

REFORESTATION AT THE PINE RIDGE FOREST NURSERY

C.A. Dermott
Alberta Forest Service
Edmonton, Alberta

It gives me great pleasure to talk on Alberta's reforestation policy and success because I feel we are highly successful in this area, and I hope the data I am about to present will bear this out.

Alberta is unique in Canada, as it is the only province to legally require the reforestation of all cutover forest lands. The policy of total reforestation has been in place for 15 years, beginning with the introduction of the quota system of timber disposal in 1966. Even earlier, in 1956, the groundwork was laid for establishing a long-term policy of sustained yield of forest products with the negotiation of the first Forest Management Agreement with Northwest Pulp and Power (now St. Regis) at Hinton.

The circumstance that makes Alberta's policy even more admirable is that the policy is motivated, not by a perceived shortage of wood products, but by a provincial commitment to sustained yield forest management.

The forest region of Alberta encompasses an area of some 39.1 million ha or approximately 60% of the total provincial land area. Timber harvesting is modest in comparison to other parts of Canada.

At present, the inventory indicates that we have 965 million m³ of coniferous timber with an allowable cut of 14.1 million m³ and an additional 580 million m³ of deciduous timber with an allowable cut of 11.7 million m³. Only 60% of the coniferous allowable cut is currently committed. A very small portion of the deciduous cut is being utilized. As a point of interest, the coniferous cut is increasing annually. The recently signed Forest Management Agreement with British Columbia Forest Products and the pending development of the Brazeau block, which will likely be finalized in 1982, will result in significant increases in use of the coniferous timber resource.

To a large extent, the success of reforestation in Alberta can be related to the realistic legislation that promotes reforestation on a shared basis between industry and government.

The sustained yield forest management concept was introduced in the province in 1956 with the signing of the first forest management agreement and was expanded in 1966 to the entire province. The objective of this management system was and is to ensure a perpetual and stable supply of wood fiber for the forest products industries. To achieve this goal, the annual timber depletion (harvest plus other losses) must be kept below annual net growth and all denuded land must be regenerated within a specified time period.

The annual allowable cut and rotation age for maximum yield are based on the assumption that all cutovers are satisfactorily regenerated within 10 years of harvest and that the productivity of the second-growth stands will at least equal the productivity of the original, unmanaged stands.

Reforestation Policy

1. All cutovers must be restocked 10 years after harvest, with year 0 being the year of harvest.
2. Some reforestation treatment is required within 24 months after harvesting.
3. Monitor initial success with a formal regeneration survey by the end of the 7th year.
4. Further treatment, if required, is mandatory in the 8th year.
5. Formal survey required to prove area sufficiently restocked by the end of the 10th year.

In addition to time frames set by policy, reforestation standards are essential to ensure that forest productivity is not diminished during the second rotation.

Reforestation Standards

1. Minimum of 790 evenly distributed trees per hectare (of acceptable species). Note: This means the minimum stocking standard; however, only one acceptable tree per plot is tallied, resulting in much higher tree densities.
2. Acceptable species: all native conifers with some limitation on alpine/balsam fir and hardwood species on coniferous cutovers.
3. Established age: minimum 2 years for pine, 3 years for all other species, and 3 years on site for planted stock.
4. A sufficiently restocked block may not contain unstocked areas larger than 4 ha.
5. All seedlings must be healthy, vigorous, and at least of minimum age.

Forest Tenure and Reforestation

In Alberta, timber is disposed of under three types of forest tenure, each with different policies governing reforestation responsibility. The majority of timber is harvested under the authority of forest management agreements and timber quotas, and a lesser amount under authority of short-term permits (local and commercial).

1. Forest management agreements
 - a) Large integrated forest industries develop area.
 - b) Fixed area.
 - c) Set annual allowable cuts.
 - d) 20-year renewable clause.
 - e) Reforestation at forest management agreement owner's cost. Some forest management agreements state that the agreement holder must produce planting

stock at his own cost, while others require the government to produce the seedlings free of charge.

- f) The government extracts, tests, and stores all tree seed free of charge. g) Must follow provincial reforestation standards. h) Intensive forest management clause.

2. Quotas

- a) Share of annual allowable cut within designated management unit.
- b) 20-year renewable quota certificates.
- c) Timber licenses issued for a 5 year period.
- d) As each timber license is issued, quota holders can opt to complete reforestation themselves or transfer reforestation responsibility to the government and pay a reforestation levy based on production (per thousand fbm).
- e) Tree seedlings supplied free of charge.
- f) All seed is extracted, tested, and stored by the government, free of charge.

