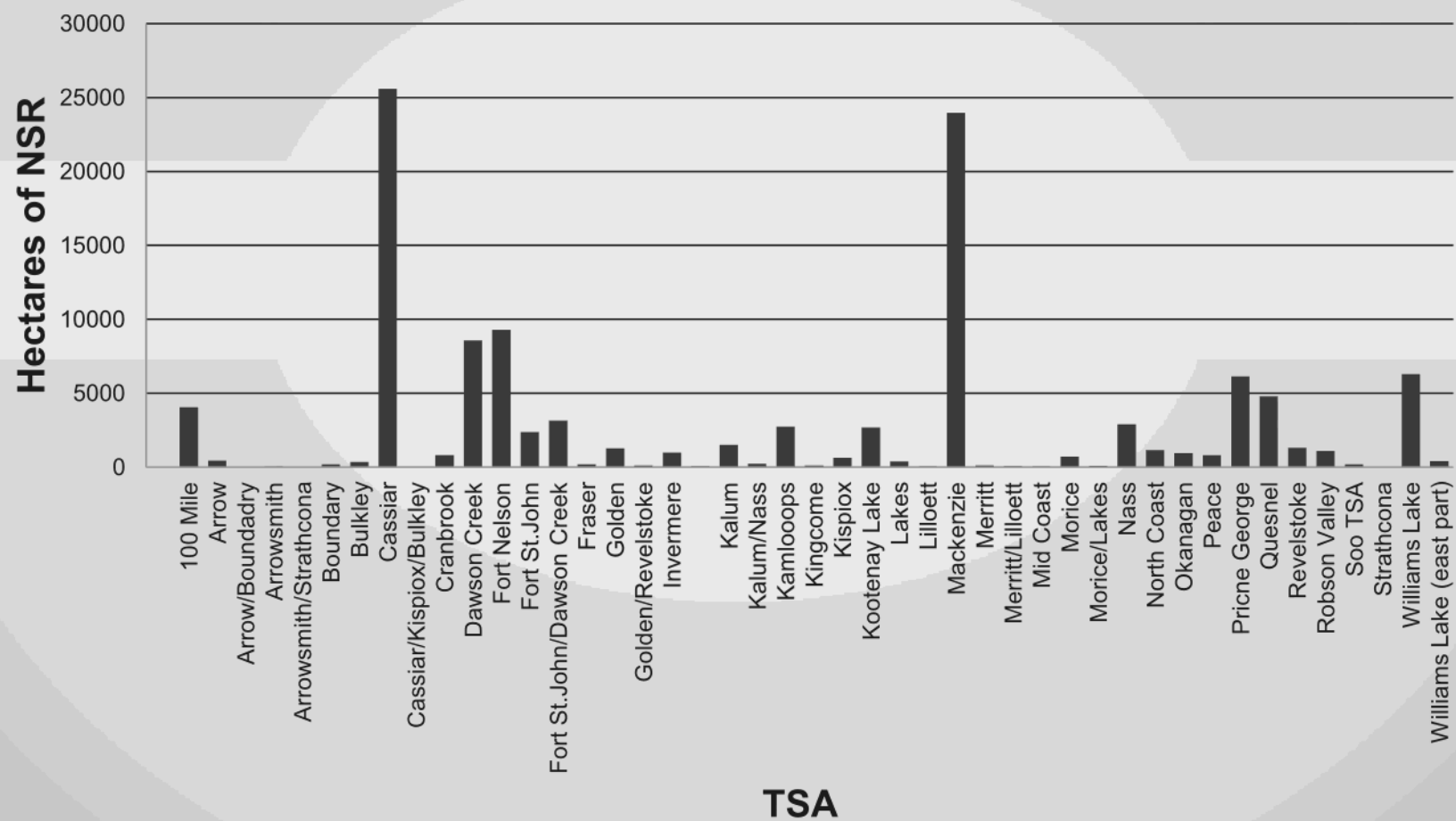
Reports

1. [% Permanent Access Structures - Summary Report \(for KOI Reporting\)](#) [+ help](#)
2. [Achievement of Ministry Free Growing Obligations Under Forest Stand Management Fund](#) [+ help](#)
3. [Changes in Not Satisfactorily Restocked Crown Land](#) [+ help](#)

