

**EAST KOOTENAY TRENCH
RESTORATION TREATMENTS
MONITORING PROJECT**

2000 Monitoring Update

For

**The Ta Ta Creek Site
Establishment Report**

**Ministry of Forests
Nelson Forest Region
Nelson, B.C.**

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1.0 Introduction

This report is an addendum to the March 1998 General Work Plan and Establishment Report for the Ta Ta Creek Site. A prescribed burn was carried out in the spring of 1998 as outlined in the work plan on the Harvest & Burn and Burn Only units. Spring weather conditions were favorable for carrying out the burn. Moisture conditions were fairly high (periods of rain showers) prior to the burn, which may have influenced the results. The results of the prescribed burn were measured in the summer of 1998. The four treatment units were measured again in the summer of 2000. The following statistics (tables and graphs) are the result of the field measurements collected in the summer of 2000 compared with the results of the 1996, and 1998 measurements where appropriate. 1996 and 1998 are used mainly as the years prior to and after harvesting and burning treatments. Volumes measured and calculated from 2000 measurements are compared to the volumes calculated from the 1996 measurements.

2.0 Methodology

The same methods were used to measure the stand layers (2 through 4) as described in the establishment report. The incremental growth factor in Layer 1 was measured and new volumes per ha were calculated for each treatment unit. Layer 1 stem counts were updated for each unit.

3.0 Measurements and Analysis

Twenty plots were measured in each unit. Each plot was marked (1996 Burn and Control) and 1997 (Harvest Only and Harvest & Burn) with a rebar pin. The flagging was replaced on each pin. Plot 13 in the Control unit was not located and not measured as a result of the pin being removed completely. The plot diameter used in the measurement procedure was 7.89 meters for the fixed plot measurements. 10 plots in each unit were measured with a BAF 2 prism as in 1996.

The following tables are the compilation for all layers 1 through 4 data for the four treatment units, Burn Only, Harvest & Burn, Control and Harvest Only. The count has been adjusted to represent live stems per hectare by species. The layer classes are as follows:

LAYER	MINIMUM		MAXIMUM
4	<1.29 m tall		
3B	>1.29 m tall	to	3.9 cm dbh
3A	4.0 cm	to	7.4 cm dbh
2B	7.5 cm	to	9.9 cm dbh
2A	10.0 cm	to	12.5 cm dbh
1	12.6 and greater		

3.1 Burn Only Treatment

Stems in the smaller diameter (3B and 3A) classes were removed or move up diameter class due to incremental growth (minor changes at best). The smallest class 3B has not been replaced due to stem removal during the fire treatment. The large (2A and 2B) classes either stayed the same or increased in numbers due to incremental growth moving a stem into the next higher class from below. There was no evidence of fire caused change from live stems into dead stems in 1998 and again in 2000 in the larger classes.