3. Commercial and local timber permits

- a) Medium and small short-term dispositions with no further tenure.
- b) Reforestation levy charged.
- c) Crown responsible for reforestation.

4. All timber harvesting prior to 1966, with the exception of forest management agreements and denuded land, becomes a responsibility of the Crown to reforest.

As previously mentioned, sustained yield forest management is based on annual timber depletion (harvest plus other losses) being kept at or below net annual growth, while all denuded lands must be regenerated within a definite period of time.

Normal reforestation for harvested lands is progressing very well under all tenures; however, forest land loss to other agencies and uses has proceeded almost unchecked. In order to compensate for this loss and maintain the present allowable cut, a new program commenced in 1979. This program compensates for three major losses in the productive coniferous land base: forest fire losses, industrial clearings, and special zoning, all of which total approximately 9300 ha annually.

The new program, called Maintaining Our Forests, is designed to create new forests on potentially productive land at the rate of 10 000 ha annually and to accelerate intensive management programs in existing forests and newly created stands. Stand improvement or juvenile spacing has been started on overstocked coniferous stands. The existing tree improvement program has also been accelerated. A small-scale program of wetland drainage has been initiated to investigate the feasibility of increasing the productive land base.

As you can see, all forest land tenure types and all major reforestation projects (such as Maintaining Our Forests) rely very heavily on the government nursery for high-quality planting stock.

Table 1. Reliance on government nursery capability

Tenure	% share of reforestation responsibility (area)	Trend	Government seedling supply (%)	Seed extraction, testing, storage by government (%)
FMAAs	35	Increase	50	90
Quotas	25	Increase	100	100
CTPs and LTPs	5	Constant	100	100
Old cuts	10	Decrease	100	100
MOF	25	Increase	100	100

To meet current and future reforestation goals, the Alberta Forest Service has developed a tree seedling nursery that has a designed annual production capacity of 20 million seedlings. The facility has 20 greenhouses, which are capable of producing 10 million container seedlings in a single crop. The bare-root facility has capacity to grow 10 million seedlings annually, with additional land available to dramatically increase this production if required. Construction of this facility was started in the summer of 1977, and it is in full operation. This year (1981) slight expansions are being made to increase the capacity of this facility to 36 million to meet estimated future demand. The seedlings ordered by and produced for the forest industry and the Alberta Forest Service from this facility contribute highly to reforestation success.

The seed extraction facility and seed cleaning line at the nursery are capable of handling in excess of 18 000 hectolitres of cones per year. The seed cold storage facility is capable of storing 60 000 kg of seed and, at present, has some 40 000 kg in storage. Also located on-site is a propagation center for a cooperative tree improvement program with forest industry.

SUCCESS OF THE REFORESTATION PROGRAM TO DATE

All the above policies, particularly the legally mandated deadline for reforestation after cutting, have contributed to Alberta's very acceptable level of reforestation success. The significance of the classification of cutovers by years after cut is related to legislation:

0-6 years after cut is considered to be the normal reforestation period or the time in which to treat areas to induce or enhance reforestation.

7-9 years after cut is mandated as the critical reforestation period. At 7 years after cut a formal assessment of reforestation success (called a regeneration survey) must be made; if the cutover is not successfully or sufficiently reforested, immediate remedial action must be taken.

10 years or more after cutting is the period legally considered to be past due for reforestation. A cutover area must be reforested to legislated standards by 10 years after cut or legal sanction can be applied. Thus, cutover areas 10 years (or more) old that are not reforested are treated as highest reforestation priority. (Table 2)

Table 2. Reforestation success in Alberta

Status of cutover area	Responsibility					
	Alberta Forest Service		Industry		Total	
	(ha)	(%)	(ha)	(%)	(ha)	(%)
0-6 yrs after cut						
Total	56 992	100.0	91 437	100.0	148 429	100.0
SR ¹	12 218	21.4	15 313	16.8	27 531	18.6
NSR ²	44 774	78.6	76 124	83.2	120 898	81.4
7-9 yrs after cut						
Total	17 903	100.0	39 452	100.0	57 355	100.0
SR	14 544	81.2	23 111	58.6	37 655	65.7
NSR	3 359	18.8	16 341	41.4	19 700	34.4
10+ yrs after cut						
Total	38 100	100.0	72 788	100.0	110 888	100.0
SR	33 509	88.0	65 278	89.7	98 787	89.1
NSR	4 591	12.0	7 510	10.3	12 101	10.9

¹ SR denotes area satisfactorily reforested.