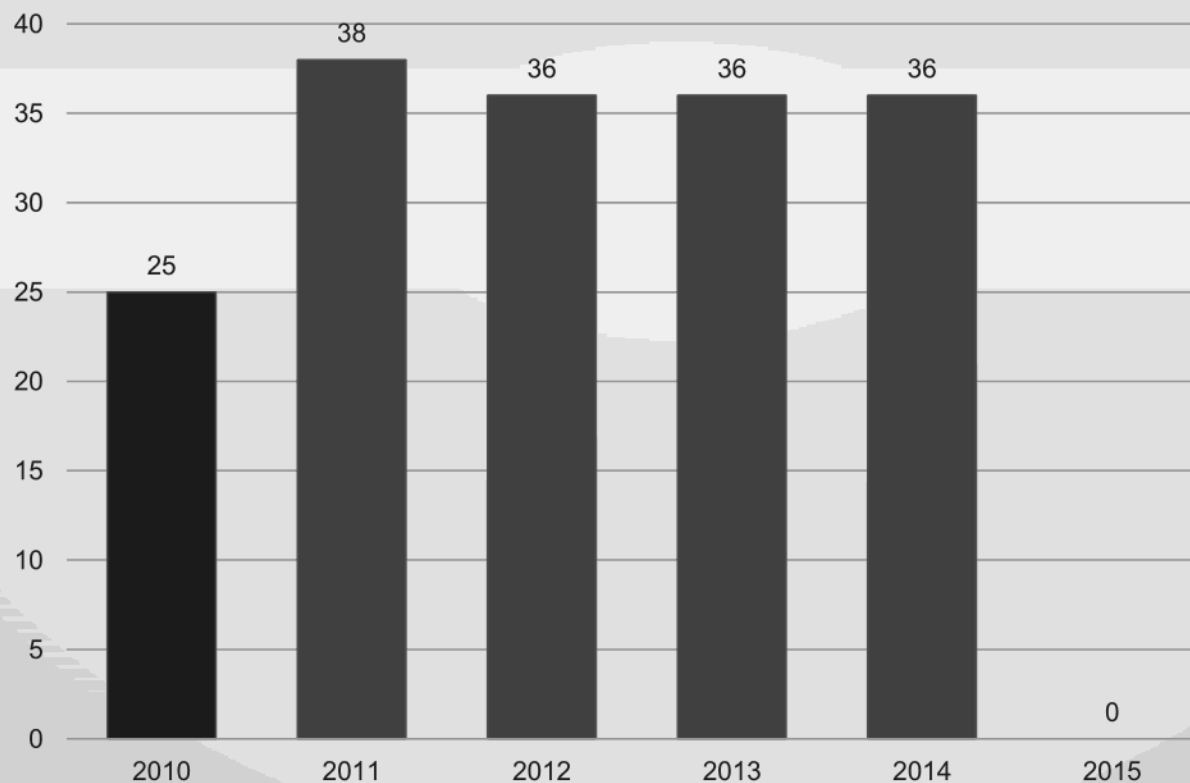
Annual NSR Backlog, Provincial Totals, (thousands of hectares)