Chart 1: Layers 3B to 2A 3 Year Comparison

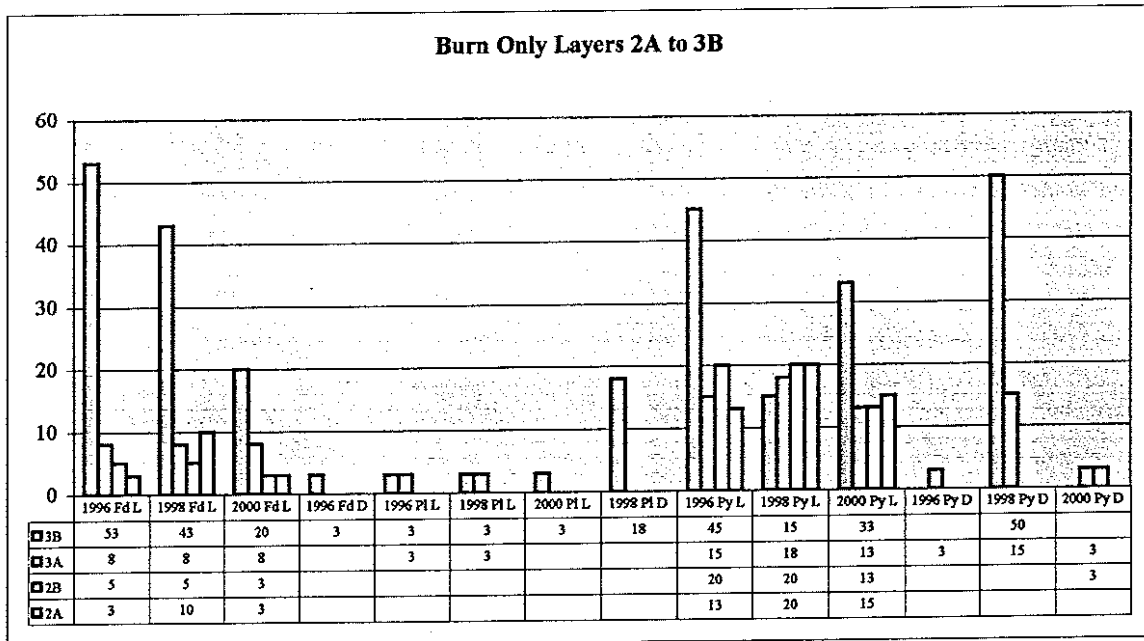
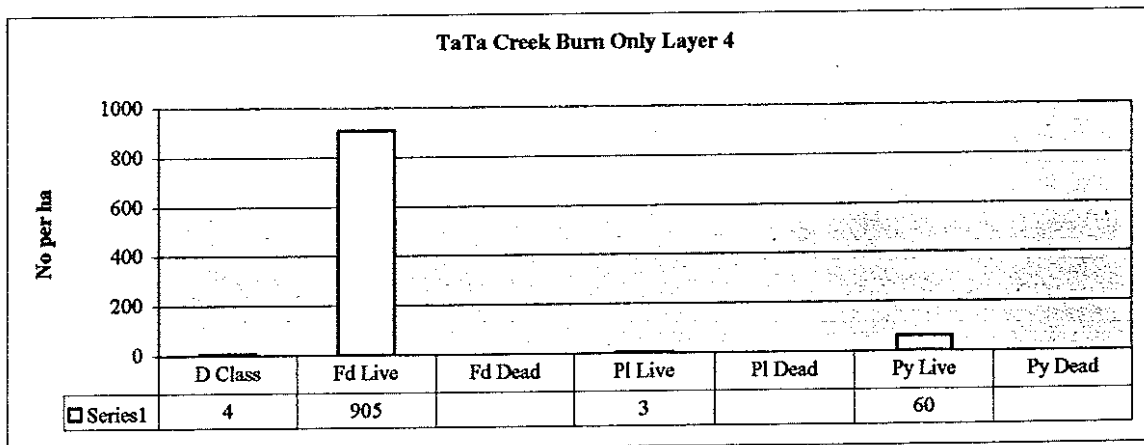
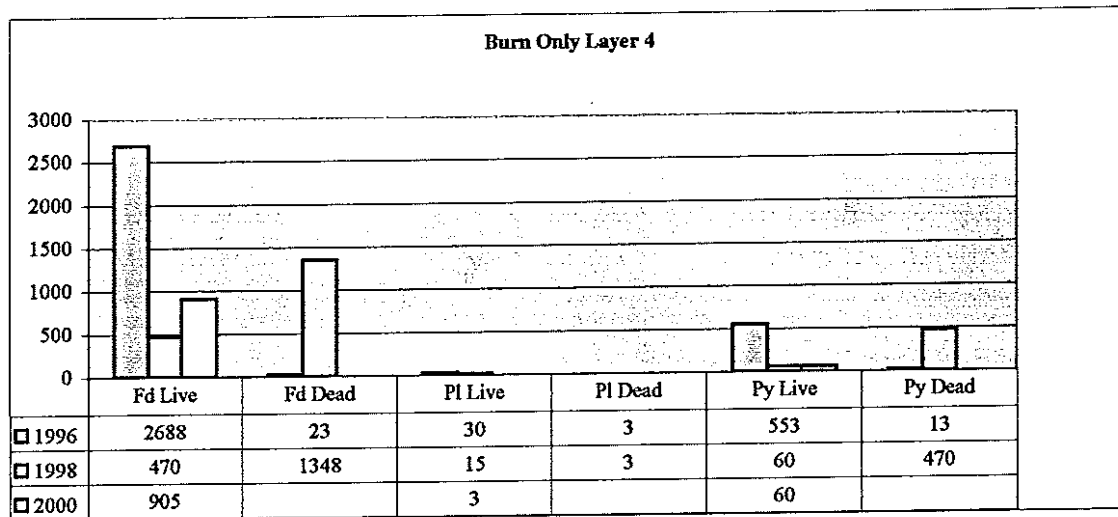


Chart 2: Layer 4 only.