² NSR denotes area not satisfactorily reforested.

Aggregate Alberta Forest Service-forest industry reforestation success on cut areas 10 years and older is remarkably good; in all, 89.1% of the area harvested in this age group is successfully reforested. It is noteworthy that this age group of cutovers includes backlog areas harvested prior to the introduction of the formal reforestation policy in 1966. In real terms, 99 000 ha out of a total 111 000 ha cut are successfully reforested; thus, a backlog of some 12 000 ha require reforestation. It must be emphasized that a large proportion of these unregenerated areas have been treated, and in some cases more than once, but site conditions have prevented reforestation success. Furthermore, many of these areas are partially reforested but do not meet the legislated standard.

Of the 57 000 ha cut 7-9 years ago, 38 000 ha, or 66% of the area, have been successfully reforested. The success ratio for the cutover areas 7-9 years old has drastically increased over the past 4-5 years. This is the result of better and more immediate treatment of the harvested lands.

The recently harvested areas (that is, 0-6 years after cut) show 19%, or 28 000 ha, already successfully reforested. These areas have received early treatment and hence are successfully reforested to the legislated standards prior to the 7th year (mandatory survey time).

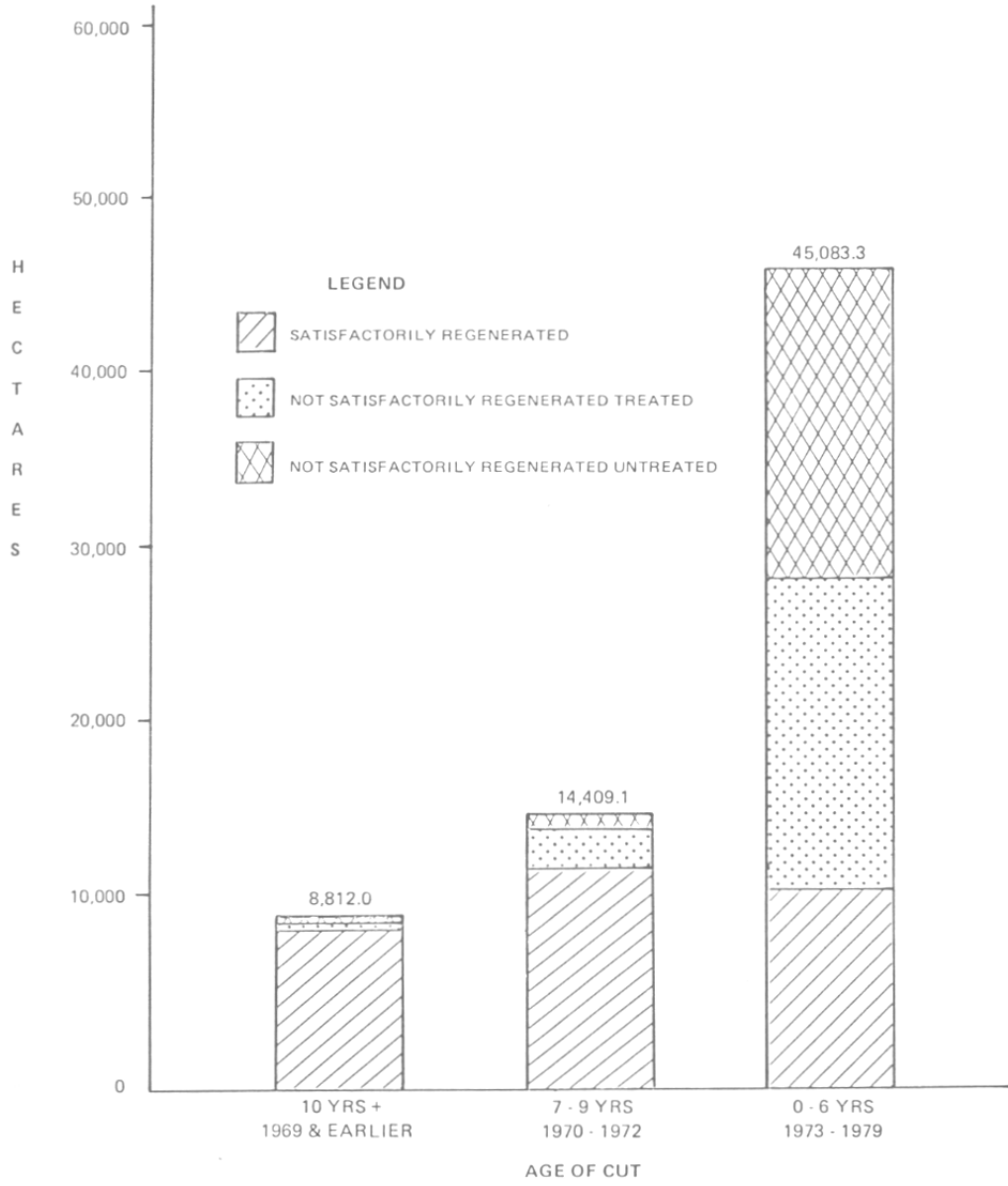
In summary, 99 000 ha (10 years and older) have been successfully reforested: industry and government combined have successfully reforested a total of 165 000 ha to sustain yield and, therefore, the flow of forest products for some years to come (Figs. 13).