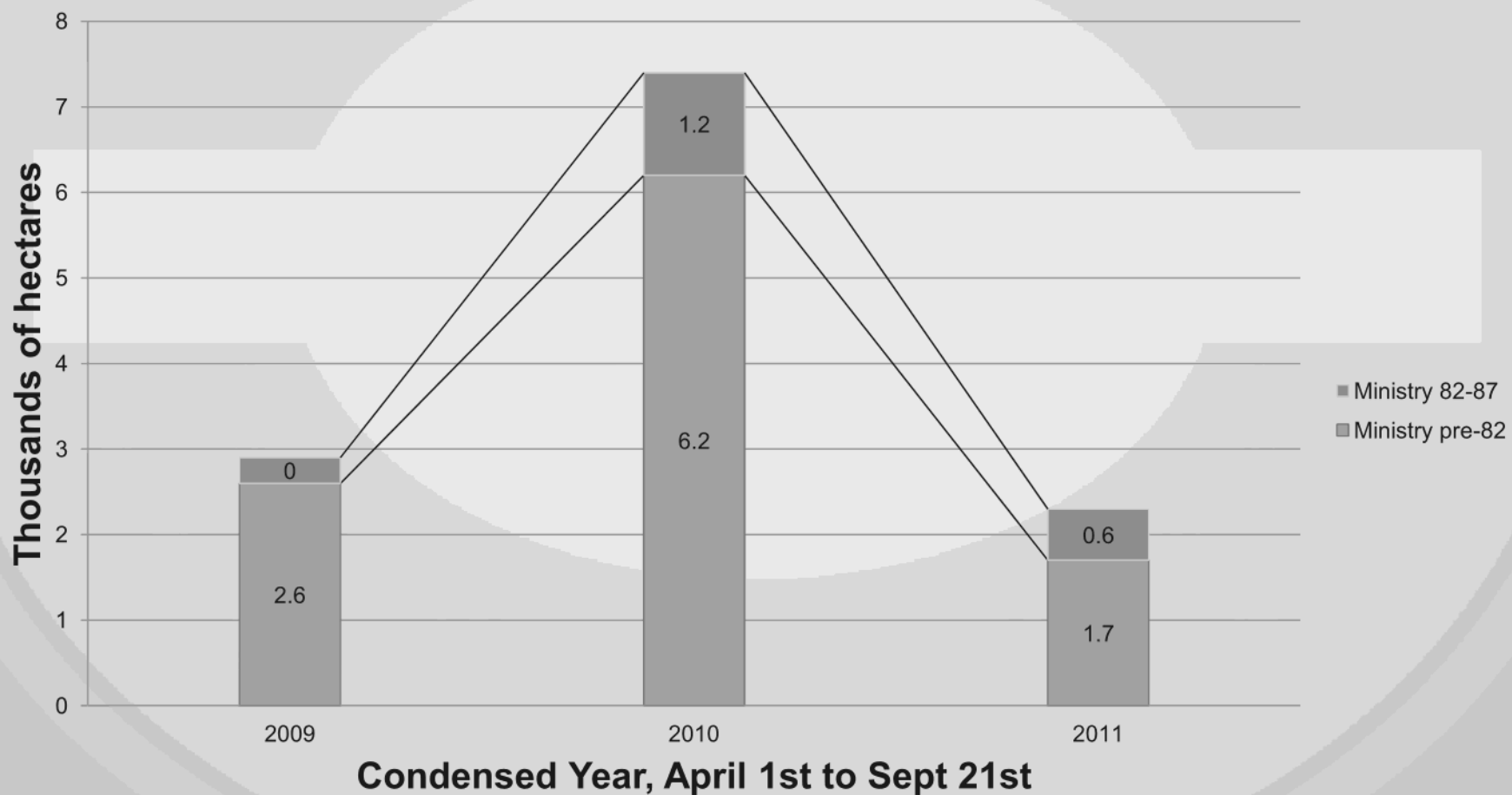
NSR hectares by TSA



Annual Backlog NSR reduction target, (thousands of hectares)



Backlog NSR reductions April 1st to September 21st



- Known Challenges:
 - Not just an opening file exercise
 - Getting down to the most challenging openings
 - Anticipating year over year increasingly challenging openings
 - Resourcing
 - Do folks know about their options with survey standards?