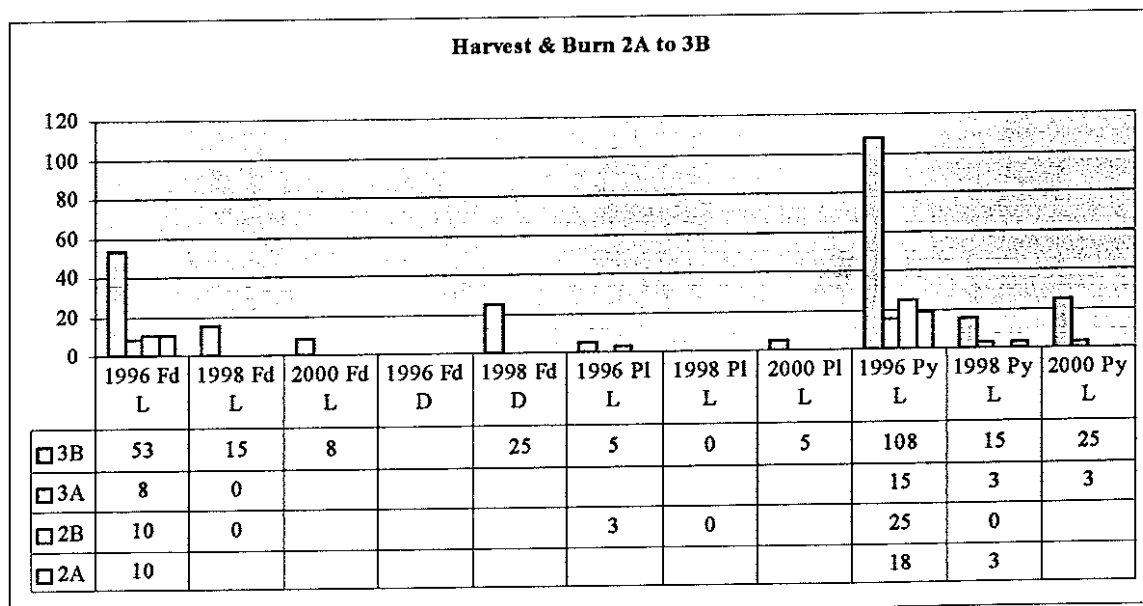
The Fd stem count in Layer 4 has increased 192% from 1998 to 2000 on a per hectare basis. This increase has occurred in portions of the plots that did not burn in 1998. If the site burned, the layer four stems and seed inventory were removed from the site. Those portions not burned maintained the seed inventory and increased in stem count.

Chart 3: Layer 4 Three-Year Comparisons



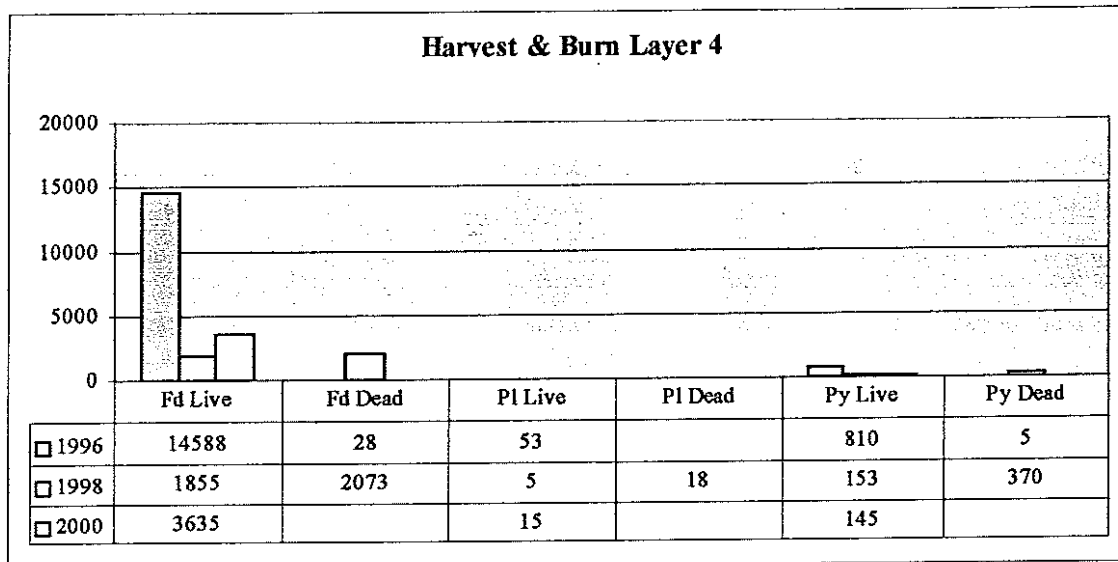
3.2 Harvest & Burn Treatment

Chart 4: Layers 2A to 3B Three-Year Comparisons



The decrease in all stem classes is the result of both slashing (1997) and burning (1998). The largest reduction in stem numbers is in the smaller classes, which are more susceptible to mechanical (logging damage and slashing) and fire mortality causes. Layer 3B Py had a reduction of 86.2% from harvesting and fire removal. Py showed an increase in the 3B class as layer 4 stems not burned moved up a class.