The new ultramodern nursery at Pine Ridge makes reforestation much easier by providing a continuous supply of high-quality seedlings for Alberta's reforestation programs. The nursery plays a very important role in both government and industry programs as it supplies free extraction, cleaning, and storage of seed and free seedling stock to quota holders and some forest management agreement holders.

Finally, Alberta is gradually embarking on an intensive forest management program. This process is being undertaken carefully and thoughtfully. First, a forest tree improvement program in cooperation with the forest industry is well under way. Second, several intensive forest management operations such as thinning and fertilization are being examined and initiated on an operational scale.

These intensive management operations are being initiated prior to any shortfall in the wood supply and as a means to expand in the future beyond the current annual allowable cut.

QUOTA
CUT AND REFORESTATION SUMMARY
ALL FORESTS



INFORMATION TO DEC. 1980

Figure 1. Quota cut and reforestation summary for all forests.

NON QUOTA CUT AND REFORESTATION SUMMARY ALL FORESTS

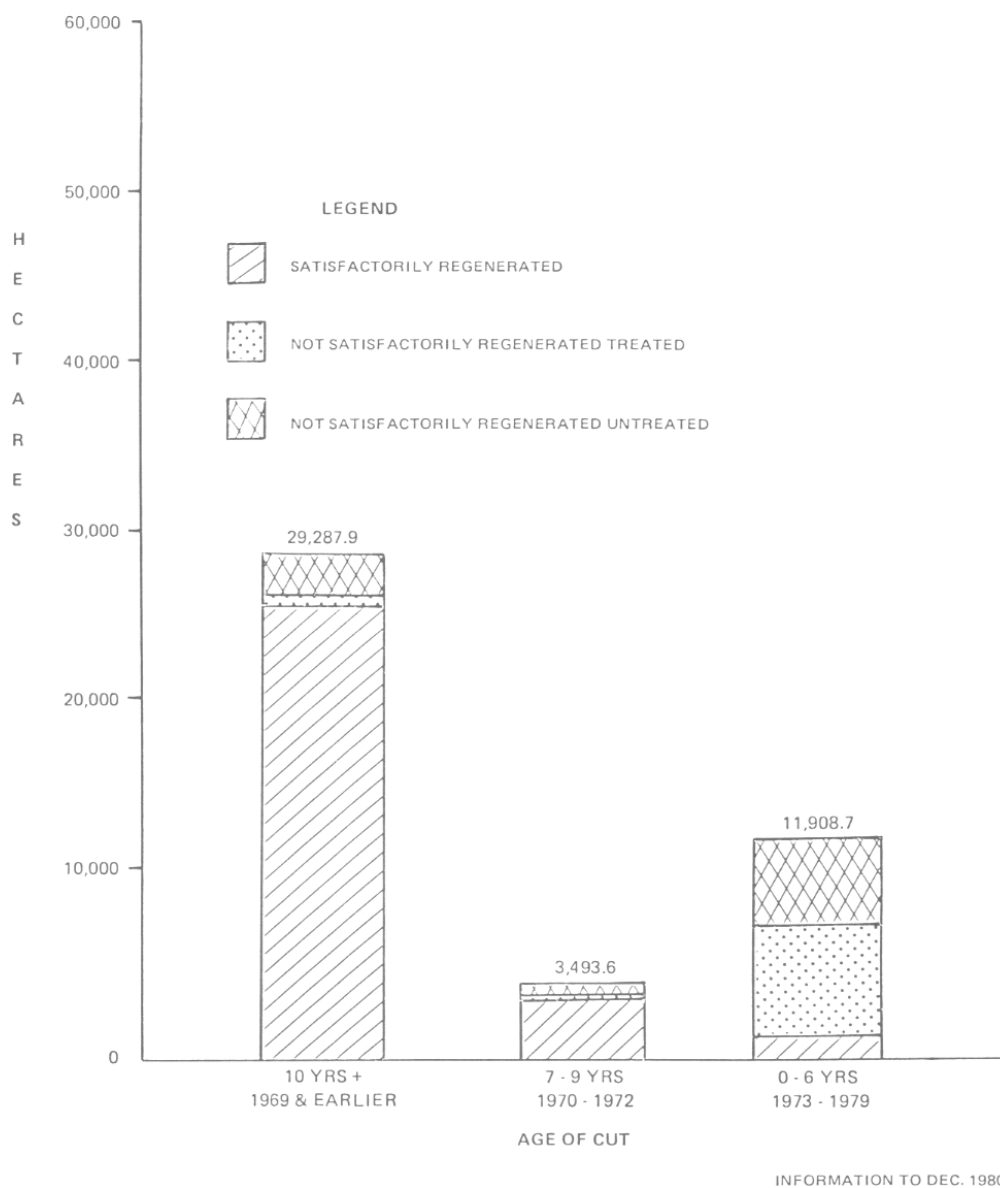


Figure 2. Nonquota cut and reforestation summary for all forests.

AGGREGATE CUT AND REFORESTATION SUMMARY ALL FORESTS

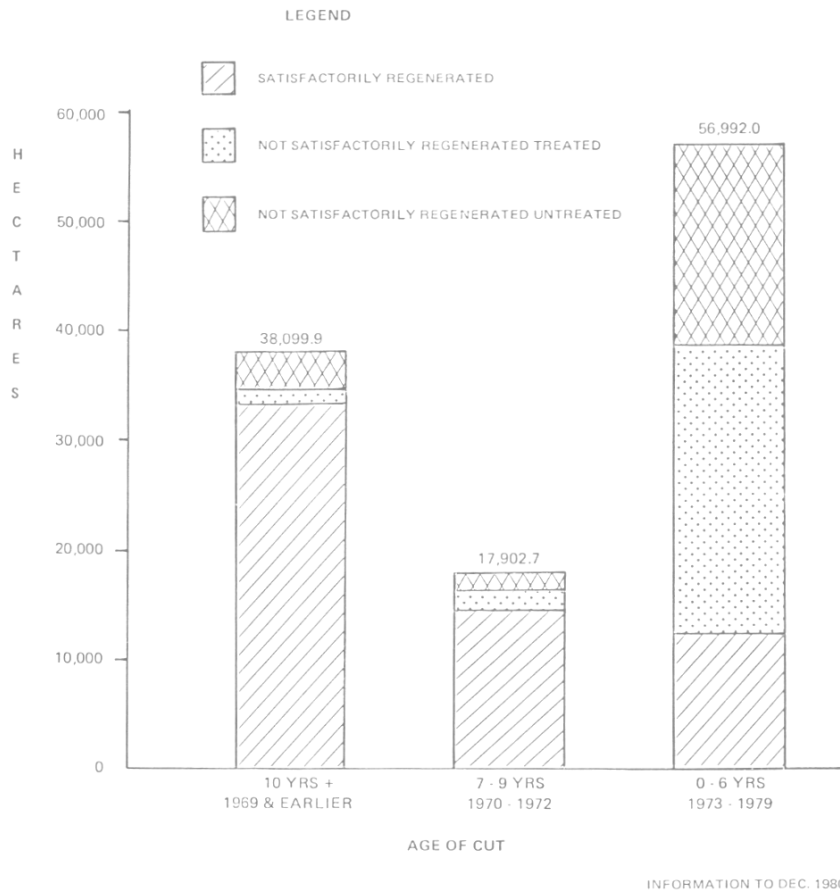


Figure 3. Aggregate cut and reforestation summary for all forests.