- Where does Forsite fit in?
 - Forsite is our provincial contractor, initially handling category 1, and 6 backlog NSR openings

NSR Project Categories

Declared with NO FC Update

Opening FG with NSR with No
Planned Treatments

Survey with no FC update

Survey with FC update no
spatial

NSR with no SU's

NSR Increased No Planning



Quick Wins

- There are a number of openings in the backlog NSR listing that are in excess of 1,000 hectares

s.13



- Survey standard talk with Dave Weaver



Ministry of Forests, Lands
and Natural Resource Operations





**Changes in the Not Satisfactorily Restocked
(NSR) Crown Land**
From: 2010-04-01
To: 2011-03-31

Page: Page 1 of 1
Date Printed: 2011 10 07
User Id: IDIR/MAENG
Database: DBP01
Report Id: RESULTSR004
File:

Org Unit: All
TSO: All
Management Unit: All
Client:

Licence: Land Status Date (From): 2010 04 01 Land Status Date (To): 2011 03 31

RESPONSIBILITY	BACKLOG (2)		CURRENT REFORESTATION (3)			Totals
	MINISTRY	MINISTRY	MINISTRY	BCTS (9)	MAJOR LICENSEES	
YEAR OF DENUDATION	PRE 82	1982 87	POST 87 (OCT 1/87)	POST 88 (JAN 1/88)	POST 87 (OCT 1/87)	
	hectares					
TOTAL NSR AS OF 2010-04-01	116,601.60	57,470.30	70,019.90	75,884.10	399,207.70	719,183.60
Additions in NSR due to:						
Harvesting (4)	375.10	69.60	3,961.10	27,394.60	104,986.70	136,787.10
Fire (5)	97.80	2.80	10,644.80	30.00	229.60	11,005.00
Pests (5)	0.00	0.00	4,081.70	235.90	17.90	4,335.50
Other Disturbances (6)	0.00	49.30	443.50	38.00	1,946.70	2,477.50
Plantation Failure	807.20	688.00	461.40	1,498.90	4,655.20	8,110.70
Natural regeneration failure	908.20	87.90	182.60	217.00	365.00	1,760.70
TOTAL ADDITIONS TO NSR	2,188.30	897.60	19,775.10	29,414.40	112,201.10	164,476.50
Reductions in NSR due to:						
Planting (7)	8,657.20	2,657.70	5,635.20	29,644.30	85,371.00	131,965.40
Natural regeneration	8,026.70	3,363.40	2,970.20	2,027.90	16,111.50	32,499.70
Reclassification of NSR to NP (8)	3,533.90	1,050.50	424.90	353.80	1,933.00	7,296.10
TOTAL REDUCTIONS TO NSR	20,217.80	7,071.60	9,030.30	32,026.00	103,415.50	171,761.20
DIFFERENCE (10)	-320.90	-1,238.40	-40.10	65.50	79.50	-1,454.40
TOTAL NSR AS OF 2011-03-31	98,251.20	50,057.90	80,724.60	73,338.00	408,072.80	710,444.50
NET CHANGE IN NSR	-18,350.40	-7,412.40	10,704.70	-2,546.10	8,865.10	-8,739.10

(1) Includes accomplishments under all funding sources.

Ministry annual reporting is based on data in ministry information systems as of 2011-10-07.

Where data entry is incomplete or delayed, numbers reported may under estimate actual accomplishments.

(2) Backlog obligation categories are based on the responsibility for reforestation to a free growing stage.

Ministry, Pre-82: A large portion of good and medium sites in this obligation category were treated under FRDA I (1985-90).

Ministry, 1982-87, All Sites: Includes areas under the Small Business Enterprise Program (cut prior to January 1, 1988), and areas of Major Licensees (cut prior to October 1, 1987).

Together with the Ministry Pre-82 areas, these areas are considered "backlog obligations" for potential treatment funded by the previous and current government programs such as Forest Renewal BC & Forest For Tomorrow.

(3) Current obligation categories are based on the responsibility for reforestation to a free growing stage, by law, within an acceptable period of time.

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BCTS, Post-88, All Sites: Basic silviculture on all areas denuded by SBFEP and BCTS after January 1, 1988 is funded by the BCTS account, and implemented by the Ministry of Forests, Lands, and Natural Resource Operations..

Major Licensees, Post-87, All Sites: Basic silviculture on areas denuded by major licensees after October 1, 1987 is funded by major licensees.