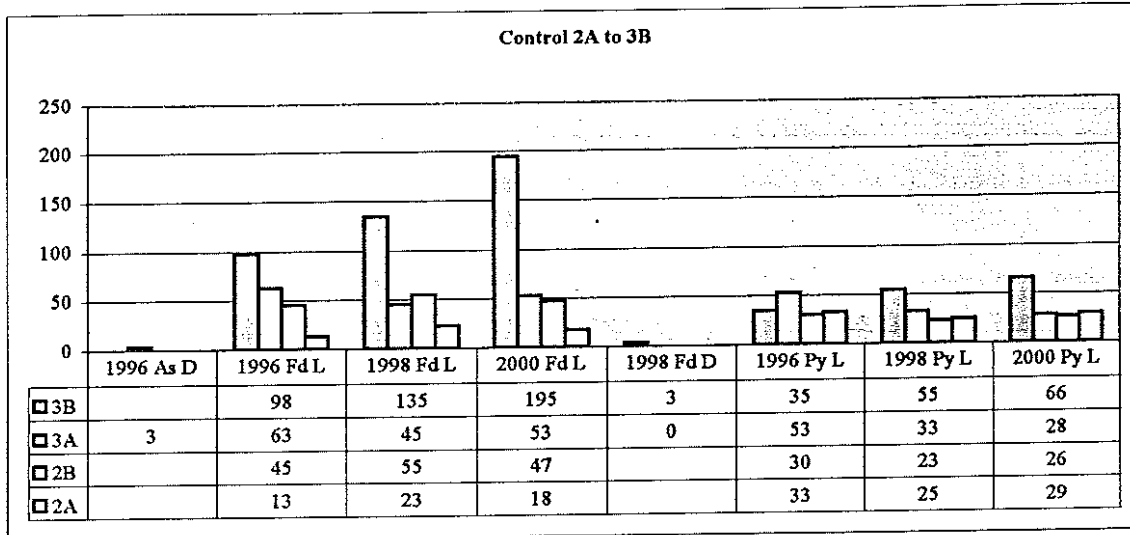
Chart 5: Layer 4 Only



This unit has the most significant reduction in layer 4 live stems per hectare with a reduction of 87.3% live Fd stems or 12.7% of the stems live after the burn. Dead classes increased with the fire caused mortality. The total number of stems from 1998 cannot be related and balanced back to the starting number of stems in 1996 due to the consumption of stems by fire. A 195% increase in the Fd species occurred where the surface was not consumed by fire in 1998. No new fir stems were observed in 2000 on burnt sites.

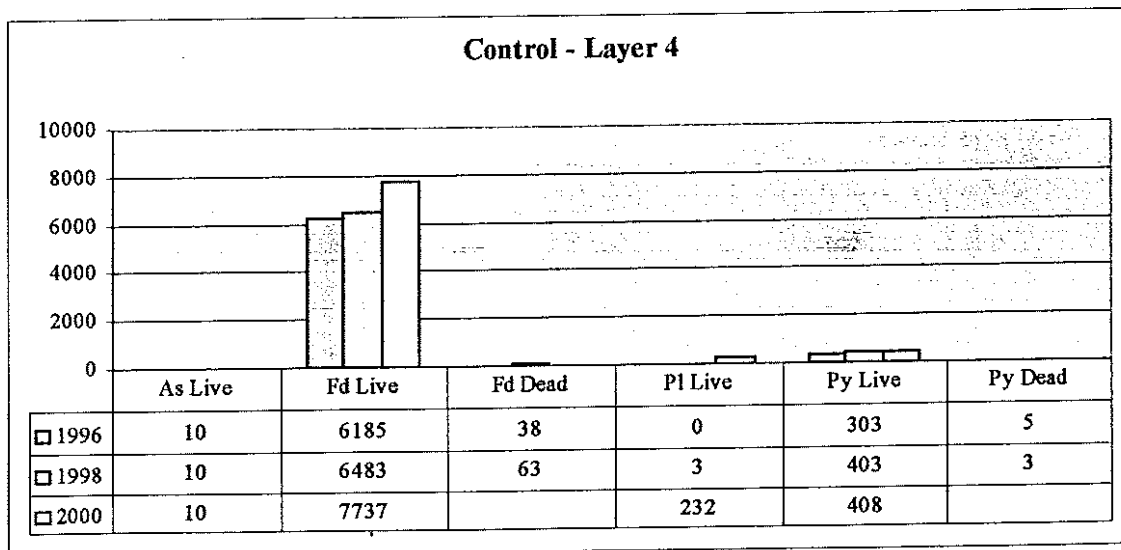
3.3 Control Treatment

Chart 6: Layers 2A to 3B Three-Year Comparisons



The 3B Live Fd class increased 37.7%. The 3A Live Fd decrease of 28.6% can be attributed to the annual incremental growth moving stems into the 2B class. The increase in 3B live Py is 57.1%. This increase is due to Layer 4 stems moving up one class by incremental growth.

Chart 7: Layer 4 Only Three-Year Comparisons



Layer 4 Live Fd had a 4.8% net increase in numbers from 1996 to 1998 and an increase of 19.3% from 1998 to 2000. This increase is due to new seedlings establishment over

the four-year period. The dead Fd stem increase of 65.6% in 1998 is possible due to trampling damage by livestock. Dead stems were not observed in 2000. The live Py 33% stem increase in 1998 is due to new stem establishment. Only three new stems per hectare were counted in 2000. The Py has not responded as the Fd has. Dead Py stems were not observed in this unit.