Licensees have approximately six to seven years to reach the basic silviculture requirement through natural regeneration, or about three to four years through planting, as specified in the silviculture prescription or site plans.

(4) NSR resulting from harvesting is the net area to be reforested after harvest (excluding roads, landing and other non-productive areas).

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(7) Area planted does not equal the statistics reported to the Service Plan tables: Total Silviculture Accomplishments on Crown Land by All Sources and Area Planted by Responsibility due to replants and fill plants that do not affect NSR status..

(8) NP is non-productive land. Reclassification of NSR to NP is due to new information currently available identifying areas as roads, landing, swamps, rock outcrops, etc.

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**Changes in the Not Satisfactorily Restocked
(NSR) Crown Land**
From: 1987-04-01
To: 2011-03-31

Page: Page 1 of 1
Date Printed: 2011 10 07
User Id: IDIR\MAENG
Database: DBP01
Report Id: RESULTSR004
File:

Org Unit: All
TSO: All
Management Unit: All
Client:

Licence:	Land Status Date (From): 1987 04 01				Land Status Date (To): 2011 03 31	
RESPONSIBILITY	BACKLOG (2)		CURRENT REFORESTATION (3)			
	MINISTRY	MINISTRY	MINISTRY	BCTS (9)	MAJOR LICENSEES	Totals
YEAR OF DENUDATION	PRE 82	1982 87	POST 87 (OCT 1/87)	POST 88 (JAN 1/88)	POST 87 (OCT 1/87)	
	hectares					
TOTAL NSR AS OF 1987-04-01	745,560.00	681,141.00	2,267.00	986.00	1,089.00	1,431,043.00
Additions in NSR due to:						
Harvesting (4)	2,400.40	3,531.30	12,412.50	71,729.10	380,481.10	470,554.40
Fire (5)	3,481.50	5,378.20	42,832.50	1,068.10	7,252.00	60,012.30
Pests (5)	1,326.60	10.10	18,949.00	235.90	5,367.40	25,889.00
Other Disturbances (6)	165.10	970.50	6,367.10	251.60	14,898.20	22,652.50
Plantation Failure	4,556.20	1,636.20	28.70	0.00	0.00	6,221.10
Natural regeneration failure	12,748.70	121.20	12.00	13.10	25.00	12,920.00
TOTAL ADDITIONS TO NSR	24,678.50	11,647.50	80,601.80	73,297.80	408,023.70	598,249.30
Reductions in NSR due to:						
Planting (7)	237,793.60	372,232.20	1,434.40	639.40	1,025.30	613,124.90
Natural regeneration	322,682.90	207,580.60	368.10	172.00	0.70	530,804.30
Reclassification of NSR to NP (8)	94,741.70	50,531.00	193.10	124.70	57.30	145,647.80
TOTAL REDUCTIONS TO NSR	655,218.20	630,343.80	1,995.60	936.10	1,083.30	1,289,577.00
DIFFERENCE (10)	-16,769.10	-12,386.80	-148.60	-9.70	43.40	-29,270.80
TOTAL NSR AS OF 2011-03-31	98,251.20	50,057.90	80,724.60	73,338.00	408,072.80	710,444.50
NET CHANGE IN NSR	-647,308.80	-631,083.10	78,457.60	72,352.00	406,983.80	-720,598.50

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From: 1987-04-01
To: 1988-03-31

Page: Page 1 of 1
Date Printed: 2011 10 07
User Id: IDIR\MAENG
Database: DBP01
Report Id: RESULTSR004
File:

Org Unit: All
TSO: All
Management Unit: All
Client:

Licence: Land Status Date (From): 1987 04 01 Land Status Date (To): 1988 03 31

RESPONSIBILITY	BACKLOG (2)		CURRENT REFORESTATION (3)			Totals
	MINISTRY	MINISTRY	MINISTRY	BCTS (9)	MAJOR LICENSEES	
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hectares						
TOTAL NSR AS OF 1987-04-01	745,560.00	681,141.00	2,267.00	986.00	1,089.00	1,431,043.00
Additions in NSR due to:						
Harvesting (4)	3,137.00	106,623.90	4,952.00	6,646.00	638.00	121,996.90
Fire (5)	641.00	11,738.00	404.00	0.00	0.00	12,783.00
Pests (5)	2.00	1,329.00	38.00	0.00	0.00	1,369.00
Other Disturbances (6)	114.00	2,580.00	1,654.00	78.00	389.00	4,815.00
Plantation Failure	21,443.00	10,254.10	314.00	0.00	71.00	32,082.10
Natural regeneration failure	14,184.00	812.00	5.00	0.00	0.00	15,001.00
TOTAL ADDITIONS TO NSR	39,521.00	133,337.00	7,367.00	6,724.00	1,098.00	188,047.00
Reductions in NSR due to:						
Planting (7)	41,984.00	100,676.00	121.00	0.00	275.00	143,056.00
Natural regeneration	61,346.00	12,123.00	183.00	0.00	0.00	73,652.00
Reclassification of NSR to NP (8)	12,017.00	4,896.00	11.00	0.00	29.00	16,953.00
TOTAL REDUCTIONS TO NSR	115,347.00	117,695.00	315.00	0.00	304.00	233,661.00
DIFFERENCE (10)	55.00	232.00	1.00	9.00	0.00	297.00
TOTAL NSR AS OF 1988-03-31	669,789.00	697,015.00	9,320.00	7,719.00	1,883.00	1,385,726.00
NET CHANGE IN NSR	-75,771.00	15,874.00	7,053.00	6,733.00	794.00	-45,317.00

(1) Includes accomplishments under all funding sources.

Ministry annual reporting is based on data in ministry information systems as of 2011-10-07.

Where data entry is incomplete or delayed, numbers reported may under estimate actual accomplishments.

(2) Backlog obligation categories are based on the responsibility for reforestation to a free growing stage.

Ministry, Pre-82: A large portion of good and medium sites in this obligation category were treated under FRDA I (1985-90).

Ministry, 1982-87, All Sites: Includes areas under the Small Business Enterprise Program (cut prior to January 1, 1988), and areas of Major Licensees (cut prior to October 1, 1987).

Together with the Ministry Pre-82 areas, these areas are considered "backlog obligations" for potential treatment funded by the previous and current government programs such as Forest Renewal BC & Forest For Tomorrow.

(3) Current obligation categories are based on the responsibility for reforestation to a free growing stage, by law, within an acceptable period of time.

Ministry, Post-87, All Sites: The Ministry remains responsible, but not legally obligated, for basic silviculture on all areas denuded by fire or pests. Also includes areas where the Ministry is legally obligated for reforestation for areas harvested under Forestry Licences to Cut.

BCTS, Post-88, All Sites: Basic silviculture on all areas denuded by SBFEP and BCTS after January 1, 1988 is funded by the BCTS account, and implemented by the Ministry of Forests, Lands, and Natural Resource Operations..

Major Licensees, Post-87, All Sites: Basic silviculture on areas denuded by major licensees after October 1, 1987 is funded by major licensees.

Licensees have approximately six to seven years to reach the basic silviculture requirement through natural regeneration, or about three to four years through planting, as specified in the silviculture prescription or site plans.

(4) NSR resulting from harvesting is the net area to be reforested after harvest (excluding roads, landing and other non-productive areas).

(5) Openings caused by fire or pests refer to incidence in mature timber or in areas already classified as free growing.

Fire and pest incidence prior to free growing is considered plantation or natural regeneration failure.

(6) "Other Disturbances" includes all disturbances that are not caused by Harvesting, Fire, or Pest.

(7) Area planted does not equal the statistics reported to the Service Plan tables: Total Silviculture Accomplishments on Crown Land by All Sources and Area Planted by Responsibility due to replants and fill plants that do not affect NSR status..

(8) NP is non-productive land. Reclassification of NSR to NP is due to new information currently available identifying areas as roads, landing, swamps, rock outcrops, etc.