3.4 Harvest Only Treatment

Chart 8:

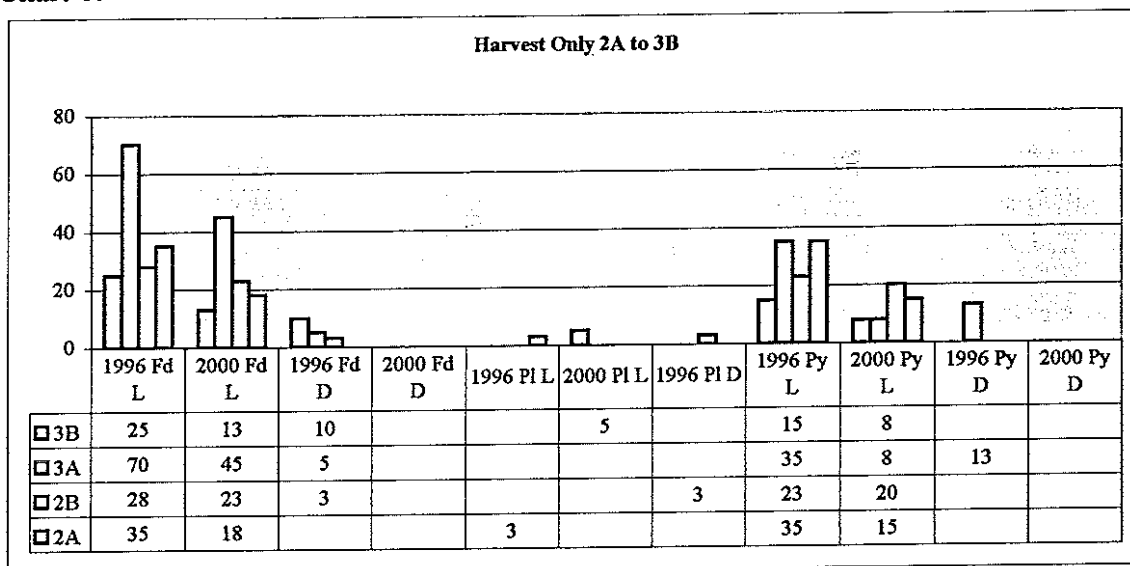
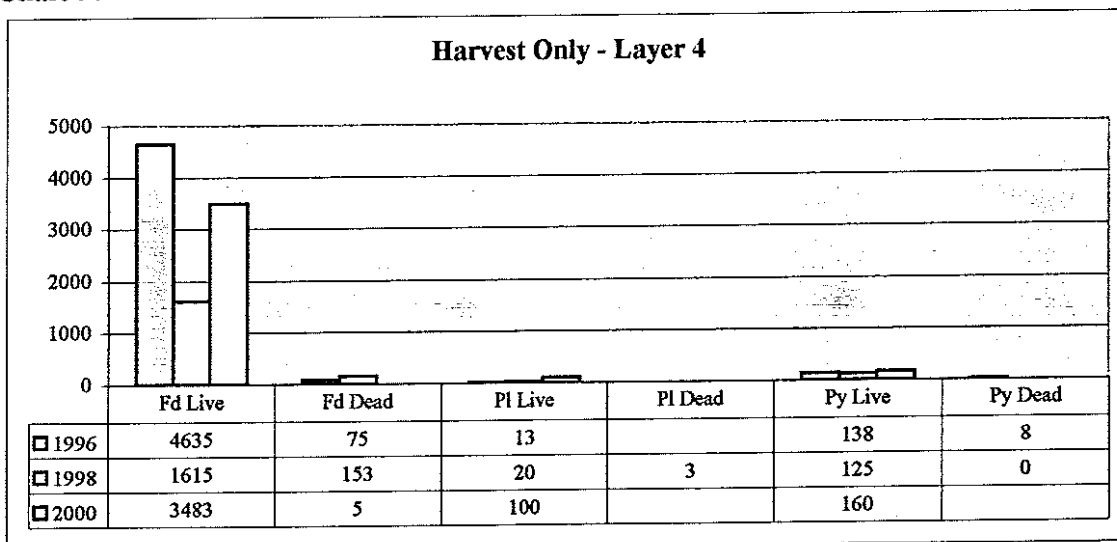


Chart 9:



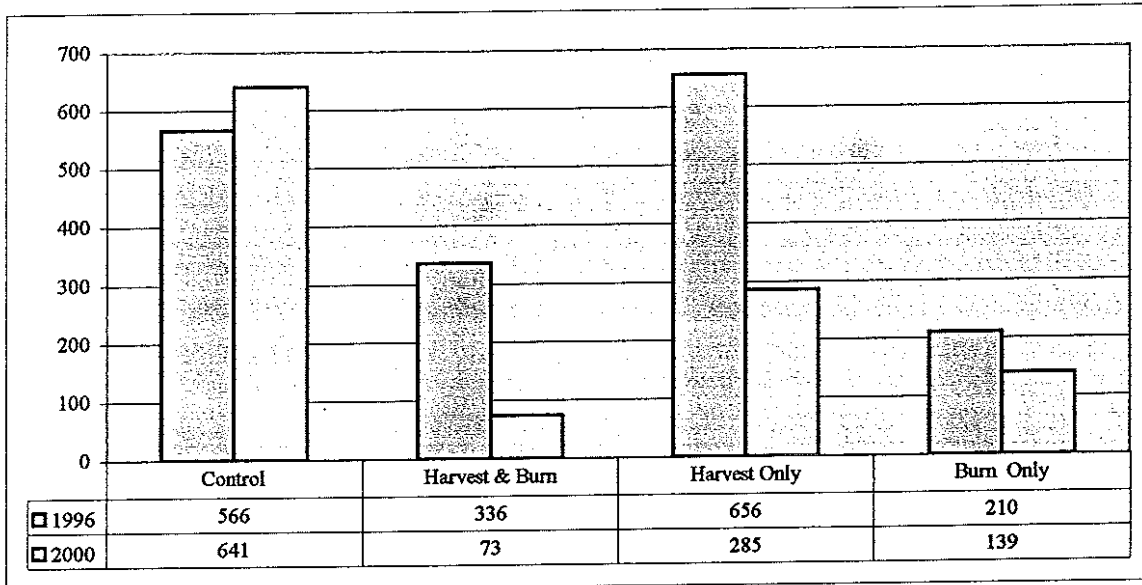
The live Fd stems had a 65% reduction in numbers from mechanical damage during the harvesting operation in 1997. An increase of 115% occurred between 1998 and 2000. Live Py were reduced 09% after harvesting but increased 28% by 2000. The 53% and 400% increase in live PI stems in 1998 and 2000 is due to a net recruitment of new stems.

This unit has a basin structure on the south end, which was populated with PI prior to harvesting. A scattered cone supply was observed on the ground supplying ample seed source combined with favorable spring weather conditions to produce this net increase in live stems.

3.5 Stems Per Hectare Comparisons

3.5.1 Stems Per Ha - 3B to 70 cm All Units

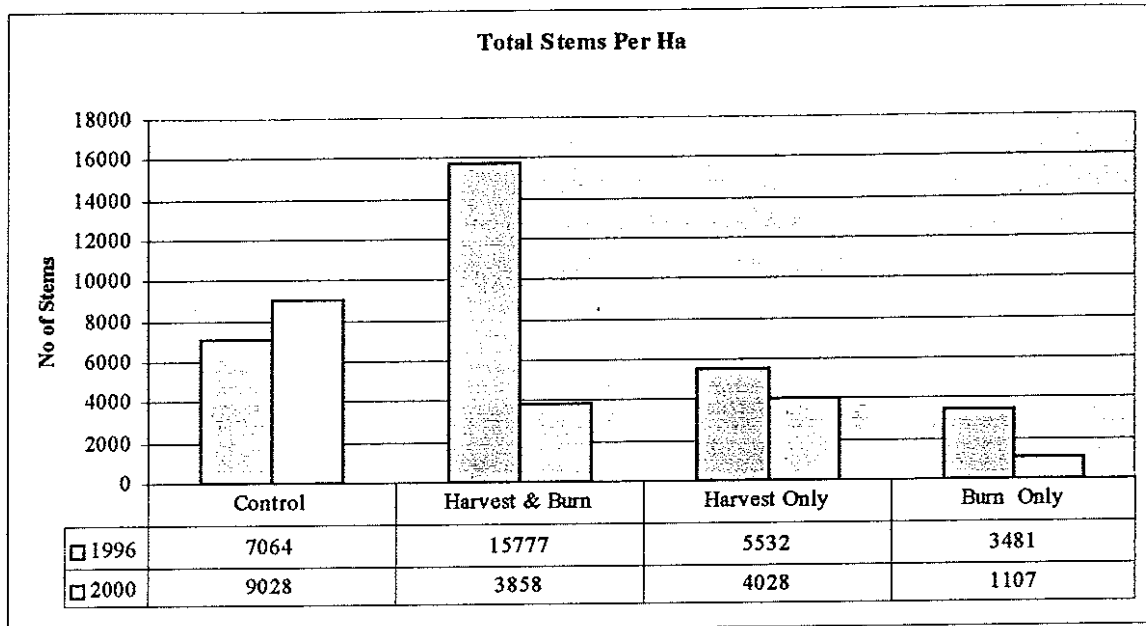
Chart 10:



The three treatments affected the total stems per hectare. The control unit has had an increase of 75 stems per hectare or 13.25 %. The Harvest & Burn treatment had the greatest reduction in stems per ha. This was partially due to the slashing operation prior the 1998 burn.