(9) Small Business Forest Enterprise Program (SBFEP) was changed to BC Timber Sales (BCTS) as of April 1, 2003

(10) Differences are used to compensate for records that have been missing or incomplete disturbance information that have records not reflected in the reported NSR statistics.



Changes in the Not Satisfactorily Restocked (NSR) Crown Land

From: 2010-04-01
To: 2010-12-17

Page: Page 1 of 1
Date Printed: 2010 12 17
User Id: IDIR\RWINTER
Database: DBP01
Report Id: RESULTSR004
File:

Org Unit: All
TSO: All
Management Unit: All
Client:

Licence:	Land Status Date (From): 2010 04 01				Land Status Date (To): 2010 12 17	
	BACKLOG (2)		CURRENT REFORESTATION (3)			
RESPONSIBILITY	MINISTRY	MINISTRY	MINISTRY	BCTS (9)	MAJOR LICENSEES	Totals
YEAR OF DENUDATION	PRE 82	1982 87	POST 87 (OCT 1/87)	POST 88 (JAN 1/88)	POST 87 (OCT 1/87)	
	hectares					
TOTAL NSR AS OF 2010-04-01	118,796.60	58,480.70	76,057.50	75,913.20	395,445.30	724,693.30
Additions in NSR due to:						
Harvesting (4)	33.10	2.40	3,570.80	20,766.80	61,927.70	86,300.80
Fire (5)	0.00	0.00	1,966.10	29.50	157.50	2,153.10
Pests (5)	0.00	0.00	1,828.00	165.20	17.70	2,010.90
Other Disturbances (6)	0.00	0.00	76.70	38.00	1,545.20	1,659.90
Plantation Failure	6.30	340.00	73.40	1,362.10	2,516.40	4,298.20
Natural regeneration failure	397.30	0.00	97.00	199.90	296.70	990.90
TOTAL ADDITIONS TO NSR	436.70	342.40	7,612.00	22,561.50	66,461.20	97,413.80
Reductions in NSR due to:						
Planting (7)	4,683.10	1,157.30	5,257.50	16,180.20	57,939.80	85,217.90
Natural regeneration	2,129.80	557.10	501.30	1,697.60	7,152.90	12,038.70
Reclassification of NSR to NP (8)	835.90	231.20	499.00	159.20	1,101.50	2,826.80
TOTAL REDUCTIONS TO NSR	7,648.80	1,945.60	6,257.80	18,037.00	66,194.20	100,083.40
DIFFERENCE (10)	88.50	16.40	-15.30	-18.70	35.90	106.80
TOTAL NSR AS OF 2010-12-17	111,673.00	56,893.90	77,396.40	80,419.00	395,748.20	722,130.50
NET CHANGE IN NSR	-7,123.60	-1,586.80	1,338.90	4,505.80	302.90	-2,562.80

(1) Includes accomplishments under all funding sources.

Ministry annual reporting is based on data in ministry information systems as of 2010-12-17.

Where data entry is incomplete or delayed, numbers reported may under estimate actual accomplishments.

(2) Backlog obligation categories are based on the responsibility for reforestation to a free growing stage.

Ministry, Pre-82: A large portion of good and medium sites in this obligation category was treated under FRDA I (1985-90).

Ministry, 1982-87, All Sites: Includes areas under the Small Business Enterprise Program (cut prior to January 1, 1988), and areas of Major Licensees (cut prior to October 1, 1987). Together with the Ministry Pre-82 areas, these areas are considered "outstanding obligations" for treatment under the Backlog Reforestation program, funded by Forest Renewal B.C. as of August 1996.

(3) Current obligation categories are based on the responsibility for reforestation to a free growing stage, by law, within an acceptable period of time.

Ministry, Post-87, All Sites: The Ministry remains responsible for basic silviculture on all areas denuded by fire or pests.

BCTS, Post-88, All Sites: Basic silviculture on all areas denuded by SBFEP after January 1, 1988 is funded by the SBFEP account, and implemented by the Ministry of Forests.

Major Licensees, Post-87, All Sites: Basic silviculture on areas denuded by major licensees after October 1, 1987 is funded by major licensees.

Licensees have approximately six to seven years to reach the basic silviculture requirement through natural regeneration, or about three to four years through planting, as specified in the silviculture prescription or site plans.

(4) NSR resulting from logging is the net area to be reforested after harvest (excluding roads, landing and other non-productive areas).

(5) Openings caused by fire or pests refer to incidence in mature timber or in areas already classified as free growing.

Fire and pest incidence prior to free growing is considered plantation or natural regeneration failure.

(6) "Other Disturbances" includes all disturbances that are not caused by Harvesting, Fire, or Pest, and also include any opening for which there are no disturbances.

(7) Area planted does not equal the statistics reported to the Service Plan tables: Total Silviculture Accomplishments on Crown Land by All Sources and Area Planted by Responsibility due to replants and fill plants that do not affect NSR status.

(8) NP is non-productive land. Reclassification to NP is due to roads, landing, swamps, rock outcrops, etc.

(9) Small Business Forest Enterprise Program (SBFEP) was changed to BC Timber Sales (BCTS) as of April 1, 2003

(10) Differences are used to compensate for records that have missing or incomplete disturbance information that have records not reflected in the reported NSR statistics.

		2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
MFR	P ant ng (000 ha)		0.35	0.83	6.5	7	12	12.7
	seed ngs (M) RESULTS		1.51	1.08	6.82	7.05	13.80	16.65
	Seed ngs (M)		0.35	0.88	7	7.14	13.8	17.5
	Surveys (000 ha) exc ud ng F e Rev ew but nc. A r (FG)		76.6	32.8	60.1	115	80	40
	Surveys (000 ha) exc ud ng F e Rev ew but nc. A r (FG) RESULTS		54.27	51.16	72.17	278.18	273.93	197.95
	Fund ng (M)	\$ 12.50	\$ 26.00	\$ 14.10	\$ 21.07	\$ 44.00	\$ 42.40	\$ 42.23
FRPA s 108	Seed ngs (M)	6	1.6	2	1.1	1	0	5
	Tota Fund ng (M)	FRPA s.108 seed ngs vary by year funds are pa d out.						

s.13

red text nd cates est mates								
seed ng cummu at ve tota		0.35	1.23	8.23	15.37	29.17	46.67	
seed ng cummu at ve tota RESULTS		1.51	2.59	9.41	16.46	30.26	46.91	
p anted area cummu at ve tota		0.35	1.18	7.68	14.68	26.68	39.38	
p anted area cumm at ve tota RESULTS		1.11	1.88	7.43	14.41	25.13	37.18	
Cummu ative funding	\$ 12.50	\$ 38.50	\$ 52.60	\$ 73.67	\$ 117.67	\$ 160.07	\$ 202.30	\$ 236.80

RESULTS reported area p anted	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
ftm	263.4	643.3	5212	6884	10341.5	11578.1
ft	843.4	129.6	336.6	94.5	379.4	471.6
tota	1106.8	772.9	5548.6	6978.5	10720.9	12049.7

RESULTS reported seed ing sp anted	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
ftm	0.383338	0.936225	6.428635	6.936013	13.381825	16.006434
ft	1.127552	0.140309	0.391661	0.114086	0.415658	0.64714
tota	1.51089	1.076534	6.820296	7.050099	13.797483	16.653574
average seed ing per ha	1365.0976	1392.8503	1229.192229	1010.25994	1286.97059	1382.07374

RESULTS reported surveys	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
ftm	25,170.50	35,251.00	48,996.10	172,378.50	267,661.30	176,919.00
ft	29,094.70	15,904.50	23,177.60	105,801.60	6,271.10	21,029.70
tota	54,265.20	51,155.50	72,173.70	278,180.10	273,932.40	197,948.70
survey cumm ative area RESULTS	54,265.20	105,420.70	177,594.40	455,774.50	729,706.90	927,655.60

76.6 109.4 169.5 284.5 364.5 404.5 444.5 484.5 524.5