3.5.2 Total Stems per Ha – All Classes

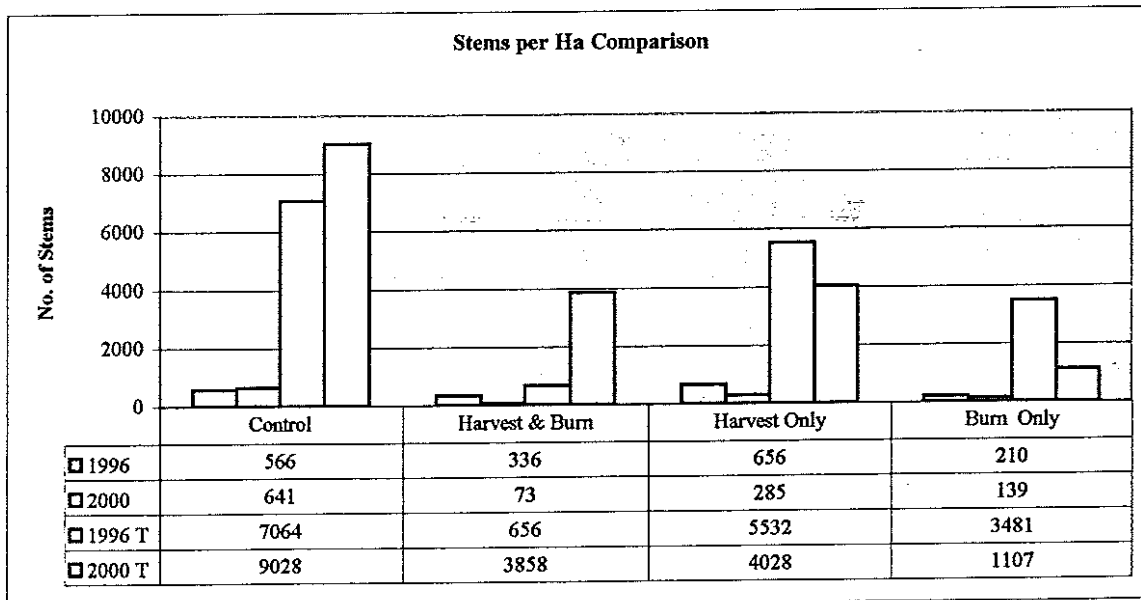
Chart 11:



The three treatment units have had a decrease in total stems per hectare. The control unit has had a 27.8% increase in the total stems per ha which is mostly attributed to Layers 4 and 3B.

3.5.3 All Layers - Stems Per Hectare

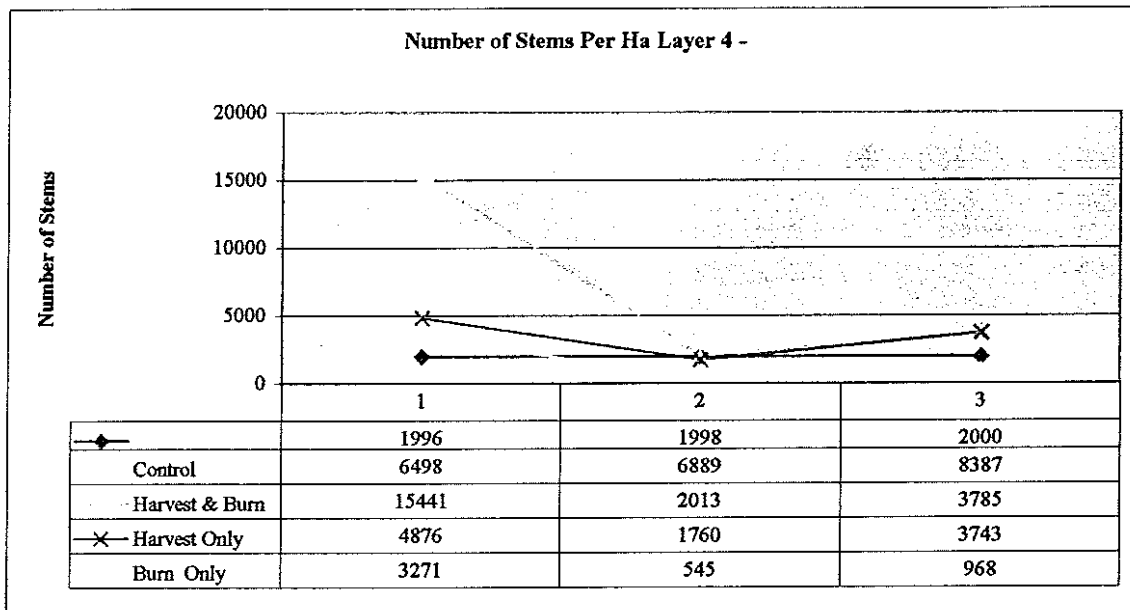
Chart 13:



* The "T" signifies total stems per hectare. The first two plain dates signify the number of stems in layers 3B to 70cm diameter class only. Layer 4 greatly adds to the total stems per hectare.

3.5.4 Layer 4 Comparison Summary

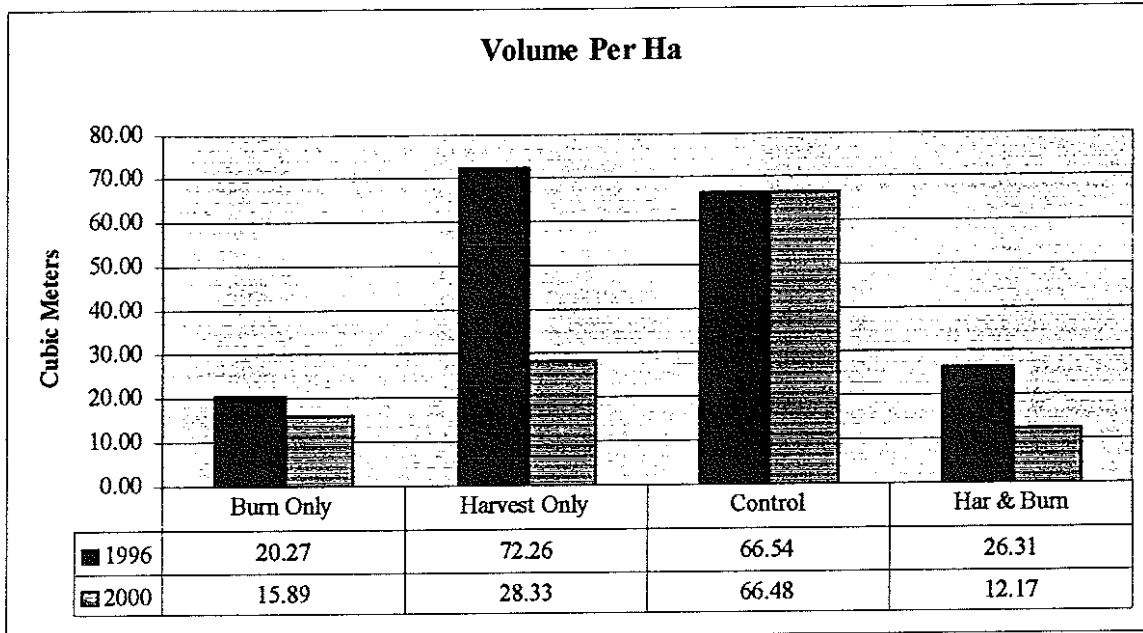
Chart 12:



Between 1996 and 1998 Layer 4 was manipulated in the three treatment units, all showing a significant reduction in count. During that same period the Control unit showed an increase in count. The same linear increase occurred between 1998 and 2000 in the Control unit. The three treatment units have increased at the same linear rate as the Control between 1998 and 2000.

4.0 Volume Summary

Chart 14:



Average volume per hectare has been reduced for each of the three manipulated treatment units over the four-year period. The volume in the control unit has stayed the same. Diameter classes in the larger stems have essentially stayed the same with some adjustments and movement in the smaller classes. The volume in these classes does not affect the average total to any significant amount. Incremental diameter growth over the four-year period was very small and did not shift the number of stems in the larger classes up to significantly increase the volume. No releases were measured or observed on any increment bores taken. Release would be expected in 2002 to 2004 once crown growth has had time to develop.

5.0 Insect and Disease

No formal insect and disease survey was carried out in 2000. Observations during the fieldwork indicate that insects and disease have not become a problem to the establishment and maintenance of stems on the sites. Douglas Fir blight has been a problem in the valley and some needle cast has occurred. No new dead stems were recorded in 2000.

6.0 Conclusions:

1. Layer 4 stems can be and are removed if fire covers an area within a site and establishment is halted for some time into the future. Those areas that are not covered by fire will maintain establishment levels as exhibited in Chart 12 Control unit.
2. Fire removed dead volume from the Burn Only site accounting for the small drop in volume.
3. Harvesting can be used to define the Layer 1 distribution. The two sites where mechanical harvesting took place exhibit the largest reduction in volume and stems per hectare in all classes.
4. The Harvest and Burn site exhibits the most pronounced reduction in volume and stems per hectare as is expected. The increase in Layer 4 is comparable to the Control unit. Those areas not covered by the fire in 1998 exhibited consistent increases in Layer 4 Fd stems. Py Layer 4 did not respond at the same level.
5. It appears that the three treatment sites, Harvest and Burn, Harvest Only and Burn Only should have a fire run through them in the near future (soon) to control the increase in Layer 4. Without fire the sites will grow back to a choked state as the Control unit is today with very little if any increase in volume.
6. Harvesting and fire will not manipulate the Layer 2 and 3 structures. A mechanical or hand method must be used to reduce these layers.
7. Good fire coverage is required to remove layer 4 stems to stop encroachment.